Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex, WA

Volume 1: Main Body of the EIS

September 2018

Prepared for:

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Prepared by:

United States Department of the Navy

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Abstract

Designation:	Environmental Impact Statement
Title of Proposed Action:	Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex
Project Location:	Naval Air Station Whidbey Island, Washington
Lead Agency for the EIS:	Department of the Navy
Affected Region:	Island County Region, Washington
Action Proponent:	United States Fleet Forces, Department of the Navy
Point of Contact:	Naval Facilities Engineering Command Atlantic Attn: Code EV21/SS 6506 Hampton Boulevard Norfolk, VA 23508
Date:	September 2018

The Department of the Navy has prepared this Environmental Impact Statement in accordance with the National Environmental Policy Act, as implemented by the Council on Environmental Quality regulations and Navy regulations for implementing the National Environmental Policy Act. The Proposed Action would:

- continue and expand existing Growler operations at the Naval Air Station Whidbey Island complex, which includes field carrier landing practice by Growler aircraft that occurs at Ault Field and Outlying Landing Field Coupeville
- increase electronic attack capabilities by adding 35 or 36 aircraft to support an expanded U.S. Department of Defense mission for identifying, tracking, and targeting in a complex electronic warfare environment
- construct and renovate facilities at Ault Field to accommodate additional Growler aircraft
- station additional personnel and their family members at the Naval Air Station Whidbey Island complex and in the surrounding community

In addition, the Navy will continue all flight operations of other aircraft at the Naval Air Station Whidbey Island complex. This Environmental Impact Statement evaluates the potential environmental impacts associated with a No Action Alternative (per Council on Environmental Quality regulations) and three action alternatives. The three alternatives consider options for increasing the number of additional Growler aircraft, as appropriated by Congress, at the Naval Air Station Whidbey Island complex. Each alternative contains further analysis of five operational scenarios that involve different distributions of annual field carrier landing practice airfield operations between Ault Field and Outlying Landing Field Coupeville. Each alternative evaluates the effects resulting from each of these five operational scenarios. The Environmental Impact Statement evaluates the potential environmental impacts associated with the following resource areas: airspace, noise, safety, air quality, land use, cultural resources, American Indian traditional resources, biological resources, water resources, socioeconomics, environmental justice, transportation, infrastructure, geological resources, hazardous materials and wastes, climate change and greenhouse gases, as well as the cumulative impacts of the Proposed Action and other local projects.

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EXECUTIVE SUMMARY

Proposed Action

Beginning as early as 2018, the United States (U.S.) Department of the Navy (Navy), as the lead agency, proposes to:

- continue and expand existing Growler operations at the Naval Air Station (NAS) Whidbey Island complex, which includes field carrier landing practice (FCLP) by Growler aircraft that occurs at Ault Field and Outlying Landing Field (OLF) Coupeville
- increase electronic attack capabilities by adding 35 or 36 aircraft to support an expanded U.S. Department of Defense mission for identifying, tracking, and targeting in a complex electronic warfare environment
- construct and renovate facilities at Ault Field to accommodate additional Growler aircraft
- station additional personnel and their family members at the NAS Whidbey Island complex and in the surrounding community

In addition, the Navy would continue all flight operations of other aircraft at the NAS Whidbey Island complex.

The NAS Whidbey Island complex is located in Island County, Washington, on Whidbey Island, in the northern Puget Sound region. The main air station (Ault Field) is located in the north-central part of the island, adjacent to the City of Oak Harbor. OLF Coupeville is located approximately 10 miles south of Ault Field and is dedicated primarily to FCLP. The NAS Whidbey Island complex includes two additional areas, the Seaplane Base and Lake Hancock. The Seaplane Base is included in this analysis because it contains housing and support facilities that would be used by personnel and their dependents. Section 2.3.2 provides a description of the squadrons and aircraft under consideration for the Proposed Action. The Proposed Action would not impact resources at Lake Hancock; therefore, Lake Hancock will not be discussed further in this analysis.

Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to augment the Navy's existing Electronic Attack community at NAS Whidbey Island by operating additional Growler aircraft as appropriated by Congress. The Navy needs to effectively and efficiently increase electronic attack capabilities in order to counter increasingly sophisticated threats and provide more aircraft per squadron in order to give operational commanders more flexibility in addressing future threats and missions. The need for the Proposed Action is to maintain and expand Growler operational readiness to support national defense requirements under Title 10, United States Code, Section 5062.

Alternatives Considered

In developing the proposed range of alternatives that meet the purpose of and need for the Proposed Action, the Navy reviewed requirements for Growler squadrons and unit-level squadron training in light of Title 10 responsibilities, existing training requirements and regulations, existing Navy infrastructure, and Chief of Naval Operations guidance to support operating naval forces. Operational factors, including incorporation of Precision Landing Mode and a reduced number of pilots, have been factored into the analysis and reduce FCLP requirements at the NAS Whidbey Island complex when compared to projections in

the Draft Environmental Impact Statement (EIS) (see Section 1.13 for more details). The Navy also reviewed comments received through the public commenting process. Considerations included:

- the NAS Whidbey Island complex is home to the Navy's Electronic Attack mission, including the training squadron, all U.S.-based squadrons, and substantial infrastructure and training ranges that have been established during the past 45-plus years
- location of suitable airfields that provide for the most realistic training environment
- distance aircraft would have to travel to accomplish training
- expense of duplicating capabilities that already exist at the NAS Whidbey Island complex
- operational readiness and synergy of the small Growler community
- access to training ranges, Special Use Airspace, and military training routes
- effective use of existing infrastructure
- management of aircraft inventories, simulators, maintenance equipment, and logistical support
- effective use of personnel to improve operational responsiveness and readiness
- existing land use and public health and safety concerns

Based on the considerations mentioned above, the Navy is analyzing three alternatives, each of which has five operational scenarios that meet the purpose and need for the Proposed Action, as well as a No Action Alternative, per Council on Environmental Quality regulations. The alternatives consist of force structure and operational changes to support an expanded Department of Defense capacity and include variations of the following factors:

- total number of operational aircraft to be flown
- number of aircraft assigned per squadron
- number of expeditionary squadrons
- number of personnel
- distribution of Growler FCLP operations at Ault Field and OLF Coupeville

Alternatives considered but not carried forward for detailed analysis in this EIS because they did not meet the purpose of and need for the project are described in detail in Section 2.4 (Alternatives Considered but Not Carried Forward for Further Analysis).

Preferred Alternative

The Navy did not identify a Preferred Alternative prior to publication of the Draft EIS in November 2016 because it was evaluating operational and environmental considerations necessary to make that determination. The Navy announced the Preferred Alternative on June 25, 2018, prior to release of the Final EIS, in order to provide timely information to the public once the Preferred Alternative had been identified. Alternative 2, adding 36 Growler aircraft to the NAS Whidbey Island complex, has been identified as the Preferred Alternative. This alternative best meets operational demands by both establishing two new expeditionary squadrons and adding two aircraft to each squadron that operates off aircraft carriers. Further, Scenario A has been identified as the preferred scenario under Alternative 2 for FCLP distribution because it results in the least disruption of other operations at Ault Field, provides the best training for Navy pilots, and impacts the fewest number of residents living in the community. No final decision has yet been made. The ultimate decision with respect to force structure and FCLP

distribution will be made by the Secretary of the Navy or his representative and announced in a Record of Decision no earlier than 30 days following the public release of the Final EIS. For more details on the Preferred Alternative, see Section 2.4.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur; this means the Navy would not operate additional Growler aircraft and would not add additional personnel at Ault Field, and no construction associated with the Proposed Action would occur. The No Action Alternative would not meet the purpose of or need for the Proposed Action; however, the conditions associated with the No Action Alternative serve as reference points for describing and quantifying the potential impacts associated with the proposed alternatives. For this EIS, the Navy is using the year 2021 as representative of the No Action Alternative because it represents the conditions when projected events at Ault Field affecting aircraft loading, facility and infrastructure assets, personnel levels, and number of aircraft are expected to be fully implemented and complete from previous aircraft home basing, retirement, and other related decisions. Therefore, with these other actions complete, the analysis clearly reflects the impacts of this Proposed Action of adding additional Growler aircraft and personnel and associated construction.

Alternative 1

Alternative 1 would expand carrier capabilities by adding three additional aircraft and additional squadron personnel to each of the existing nine carrier squadrons and augmenting the Fleet Replacement Squadron (FRS) with eight additional aircraft and additional squadron personnel (a net increase of 35 aircraft). Alternative 1 would add 335 Navy personnel and 459 dependents to the region.

Alternative 2

Alternative 2 would expand expeditionary and carrier capabilities by establishing two new expeditionary squadrons, adding two additional aircraft and additional squadron personnel to each of the nine existing carrier squadrons, and augmenting the FRS with eight additional aircraft and additional squadron personnel (a net increase of 36 aircraft). Alternative 2 would add 628 Navy personnel and 860 dependents to the region.

Alternative 3

Alternative 3 would expand expeditionary and carrier capabilities by adding three additional aircraft and additional squadron personnel to each of the three existing expeditionary squadrons, adding two additional aircraft and additional squadron personnel to each of the nine existing carrier squadrons, and augmenting the FRS with nine additional aircraft and additional squadron personnel (a net increase of 36 aircraft). Alternative 3 would add 341 Navy personnel and 467 dependents to the region.

In order to determine how the distribution of Growler FCLP operations may affect noise impacts at OLF Coupeville and Ault Field, this EIS evaluates the following five sub-alternatives, which are operational scenarios (analyzing varying distribution of Growler FCLP operations between Ault Field and OLF Coupeville) for each alternative listed above. The percentages depicted are used for general description

of the scenarios. The proposed level of activity for each alternative and associated scenario is quantified in Table 2.3-2.

Scenario A

Twenty percent of all FCLPs would be conducted at Ault Field, and 80 percent of all FCLPs would be conducted at OLF Coupeville.

Scenario B

Fifty percent of all FCLPs would be conducted at Ault Field, and 50 percent of all FCLPs would be conducted at OLF Coupeville.

Scenario C

Eighty percent of all FCLPs would be conducted at Ault Field, and 20 percent of all FCLPs would be conducted at OLF Coupeville.

Scenario D

Thirty percent of all FCLPs would be conducted at Ault Field, and 70 percent of all FCLPs would be conducted at OLF Coupeville.

Scenario E

Seventy percent of all FCLPs would be conducted at Ault Field, and 30 percent of all FCLPs would be conducted at OLF Coupeville.

The above five scenarios (A, B, C, D, and E), in combination with the alternatives, provide a total of 15 alternatives that are fully evaluated in this EIS analysis. The Secretary of the Navy's office will be able to select a final alternative/scenario combination from the range of 15 analyzed in this EIS.

Scenarios are based on the distribution of Growler FCLP between Ault Field and OLF Coupeville. The FCLP percentages for each scenario that are expressed in this analysis are intended to analyze levels of total aircraft operations. FCLPs are not expected to exceed those analyzed in this document. The percentages are not intended to provide a firm division of FCLPs between airfields. The percentages are used for general description of the scenarios; the distribution of FCLPs will be based on the level of activity presented in Table 2.3-2. From a purely operational perspective, the Navy would prefer to use OLF Coupeville for all FCLPs because it more closely replicates the pattern and conditions at sea and therefore provides superior training. However, because the Navy recognizes that noise impacts to the community are an unavoidable adverse effect of the Proposed Action, this EIS analyzes five operational scenarios at the expense of ideal training.

Summary of Environmental Resources Evaluated in the EIS

The National Environmental Policy Act (NEPA), Council on Environmental Quality regulations, and Navy regulations for implementing NEPA specify that an EIS should address those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact. This EIS assesses the potential environmental effects of continuing and expanding the existing Growler operations at the NAS Whidbey Island complex, and it analyzes aircraft operations conducted in the vicinity of Ault Field and OLF Coupeville, including the effects of additional military personnel and their families who would move to the area. The following topics are evaluated in this EIS:

- Airspace and Airfield Operations
- Noise Associated with Aircraft Operations (Noise)
- Public Health and Safety
- Air Quality
- Land Use
- Cultural Resources
- American Indian Traditional Resources
- Biological Resources
- Water Resources
- Socioeconomics
- Environmental Justice
- Transportation
- Infrastructure
- Geological Resources
- Hazardous Materials and Wastes
- Climate Change and Greenhouse Gases

Summary of Potential Environmental Consequences of the Action Alternatives and Major Mitigating Actions

Airspace and Airfield Operations. Alternative 1 proposes a net increase of 35 Growler aircraft, while Alternatives 2 and 3 propose a net increase of 36 Growler aircraft. Annual airfield operations at the NAS Whidbey Island complex would increase up to 33 percent (depending on alternative and scenario selected) over the No Action Alternative to support the addition of 35 or 36 new aircraft assigned to Ault Field. The total annual airfield operations at the NAS Whidbey Island complex would range from an increase of approximately 24,500 (Alternative 3, Scenario C) to 27,900 (Alternative 1, Scenario A). The total annual airfield operations at Ault Field would range from an increase of 9,100 (Alternative 1, Scenario A) to 25,000 (Alternatives 1 and 2, Scenario C). The total annual airfield operations at OLF Coupeville would range from a decrease of 200 (Alternatives 2 and 3, Scenario C) to an increase of 18,800 (Alternative 1, Scenario A). Airfield operations may include aircraft arrival and departure, interfacility flights, and closed-loop flights (such as FCLP). These operational levels would be similar to historic flight operations experienced in the 1970s, 1980s, and 1990s for the NAS Whidbey Island complex, as indicated in Section 1.4. Ault Field and OLF Coupeville meet all the operational requirements and have sufficient capacity under routine operating conditions to support the airfield operations of the additional Growler aircraft proposed under each alternative and scenario. Airfield operations at Ault Field would experience scheduling difficulty under Scenario C and Scenario E of all three of the alternatives because approximately 80 percent and 70 percent of FCLPs would be conducted at Ault Field under those scenarios, respectively. When more FCLPs are flown at Ault Field, other flights and aircraft training operations occurring at Ault Field are restricted or delayed. This would cause more people off base to be affected because training is extended later into the night, and more aircraft are held in larger or extended flight patterns while FCLP is conducted. For more information on airspace and airfield operations, see Sections 3.1 and 4.1.

Noise Associated with Aircraft Operations. The U.S. Department of Defense recommends land use controls beginning at the 65 decibel (dB) day-night average sound level (DNL). This level has been identified in both the Federal Aviation Administration's Part 150 Program and the Department of Defense's Air Installations Compatible Use Zones (AICUZ) Program (including the individual Air Force and Navy programs) as a threshold for land use recommendations. Research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 dB DNL (FICUN [Federal Interagency Committee on Urban Noise], 1980). Most people are exposed to sound levels of 50 to 55 dB DNL or higher on a daily basis. Therefore, the 65 dB DNL contour is used to help determine compatibility of local land use with military aircraft operations, particularly for land use associated with airfields. There would be new areas that would be located within the 65 dB DNL noise contour that are not currently within the 65 dB DNL noise contour generated by Navy aircraft operations under all alternatives and scenarios. Although some of these areas are over water, others are over land and would therefore result in additional people living within the 65 dB DNL noise contour.

The number of additional people who are estimated to be within the 65 dB DNL noise contour ranges from a high of 1,879 (Alternative 1, Scenario E) to a low of 1,312 (Alternative 3, Scenario A) for the entire NAS Whidbey Island complex. When examining community impacts by individual airfield, Ault Field would have the largest increase of individuals within the 65 dB DNL noise contour under Scenario C, up to 1,312 people (Alternative 1, Scenario C), while the lowest increase would be 109 individuals under Alternative 3, Scenario A . For OLF Coupeville, the largest increase of individuals within the 65 dB DNL noise contour would be under Scenario A, with up to 1,236 people (Alternative 1, Scenario A), while the lowest increase would be 489 individuals under Alternative 2, Scenario C. Therefore, the Proposed Action would have a significant impact on the noise environment as it relates to aircraft operations at the NAS Whidbey Island complex.

Additionally, supplemental metrics were used to identify potential impacts from noise exposure that could be realized under the alternatives. These include additional events of indoor and outdoor speech interference, an increase in the number of events causing classroom/learning interference, an increase in the probability of awakening, and an increase in the population that may be vulnerable to a potential hearing loss of 5 dB or more.

It is NAS Whidbey Island Commanding Officer's policy to conduct required training and operational flights with as minimal impact as possible, including noise, on surrounding communities. All aircrews using NAS Whidbey Island are responsible for the safe conduct of their mission while complying with published course rules, established noise-abatement procedures, and good common sense. Each aircrew must be familiar with the noise profiles of its aircraft and is expected to minimize noise impacts without compromising operational and safety requirements. Specific noise-abatement procedures and policy are outlined in Sections 3.2 and 4.2, and Appendix H, with procedures listed in NAS Whidbey Island's Air Operations Manual. The NAS Whidbey Island Air Operations Manual is periodically reviewed and updated as necessary to reflect changes to procedures and operations. For more information on noise from aircraft operations, see Sections 3.2 and 4.2.

Public Health and Safety. Increased operations increase the potential for flight incidents and bird-animal aircraft strike hazard, but existing management strategies would manage risk. Scenarios with high numbers of operations at OLF Coupeville may require the development of Accident Potential Zones (APZs) through the AICUZ update process, including Alternative 1, Scenario A; Alternative 1, Scenario B; Alternative 1, Scenario D; Alternative 2, Scenario A; Alternative 2, Scenario B; Alternative 2, Scenario D;

Alternative 3, Scenario A; Alternative 3, Scenario B; and Alternative 3, Scenario D. Conceptual APZs are presented for the purpose of analyzing potential land use impacts of the Proposed Action (see Section 4.3.2.3). At this time, no decision has been made with regard to additional APZs. The Navy will perform an AICUZ Update upon completion of this EIS and share official recommendations with the community.

Under Executive Order 13045, Environmental Health Risks and Safety Risks to Children, the Navy identifies that there would be an increase in the number of children (19 years of age and younger) within the noise contours under all alternatives and scenarios; the increase in the number of children likely to be affected by the greater than 65 dB DNL contours would range from a low of 230 children under Alternative 3, Scenario A, to a high of 440 children under Alternative 1, Scenario C, under the average year. Based on the limited scientific literature available, there is no proven positive correlation between noise-related events and physiological changes in children. Additionally, the aircraft noise associated with the alternatives is intermittent; therefore, the Navy does not anticipate any significant, disproportionate health impacts to children caused by aircraft noise. Unless there is a place where children congregate within an APZ, such as a school, there is not a disproportionate safety risk to children residing in that APZ. There are no schools located within the existing or conceptual APZs at Ault Field and OLF Coupeville under any of the alternatives or scenarios; therefore, there is no disproportionate environmental health and safety risk to children as a result of possible aircraft mishaps. For more information on public health and safety, see Sections 3.3 and 4.3.

Air Quality. Potential impacts to air quality from implementation of the Proposed Action when compared to the No Action Alternative would be similar between all three action alternatives and five scenarios but greatest under Alternative 2, Scenario A. For air emissions, the difference in aircraft emissions between the scenarios within each alternative is more distinctive than the differences in aircraft emissions between the alternatives. For all three alternatives, Scenario A, the option to conduct 80 percent of FCLPs at OLF Coupeville and 20 percent of FCLPs at Ault Field, would result in the greatest increase in emissions.

Construction impacts would be minor and temporary, and would not result in significant impacts on air quality. Operations would result in an increase in stationary and mobile emissions sources. Increased stationary sources would be covered under the existing NAS Whidbey Island air operating permit and would have no significant impact. Changes in mobile emissions are not subject to permit requirements or emission thresholds; however, these emissions contribute to regional emission totals and may affect compliance with National Ambient Air Quality Standards. The region is currently in attainment for all National Ambient Air Quality Standards, and the Northwest Clean Air Agency continues to monitor ambient air emission levels to confirm continued compliance. For more information on air quality, see Sections 3.4 and 4.4.

Land Use. Each of the alternatives would result in an increase in the land area within the projected greater than 65 dB DNL noise contours (range of 9 percent to 18 percent). There would be an increase in residential land use within the greater than 65 dB DNL noise contour as compared to the No Action Alternative, ranging from an increase of 5 percent to 11 percent at Ault Field to an increase of 22 to 51 percent at OLF Coupeville.

Under all alternatives and scenarios, the Proposed Action would have no impact to on-station land use, on-station land use controls, or regional land use, but it would have an impact on regional land use controls. Land within the conceptual APZs at OLF Coupeville would increase under Scenarios A, B, and D of each alternative. Conceptual APZs at OLF Coupeville would impact 503 acres of residential land under

Scenarios A, B, and D under all three alternatives, if adopted by the local municipality with authority regarding land use controls. If warranted and depending upon the alternative and scenario selected, the APZs could be updated by completing an AICUZ Update and coordinating with local communities to provide appropriate new land use recommendations as necessary, which could impact regional land-use controls.

Implementation of the Proposed Action would result in moderate impacts on wilderness recreation and management at Williamson Rocks, an uninhabited rock formation closed to the public that is included in the San Juan Island Wilderness, part of the San Juan Island National Wildlife Refuge. Williamson Rocks is in proximity to a busy marina and Rosario Strait, which is a U.S. Coast Guard Regulated Navigation Area due to the amount of vessel traffic through this passage. Implementation of the Proposed Action would increase average annual noise levels at Williamson Rocks under all alternatives and would result in reduced opportunities for visitors by boat to experience natural soundscapes associated with the rocks and surrounding waters. The Proposed Action also may impact the U.S. Fish and Wildlife Service's ability to manage Williamson Rocks to protect wilderness values. Although visitors are currently exposed to noise from existing aircraft operations, the proposed increase in Growler operations would increase the occurrence of intrusive noise at and near this area, which would result in fewer or limited opportunities for visitors to experience solitude and primitive recreational activities and would likely negatively affect visitors' perceptions of these areas as retaining their primeval, natural character. Impacts to visitor experience and wilderness character would be intermittent over the long term, occurring only when aircraft are operating in the area.

Overall, implementation of the Proposed Action at NAS Whidbey Island would result in localized significant impacts to recreation as a result of increased noise exposure at Ebey's Landing National Historical Reserve, various county and municipal parks and recreational areas, and private recreational facilities under some alternatives and scenarios when aircraft are operating in the area. Impacts on other parks and recreational areas would predominantly be long term and minor or moderate at individual locations as a result of varying degrees of increased noise exposure. Depending on the location of the park, different scenarios may result in few to no noise impacts as a result of the number of Growler operations occurring at either Ault Field or OLF Coupeville. Noise impacts would be intermittent over the long term, occurring only when aircraft are operating in the area. The Proposed Action may result in increased demand for parks and recreation areas as a result of personnel and their families moving into the region; however, impacts resulting from this increased demand would be minor.

Cultural Resources. Archaeological resources, architectural resources, cemeteries, and traditional cultural properties were evaluated with regard to direct and indirect effects under NEPA and Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA). Direct effects were considered within areas on the installation where cultural resources could be affected by ground disturbance, demolition, or alteration. Indirect effects were considered for on- and off-station[1] areas within the 65 dB DNL noise contours and within the Ebey's Landing National Historical Reserve. Indirect effects constitute those that result from construction (on station) at Ault Field or from aircraft operations (on and off station) occurring at both Ault Field and OLF Coupeville. They include effects from

[1] "On station" refers to those areas within Ault Field and OLF Coupeville. "Off station" refers to those resources located outside these areas and, for the cultural resources discussion, that also are within the area of potential effects.

the introduction of visual, atmospheric, and/or auditory (noise and vibration) elements that occur during construction or when aircraft are seen or heard flying in the vicinity of a resource.

As evaluated under NEPA, minimal to no direct or indirect impacts would result to known or intact archaeological resources during construction and operation. With regard to architectural resources, moderate to no direct and indirect impacts would occur. Direct impacts during construction would occur to and in proximity to Building 2737 (Hangar 12) and the taxiways, and for the demolition of Building 115; however, the hangar, taxiways, and Building 115 have been determined not eligible for listing in the National Register of Historic Places (NRHP). Indirect impacts, including visual, atmospheric, and/or auditory impacts, may be experienced in the immediate proximity of construction activities on Ault Field and in those areas on and off station within the 65 dB DNL noise contours and within Ebey's Landing National Historical Reserve during aircraft operations. Minimal indirect impacts are anticipated to occur with the operation of the additional Growler aircraft or from the new construction and expansion of facilities on station.

Minimal to moderate indirect impacts are anticipated to occur to off-station historic resources during aircraft operations. Under Scenario A (for all alternatives), resources that are closer to OLF Coupeville may experience a higher level of visual, atmospheric, and/or auditory impact and more frequent occurrences of aircraft appearances, noise, and vibration than those located elsewhere due to the increased FCLPs at OLF Coupeville for this scenario as compared to Scenarios B, C, D, and E. Under Scenario B, resources that are closer to both Ault Field and OLF Coupeville may experience a higher level of impact. Under Scenario C, resources that are closer to Ault Field (and not OLF Coupeville) may experience a higher level of impact and OLF Coupeville a lower level of impact. Under Scenario D, resources that are closer to OLF Coupeville (and not Ault Field) may experience a higher level of impact and Ault Field a lower level of impact. Under Scenario E, resources that are closer to Ault Field (and not OLF Coupeville) may experience a higher level of impact and OLF Coupeville a lower level of impact.

No known cemeteries or human burial grounds are located within Ault Field; therefore, no direct impacts would occur. Off-station cemeteries would be indirectly impacted in a manner similar to architectural resources. No known traditional cultural properties have been identified within the areas evaluated for this analysis; therefore, no impacts would occur to these cultural resources.

Under NEPA, no significant impacts would occur to cultural resources, including archaeological sites, architectural buildings and structures, cemeteries, and traditional cultural properties.

In accordance with Section 106 of the NHPA, the Navy has determined that the proposed undertaking will result in "Historic Properties Adversely Affected." The increased frequency of noise exposure results in adverse indirect effects to characteristics of the Central Whidbey Island Historic District that currently make it eligible for the NRHP. Although the effects are intermittent, the proposed undertaking would result in an increased occurrence of noise exposure affecting certain cultural landscape components in the historic district—specifically, the perceptual qualities of five locations that contribute to the significance of the landscapes. The Navy finds no other adverse effects to historic properties from the proposed undertaking. The Navy is consulting with the Washington State Historic Preservation Office, Advisory Council on Historic Preservation, tribes, and consulting parties regarding the development of a Memorandum of Agreement to mitigate adverse effects. A full list of consulting parties is provided in Section 3.6.2.6. For more information on cultural resources, see Sections 3.6 and 4.6.

American Indian Traditional Resources. The implementation of the Proposed Action at NAS Whidbey Island should not result in significant impacts to known American Indian traditional resources because there would be no change to current tribal access and no additional potential to impact known traditional resources in the study area. In accordance with executive orders and U.S. Department of Defense and Navy policies, the Navy invited government-to-government consultation with the following federally recognized tribes that could potentially be affected by the Proposed Action and evaluated whether such consultation was desired:

- Jamestown S'Klallam Tribe
- Lummi Tribe of the Lummi Reservation
- Samish Indian Nation
- Stillaguamish Tribe of Indians of Washington
- Suquamish Indian Tribe of the Port Madison Reservation
- Swinomish Indian Tribal Community
- Tulalip Tribes of Washington
- Upper Skagit Indian Tribe

The Swinomish Indian Tribal Community requested government-to-government consultation on the Proposed Action on December 13, 2016. The Navy responded to the Swinomish Indian Tribal Community via email on December 20, 2016, and via letter on December 21, 2016. Additional correspondence occurred in June of 2017. The Swinomish Indian Tribal Community subsequently withdrew its request on September 27, 2017. No other requests for government-to-government consultation were received. For more information on American Indian traditional resources, see Sections 3.7 and 4.7.

Biological Resources. Minimal habitat loss from construction activities would not significantly impact terrestrial wildlife because construction is within the urban/industrial area of the installation and has habitat of poor quality and would not impact marine habitat. Animals in the study area are already exposed to high levels of aircraft operations and other human disturbances, and the Proposed Action would result in some additional sensory disturbance impacts, particularly from noise. Wildlife inhabiting the study area throughout the year increase the risk of a strike, but with the continued implementation of a bird-animal aircraft strike hazard plan, the Proposed Action would not significantly impact local wildlife populations. For Endangered Species Act listed species, the Proposed Action may affect, but is not likely to adversely affect, the bull trout, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, yelloweye rockfish, Southern Resident killer whale, and humpback whale. The National Marine Fisheries Service concurred with the finding that the Proposed Action is not likely to adversely affect endangered or threatened marine mammals and fish, respectively, on July 20, 2017, and April 23, 2018. The U.S. Fish and Wildlife Service (USFWS) concluded in its June 14, 2018, Biological Opinion that the Proposed Action is not likely to jeopardize the continued existence of the marbled murrelet (*Brachyramphus marmoratus*) and may affect but is not likely to adversely affect the bull trout (*Salvelinus confluentus*). As required by the terms and conditions associated with the Incidental Take Statement, the Navy will submit an annual report to the USFWS describing Growler flight operations from the previous year. For Migratory Bird Treaty Act (MBTA)-protected species, U.S. Department of Defense installations are not exempt from "take"; however, under the MBTA regulations applicable to military readiness activities (50 CFR Part 21), the impacts of stressors from the Proposed Action would not result in a significant adverse effect on migratory bird populations. During

construction, there would be no adverse effects of the Proposed Action on Migratory Bird Treaty Act-protected species because birds would be largely avoided and any effects minimized such that they would not rise to the level of take. For more information on biological resources, see Sections 3.8 and 4.8. Pursuant to the Marine Mammal Protection Act, the Proposed Action would not result in the unintentional taking (e.g., harassment) of marine mammals incidental to the activity.

Water Resources. There would be no significant impacts on water resources from construction activities or operation of new aircraft. No construction would extend to a depth that may impact groundwater resources, and there would be a minimal increase in demand for groundwater. Although fuel or other chemicals could be spilled during construction, implementation of best management practices (BMPs), such as immediate cleanup of these spills, would prevent any infiltration into the underlying groundwater. There would be no direct impact on water quality because construction would not be occurring within resource areas. Potential indirect impacts on water quality due to 2 acres of new impervious surface at Ault Field (a 1-percent increase over existing conditions) would slightly increase stormwater flow. Impacts would be minimized and avoided through implementation of BMPs. For more information on water resources, see Sections 3.9 and 4.9.

Socioeconomics. The Proposed Action would have minor impacts on the local and regional population, ranging from a net increase of 794 people under Alternative 1 to 1,488 people under Alternative 2. Construction impacts would result in temporary and positive impacts to the local economy. There would be up to $122.5 million in direct construction expenditures, up to 839 projected short-term employment positions from construction activities, and an additional 335 (Alternative 1) to 628 (Alternative 2) personnel and their households in the region spending money. An additional $12.2 million (Alternative 1) to $21.4 million (Alternative 2) in payroll would also be injected into the regional economy from military members' salaries. The increase in local government tax receipts would range from $222,000 in Island County and $96,000 in Skagit County under Alternative 1 to $415,000 in Island County and $181,000 in Skagit County under Alternative 2. Between 335 (Alternative 1) and 628 (Alternative 2) households would relocate to the area. In 2017, a housing study completed for the NAS Whidbey Island complex found that there was a surplus of 54 acceptable family housing units in the area but a deficit of 914 unaccompanied personnel housing units. Under all three alternatives, the regional housing supply may not have sufficient vacancies to handle the influx of personnel (requiring 335 to 628 housing units), causing an impact on the housing market. Housing affordability would also be negatively affected. Under all three alternatives, local school districts, particularly the Oak Harbor School District, would experience an increase in enrollment. The projected increase in enrollment ranges from 121 students under Alternative 1 to 226 students under Alternative 2. The increased enrollment at the Oak Harbor School District would further exacerbate the existing overcrowding problem and have a significant adverse impact on the district. Minimal to no impact is expected on medical, police, and fire services under all three alternatives. For more information on socioeconomics, see Sections 3.10 and 4.10.

Environmental Justice. Under all alternatives and scenarios, there are minority populations and low-income populations living within the affected environment. The Navy has concluded that there are environmental justice communities within the affected area and there are significant impacts outlined within the EIS to populations living within the affected area (noise impacts to those living within the 65 dB DNL noise contours and overcrowding at Oak Harbor School District schools). However, the Navy has determined that there will be no disproportionate high and adverse human health or environmental effects from noise, Clear Zones/Accident Potential Zones, or school overcrowding on minority populations or low-income populations. The Navy has, however, concluded that impacts on housing

availability and housing affordability could have the potential to have a disproportionately high and adverse impact on low-income communities. The Navy further acknowledges that the increase in the cost of housing and the decrease in available properties may have a negative impact on low-income residents, who typically spend a larger proportion of their income on housing than the general population. For more information on environmental justice, see Sections 3.11 and 4.11.

Transportation. Construction impacts would result in increased traffic on and off the installation, but roadways would be able to handle the increase. An increase in personnel and dependents would result in an increase in traffic on local roads. New trips per weekday would be lowest under Alternative 1 and highest under Alternative 2, regardless of the scenario selected. Under Alternative 1, there would be an estimated 122 to 2,051 new trips per weekday on major roadways off base, and under Alternative 2, there would be an estimated 229 to 3,845 new trips per weekday on major roadways off base. Traffic would be spread throughout roads in Island and Skagit Counties, and, although there would be some degradation of service, it would not be expected to result in level of service falling below established level of service standards. An area of concern at the intersection of State Route 20 and Banta Road would see an increase of between 238 daily trips under Alternative 1 and 445 daily trips under Alternative 2; however, the Washington State Department of Transportation will implement intersection improvements by 2019. An increase in gate traffic of approximately 3 percent to 6 percent over No Action Alternative traffic volumes entering and exiting the installation may result in queuing of vehicles, but this would be limited to peak hours. No significant increase in use of transit, pedestrian, and bicycle facilities would occur because the majority of new traffic would be car based. For more information on transportation, see Sections 3.12 and 4.12.

Infrastructure. Increased consumption or demand would occur for water, wastewater, stormwater, solid waste management, energy, and communications systems from the increase in population that would be spread throughout Island and Skagit Counties. Existing and future capacity is expected to handle the increases in demand; therefore, no significant impacts are expected. Increased consumption or demand is lowest under Alternative 1 (335 additional households in the region) and highest under Alternative 2 (628 additional households in the region) for all types of infrastructure analyzed. New facilities under each alternative would also result in increased demand for infrastructure resources on station. For more information on infrastructure, see Sections 3.13 and 4.13.

Geological Resources. Construction would not include clearing or blasting of earth or rock, and only minor grading activities would occur; therefore, no significant impacts on geologic resources would occur. There would be no impact on resistance to seismic events because all buildings constructed under the Proposed Action would be designed to conform to the seismic provisions of the Washington State Building Code, and a Spill Prevention, Control, and Countermeasure plan would be in place during construction. Impacts to soils during construction could include compaction and rutting from vehicle traffic and an increase in erosion, but impacts would be minimized through the use of BMPs. No significant impacts would occur. BMPs would be implemented to further reduce or eliminate any potential impacts. For more information on geological resources, see Sections 3.14 and 4.14.

Hazardous Waste and Materials. No significant impacts related to hazardous waste and materials would occur due to construction activities or from the addition and operation of additional Growler aircraft. Hazardous materials and wastes would increase in quantity but would be managed under existing law and Navy regulation and management practices. Impacts under Alternatives 2 and 3 would be negligibly higher (36 aircraft) than under Alternative 1 (35 aircraft). The existing practices and strategies would

successfully manage the use and disposal of these materials. No proposed construction activities would occur within or in proximity to any Defense Environmental Restoration Program sites; therefore ongoing remedial programs would not be impacted. For more information on hazardous waste and materials, see Sections 3.15 and 4.15.

Climate Change and Greenhouse Gases. Climate change will continue to occur, resulting in global impacts affecting Whidbey Island and Puget Sound and the Navy's priorities and mission. Federal, state, and local agencies, including the U.S. Department of Defense, will continue to assess impacts and define adaptation and mitigation strategies to address them.

The increase in greenhouse gas (GHG) emissions from the Proposed Action equates to less than 1 percent of all aircraft GHG emissions in Washington. Therefore, the GHG emissions from the Proposed Action should not have a significant impact on Washington's GHG emission goals. Stationary GHG emissions would increase by 4 percent under the alternatives when compared to the No Action Alternative. Mobile GHG emissions would increase by between 25 percent (Scenario C under Alternatives 1 and 3) and 40 percent (Scenario A under all three alternatives) under the alternatives when compared to the No Action Alternative. For more information on climate change and GHGs, see Sections 3.16 and 4.16.

Summary of Potential Impacts by Resource Area

Table 4.17-1 (Summary of Potential Impacts to Resource Areas) provides a tabular summary of the potential impacts to the resources associated with each of the alternatives analyzed. This EIS does not identify any new mitigation measures considering the degree of environmental impacts for the implementation of alternatives but does identify measures that could be taken to develop suggested mitigation techniques, including, but not limited to, stormwater retention practices. During the NEPA process, through comments received during public and regulatory agency review of the EIS, there is the potential to identify and develop new mitigation measures. Appendix H (Noise Mitigation) provides an overview of existing, voluntary noise-mitigation measures that are in place at the NAS Whidbey Island complex. Appendix H also describes potential noise-mitigation measures that are being evaluated for potential future implementation as the Navy takes a proactive approach to noise mitigation and addressing community concerns. Under the Section 106 process, further consultation and development of a Memorandum of Agreement to address adverse effects on historic resources is ongoing. The Navy is consulting with the Washington State Historic Preservation Office, the Advisory Council on Historic Preservation, tribes, and consulting parties regarding the Memorandum of Agreement. If additional mitigation measures are identified during this process, they would be identified in the Record of Decision. These measures would be funded, and efforts to ensure their successful completion or implementation would be treated as compliance requirements.

Public Involvement

The Navy solicited public, tribal, and state and federal agency comments during two scoping periods and during the Draft EIS review period:

Public Scoping Comment Periods:

1. September 5, 2013, to January 3, 2014, and reopened from January 13 to January 31, 2014
2. October 8, 2014, through January 9, 2015

Public Scoping meetings were held on:

- December 3, 2013, in Coupeville, Washington
- December 4, 2013, in Oak Harbor, Washington
- December 5, 2013, in Anacortes, Washington
- October 28, 2014, in Coupeville, Washington
- October 29, 2014, in Oak Harbor, Washington
- October 30, 2014, in Anacortes, Washington
- December 3, 2014, on Lopez Island, Washington
- December 4, 2014, in Port Townsend, Washington

Draft EIS Review Comment Period:

1. November 10, 2016, to February 24, 2017

Public open house meetings for the Draft EIS were held on:

- December 5, 2016, in Port Townsend, Washington
- December 6, 2016, in Oak Harbor, Washington
- December 7, 2016, on Lopez Island, Washington
- December 8, 2016, in Anacortes, Washington
- December 9, 2016, in Coupeville, Washington

Comments received during the two scoping periods were considered in preparing the Draft EIS. Comments received during the Draft EIS review period were considered in preparing the Final EIS. Specifically, the Navy solicited comments from elected officials, agencies, tribes, and the general public to determine the scope and refine the analysis for this EIS.

Noise and Health Reader's Guide

This guide is intended to assist readers in locating information within the Environmental Impact Statement (EIS) related to potential health effects of noise. This list is organized by topic and includes where to find information on the latest science related to noise and health, standards the Navy uses to assess potential impacts, and potential impacts of the Proposed Action.

Page Number

1. Noise Metrics and Modeling

a. General discussion of the types of noise metrics and modeling used to assess noise impacts can be found in the following EIS sections:

2. DNL Noise Contours

a. Estimation of the population and acreage affected by noise can be found in the following EIS sections:

3. Single Event Noise

a. Analysis of single event noise, a composite metric that represents both the intensity of sound and its duration, at several Points of Interest in the vicinity of the Proposed Action, can be found in the following EIS sections:

vi. Appendix A - Aircraft Noise Study, Appendix A1, Discussion of Noise and Its Effect on the Environment, Sections A.1.2 and A.1.3 ..... A1-16, A1-21
vii. Appendix A - Aircraft Noise Study, Appendix A7, Other Modeling Output for High-tempo Scenarios A7-1

4. Speech Interference (Indoor)

a. General discussion of the science and standards used to assess annoyance and, specifically, speech interference, can be found in the following EIS sections:
   i. 3.2.3.1 Annoyance 3-20
   ii. 3.2.3.2 Speech Interference (Indoor) 3-20
   iii. Appendix A - Aircraft Noise Study, Appendix A1, Discussion of Noise and Its Effect on the Environment, Section A1.3.2 ..... A1-28

b. Discussion of the existing environment and potential impacts of the Proposed Action can be found in the following sections:
   i. 3.2.4.3.2 Speech Interference (Indoor) (No Action Alternative) 3-44
   ii. 4.2.2.2.2 Speech Interference (Indoor), Alternative 1 4-55
   iii. 4.2.3.2.2 Speech Interference (Indoor), Alternative 2 4-101
   iv. 4.2.4.2.2 Speech Interference (Indoor), Alternative 3 4-145
   v. Appendix A - Aircraft Noise Study, Section 5.4.4, 6.4.4, 7.4.4, and 8.4.4 ..... A-67, A-112, A-161, A-211
   vi. Appendix A - Aircraft Noise Study, Appendix A7, Other Modeling Output for High-tempo Scenarios A7-1

5. Classroom/Learning Interference

a. General discussion of the science and standards used to assess classroom/learning interference can be found in the following EIS sections:
   i. 3.2.3.3 Classroom/Learning Interference 3-20
   ii. Appendix A - Aircraft Noise Study, Appendix A1, Discussion of Noise and Its Effect on the Environment, Section A1.3.7.1 ..... A1-50
   iii. Appendix I - Community Health and Learning I-1

b. Discussion of the existing environment and potential impacts of the Proposed Action can be found in the following sections:
   i. 3.2.4.3.3 Classroom/Learning Interference (No Action Alternative) 3-46
   ii. 4.2.2.2.3 Classroom/Learning Interference, Alternative 1 4-59
   iii. 4.2.3.2.3 Classroom/Learning Interference, Alternative 2 4-105
   iv. 4.2.4.2.3 Classroom/Learning Interference, Alternative 3 4-149
   v. Appendix A - Aircraft Noise Study, Section 5.4.5, 6.4.5, 7.4.5, and 8.4.5 ..... A-69, A-115, A-164, A-214
   vi. Appendix A - Aircraft Noise Study, Appendix A7, Other Modeling Output for High-tempo Scenarios A7-1

c. Presentation of local school district test scores and graduation rates can be found in the following appendix:
   i. Appendix I - Community Health and Learning (Section 3, Local School District Test Scores and Graduation Rates) I-8

6. Sleep Disturbance

a. General discussion of the science and standards used to assess sleep disturbance can be found in the following EIS sections:

11. Noise Impacts to Specific Populations

a. Executive Order 13045, Environmental Health Risks and Safety Risks to Children, requires each federal agency to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Environmental health risks and safety risks to children are discussed in the following EIS sections:

b. Environmental Justice

12. Noise Mitigation

a. General discussion of existing, future, and potential mitigation measures at NAS Whidbey Island

b. Alternatives Considered: It should be noted that the Navy considered many alternatives to the Proposed Action; however, most would result in relocating noise and other environmental impacts from one community to another.

13. Agency Coordination and Public Participation

a. The following sections are related to agency coordination and public participation in the EIS:

15. Conclusions Regarding Noise-related Topics

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Overview of the Environmental Impact Statement

This Environmental Impact Statement (EIS) is for EA-18G "Growler" Airfield Operations at the Naval Air Station Whidbey Island complex. It evaluates the potential environmental impacts associated with a No Action Alternative and three action alternatives. The three alternatives consider options for increasing the number of additional Growler aircraft at the NAS Whidbey Island complex. Each alternative contains further analysis of five operational scenarios that involve different distributions of annual field carrier landing practice airfield operations between Ault Field and Outlying Landing Field Coupeville.

Chapter 1 provides background information related to the Proposed Action and describes the purpose of and need for the Proposed Action. Chapter 2 describes the Proposed Action, the process for selecting the range of alternatives, and the alternatives carried forward or eliminated from further analysis. Chapter 3 provides a description of the existing environmental resource areas and existing conditions that could be affected from implementing any of the alternatives. Chapter 4 presents an analysis of the potential direct and indirect effects of each alternative on the affected environment. This EIS evaluates the potential environmental impacts associated with 16 resource areas, as well as the cumulative impacts of the Proposed Action and other local projects. Each of the 16 resource areas is discussed in Chapter 3 (Affected Environment) and Chapter 4 (Environmental Consequences). Below is a list of the key sections in this document (for a full Table of Contents, go to page i).

Environmental Impact Statement for EA-18G "Growler" Airfield Operations at the Naval Air Station Whidbey Island Complex

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Abbreviations and Acronyms

Acronym	Definition
AAM	Advanced Acoustic Model
AAD	Average Annual Day
AB	Afterburner
ABD	Average Busy Day
ACHP	Advisory Council on Historic Preservation
ACRP	Aircraft Cooperative Research Program
ADT	Average Daily Traffic
AEMR	Annual Energy Management Report
AESO	Aircraft Environmental Support Office
AFFF	aqueous film-forming foam
AGL	above ground level
AICUZ	Air Installations Compatible Use Zones
ANSI	American National Standards Institute
AOP	air operating permit
APE	Area of Potential Effects
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
ATC	air traffic control
ATCAA	Air Traffic Controlled Assigned Airspace
ATFP	Anti-Terrorist Force Protection
BASH	Bird/Animal Aircraft Strike Hazard
BCC	Bird of Conservation Concern
BCR	Bird Conservation Region

Acronym	Definition
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act
CCA	Carrier Controlled Approach
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CI	confidence interval
CNG	Cascade Natural Gas Corporation
CNEL	Community Noise Equivalent Level
CNO	Chief of Naval Operations
CO	carbon monoxide
COER	Citizens of Ebey's Reserve
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CWA	Clean Water Act
CY	Calendar Year
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted sound level
dBC	C-weighted sound level
DEIS	Draft Environmental Impact Statement

Acronym	Definition
DERP	Defense Environmental Restoration Program
DNL	day-night average sound level (also known as L_{dn})
DNWG	U.S. Department of Defense Noise Working Group
DoD	U.S. Department of Defense
DoDI	United States Department of Defense Instruction
DPS	Distinct Population Segment
EA	Environmental Assessment
e.g.	for example
EIS	Environmental Impact Statement
EMS	emergency medical service
EO	Executive Order
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FAA	Federal Aviation Administration
FCLP	field carrier landing practice
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FMR	Fair Market Rent
FONSI	Finding of No Significant Impact
FRS	Fleet Replacement Squadron
FWHCAs	Fish and Wildlife Habitat Conservation Areas

Acronym	Definition
FY	Fiscal Year
GCA	Ground Controlled Approach
GHG	greenhouse gas
HAP	hazardous air pollutant
Hz	hertz
IBA	Important Bird Area
ICRMP	Integrated Cultural Resources Management Plan
IFLOLS	Improved Fresnel Lens Optical Landing System
IFR	Instrument Flight Rule
in/sec	inches per second
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Conservation
IR	Instrument Flight Rules Military Training Route
ISO	International Organization for Standardization
JLUS	joint land use study
lbf	pound-force
L_{dn}	day-night average sound level (also known as DNL)
L_{eq}	Equivalent Sound Level
$L_{eq(8)}$	8-hour Equivalent Sound Level
$L_{eq(24)}$	24-hour Equivalent Sound Level
L_{max}	maximum A-weighted sound level
LID	low-impact development
LOS	level of service

Acronym	Definition
LSO	Landing Signal Officer
LTO	landing and takeoff operation
MAGIC CARPET	Maritime Augmented Guidance with Integrated Controls for Carrier Approach and Recovery Precision Enabling Technologies (now known as Precision Landing Mode [PLM])
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
µPa	Micropascal
mgd	million gallons per day
MLS	Multiple Listings Service
MMPA	Marine Mammal Protection Act
MOVES	Motor Vehicle Emission Simulator
mph	miles per hour
MoA	Memorandum of Agreement
MOA	Military Operations Area
MSAT	Mobile Source Air Toxics
MSL	mean sea level
MT	metric ton
$MTCO_2e$	metric tons carbon dioxide equivalent
MTR	military training route
NA	number of events above (a specific sound level)
NAAQS	National Ambient Air Quality Standards
NAF	Naval Air Facility
NAS	Naval Air Station

Acronym	Definition
Navy	U.S. Department of the Navy
NAWS	Naval Air Weapons Station
NDI	Noise Depreciation Index
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIPTS	Noise Induced Permanent Threshold Shift
nm	nautical miles
nm^2	square nautical miles
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NRNW F&ES	Navy Region Northwest Fire and Emergency Services
N_2O	nitrous oxide
NWCAA	Northwest Clean Air Agency
NWR	National Wildlife Refuge
NWSTF	Naval Weapons Systems Training Facility
NWTRC	Northwest Training Range Complex
NWTT	Northwest Training and Testing
OEIS	Overseas Environmental Impact Statement

Acronym	Definition
OLF	outlying landing field
OPNAVINST	Office of the Chief of Naval Operations Instruction
OU	Operable Unit
PFAS	per- and polyfluoroalkyl substances
PFC	perfluorinated compound
PFOA	perfluorooctanic acid
PFOS	perfluorooctane sulfanate
PHL	Potential Hearing Loss
PLM	Precision Landing Mode (aka MAGIC CARPET)
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
POI	point of interest
POV	Personally Owned Vehicles
PSD	Prevention of Significant Deterioration
PSE	Puget Sound Energy
PUD	Public Utility District
RCW	Revised Code of Washington
RDT&E	Research, Development, Test, and Evaluation
REPI	Readiness and Environmental Protection Integration
ROD	Record of Decision
RTIP	Regional Transportation Improvement Program

Acronym	Definition
RTPO	Regional Transportation Planning Organization
SAR	search and rescue
SCOG	Skagit Council of Governments
SDZ	Surface Danger Zone
SEL	sound exposure level
SHPO	State Historic Preservation Office(r)
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPBHD	Seaplane Base Historic District
SPCC	Spill Prevention Control and Countermeasures
SPL	Sound Pressure Level
SR	State Route
STIP	Statewide Transportation Improvement Program
SUA	Special Use Airspace
TCP	traditional cultural property
T&G	touch-and-go
TACAN	Tactical Air Navigation
U&A	usual and accustomed
UFC	Unified Facility Criteria
UIC	Underground Injection Control
U.S.C.	United States Code
U.S.	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency

Acronym	Definition
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VFR	Visual Flight Rules
VOC	volatile organic compound
VQ	Fleet Air Reconnaissance
VR	Visual Flight Rules Military Training Route

Acronym	Definition
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WGMA	Washington State Growth Management Act
WHO	World Health Organization
WSDOT	Washington State Department of Transportation

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1 Purpose of and Need for the Proposed Action

This chapter provides background information related to the Proposed Action and describes the purpose of and need for the Proposed Action. It also describes the National Environmental Policy Act (NEPA) process, public involvement, and how the Environmental Impact Statement (EIS) was developed and organized.

1.1 Introduction

The United States (U.S.) Department of the Navy (Navy), beginning as early as 2018, proposes to:

- continue and expand existing EA-18G "Growler" operations at the Naval Air Station (NAS) Whidbey Island complex, which includes field carrier landing practice (FCLP) by Growler aircraft that occurs at Ault Field and Outlying Landing Field (OLF) Coupeville
- increase electronic attack capabilities by adding 35 or 36 aircraft to support an expanded U.S. Department of Defense (DoD) mission for identifying, tracking, and targeting in a complex electronic warfare environment
- construct and renovate facilities at Ault Field to accommodate additional Growler aircraft
- station additional personnel and their family members at the NAS Whidbey Island complex and in the surrounding community

In addition, the Navy would continue all flight operations of other aircraft at the NAS Whidbey Island complex. This EIS evaluates the potential direct, indirect, and cumulative environmental impacts of the Proposed Action under three action alternatives (further described in Section 2.3, Alternatives Carried Forward for Analysis). After completion of the EIS process and issuance of a Record of Decision (ROD), construction of new and improved facilities could begin as early as 2018. Personnel and aircraft would arrive incrementally, as aircraft are delivered by the manufacturer, personnel are trained, and families relocate to the area, until the action is complete. No final decision has yet been made. The ultimate decision with respect to force structure and FCLP distribution will be made by the Secretary of the Navy or his representative and announced in a ROD no earlier than 30 days following the public release of the Final EIS.

The Navy has prepared this EIS in accordance with NEPA and its implementing regulations.

1.2 Location

The NAS Whidbey Island complex is located in Island County, Washington, on Whidbey Island, in the northern Puget Sound region (Figure 1.2-1). The NAS Whidbey Island complex includes the main air station (Ault Field), OLF Coupeville, the Seaplane Base, and Lake Hancock. Ault Field is located in the north-central part of the island, adjacent to the City of Oak Harbor (Figure 1.2-2). OLF Coupeville is located approximately 10 miles south of Ault Field (Figure 1.2-3) and is used primarily for FCLP. The Seaplane Base is within the city limits of Oak Harbor and is the primary support facility for NAS Whidbey Island complex, including Navy housing, the Navy Exchange and Commissary, and administration/ communications facilities. The Seaplane Base is included in this analysis because it contains housing and support facilities, which would be used by personnel and their dependents. Lake Hancock is a 423-acre site near Greenbank, Washington, that was previously used for aerial bombing training between 1943 and 1971. Lake Hancock Training Range was listed as closed for aerial bombing training in 2002. Today, the site is managed by the Navy and The Nature Conservancy as a wetlands marsh. This area is still underneath restricted airspace, and a portion of the site is currently being used by the military to

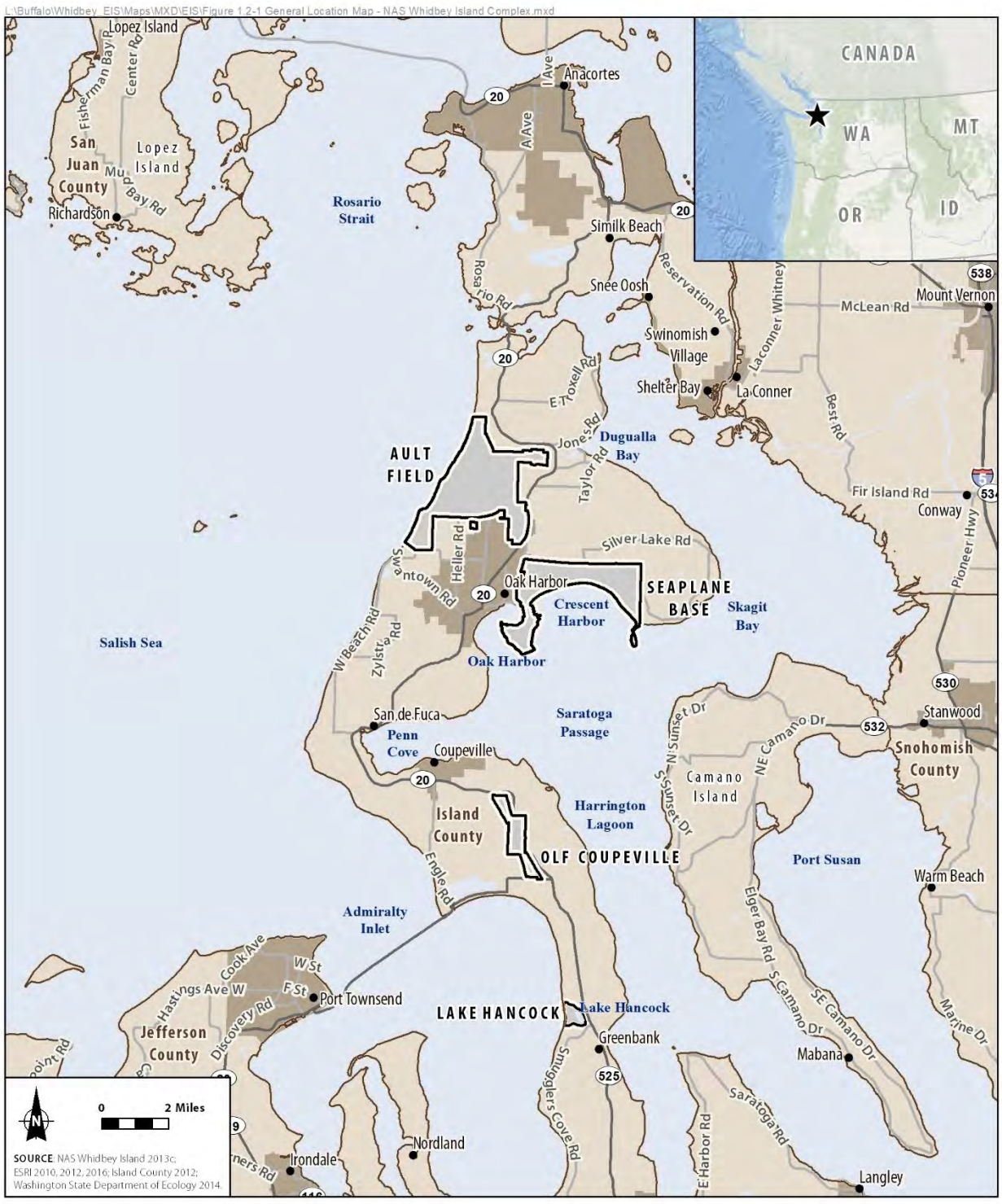


Figure 1.2-1
General Location Map – NAS Whidbey Island Complex
Whidbey Island, Island County, WA

Figure 1.2-2
General Location Map, Aerial - Ault Field
Whidbey Island, Island County, WA

Figure 1.2-3
General Location Map, Aerial - OLF Coupeville
Whidbey Island, Island County, WA

monitor training in Admiralty Bay and for other military training exercises. The Proposed Action would not impact resources at Lake Hancock; therefore, Lake Hancock will not be discussed further in this analysis.

1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to augment the Navy's existing Electronic Attack community at NAS Whidbey Island by operating additional Growler aircraft that have been appropriated by Congress. The Navy needs to effectively and efficiently increase electronic attack capabilities in order to counter increasingly sophisticated threats, and provide more aircraft per squadron in order to give operational commanders more flexibility in addressing future threats and missions. The need for the Proposed Action is to maintain and expand Growler operational readiness to support national defense requirements under Title 10, United States Code (U.S.C.), Section 5062.

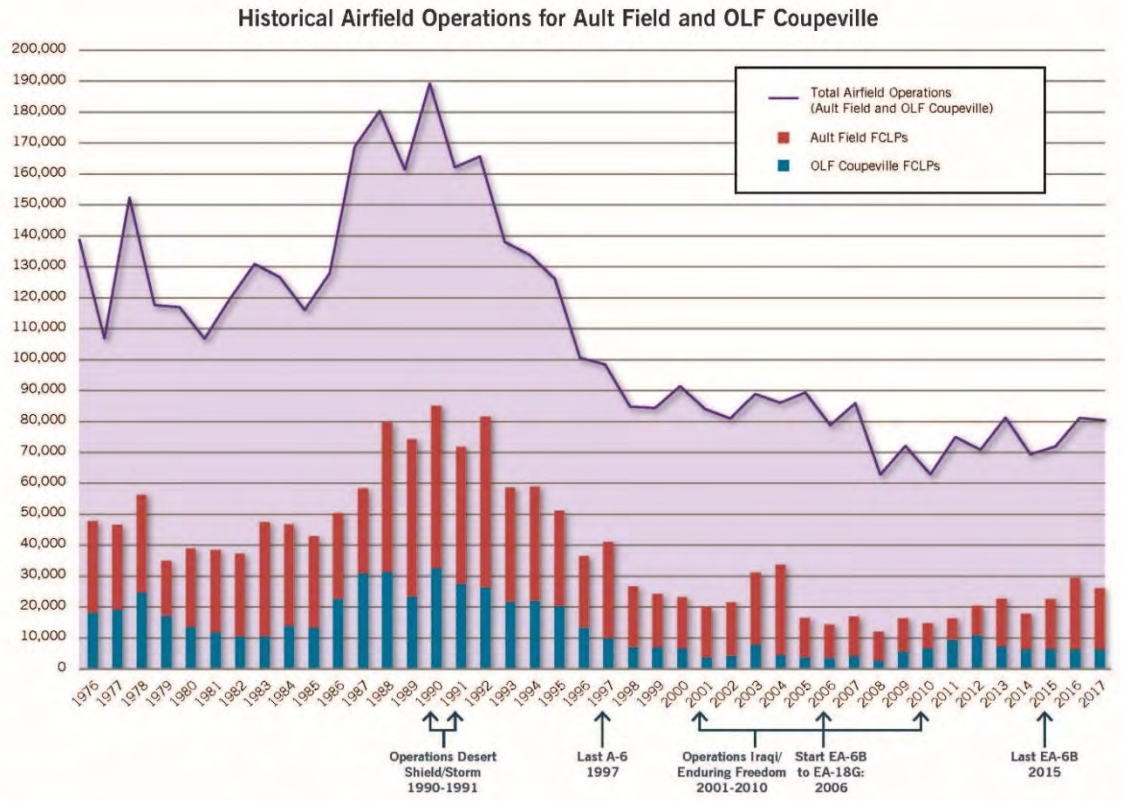
> 10 U.S.C. Section 5062: "The Navy shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea. It is responsible for the preparation of Naval forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Navy to meet the needs of war."

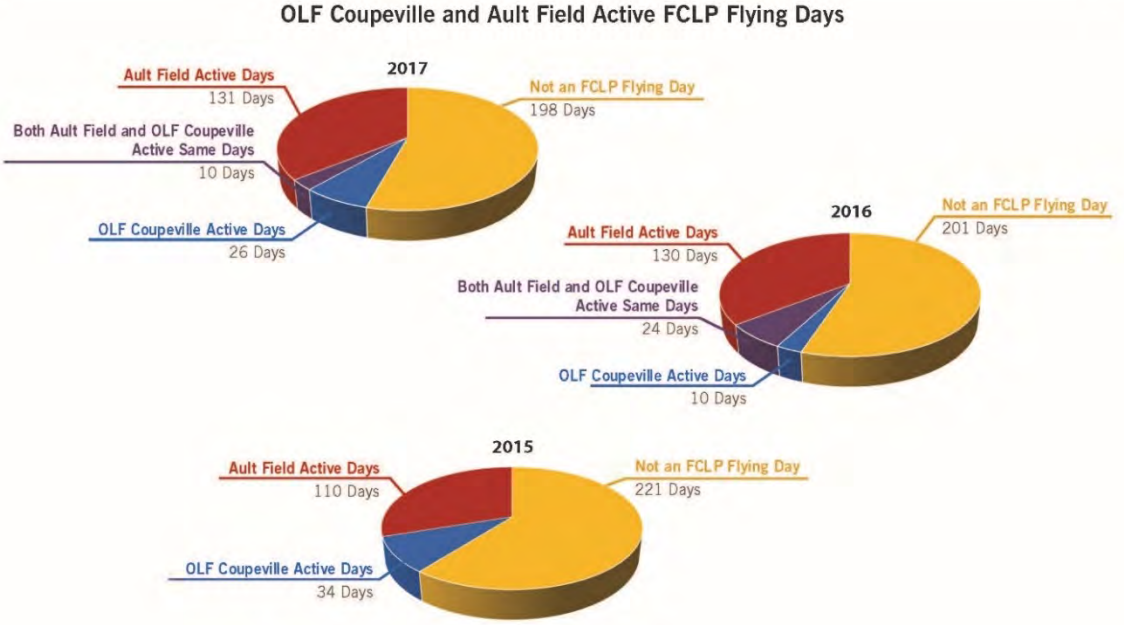
1.4 The Navy's Electronic Attack Community at Ault Field and OLF Coupeville

Commissioned in 1942 as part of NAS Whidbey Island, Ault Field is the only naval air station in the Pacific Northwest and has supported naval aviation for more than 75 years. Ault Field has served as the home base location for the Navy's tactical Electronic Warfare community for more than 45 years. Ault Field and the Seaplane Base were identified as ideal locations for the rearming and refueling of Navy patrol planes and other tactical aircraft operating in defense of Puget Sound during World War II; OLF Coupeville became operational in 1943 to support practice approach/landings and emergency landings. Over a period of more than 45 years, Ault Field has evolved into the Navy's home for its Electronic Attack aircraft. OLF Coupeville, an integral part of operations at Ault Field, provides the most realistic training for FCLP, as well as training for search-and-rescue and parachute operations.

> **FCLP (field carrier landing practice)** is a graded flight exercise that prepares pilots for landing on aircraft carriers. FCLPs are conducted on shore facilities to provide pilots the opportunity to simulate carrier landing operations in an environment where the risks associated with at-sea carrier operations can be safely managed. Landing on an aircraft carrier is one of the most dangerous tasks a pilot can perform, and is a perishable skill.
>
> A typical FCLP evolution lasts approximately 45 minutes, usually with three to five aircraft participating in the training. FCLP schedules are dictated by training and deployment schedules, occur with concentrated periods of high-tempo operations, and are followed by periods of little to no activity.
>
> Per Navy guidelines, pilots must perform FCLP before initial carrier qualification (ship) landings or re-qualification landings. The first carrier landing needs to occur within 10 days of completion of FCLP.

Since the late 1960s, the Navy has continuously used OLF Coupeville for FCLP. Previous flight operations data for both Ault Field and OLF Coupeville indicate periods of higher and lower activity, depending on Navy mission requirements. The following graphs represent approximate and best available aircraft operations data for Ault Field and OLF Coupeville as recorded through tracking methods at the time.





Ault Field is the home base location of the Navy's tactical Electronic Attack community in the U.S., including all Growler squadrons, and provides facilities and support services for nine carrier squadrons, three expeditionary squadrons, one expeditionary reserve squadron, one training squadron, and an Electronic Attack Weapons School. The carrier and expeditionary squadrons have similar missions but differ in where they deploy and how they train before deployment.

Three types of Growler squadrons support the Airborne Electronic Attack mission for DoD:

- **carrier squadrons,** which deploy on aircraft carriers and conduct periodic FCLP to requalify to land on aircraft carriers
- **expeditionary squadrons,** including the reserve squadron, deploy to overseas land-based locations and therefore do not normally require periodic FCLP prior to deployment
- **the training squadron,** which is also known as the Fleet Replacement Squadron, or FRS, is responsible for "post-graduate" training of newly designated Navy pilots and Naval Flight Officers, those returning to flight status after non-flying assignments, or those transitioning to a new aircraft for duty in the Fleet. The training squadron is the "schoolhouse" where pilots receive their initial FCLP, and it fosters professional standardization and a sense of community.

Electronic warfare has played a key role in combat operations since being first introduced during World War II, and its importance continues to grow as potential adversaries invest in modern threat systems. The mission of the Navy's Growler aircraft is to suppress enemy air defenses and communications systems. Additionally, Navy Growlers disrupt land-based threats in order to protect the lives of U.S. ground forces. In 2009, the Secretary of Defense directed the Navy to take responsibility for the nation's tactical Airborne Electronic Attack mission. As a result, the Navy is the only U.S. military service that will maintain a tactical airborne electronic attack capability and is required to preserve and cultivate the expertise and knowledge of the Growler community.

In addition to being home to the Growler community, Ault Field is the West Coast home of the Maritime Patrol community and a Fleet Air Reconnaissance squadron initially consisting of three P-3C Orion squadrons, one reserve P-3C Orion squadron, and one EP-3 squadron. On June 3, 2014, the Navy signed a ROD to replace the existing three P-3C Orion squadrons with six P-8A Poseidon squadrons at Ault Field. The P-8A Poseidon began arriving at Ault Field in 2016, and the transition from three P-3C Orion squadrons to six P-8A Poseidon squadrons is expected to be complete in 2020. Furthermore, the one EP-3 squadron is slated for disestablishment by 2021. Ault Field also supports a unit of MH-60 search and rescue helicopters and a squadron of C-40 aircraft. It should be noted that Maritime Patrol and Fleet Air Reconnaissance aircraft conduct airfield operations at Ault Field but not at OLF Coupeville.

FCLP at OLF Coupeville provides a realistic training environment for both student pilots and experienced pilots to prepare for landing on aircraft carriers. A series of day and night FCLP must be performed by all pilots before landing the Growler on an aircraft carrier for the first time, or, for experienced pilots, after a period of absence away from the aircraft carrier environment. Training at OLF Coupeville allows pilots, as well as Landing Signal Officers (LSOs), the opportunity to train in a closed pattern, or a pattern without interference from other aircraft. LSOs are highly trained carrier pilots who instruct and critique aircrews' landing performance from the flight deck. During FCLP, LSOs are stationed next to the approach end of the runway and train and evaluate pilots while providing an additional margin of safety during each landing by maintaining two-way radio communication with the landing aircraft, which allows the LSOs to give immediate feedback to pilots during their landing approaches.

Since OLF Coupeville is dedicated primarily to FCLP (although it also supports helicopter operations), pilots and LSOs can maximize the number of practice landings in a given timeframe while significantly benefitting from the unique environment OLF Coupeville provides. Using OLF Coupeville allows the Navy to conclude daily operations in less time, thereby reducing community impacts. When performing FCLP at Ault Field, operations are often hindered due to multiple types of aircraft flying patterns around the field that differ from the prescribed FCLP pattern and that extend flights beyond the normal pattern. Operations by non-FCLP aircraft (e.g., Growlers not performing FCLP, P-3s, P-8s, EP-3s, MH-60s, C-40s, cargo and passenger aircraft, and other transient aircraft) degrade FCLP due to aircraft separation requirements, varying field lighting, topography requirements, and specific approach requests. This degradation in training can occur for FCLP pilots as well as non-FCLP pilots, who, in some cases, are precluded from practicing their own landings due to aircraft limitations in the landing pattern. For example, aircraft may have take-offs, practice approaches, or landings delayed or denied. An inability to accomplish required training due to pattern congestion disrupts training schedules, increases operational costs to the Navy, and complicates pilot training. Performing FCLP at Ault Field can be more impactful to the community by extending flight patterns, repeating training, extending daily operations later into the night, and impacting more densely populated areas.

The field elevation of OLF Coupeville is 200 feet above mean sea level, and the aircraft landing pattern for the field is 800 feet above mean sea level. The altitude above ground at which the aircraft fly the landing pattern at OLF Coupeville closely replicates the altitude of the aircraft carrier landing pattern (OLF Coupeville is located on a 200-foot ridge surrounded by flat terrain, similar to how an aircraft carrier is situated at sea). Practicing at an altitude that simulates the carrier environment is essential for pilots preparing to land on an aircraft carrier because such practice matches the visual cues as well as the required power settings needed to fly a safe approach for an actual landing on an aircraft carrier. Growlers routinely perform FCLPs at OLF Coupeville and would only perform a full-stop landing in an extreme circumstance. The proximity of OLF Coupeville to Ault Field allows for more training to be conducted per fuel load and provides a safe divert field if an emergency arises. Finally, OLF Coupeville is close enough to Ault Field so the LSO, who for safety and training reasons is required to be present at the field and in radio contact with the pilots performing FCLP, may brief the participating aircrew on training procedures and then drive to the OLF in a reasonable amount of time to be present in order to oversee the training and to qualify the pilot for carrier landings.

1.5 Scope of Environmental Analysis

This EIS includes an analysis of potential environmental impacts associated with the No Action Alternative and action alternatives. In general, environmental analysis involving aircraft operations at military airfields requires an analysis of noise, air quality, biological resources, and land use compatibility. New facility construction generally requires analysis of potential impacts to topography and soils, water resources and wetlands, biological resources, and cultural resources. Changes in personnel levels generally require analysis of socioeconomics, community services, safety, infrastructure and utilities, and transportation. The study area for each resource analyzed may differ due to how the Proposed Action interacts with or impacts the resource. For instance, the study area for geological resources may only include the construction footprint of a building, whereas the noise study area would expand out to include areas that may be impacted by airborne noise.

For the affected environment analysis, environmental conditions for each resource are evaluated using the best available data for that specific resource. Depending on the resource and best available data, the

affected environment conditions may vary. For example, the noise discussion uses the year 2021 to describe the affected environment, when previous aircraft loading decisions unrelated to the Proposed Action are expected to be fully implemented and complete (2021 is when the P-8A Poseidon will complete the transition), whereas the biological resource discussion uses the most current and best available species data sets and surveys to inform the analysis.

This EIS assesses the potential environmental effects of continuing and expanding the existing Growler operations at the NAS Whidbey Island complex and analyzes aircraft operations conducted in the vicinity of Ault Field and OLF Coupeville. The following topics are evaluated in this EIS:

- Airspace and Airfield Operations
- Noise Associated with Aircraft Operations (Noise)
- Public Health and Safety
- Air Quality
- Land Use
- Cultural Resources
- American Indian Traditional Resources
- Biological Resources
- Water Resources
- Socioeconomics
- Environmental Justice
- Transportation
- Infrastructure
- Geological Resources
- Hazardous Materials and Wastes
- Climate Change and Greenhouse Gases

Additional information about specific resource areas is included in the following appendices to this EIS.

Volume 2, Appendices, includes the following:

- Appendix A, Aircraft Noise Study
- Appendix B, Air Emissions Calculations

Volume 3, Appendices, includes the following:

- Appendix C, Federal and State Agency Coordination

Volume 4, Appendices, includes the following:

- Appendix D, Transportation Trip Generation Data
- Appendix E, Land Use Data, High-tempo FCLP Year
- Appendix F, Environmental Justice Data, High-tempo FCLP Year
- Appendix G, Civilian Airfield Analysis
- Appendix H, Noise Mitigation

- Appendix I, Community Health and Learning Review
- Appendix J, 2013 Scoping Information
- Appendix K, 2014 Scoping Information
- Appendix L, 2016 Draft EIS Public Information Meetings
- Appendix M, Draft EIS Public Commenting and Response Key

1.6 Key Documents

Key documents are sources of information incorporated into this EIS. Documents are considered key because of similar actions, analyses, or impacts that may apply to the Proposed Action. Although these NEPA documents address actions that are separate and distinct from the Proposed Action analyzed in this EIS, the potential cumulative effects from these actions have been considered in the preparation of this EIS and are described further in Chapter 5, Cumulative Impacts.

2005 Environmental Assessment for Replacement of Prowler Aircraft with Growler Aircraft at NAS Whidbey Island

This document analyzed the environmental consequences of transitioning Growler carrier squadrons at NAS Whidbey Island from the older Prowler aircraft to the newer Growler aircraft. A Finding of No Significant Impact (FONSI) was signed on July 19, 2005. The transition of Prowler squadrons to the Growler aircraft was completed in April 2016.

2012 Environmental Assessment for the Expeditionary Transition of Prowler Squadrons to the Growler at NAS Whidbey Island

This Environmental Assessment (EA) analyzed the potential environmental effects of transitioning the expeditionary Electronic Attack squadrons at NAS Whidbey Island from the aging Prowler to the newer Growler in the 2012 through 2014 timeline. The action included retaining the expeditionary Electronic Attack squadrons at NAS Whidbey Island; performing the in-place transition of three existing expeditionary Electronic Attack squadrons home based at NAS Whidbey Island from the Prowler aircraft to the Growler aircraft; relocating one reserve expeditionary Electronic Attack Prowler squadron from Joint Base Andrews to NAS Whidbey Island and transitioning from the Prowler aircraft to the Growler aircraft; adding up to 11 Growler aircraft to the FRS at NAS Whidbey Island to support the expeditionary Electronic Attack community; modifying certain facilities at Ault Field to provide infrastructure and functions to support the new aircraft type; and a modest increase in personnel to support the expeditionary Electronic Attack community. The purpose of the transition was to provide deployable, land-based expeditionary Electronic Attack community assets that meet DoD requirements. A FONSI for the EA was signed on October 30, 2012. The in-place transitions and relocation of the reserve squadron were completed in 2014.

2008 EIS and 2014 Supplemental EIS for Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Navy Fleet

An EIS and Supplemental EIS were prepared to analyze the potential environmental impacts associated with the introduction of P-8A Poseidon aircraft into the Navy Fleet. In 2008, the Navy decided to provide facilities and functions to support home basing 12 P-8A Poseidon squadrons and one FRS into the Navy Fleet. The P-8A Poseidon will replace the current maritime patrol aircraft, the P-3C Orion, at the three existing maritime patrol home bases. In light of changing conditions after completion of the original EIS

(ROD signed on December 23, 2008), the Navy prepared a Supplemental EIS. The Supplemental EIS (ROD signed June 3, 2014) selected NAS Jacksonville and NAS Whidbey Island as the two home base locations. At NAS Whidbey Island, the existing three P-3C Orion squadrons will be replaced with six P-8A Poseidon squadrons. The P-8A aircraft began arriving at Ault Field in 2016, and the transition from P-3C Orion to P-8A Poseidon aircraft is expected to be complete in 2020.

2014 Environmental Assessment for Pacific Northwest Electronic Warfare Range

This EA tiered off the 2010 *Northwest Training Range Complex Final EIS/Overseas Environmental Impact Statement (OEIS)*, which analyzed at-sea and inland training, including electronic warfare training in existing Military Operations Areas. This EA proposed to improve existing training with the use of a fixed emitter site and up to three mobile emitter vehicles that would transmit low-power signals skyward to aircraft for aircrew to detect, locate, and identify. The ground-based emitters are intended to improve flight training by providing aircrews with more varied signal locations. The Navy completed the EA and issued a FONSI on August 28, 2014. In July 2017, the Navy was issued a permit from the U.S. Forest Service to drive the mobile emitter vehicles on existing roads and cutouts, and is required to report operation numbers.

2015 EIS/Overseas Environmental Impact Statement for Northwest Training and Testing

An EIS/OEIS was prepared to analyze the potential environmental impacts associated with training and testing activities primarily within existing range complexes, operating areas, testing ranges, and selected pier-side locations in the Pacific Northwest, which includes areas where Growler aircraft currently train. The ROD was signed on October 31, 2016.

2015 EIS for Military Readiness Activities at Naval Weapons Systems Training Facility Boardman

An EIS was prepared for a Navy proposal to continue and enhance Navy and Oregon National Guard training at Naval Weapons Systems Training Facility Boardman, Oregon. The ROD was signed on March 31, 2016. The Naval Weapons Systems Training Facility Boardman EIS analyzes current and future Growler training requirements at the facility.

1.7 Relevant Laws and Regulations

The Navy has prepared this EIS based upon federal and state laws, statutes, regulations, and policies that are pertinent to the implementation of the Proposed Action, including the following:

- NEPA (42 U.S.C. sections 4321-4370h)
- CEQ regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] parts 1500-1508)
- Navy regulations for implementing NEPA (32 CFR part 775)
- Clean Air Act (42 U.S.C. section 7401 et seq.)
- Clean Water Act (33 U.S.C. section 1251 et seq.)
- Coastal Zone Management Act (16 U.S.C. section 1451 et seq.)
- National Historic Preservation Act (54 U.S.C. section 306101 et seq.)
- Endangered Species Act (16 U.S.C. section 1531 et seq.)
- Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (16 U.S.C. section 1801 et seq.)

- Marine Mammal Protection Act (16 U.S.C. section 1361 et seq.)
- Migratory Bird Treaty Act (16 U.S.C. sections 703-712)
- Bald and Golden Eagle Protection Act (16 U.S.C. section 668-668d)
- Fish and Wildlife Coordination Act of 1996 (16 U.S.C. 661)
- Safe Drinking Water Act of 1974 (42 U.S.C. 300f et seq.)
- Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.)
- Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 9601 et seq.)
- Sikes Act Improvement Act of 1997 (16 U.S.C. 670)
- Federal Aviation Act of 1958 (49 U.S.C. 1301 et seq.)
- Federal Noxious Weeds Act of 1970 (7 U.S.C. 2803 and 2809)
- Energy Independence and Security Act of 2007 (42 U.S.C. section 17001 et seq.)
- Emergency Planning and Community Right to Know Act (42 U.S.C. section 116 et seq.)
- Pollution Prevention Act of 1990 (42 U.S.C. section 13101 et seq.)
- Executive Order (EO) 11990, Protection of Wetlands
- EO 11988, Floodplain Management
- EO 12088, Federal Compliance with Pollution Control Standards
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks
- EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management
- EO 13175, Consultation and Coordination with Indian Tribal Governments
- EO 13834, Efficient Federal Operations

A description of the Proposed Action's consistency with these laws, policies, and regulations, as well as the names of regulatory agencies responsible for their implementation, is presented in Chapter 6.

1.8 Agency Participation and Intergovernmental Coordination

NEPA implementing regulations (40 CFR Section 1506.6) direct agencies to involve the public in preparing NEPA analysis. The Navy solicited agency comments during two scoping periods and during the Draft EIS review period. The Navy conducted a total of eight scoping meetings and five Draft EIS public information meetings. Elected officials and federal and state agencies were invited to attend public meetings, submit comments, and participate in the development of this analysis. The Navy has coordinated with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Washington State Department of Ecology, Washington State Department of Health, and Washington State Historic Preservation Office (SHPO) regarding the Proposed Action. Based on early coordination with these federal and state agencies, supporting documentation and consultation items were prepared and submitted as needed (see Appendix C, Federal and State Agency Coordination). The section 7 Endangered Species Act consultation has been completed with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (see also Sections 3.8 and 4.8, Biological Resources). A National

Historic Preservation Act Section 106 consultation process has been completed with the SHPO and the Advisory Council on Historic Preservation (See also Sections 3.6 and 4.6, Cultural Resources). A Coastal Consistency Determination has been completed with the Washington State Department of Ecology. The following federally recognized American Indian tribes and nations (herein after referred to as "tribes") were invited to initiate government-to-government consultation:

- Jamestown S'Klallam Tribe
- Lummi Tribe of the Lummi Reservation
- Samish Indian Nation
- Stillaguamish Tribe of Indians of Washington
- Suquamish Indian Tribe of the Port Madison Reservation
- Swinomish Indian Tribal Community
- Tulalip Tribes of Washington
- Upper Skagit Indian Tribe

1.9 Public Participation: Scoping 2013 and Scoping 2014

Scoping is a fundamental part of the EIS process. Scoping informs the public about the Proposed Action and alternatives and allows the public and interested stakeholders to identify topics and concerns of particular interest to affected communities. Comments received during the public scoping comment periods were considered in preparing the Draft EIS. Specifically, the Navy solicited scoping comments from elected officials, tribes, agencies, and the general public to determine what topics should be studied and analyzed in the EIS. In addition to soliciting comments for preparation of the EIS, the Navy used the NEPA scoping process to solicit comments related to Section 106 of the National Historic Preservation Act. Section 1.9.4 provides a summary of scoping comment topics.

Two separate scoping efforts were completed for this project:

1. **2013-2014 Scoping Efforts**[2]
   A 139-day initial public scoping period was conducted from September 5, 2013, to January 3, 2014, and reopened from January 13 to 31, 2014, and included three scoping meetings held in Coupeville, Oak Harbor, and Anacortes, Washington.
2. **2014-2015 Scoping Efforts**[3]
   A 93-day re-scoping effort was conducted from October 8, 2014, to January 9, 2015, which included a total of five scoping meetings held in Coupeville, Oak Harbor, Anacortes, Lopez Island, and Port Townsend, Washington.

[2] A Notice of Intent was published on September 5, 2013 (78 FR 54635). A notice to re-open scoping and extend the scoping period through January 31 was published on January 17, 2014 (79 FR 3188).

[3] A Revised Notice of Intent was published on October 10, 2014 (79 FR 61296). An extension notice was published on November 17, 2014 (79 FR 221).

2013-2014 Scoping Efforts

The initial scoping efforts for the EIS commenced in September 2013. This effort focused on the Navy's proposal to introduce two additional Growler expeditionary squadrons (two squadrons of five aircraft each) and the addition of three Growler aircraft to the training squadron, for a total of 13 additional aircraft, and the continuation and increase of Growler operations at Ault Field and OLF Coupeville. The EIS scope also included an assessment of the distribution of operations between Ault Field and OLF Coupeville.

2014-2015 Scoping Efforts

In the spring of 2014, following completion of the first scoping efforts, the Chief of Naval Operations requested the purchase of additional Growler aircraft as part of the Unfunded Requirements List in the President's Budget for Fiscal Year 2015. While it was unclear at that time how many Growler aircraft would ultimately be procured, if any, the Navy elected to analyze the potential environmental impacts of these additional aircraft in order to be proactive and transparent. Therefore, the Navy revised the scope of the ongoing EIS originally presented to the public in 2013 and initiated a new scoping effort on October 8, 2014, which was completed on January 9, 2015.

The revised EIS scope presented the Navy's revised proposal to add up to 36 Growler aircraft to support an expanded Electronic Attack mission. This includes training at Ault Field and OLF Coupeville, and the continuation and increase in Growler operations at these two airfields, including the distribution of operations between the two airfields.

1.9.1 Scoping Notifications

A range of notification tools were used during both scoping efforts to: 1) publicize the issuance of the Notice of Intent for each scoping period; 2) provide details on the proposals and the times, dates, and locations of the scoping meetings; and 3) describe ways to comment. Notification tools included mailings (letters and postcards), newspaper display advertisements, press releases, and the use of the project website (see Table 1.9-1). Two additional methods of notification were used during re-scoping efforts: digital advertisements (i.e., advertisements on the newspaper websites) and phone calls to elected leaders.

Table 1.9-1 Summary of Public Scoping Notifications for the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

	2013-2014[1]		*2014-2015[2]*	
Notification Method	*Total for Initial Scoping Period*	*Total for Scoping Extension*	*Total for Re-scoping Period*	*Total for Re-scoping Extension*
Mailings to addressees on initial mailing list[3]	350	-	771	-
Letter	72	-	86	-
Postcard	278	-	685	705
Newspapers with paid advertisements	6	8	8	8
Paid print advertisements (days)	25	14	28	28
Paid digital advertisements (days)	-	-	7 sites, for a total of 14 days each	8 sites, for a total of 14 days each
Media outlets that received press release	48	49	45	45
Phone calls to elected leaders	-	-	70	-
Website visits	3,454	1,103	2,553	3,567
Libraries with scoping materials	-	-	14	

Notes:

1 A 139-day initial public scoping period was conducted from September 5, 2013, to January 3, 2014, and from January 13 to 31, 2014.

2 A 93-day re-scoping effort was conducted from October 8, 2014, to January 9, 2015. .

3 See Chapter 9 for the current mailing distribution list.

1.9.2 Scoping Meetings

The Navy held two sets of public scoping meetings (Table 1.9-2):

- **2013-2014**, which included three scoping meetings held in Coupeville, Oak Harbor, and Anacortes, Washington
- **2014-2015**, which included five scoping meetings held in Coupeville, Oak Harbor, Anacortes, Lopez Island, and Port Townsend, Washington

Table 1.9-2 Public Scoping Meeting Dates and Locations for the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Date	*Location*
Tuesday, December 3, 2013 4:00 pm to 8:00 pm	Coupeville High School 501 South Main Street Coupeville, WA 98239
Wednesday, December 4, 2013 4:00 pm to 8:00 pm	Oak Harbor High School 1 Wildcat Way Oak Harbor, WA 98277
Thursday, December 5, 2013 4:00 pm to 8:00 pm	Anacortes Middle School 2202 M Avenue Anacortes, WA 98221
Tuesday, October 28, 2014 4:00 pm to 8:00 pm	Coupeville High School Commons Area 501 South Main Street Coupeville, WA 98239
Wednesday, October 29, 2014 4:00 pm to 8:00 pm	Oak Harbor Elks Lodge 155 NE Ernst Street Oak Harbor, WA 98277
Thursday, October 30, 2014 4:00 pm to 8:00 pm	Anacortes High School Cafeteria 1600 20th Street Anacortes, WA 98221
Wednesday, December 3, 2014[1] 3:00 pm to 6:00 pm	Lopez Center for Community and Arts 204 Village Road Lopez Island, WA 98261
Thursday, December 4, 2014[1] 3:00 pm to 6: 00 pm	Fort Worden Conference Center, Commons B and C 200 Battery Way Port Townsend, WA 98368

Notes:

[1] The Navy added two additional meetings (Lopez Island and Port Townsend) at the request of Congressional leaders. A Notice of Extension of Public Scoping Period and Additional Public Scoping Meetings was published on November 17, 2014 (79 FR 68423).

Scoping meetings were conducted in an open-house format designed to enhance public understanding of the project and the NEPA process, and to allow members of the public to identify for Navy representatives topics and concerns they would like to see addressed in the EIS. During the scoping meetings, attendees could speak individually with Navy representatives and submit written and oral comments. Scoping information materials were made available in paper copy to scoping meeting attendees and in electronic data files downloaded from the project website. Meeting start times and duration varied from 3 to 4 hours based on local conditions to accommodate travel distances, the schedules for ferries used by the public attending the meetings, tidal variance, and peak hours for public attendance. Across all eight scoping meetings, a total of 1,307 individuals were counted in attendance, including federal and state elected officials, the media, city government agencies, and local community planning groups.

During the 2014-2015 scoping effort, the Navy expanded its public outreach and provided paper copies of the scoping information materials at various libraries in the area (Table 1.9-3).

Table 1.9-3 Libraries and Locations Provided Paper Copies of Scoping Information Materials (2014-2015 Scoping Efforts) for the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Library	*Location*
Oak Harbor City Library	1000 SE Regatta Drive Oak Harbor, Washington
Anacortes Public Library	1220 10th Street Anacortes, Washington
La Conner Regional Library	614 Morris Street La Conner, Washington
Coupeville Library	788 NW Alexander Street Coupeville, Washington
San Juan Island Library	1010 Guard Street Friday Harbor, Washington
Lopez Island Library District	2225 Fishermen Bay Road Lopez Island, Washington
Orcas Island Public Library	500 Rose Street Eastsound, Washington
Island Library	2144 South Nugent Road Lummi Island, Washington
Camano Island Library	848 North Sunrise Boulevard Camano Island, Washington
Mount Vernon City Library	315 Snoqualmie Street Mount Vernon, Washington
Port Townsend Public Library	1220 Lawrence Street Port Townsend, Washington
Guemes Island Library	7549 Guemes Island Road Anacortes, Washington
Seattle Public Library	1000 4th Avenue Seattle, Washington
Burlington Public Library	820 East Washington Avenue Burlington, Washington

1.9.3 Scoping Comments

Comments were received from elected officials, tribes, federal regulatory and state resource agencies, business and community leaders, organizations, and individuals. Comments received during scoping were provided through one or more of the following five comment-submittal methods:

- in writing, while attending one of the meetings
- orally to the stenographer, while attending one of the meetings
- electronically, via the project website at www.whidbeyeis.com
- electronically, via email
- in writing, by mail

Comments pertaining to this project that were submitted during public involvement efforts for other regional NEPA projects were collected and considered in the development of this EIS. Similarly, comments submitted during public meetings for this project but which pertain to other regional NEPA

projects were forwarded to those project teams as appropriate for consideration in the preparation of their projects. In total, 73 comments from other project meetings were forwarded to this project team, and, in turn, this project team forwarded 192 comments to other projects. Table 1.9-4 summarizes the total number of scoping comments submitted through all methods made available to the public during each scoping period.

Table 1.9-4 Summary of Comment Methods during Public Scoping for the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Method of Comment Submittal	*2013-2014 Scoping*[3] *Number of Comments Received*[5]	*2014-2015 Re-scoping*[4]
Written Comments Submitted at Scoping Meetings[2]	149	276
Oral Comments Submitted at Scoping Meetings	29	67
Comments Submitted via the Website	1,122	1,473
Comments Emailed	262	8
Comments Mailed	102	146
Comments Received from Other NEPA Efforts[1]	14 (P-8A Draft Supplemental EIS)	59 (NWTT Supplemental Draft EIS, Electronic Warfare Range EA, and Transit Protection System Pier EA)
Total	**1,678**	**1,970**

Notes:

1 In addition to the project team receiving comments from other concurrent projects being conducted within the region, comments were received during the re-scoping process for the Growler EIS that pertain to the NWTT Supplemental Draft EIS and the Electronic Warfare Range EA. In total, 192 comments were forwarded to other project teams for review and consideration. Of the 192 forwarded comments, 36 were provided to the project team for the NWTT Supplemental Draft EIS/Overseas Environmental Impact Statement, and 156 comments were provided to the project team for the Electronic Warfare Range EA.

2 Comments collected during the 2013 Oak Harbor scoping meeting included a variety of studies, reports, and literature provided by the Citizens of Ebey's Reserve.

3 A 139-day initial public scoping period was conducted from September 5, 2013, to January 3, 2014, and from January 13 to 31, 2014.

4 A 93-day re-scoping effort was conducted from October 8, 2014, to January 9, 2015.

5 A comment is an individual communication received (e.g., letter, email, oral statement). Any one comment (e.g., letter, email, oral statement) may include several topics. Comments are counted based on the number of individual communications received (e.g., letters, emails, oral statements).

Key:
EA = Environmental Assessment
EIS = Environmental Impact Statement
NEPA = National Environmental Policy Act
NWTT = Northwest Training and Testing

1.9.4 Summary of Scoping Comment Topics and Commenters

Table 1.9-5 provides a summary of all comments received by topic area across the two scoping efforts. The alternatives analysis, human health effects, noise and vibration, socioeconomic impacts, and

biological resources were the top five named topics identified during both scoping efforts. Of the comment topics raised, general support of the project constituted 27 percent of the total comments received during the 2013-2014 scoping efforts and 15 percent of the total comments received during the 2014-2015 scoping efforts.

Table 1.9-5 Comparison of Comment Topics and Quantities of Public Scoping Comments for the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Topic	*Number of Comments*	
	2013-2014	*2014-2015*
1. General Support	459	303
2. Purpose and Need	3	8
3. Project Description/Proposed Action	176	19
4. Alternatives	287	334
5. National Environmental Policy Act Process/Public Involvement	55	300
6. Specific Resources		
a. Airfield Operations	138	114
b. Noise and Vibration	783	1,002
c. Noise Disclosure	57	31
d. Land Use and Recreation	205	73
e. Public Safety	207	56
f. Human Health Effects	433	481
g. Socioeconomics[1]	502	304
h. Environmental Justice	183	107
i. Air Quality	142	65
j. Transportation	16	13
k. Community Facilities and Services	11	8
l. Aesthetics	10	0
m. Hazardous Materials and Waste[2]	105	30
n. Biological Resources	396	145
o. Topography, Geology, and Soils	181	22
p. Water Resources	66	15
q. Cultural Resources	163	40
r. Cumulative Effects	43	27

Notes:

[1] Comments related to property values were considered under the topic of Socioeconomics.

[2] Comments related to fuel dumping were considered under the topic of Hazardous Materials and Wastes.

1.10 Public Participation: Draft EIS Review

The Navy extends its thanks to the elected officials; federal, state, and local agencies; and members of the public for taking the time to review the Draft EIS, attend public information meetings, and submit comments on the Draft EIS. The Draft EIS public comment period and information meetings are an important aspect of the environmental analysis process. Comments received during the Draft EIS public comment period were considered in preparing the Final EIS. Section 1.11 provides a summary of Draft EIS public review comment themes.

A 105-day public comment period was conducted from November 10, 2016, to February 24, 2017, and included five public information meetings held in Port Townsend, Oak Harbor, Lopez Island, Anacortes, and Coupeville, Washington. The public comment period for the Draft EIS began on November 10, 2016, with publication of the Draft EIS Notice of Availability in the *Federal Register*[4]. The initial deadline for the public comment period was January 25, 2017. However, due to requests from elected officials, the public comment period was extended to February 24, 2017. An announcement of the amended Notice of Availability and Notice of the Extension of the Public Comment Period were published on January 23, 2017, and January 24, 2017, respectively, in the *Federal Register*[5]. A press release with notification of the comment period extension was issued on January 13, 2017. Display advertisements with the public notice of the comment period extension were published in local newspapers from January 19, 2017, through January 25, 2017. In total, the public comment period comprised 105 days.

1.10.1 Draft EIS Notifications

A range of notification tools were used to: 1) publicize the release of the Draft EIS; 2) provide details on the Proposed Action and the times, dates, and locations of the public meetings; and 3) describe ways to comment. Notification tools included mailings (letters and postcards), newspaper display advertisements, digital advertisement (i.e., advertisements on the newspaper websites), press releases, use of the project website, and phone calls to elected leaders (Table 1.10-1).

[4] A Notice of Availability was published on November 10, 2016 (81 FR 79019).

[5] An amended Notice of Availability was published on January 23, 2016 (82 FR 7822). A Notice of Extension of the Public Comment Period for the Draft EIS was published on January 24, 2016 (82 FR 8185).

Table 1.10-1 Summary of Notifications for the Draft Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

	2016-2017[1]	
Notification Method	***Total for Notice of Availability, Initial Comment Period, and Notice of Public Meetings***	***Total for Amended Notice of Availability and Extension of Public Comment Period***
Mailings to addressees on initial mailing list[2]	1,388	-
Letter	125	-
Postcard	1,263	-
Newspapers with paid advertisements	8	7
Paid print advertisements (days)	28	13
Paid digital advertisements (days)	7 sites, for a total of 14 days each	6 sites, for a total of 7 days each
Phone calls to elected leaders	12	-
Website visits	10,219	5,110
Libraries with Draft EIS materials	22	22

Notes:

[1] An initial 75-day public comment period was conducted from November 10, 2016, to January 25, 2017. Due to requests from elected officials, the public comment period was extended to February 24, 2017, for a total of 105 days. An amended Notice of Availability and a Notice of Extension of the Public Comment Period for the Draft EIS were published January 23, 2017, and January 24, 2017, respectively, in the *Federal Register*.

[2] See Chapter 9 for the distribution list for these mailings.

1.10.2 Draft EIS Public Meetings

The Navy held five open house public meetings in Port Townsend, Oak Harbor, Lopez Island, Anacortes, and Coupeville, Washington (Table 1.10-2). A Notice of Public Meetings was published on November 18, 2016, in the *Federal Register*[6].

[6] Notice of Public Meetings was published on November 18, 2016, (81 FR 81748) in the *Federal Register*.

Table 1.10-2 Public Meeting Dates and Locations for the Draft Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Date	*Location*
Monday, December 5, 2016 3:00 pm to 6:00 pm	Fort Worden State Park Conference Center, USO Hall 200 Battery Way Port Townsend, WA 98368
Tuesday, December 6, 2016 4:00 pm to 7:00 pm	Oak Harbor Elks Lodge, Grande Hall 155 NE Ernst Street Oak Harbor, WA 98277
Wednesday, December 7, 2016 3:00 pm to 6:00 pm	Lopez Center for Community and the Arts 204 Village Road Lopez Island, WA 98261
Thursday, December 8, 2016 3:00 pm to 6:00 pm	Seafarer's Memorial Park Building 601 Seafarer's Way Anacortes, WA 98221
Friday, December 9, 2016 4:00 pm to 7:00 pm	Coupeville High School Commons 501 South Main Street Coupeville, WA 98239

Public meetings were conducted in an open-house format designed to enhance public understanding of the project and the NEPA process, and to allow members of the public to identify for Navy representatives topics and concerns they would like to see addressed in the Final EIS. In addition to soliciting comments on the Draft EIS, the Navy used the NEPA public meetings to solicit comments related to Section 106 of the National Historic Preservation Act.

During the public meetings, attendees could speak individually with Navy representatives and submit written and oral comments. Meeting materials were made available in paper copy to public meeting attendees and were also available for electronic download from the project website. Across all five public meetings, a total of 1,013 individuals were counted in attendance, including federal and state elected officials, and members of the media, city government agencies, and local community planning groups.

During the public Draft EIS public review and comment period, the Navy expanded its public outreach and provided paper copies of the Draft EIS to additional libraries in the area (Table 1.10-3).

Table 1.10-3 Libraries and Locations Provided Paper Copies of the Draft Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Library	*Location*
Oak Harbor City Library	1000 SE Regatta Drive Oak Harbor, Washington
Anacortes Public Library	1220 10th Street Anacortes, Washington
La Conner Regional Library	614 Morris Street La Conner, Washington
Coupeville Library	788 NW Alexander Street Coupeville, Washington
San Juan Island Library	1010 Guard Street Friday Harbor, Washington
Lopez Island Library District	2225 Fishermen Bay Road Lopez Island, Washington
Orcas Island Public Library	500 Rose Street Eastsound, Washington
Island Library	2144 South Nugent Road Lummi Island, Washington
Camano Island Library	848 North Sunrise Boulevard Camano Island, Washington
Mount Vernon City Library	315 Snoqualmie Street Mount Vernon, Washington
Port Townsend Public Library	1220 Lawrence Street Port Townsend, Washington
Guemes Island Library	7549 Guemes Island Road Anacortes, Washington
Seattle Public Library	1000 4th Avenue Seattle, Washington
Burlington Public Library	820 East Washington Avenue Burlington, Washington
Freeland Library	5495 Harbor Avenue Freeland, WA 98249
Langley Library	104 2nd Street Langley, WA 98260
Clinton Library	4781 Deer Lake Road Clinton, WA 98236
North Olympic Library System, Sequim	630 North Sequim Avenue Sequim, WA 98382
Bellingham Public Library	210 Central Ave Bellingham, WA 98225
North Olympic Library System, Port Angeles	2210 South Peabody Street Port Angeles, WA 98362
Jefferson County Library	620 Cedar Ave Port Hadlock, WA 98339
Sedro-Woolley Library	802 Ball St Sedro-Woolley, WA 98284

1.10.3 Draft EIS Public Comments

Comments were received from elected officials, federal regulatory and state resource agencies, business and community leaders, organizations, and individuals. Comments received during the Draft EIS public comment period were provided through one or more of the following five comment-submittal methods:

- in writing, while attending one of the meetings
- orally to the stenographer, while attending one of the meetings
- electronically, via the project website at www.whidbeyeis.com
- electronically, via email
- in writing, by mail

Comments pertaining to this project but submitted during public involvement efforts for other regional NEPA projects were collected, reviewed by this project team, and considered in the development of this EIS analysis. Similarly, comments submitted during public information meetings for this project but that pertain to other regional Navy projects were forwarded to those project teams as appropriate for consideration in the preparation of their projects. In total, one comment from other project meetings was forwarded to this project team, and, in turn, this project team forwarded 950 comments to other project teams (this includes 151 Electronic Warfare comments, eight Naval Special Operations comments, 673 perfluorinated compound [PFC] comments, and 18 water test requests). Table 1.10-4 summarizes the total number of comments submitted through all methods that were made available to the public during the Draft EIS public comment period.

Table 1.10-4 Summary of Comments by Submittal Method during the Public Comment Period for the Draft Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Method of Comment Submittal	*2016-2017 Draft EIS Public Comment Period* *Number of Comments Received*[2]
Written Comments Submitted at Public Meetings	335
Oral Comments Submitted at Public Meetings	30
Comments Submitted via the Website	3,334
Comments Emailed	17
Comments Mailed	619
Comments Received from Other NEPA Efforts[1]	1
Total Comments	4,335

Notes:

[1] Comments were received during the public comment period for this Draft EIS that pertain to other regional efforts. These included comments on perfluorinated compounds, NWTT Supplemental Draft EIS/OEIS, the Electronic Warfare Range EA, and the Naval Special Operations EA. In total, 950 comments were forwarded to other project teams for review and consideration. Of the 950 forwarded comments, 673 were provided to the project team for perfluorinated compounds, 251 were provided to the project teams for the NWTT Supplemental Draft EIS/OEIS and the Electronic Warfare Range EA, and eight were provided to the project team for the Naval Special Operations EA.

[2] A comment is an individual communication received (e.g., letter, email, oral statement). Any one comment (e.g., letter, email, oral statement) may include several topics. Comments are counted based on the number of individual communications received (e.g., letters, emails, oral statements).

Key:
EA = Environmental Assessment
EIS = Environmental Impact Statement
NEPA = National Environmental Policy Act
NWTT = Northwest Training and Testing
OEIS = Overseas Environmental Impact Statement

1.10.4 Summary of Draft EIS Comment Topics and Commenters

Each comment submittal received during the Draft EIS public comment period was reviewed and segmented/categorized by its primary resource area and subtopics. Most comment submittals included multiple topics and were therefore divided accordingly into multiple comment segments. Each substantive segment was assigned to the appropriate resource-specific specialist from the Navy's interdisciplinary team for review and response.

Table 1.10-5 provides a summary of all coded comment segments, categorized by primary resource area. A total of 4,335 comment submittals were received during the comment period from 2,638 unique commenters. These comment submittals were coded into 20,527 comment segments for review and response. Noise associated with aircraft operations, socioeconomics, alternatives, public health and safety, and the NEPA process were the top five named topics identified during the public comment period.

Table 1.10-5 Comment Topics and Quantities of Public Comment Segments for the Draft Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Primary Resource Area	*Number of Comment Segments[1]* *2016-2017*
1. General Support	192
2. General Opposition	93
3. Purpose and Need	188
4. Proposed Action	73
5. Alternatives	1,782
6. National Environmental Policy Act Process	1,268
7. Public Participation	529
8. Specific Resources	
a. Airspace and Airfield Operations	576
b. Noise Associated with Aircraft Operations	7,388
c. Public Health and Safety	1,489
d. Air Quality	159
e. Land Use	847
f. Cultural Resources	302
g. American Indian Traditional Resources	36
h. Biological Resources	1,071
i. Water Resources	50
j. Socioeconomics	2,327
k. Environmental Justice	93
l. Transportation	71
m. Infrastructure	26
n. Geologic Resources	85
o. Hazardous Materials and Wastes	1,141
p. Climate Change and Greenhouse Gases	130
9. Cumulative Impacts	145
10. Electronic Warfare	448
11. Naval Special Operations	8
12. No Comment Submitted	10
Total Comment Segments	20,527

Notes:

[1] A comment segment is an individual substantive statement within a comment submittal that warrants a response. Comment segments were categorized by primary resource area and subtopic. A comment is an individual communication received (e.g., letter, email, oral statement). Any one comment submittal (e.g., letter, email, oral statement) may include numerous comment segments.

As discussed above, comment segments were categorized by primary resource area and subtopic. Primary resource areas (in bold) and their associated subtopics are listed below (note: there were no subtopics identified for some primary resource areas):

- General Support
- General Opposition
- Purpose and Need

- Proposed Action
- Alternatives
- NEPA Process
- Public Participation
- **Airspace and Airfield Operations** – Airspace and Airfield Operations (General), Flight Tracks, and Airspace, Airspace Classification
- **Noise Associated with Aircraft Operations** – Noise (General), Day-Night Average Sound Level (DNL) Contours, Domestic Pets or Livestock, Location Specific (Not Canada), Location Specific (Canada), Neutral/Support, Noise Mitigation, Noise Modeling, Nonauditory Health Effects, Supplemental Metrics and Health, Supplemental Noise Metrics (General), Classroom/Learning Interference, Effects on Recreation, Potential Hearing Loss, Single Event Noise, Sleep Disturbance, Speech Interference, and Vibration Effects
- **Public Health and Safety** – Public Health and Safety (General), Bird/Animal Aircraft Strike Hazard, Risk of Mishap, Safety Risks to Children, and Accident Potential Zones (APZs)
- **Air Quality** – Air Quality (General), Construction Emissions, Fuel Dumping, Mobile Emissions, and Stationary Operation Emissions
- **Land Use** – Land Use (General), Coastal Consistency Determination, Noise Disclosure, On-Station Land Use, Regional Land-Use, and Recreation and Wilderness
- **Cultural Resources** – Cultural Resources (General), Archaeological Resources, Architectural Resources, SHPO Consultation, and Vibration Effects
- **American Indian Traditional Resources** – American Indian Traditional Resources (General) and Government-to-Government Consultation
- **Biological Resources** – Biological Resources (General), Habitat, Marine Species, Terrestrial Wildlife (Birds), Terrestrial Wildlife (Not Birds), Threatened and Endangered Species, and Threatened and Endangered Species Consultation
- **Water Resources** – Water Resources (General), Floodplains and Wetlands, Groundwater, Marine Water and Sediments, and Surface Water
- **Socioeconomics** – Socioeconomics (General), Housing, Local Government Revenue and Expenditures, Population, Property Values, Community Services (General), Education, Fire and Emergency, Medical, Police, Economy/Employment/Income, and Tourism
- **Environmental Justice** – Environmental Justice (General), Impacts, and Methodology
- **Transportation** – Transportation (General), Off-Base Transportation, and On-Base Transportation
- **Infrastructure** – Infrastructure (General), Energy, Potable Water, Solid Waste, Stormwater, and Wastewater
- Geologic Resources
- **Hazardous Materials and Wastes** – Hazardous Materials and Wastes (General), PFCs, and Water Test Request
- **Climate Change and Greenhouse Gases** – Climate Change and Greenhouse Gases

- **Cumulative Impacts** – Cumulative Impacts (General), Cumulative Impacts (Project), and Cumulative Impacts (Resource)
- Electronic Warfare
- Naval Special Operations
- No Comment Submitted

1.11 Public Participation: Comment Themes

Specific comment themes have been identified across the three public comment periods (Scoping 2013, Scoping 2014, and Draft EIS Release). Themes are recurring topics raised by commenters across the three public comment periods. Theme topics are detailed below, including information on how these themes are considered within the EIS analysis. Themes are organized under their respective resource area, in the order they are presented in the EIS. When applicable, theme descriptions include references to analysis in the EIS where expanded or additional information is located.

1.11.1 General Topics

- **Best Available Science and Analysis Methodology.** The EIS fully considers peer-reviewed studies and articles, particularly those related to potential health effects (nonauditory) of aircraft noise on humans and wildlife. An extensive literature review was conducted for the purposes of this EIS analysis (see Section 4.2 [Noise], 4.8 [Biological Resources], and Appendix A, Aircraft Noise Study). A comprehensive Aircraft Noise Study (Appendix A) was prepared for this EIS, and specific discussions on key topics are addressed in Section 4.2 (Noise) and Section 4.8 (Biological Resources), respectively. Through public comment, specifically from the State of Washington Department of Health, the U.S. Environmental Protection Agency (USEPA), and other public comments, requests were received to review additional published articles. In preparation of the Final EIS, the Navy reviewed 260 published articles as suggested by public comment. In doing so, the Navy identified that many of these studies had been already reviewed and included in the Navy's literature review or were referenced in or by studies the Navy has already considered. However, expanded information has been incorporated as appropriate. The studies did not change the overall findings of the Navy's original literature review. See Appendix A-8 for details on the literature review process.
- **Previous NEPA Studies and Segmentation.** Multiple Navy actions have previously occurred at the NAS Whidbey Island complex. Through public comment, inquiries were received about how earlier studies are related to the current Proposed Action. Information has been provided in Section 1.6 (Key Documents) on the studies relevant to this Proposed Action. Documents are considered key because of similar actions, analyses, or impacts that are either directly relevant or inform the analysis of this Proposed Action. Under the Proposed Action, the Navy evaluated potential environmental impacts of increasing the capabilities of the electronic attack mission by increasing the number of Growlers operating at NAS Whidbey Island and associated personnel changes. This EIS does not analyze impacts of Growler training occurring at existing range complexes, Special Use Airspace, and testing ranges. The Navy prepares separate NEPA documents addressing home basing and training because each of these documents is focused on the specific action that occurs at these locations. These actions are separated from other actions by their purpose and need, independent utility, timing, and geographic location. While the Navy has analyzed, and is currently analyzing, various proposed actions in the area, those

proposed actions are not preconditions for Growler operations at the NAS Whidbey Island complex. Growler operations at the NAS Whidbey Island complex are not a precondition for larger military readiness activities on range complexes in the Pacific Northwest. Even in the absence of this Proposed Action, military training in the Pacific Northwest would continue independently from this Proposed Action as analyzed in the documents referenced in Section 1.6. The Navy does consider the impacts from past, present, and reasonably foreseeable future actions in Chapter 5 (Cumulative Impacts).

- **Drinking Water Testing.** The Navy is actively identifying all known and suspected sites where perfluorooctane sulfanate (PFOS) and/or perfluorooctanic acid (PFOA) may have been released, as well as locations where PFOA or PFOS may have migrated to off-installation drinking water sources. Through public comment on this document, inquiries were received related to the Navy's handling of these emerging contaminants. Areas surrounding both Ault Field and OLF Coupeville are receiving drinking water testing to confirm the USEPA drinking water lifetime health advisory is not exceeded for PFOS and PFOA. In situations where the USEPA lifetime health advisory level is exceeded, the Navy is providing alternative drinking water.

  The Navy is also taking action to reduce potential releases of these compounds into the environment. Consistent with Navy policy, these actions include ceasing uncontrolled environmental release of aqueous film-forming foam (AFFF) for shoreside installations (with the exception of emergency response), ceasing training with AFFF, testing firefighting and crash response vehicle AFFF systems, and testing to ensure hangar AFFF and other fixed systems have appropriate controls in place to prevent environmental release. The Navy is identifying for removal and destruction all legacy 3M® PFOS-containing (and PFOA-containing) AFFF. The Navy is testing current AFFF (most of which was developed to comply with the USEPA 2010/2015 PFOA Stewardship Program) to confirm chemical formulations, with the goal of identifying suitable replacements for existing stocks. If a crash occurs that necessitates the use of AFFF, the Navy will contain and capture released AFFF to the maximum extent practical to ensure limited infiltration into the soil and/or groundwater. Per public comment on this document, more information on this topic is included in Sections 3.9 and 4.9, Water Resources.

- **Olympic Peninsula/Olympic National Park and Study Area.** The Olympic Peninsula, including the Olympic National Park, is not part of the study area for this analysis. Through public comment, inquiries were received as to how the Navy addresses its activities in these areas. The Navy prepares separate NEPA documents addressing home basing and training activities. These actions are separated from other actions by their purpose and need, independent utility, timing, and geographic location. Discussion has been included in Section 1.6 related to how the environmental impacts from Navy activities for the Olympic Peninsula are evaluated in the 2010 Northwest Training Range Complex EIS/OEIS and the 2015 EIS/OEIS for Northwest Training and Testing.

  Growler operations at the NAS Whidbey Island complex do not automatically trigger larger military training activities in the Pacific Northwest. Likewise, Navy military readiness activities proceed independently of whether this Proposed Action is implemented. NEPA documents that address training typically analyze various training activities of many different types of aircraft and ships within an existing military range. This EIS focuses on the facilities and functions to support Growler operations at the NAS Whidbey Island complex.

- **Procurement Aircraft and Operational Aircraft.** The Navy's Proposed Action remains as communicated to the public, which is to potentially operate up to 118 Growler aircraft at the NAS Whidbey Island complex, an increase of up to 36 operational aircraft from the current 82. Through public comment, inquiries were received about the total number of aircraft that may be procured by the Navy and the number of aircraft that will be operated at NAS Whidbey Island. The program of record, or the total number of Growlers the Navy plans on buying over the expected life of the Growler program, is 160 aircraft. This does not mean that all 160 aircraft will be operating at NAS Whidbey Island complex at one time. The program of record represents a pool of available assets: some aircraft will be in an operational flight status, while others will be inoperable (non-flying or preservation status) until such time as they are needed.

  The Navy purchased additional replacement aircraft because the manufacturing line was still operational. Many of these additional aircraft will be maintained in a preservation status and will be used to replace aircraft at the end of their service life, aircraft that are undergoing repairs, or aircraft that may be lost in combat. Some of the preservation aircraft may be stored at Ault Field, while other preservation aircraft may be stored at other locations. One carrier squadron is forward-deployed to Japan as part of Carrier Air Wing FIVE. Some of the aircraft will be designated as test aircraft, which will be assigned to NAS Patuxent River, in Maryland, and the Naval Air Weapons Station China Lake, in California. Some aircraft will be assigned to NAS Fallon, Nevada, as part of the Naval Aviation Warfighting Development Center.

  It is important to note that the number of aircraft operations is defined by the number of aviators who are conducting training operations. The aircraft only facilitate the training of Navy aircrew because Navy aircrew fly the available aircraft from a pool of assets. Thus, the total number of aircraft procured by the Navy does not define how many aircraft will be operational; rather, the number of training operations is determined by the number of aviators available to fly the aircraft.

1.11.2 Airspace and Airfield Operations

- **Flight Tracks**. Air Traffic Control (ATC) services for all aircraft operating within the Class C airspace are provided by the NAS Whidbey Island ATC facility. The NAS Whidbey Island ATC facility is responsible for the safe, orderly, and expeditious flow of all civil and military air traffic and provides the en-route traffic control service within 2,100 square miles of the airspace surrounding the Class C airspace. Through public comment, requests were made for additional information on the flight tracks used by Growler aircraft at the NAS Whidbey Island complex. This EIS examines existing airspace conditions, which includes a discussion of flight tracks, in Section 3.1 and impacts to airspace under each alternative in Section 4.1.

  The flight tracks at NAS Whidbey Island complex, depicted in Chapters 3.1 and 4.1 of the EIS, were established based on land use and obstacle clearance, civil air traffic routes and available airspace, and navigational aid coverage, as well as current operational characteristics of the aircraft operating at NAS Whidbey Island complex. Since additional Growlers will perform the same mission as the existing Growlers, the Navy is not proposing to change the type, location, or current ratio of daytime and nighttime operations to support the additional aircraft. All Navy pilots are required to comply with Federal Aviation Administration (FAA) and Navy regulations, which dictate allowable aircraft flight altitudes. Many variables determine flight pattern altitude, such as designation of flight corridors, distance between takeoff and landing locations, mission,

and other air traffic. Other than during takeoff and landing, low-altitude flight is conducted only for specific training requirements in approved areas and on approved routes.

- **Explanation of Operation Types and Training Needs**. This EIS examines air operations in Section 3.1 and any proposed changes to air operations under each alternative in Section 4.1. In addition, the EIS addresses the need for this Proposed Action in Section 1.3 (Purpose of and Need for the Proposed Action). Through public comment, requests were received for a more comprehensive explanation of the various types of operations (such as FCLP) completed by Growler aircraft at the NAS Whidbey Island complex. In addition, some commenters requested additional information on the need for this action and reasoning why another type of training or alternative was not being analyzed (e.g., moving the Growlers to another location and conducting FCLP there). Additional discussion has been added to Sections 3.1 and 4.1.
- **Australian Air Force Operations**. The Navy conducts training at NAS Whidbey Island for Royal Australian Air Force EA-18G pilots. The training is not scheduled to change as part of the Proposed Action. Through public comment, inquiries were received about how the Navy is including this program under the Proposed Action. Flight operations for this training program are included in the operation totals under the affected environment analysis (see Sections 3.1, Airspace and Airfield Operations, and 3.2, Noise Associated with Aircraft Operations) because the training is in progress and ongoing.
- **Seasonal Impacts on Airfield Operations.** Airfield operations at the NAS Whidbey Island complex can be affected by weather delays and other seasonal conditions (such as longer daylight hours during the summer months or shifts in the prevailing wind direction). Through public comment, inquiries were received related to how these types of considerations are incorporated into the analysis. Current airfield operations are provided in Section 3.1.2, and changes to operations under the various alternatives are examined in Section 4.1. Relevant operational considerations are included in the discussion within these sections.

1.11.3 Noise Associated with Aircraft Operations

- **Sonic Booms**. Sonic booms are the sound created by an object traveling faster than the speed of sound, or when aircraft are traveling at or above Mach 1.0. Through public comment, sonic booms were identified as a concern pertaining to Growler aircraft. Navy regulations strictly control supersonic flight and provide that sonic booms shall not be intentionally generated below 30,000 feet of altitude unless over water and more than 30 miles from inhabited land areas. Supersonic flight over land or within 30 miles offshore may only be conducted in specifically designated areas, and no such areas exist in the study area. The training activities that have the potential to produce sonic booms occur well out at sea in the Northwest Training Range Complex and are covered in a separate NEPA document. Northwest Training Range Complex rules prohibit supersonic flight except when greater than 30 nautical miles off shore of the Pacific Coast and clear of ship traffic and personnel. For this reason, sonic booms are rarely heard in the vicinity of the NAS Whidbey Island complex and can be confused with seismic or atmospheric events and industrial activities. Navy rules strictly control supersonic flight over land. This Proposed Action is not anticipated to result in any increase in the instances of sonic booms in the study area. A comprehensive Aircraft Noise Study (Appendix A) was prepared for this EIS, and impacts associated with noise are further analyzed in Section 4.2.

- **Noise Mitigation.** The Navy employs numerous mitigation measures for aircraft operating at the installation and periodically reviews ongoing operational procedures to minimize noise impacts whenever and wherever practicable while maintaining flight safety. Through public comment, requests were made for more information on the measures that would be taken by the Navy to mitigate potential noise impacts as a result of implementing the Proposed Action. Additional details have been added to Sections 3.2 and 4.2 regarding existing and potential future noise mitigation measures. In addition, a technical appendix has been added to the EIS providing an expanded discussion of this topic; see Appendix H, Noise Mitigation. Numerous noise-abatement procedures are specified in the current air operations manual for NAS Whidbey Island. NAS Whidbey Island's policy is to conduct required training and operational flights with a minimal impact on surrounding communities. All aircrews using NAS Whidbey Island facilities are responsible for the safe conduct of their mission while complying with published course rules, noise-abatement procedures, and good common sense. Each aircrew must be familiar with the noise profiles of their aircraft and must be committed to minimizing noise impacts without compromising operational and safety requirements. Section 3.2.4.2 discusses some examples of the Navy's current noise-abatement procedures at NAS Whidbey Island, which are outlined in the NAS Whidbey Island Air Operations Manual and are also subject to change in the future based on revisions to the manual.

  Installation Public Affairs personnel frequently correspond with numerous media outlets and utilize the installation's webpage and social media, such as the station's Facebook page, to share flight schedules and other information and to solicit public feedback. When possible and if weather conditions allow, station officials modify fight operations to minimize noise impacts, such as during weekends and during school exams. The installation will continue to publish FCLP schedules and notify the public of any changes to them, such as for weekend festivals. The installation continuously reviews flight procedures to determine whether there are any changes that could help reduce noise impacts on the surrounding population. The Navy is also considering other noise-reduction measures, such as construction and operation of a noise suppression facility for engine maintenance (also known as a "hush house") and actively researching engine design solutions to reduce overall sound emissions from the engines of the FA-18E/F "Super Hornet" and Growler in addition to other measures that may reduce the number of FCLPs required. These measures include the following:

  - **Precision Landing Mode (PLM),** also known as MAGIC CARPET (an acronym for Maritime Augmented Guidance with Integrated Controls for Carrier Approach and Recovery Precision Enabling Technologies), is a flight control system that automates some controls to assist pilots with landing on aircraft carriers, making the flight deck operations aboard the carrier safer and more efficient. In addition, the technology potentially reduces the workload and training required for pilots to develop and maintain proficiency for shipboard landings. This technology could eventually result in a decrease of future training requirements, resulting in fewer FCLPs at locations such as the NAS Whidbey Island complex. The initial capabilities of PLM were demonstrated when the system was used in its first shore-based flight on the Super Hornet and the Growler on February 6, 2015. PLM has already been successfully demonstrated on the F-35C Joint Strike Fighter during operational testing. PLM's introduction into the Growler fleet began in 2017 and is scheduled to be complete by the end of 2020. PLM holds great promise for making carrier landing safer

through automation, which will reduce the amount of FCLP required. The potential training reduction for required FCLPs is estimated at 20 percent overall. This reduction has been factored into the Final EIS analysis under all alternatives and leads to a decrease in FCLP operations as compared to the FCLP operations described in the Draft EIS. The Navy is moving forward with an aggressive schedule to incorporate this technology into the Fleet, and the Navy expects that this will reduce FCLP training requirements in the next several years. In fact, initial versions of PLM capability have been introduced to all carrier squadrons in the Growler fleet currently stationed at NAS Whidbey Island, and a more robust version offering full capabilities and redundancy is expected to be complete by the end of 2020.

- **Chevrons.** Chevrons are specially designed shapes installed at the end of a jet engine exhaust nozzle for sound reduction. Testing confirmed that chevron technology has some positive effect on noise output; however, it also demonstrated that redesign and additional testing are necessary to fully assess any noise-reduction benefits and potential drawbacks. The Navy is continuing to explore different technologies to reduce noise impacts from aircraft.
- **Air Installations Compatible Use Zones.** The Navy has an active Air Installations Compatible Use Zones (AICUZ) program in place at the NAS Whidbey Island complex. The Navy AICUZ program's goals are to protect the safety, welfare, and health of those who live and work near military airfields while preserving the military flying mission. This is done through working with the local community and municipal organizations to coordinate appropriate development and land uses in various locations surrounding the installation. The Navy will continue to address local concerns about aircraft noise by updating the existing AICUZ, as necessary, and coordinating closely with the local community.

- **NOISEMAP and Noise Monitoring.** NOISEMAP is the approved DoD program to assess aircraft noise impacts on the surrounding community. Through public comment, inquiries were received related to NOISEMAP, modeling, and monitoring future noise conditions in order to validate NOISEMAP results. The discussion of the NOISEMAP model, as well as the data inputs into the model that were used for this analysis, can be found in Section 3.2.2. As discussed in Section 3.2.2, computer modeling provides a tool to assess potential noise impacts. DNL noise contours are generated by a computer model that draws from a library of actual aircraft noise measurements. Noise contours produced by the model allow for a comparison of existing conditions and proposed changes or alternative actions that do not currently exist or operate at the installation. For these reasons, on-site noise monitoring is seldom used at military air installations for NEPA analyses, especially when the aircraft mix and operational tempo are not uniform. However, NOISEMAP has already been validated as an accurate process through many years of use by the DoD.

  NOISEMAP is the latest model available for environmental noise for all DoD studies. It should also be noted that the noise analysis was updated in the Final EIS using the most recent update to the modeling software, NOISEMAP 7.3 (released in March 2017). NOISEMAP modeling results are based in part on aircraft noise data that were measured from actual aircraft. The noise source data used to analyze the Growler for this impact assessment were measured by the U.S. Air Force on February 15, 2001, and are publicly available. Typical measurement procedures

involve establishing large arrays of microphones at specific points on the ground and can include aerial microphones suspended from cranes. The aircraft to be tested is flown along a planned path at known speeds, altitudes, and power settings while the microphones record the sound levels generated. Data are then normalized using prescribed protocols to account for the location, weather conditions, and terrain.

The noise measurements used for the Growler are based on the FA-18E/F Super Hornet, which shares the same airframe and engine as the Growler. Since the Growler includes different onboard equipment than the Super Hornet, the Growler-specific aircraft flight parameters (speed, power, etc.) were modeled to account for potential differences in aircraft weight.

The noise model takes this measured noise data from the aircraft maneuvers and then applies it to how the Growler flies specifically at NAS Whidbey Island, including the flight tracks, site-specific flight profiles, number of operations, and other site-specific factors such as terrain (including land and water) and relative humidity. The combination of these aircraft noise measurements, operational inputs, and environmental factors are utilized by the noise model to output noise results in different metrics.

- **Noise Points of Interest.** Noise is not limited to the areas immediately around Ault Field and OLF Coupeville. Therefore, the Navy includes additional noise analyses in the EIS using other noise metrics for various points of interest (POIs) around the airfields and in the surrounding communities. The wide geographic distribution of POIs provides broad coverage and context to compare the noise effects for the affected environment with the noise effects under each of the alternatives. Input from public scoping was used to identify these POIs, which include residential areas, parks, and schools. In addition, based upon public comments received between the Draft EIS and Final EIS, an additional 18 POIs were added to the analysis to provide the public and decision makers with more data to compare. These additional POIs include additional residential areas, schools, and parks, as well as two points in Ebey's Landing National Historical Reserve as identified in the National Park Service's acoustical monitoring report. The two points from that report (designated as EBLA001 [Reuble Farmstead] and EBLA002 [Ferry House]) correspond to POIs P18 and P17, respectively, in this EIS. All POIs are illustrated on Figure 3.2-6 and listed in Table 3.2-4 of this EIS, with a comprehensive impact analysis provided in Section 4.2 and in Appendix A. As discussed in Section 3.2.4.3, in general, the POIs were chosen based upon several factors, including geographic dispersal from the airfields and being located under flight operations, near major or identifiable landmarks, and areas that have had a history of noise impacts. It should be noted that for POIs located closely to one another (i.e., within about 0.25 mile, depending on topography), the results will most likely be the same or very similar and thus not add value to the analysis. Furthermore, it is possible to deduce the potential noise impacts for a specific location based on its proximity to a POI and its distance from the airfields. The POIs represent a geographic variety of residential neighborhoods, schools, and parks throughout Island County, as well as in the surrounding counties of San Juan, Jefferson, Clallam, Snohomish, and Skagit where noise from aircraft activity may be experienced. The supplemental metrics presented in the EIS for the various POIs include sound exposure level, the peak noise level for an event, indoor/outdoor speech interference, classroom learning interference, and sleep disturbance. These supplemental metrics are based upon what an individual may experience in terms of noise levels from a single aircraft event or number of events they may experience during a given time period when aircraft are flying in the vicinity. However, it should be kept in

mind that these are still averages, and, on a given day, an individual may experience more or fewer noise events than are presented in the EIS.

- **Average Annual Day.** Some commenters have stated that the Navy should have used the Average Busy Day (ABD) methodology found in the Navy's AICUZ instruction. The ABD methodology is not appropriate for this analysis for the reasons stated in Section 3.1.2.
- **Day-Night Average Sound Level Metric.** As stated in Section 3.2, DNL is the standard and federally accepted metric for assessing community annoyance due to aircraft noise impacts. In 1992, the Federal Interagency Committee on Noise (FICON) found "There are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric" (FICON, 1992), and the latest International Organization for Standardization (ISO) update (ISO 1996:1-2016) also suggests L_{dn} (another name for DNL) for community noise assessments. The FAA continues to recommend and utilize DNL, and the DoD methodology remains consistent with other federal agencies (including the USEPA, DoD, FICON, American National Standards Institute, and World Health Organization [WHO], among others).

  During the public comment process, comments were received on other noise metrics including Effective Perceived Noise Level and Weighted Equivalent Continuous Perceived Noise Level. These noise metrics are typically used only for engine certification, and, in addition, Effective Perceived Noise Level is analogous to SEL in that both are best suited to single-event analysis. DNL, on the other hand, is a cumulative noise metric designed to account for all noise events over the period of assessment (typically one day) and applies adjustments to account for the added intrusiveness of noise events that occur during nighttime. Due to these adjustments implemented by DNL and the ability to account for all noise events over the period of assessment, DNL is better suited for determination of annoyance rates among noise-exposed populations and remains the industry standard metric for environmental noise impact analysis. In the U.S. (specifically California), a variant of DNL, the Community Noise Equivalent Level (CNEL), is required by state law and applies an additional adjustment for noise events occurring during the evening time period of 7:00 p.m. to 10:00 p.m. Generally, CNEL results are within 0.5 to 1 dB of DNL, which yields very similar rates of annoyance. In scientific literature, particularly when correlating annoyance and evaluating health effects, DNL (or L_{dn}) is more prevalent and used at least 10 times more frequently than CNEL. Although CNEL is more conservative (i.e., predicts higher annoyance rates) than DNL, the stronger documented correlation between DNL and annoyance more than offsets this variance when evaluating potential environmental impacts. Scientific literature has not demonstrated a significant advantage of CNEL over DNL, so DNL remains the best available science.
- **A-Weighted vs. C-Weighted Sound Levels.** All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second, or Hertz. Based on the type of analysis or evaluation being conducted, the spectral content is weighted, and there are different weighting scales. For a discussion on noise, refer to Section 3.2 and Appendix A (Aircraft Noise Study). A-weighting best replicates human hearing and is the most appropriate for the assessment of annoyance from aircraft noise. A-weighted sound levels form the basis of the DNL metric, which is the best available metric to relate aircraft noise to long-term annoyance.

  Commenters have suggested that A-weighted measures may not be as accurate in determining the disturbing effects of noises with strong low-frequency components. However, the

alternative measurement methodology, C-weighting, increases the emphasis on lower frequencies when compared with A-weighting, and it is most appropriate for impulsive or repetitive sounds such as blast noise and machine gun fire, which contain significant low-frequency noise, as well as continuous noise sources such as pumps and compressors. The FAA continues to recommend and utilize DNL and A-weighting for airfield noise studies, and the DoD methodology used in the EIS is consistent with all applicable federal standards.

The low-frequency sound characteristics of the Growler are noticeably different from those of the Prowler, which previously operated at NAS Whidbey Island, but are quite similar to the sound characteristics of typical fighter aircraft. The Growler generates the greatest sound pressure levels (SPLs) at frequencies between 200 and 4,000 Hertz, consistent with the SPLs of many commercial jetliners, and noise impact analyses for these commercial jetliners utilize A-weighted DNL measurements.

The 15 dB and 25 dB attenuation levels for, respectively, windows-open and windows-closed conditions utilized in this analysis are consistent with DoD guidance. These values already account for the reduced attenuation at lower frequencies as well as the greater attenuation at high frequencies. The supplemental metrics that include assumed values of structure attenuation (sleep disturbance, speech interference, and classroom learning) apply the same attenuation to all scenarios. The analysis focuses on a "'before-and-after" comparison of the Proposed Action to existing conditions, which effectively reduces or, in some cases, completely eliminates the impact of variances in assumed structure attenuation.

- **Advanced Acoustic Model (AAM).** The discussion of the NOISEMAP model, which is the current, validated, and publicly available model that was used for this analysis, can be found in Section 3.2.2. Some commenters have asked the Navy to use the AAM instead of NOISEMAP.

  NOISEMAP is capable of modeling complex airfield activity by computing and combining many, often hundreds, of single aircraft flight paths. This method remains reliable when computing DNL even with multiple aircraft in the pattern at OLF Coupeville. The environmental analysis presents a comparison of potential impacts under the proposed scenarios to the existing conditions. With the focus on impacts as the difference between the Proposed Action and existing conditions, the use of NOISEMAP gives a valid comparison. NOISEMAP is the latest model available for environmental noise for all DoD studies. It should be noted that the FAA uses an integrated model similar to NOISEMAP for creating noise contours at commercial airports and does not plan, at this time, to change to a simulation model, such as AAM.

  The AAM is based on the Rotorcraft Noise Model, which was developed by the National Aeronautics and Space Administration since the late 1990s. AAM extends the algorithms in the Rotorcraft Noise Model to apply to fixed-wing aircraft and adds the capability to account for nonlinear propagation effects and vectored thrust. AAM is still in development and not ready for use. DoD's current version of AAM (v1) does not accurately account for the nonlinear propagation of noise that is associated with tactical jet aircraft. The U.S. Air Force, which has fixed-wing model responsibility, is currently considering approaches to develop reference noise spheres created from legacy data so that older aircraft can also be modeled within AAM. After the DoD receives an updated version of AAM that incorporates nonlinear propagation and validated legacy noise spheres, the model will have to undergo final testing, evaluation, and validation by the U.S. Air Force before it can be utilized by DoD to support informed decision

making regarding fixed-wing aircraft. Consequently, the Navy is continuing to utilize the latest version of NOISEMAP for modeling.

Wyle Report WR-1304 describes the potential benefits of AAM and limitations of NOISEMAP for assessing next-generation aircraft primarily differentiated by vectored thrust ability and higher maximum thrust. These factors apply primarily to fifth-generation aircraft, such as the F-22 and F-35. The F-22 is capable of generating more than 35,000 pounds of force (lbf) from each of its two engines. The F-35 produces 43,000 lbf of thrust from its single engine. The Growler utilizes two General Electric F414-GE-400 engines with reported thrust of 22,000 lbf with afterburner, significantly lower than the next-generation fighter aircraft. For comparison of historical aircraft, the maximum thrust for each of the two engines of the F-15C is 23,700 lbf with afterburner, while the F-14's two engines were each capable of 28,200 lbf with afterburner. For comparison to aircraft that historically operated at NAS Whidbey Island, the Prowler engines generated 10,400 lbf of thrust.

- **Other Noise Reports.** Several other noise reports are available that examine both measured and experiential noise in the areas near and far from NAS Whidbey Island. These include the *NPS Acoustic Monitoring Report for Ebey's Landing National Historical Reserve* (2016), the *Dahlgren Report on Combat Jet Noise from Landing and Taking Off at Whidbey Island* (2015), the JGL Acoustics, Inc., report, *Whidbey Island Military Jet Noise Measurements* (JGL Acoustics, Inc., 2013), and the *San Juan County Jet Aircraft Noise Reporting* (2014 to present), and they are discussed in Section 1.12. The results of these noise reports have not been incorporated into the EIS because these results have not been peer reviewed and in some cases do not use empirical data, although the results of the *NPS Acoustic Monitoring Report* (dated August 2016) appear to be consistent with the Navy's previous noise analyses. Furthermore, the National Park Service's (NPS's) monitoring report demonstrates that, while military aircraft are loud, military aircraft operations are highly intermittent, with long periods of no military aircraft activity.
- **Nonauditory Health Effects.** The EIS analysis considers the potential for aircraft noise to impact one's health, as discussed throughout Section 4.2 and Appendix A. The nonauditory health effects literature review was expanded using journals and research referred to by the Washington State Department of Health, the USEPA, and the public in their comment letters. More complete information added with respect to the following topics includes, but is not limited to, hypertension and cardiovascular health, lack of sleep, stress, and anxiety. Details can be found in Appendix A.

  Numerous epidemiological studies and meta-analyses have been conducted on the long-term health impacts of exposure to noise. The basic premise of these studies is that noise can cause annoyance, annoyance can cause stress, and prolonged stress is known to be a contributor to a number of health disorders, such as hypertension, myocardial infarction (heart attack), cardiovascular disease, and stroke.

  A 1974 study confirmed that noise can provoke stress but noted that results on its effect on cardiovascular health were contradictory. Some studies in the 1990s found a connection between aircraft noise and increased blood pressure, while others did not. This inconsistency in results led the WHO in 2000 to conclude that there was only a weak association between long-term noise exposure and hypertension and cardiovascular effects, and that a dose-response relationship (i.e., the change in effect [response] on an organism based on differing levels of exposure [dose]) could not be established (WHO, 2000).

Research studies seem to indicate that aircraft noise may contribute to the risk of health disorders, along with other confounding factors such as heredity, medical history, smoking, alcohol use, diet, lack of exercise, and air pollution, but the measured effect is small compared to the effects of these other factors and often not statistically significant. Although commenters have suggested aircraft noise contributes heavily to health disorders, there are no peer-reviewed studies that definitively show a causal and significant relationship between aircraft noise and health. Such definitive, peer-reviewed studies are very difficult to conduct and interpret because of the large number of confounding factors that have to be considered for their effects to be excluded from the analysis. The WHO (2000) notes there is still considerable variation among studies. Almost without exception, research studies conclude that additional research is needed to determine whether such a causal relationship between noise and human health exists. The European Network on Noise and Health, in its summary report of 2013, concludes "…..while the literature on non-auditory health effects of environmental noise is extensive, the scientific evidence of the relationship between noise and non-auditory effects is still contradictory" (European Network on Noise and Health, 2013).

Even though residents are exposed to aircraft noise, data collected from the Centers for Disease Control and Prevention, the Washington State Department of Health, and Island County Board of Health demonstrate that Island County is among the healthiest places to live and to work in the State of Washington (Appendix I). In general, individuals living in Island County enjoy a longer life span and better overall health. Island County ranks third for health outcomes and fifth for health factors among the 39 counties that comprise the State of Washington. Based on these indicators, while the local community may be concerned about aircraft noise, it does not appear to affect the overall health of most individuals.

1.11.4 Public Health and Safety

- **Accident Potential Zones.** APZs are areas near airfield runways where an aircraft mishap is most likely to occur, should one occur. Although some commenters suggested otherwise, APZs do not predict the likelihood of an aircraft accident. An examination of military aircraft mishaps indicates that most occur on or near the runway, or within the first 15,000 feet of the extended arrival or departure corridor of the airfield for Class B runways that are utilized by heavy or high-performance aircraft. While APZs do not predict the likelihood of an aircraft mishap, they do predict the most likely location of an aircraft accident, if one were to occur. While the likelihood of a mishap is small, the Navy recommends that land use within APZs be minimal or low density to ensure maximum protection of public health and property.
- **Mishap Rates.** From FY 2009 through FY 2017, the Growler community conducted approximately 187,642 flight hours of operations from land-based airfields. During that 9-year period, the Growler community experienced four Class A mishaps while operating from land-based airfields, equivalent to a mishap rate of 2.13 per 100,000 flight hours, none of which involved a "crash." A Class A mishap is defined as a mishap where either property damage is $2 million or more and/or the aircraft is destroyed or the mishap results in a fatality or permanent total disability. Two of the Growler Class A mishaps were ground mishaps and occurred at Ault Field. Mishaps are classified as ground mishaps if the "intent for flight" did not exist at the time of the mishap. The remaining two Class A mishaps from land-based operations were flight-related mishaps that did not occur at the NAS Whidbey Island complex. The FRS conducts

training for fully qualified pilots on operational aircraft. A replacement pilot may be a newly winged aviator or a veteran pilot returning from a non-flying tour who requires refresher training. While some have commented that replacement pilots are more mishap-prone, statistical evidence does not support the assertion that replacement pilots are more likely to have a mishap. In the same 9-year time period of 2009 through 2017, the Growler FRS experienced one Class A mishap during approximately 90,000 flight hours.

- **Risk of a terrorist attack.** Many comments were received that suggested there would be an increased risk of a terrorist attack due to the implementation of the Proposed Action. Section 1.11 of the Final EIS provides details on this topic. The Proposed Action does not change the status of NAS Whidbey Island as the home of the Navy's tactical Electronic Attack community. Therefore, it does not impact the Navy's force-protection requirements, which make a terrorist attack on a guarded military facility difficult and unlikely. Thus, to the extent that NAS Whidbey Island is currently a target for terrorism, the Proposed Action would not change that. It should be noted that, due to the robust protection measures at military facilities, military bases are generally unattractive targets for such attacks. To the extent an attack is intended to do something other than damage aircraft, such as damage infrastructure, the Proposed Action would not significantly add to the overall base infrastructure that is already present.

  In February 2012 (amended October 1, 2013), the DoD issued Unified Facility Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards For Buildings (February 9, 2012), requiring all DoD components to adopt and adhere to common criteria and minimum construction standards to reduce the potential damage that could be inflicted by terrorist activity directed at buildings occupied by DoD personnel. The intent of these building standards is to integrate greater resistance to a terrorist attack into all inhabited buildings. That philosophy affects the general practice of designing inhabited buildings. Anti-Terrorist Force Protection (ATFP) requirements and standards consist of restrictions for onsite planning, including standoff distances, unobstructed space, drive-up and drop-off areas, access roads, and parking; structural design; and electrical and mechanical design.

  In September 2008, the DoD issued UFC 4-020-01, DoD Security Engineering Facilities Planning Manual. This UFC supports the planning of DoD facilities that includes requirements for security and antiterrorism and is used in conjunction with UFC 4-010-01 to establish the security and antiterrorism design criteria that will be the basis for DoD facility designs. Those criteria include the assets to be protected, the threats to those assets, the levels to which those assets are to be protected against those threats, and any design constraints imposed by facility users. The document also provides a risk management process for evaluating costs and protection options.

  UFC 4-010-01 and UFC 4-020-01 contain several design strategies that protect facilities from terrorist attacks, including controlled perimeters, access control standards, vehicle barriers, and manpower and procedures. Controlled perimeters require physical boundaries that channel vehicles to access control points. They are intended to clearly delineate the perimeter and to force potential aggressors to perpetrate an overt act to breach the perimeter rather than being able to cross the perimeter at any point other than the entry control point without any obstacles. Controlled perimeters and access control standards assume that procedures are implemented to search for and detect explosives to limit the likelihood that a vehicle carrying explosives could penetrate a controlled perimeter undetected. It is further assumed that access control will include provisions to reject vehicles without penetrating the controlled perimeter.

DoD Instruction 2000.16 requires every installation or base to have an antiterrorism officer. The role of the antiterrorism officer is to orchestrate the development of comprehensive antiterrorism plans and to coordinate the efforts of all organizations on the installations with respect to antiterrorism preparation and response (DoD, 2008; DoD, 2012).

Physical security of NAS Whidbey Island includes requirements for a secured perimeter, building siting, construction types, and setbacks from the installation secured perimeter, roadways, and parking, including any new construction under the Proposed Action. All new construction or renovation projects for a facility that exceed 50 percent of the Plant Replacement Value for that facility (or 75 percent if the structure is historic) must be in compliance with ATFP requirements. NAS Whidbey Island completed an ATFP barrier plan in 2010. According to security officials, base security operations are anticipated to grow with the arrival of additional aircraft (NAVFAC, 2016b).

Based on current threat reporting, there is no known specific threat targeting the NAS Whidbey Island complex. The risks of terrorist attacks are otherwise too speculative, remote, and removed from the environmental effects of the Proposed Action to merit further analysis under NEPA.

1.11.5 Air Quality

- **Fuel Dumping**. Fuel dumping is the release of aviation fuel during flight operations. Fuel release procedures are governed by the FAA and Navy rules. Some commenters expressed concerns with respect to fuel dumping. Per the NAS Whidbey Island Air Operations Manual, Navy pilots are prohibited from dumping fuel at altitudes below 8,000 feet above ground level, except in an emergency situation. Related environmental impacts are addressed in Section 4.4 (Air Quality) and Section 4.15 (Hazardous Materials and Waste).

1.11.6 Socioeconomics

- **Property Values.** Commenters have expressed concerns that increased operations at Ault Field and OLF Coupeville may potentially have a negative impact on surrounding property values with the increased frequency of noise exposure. Property values are dynamic and influenced by a combination of factors, including market conditions, neighborhood characteristics, and individual real property characteristics (e.g., the age of the property, its size, home amenities, and lot size). The degree to which a particular factor may affect property values is influenced by many other factors that fluctuate widely with time and market conditions. These same factors go into the personal decision for people to purchase a home. As discussed in Section 4.10.2.1 (Population Impacts) and in Appendix A, aircraft noise could affect the value of property under the greater than 65 DNL noise contours. As described and based on a review of relevant technical articles, property values generally can be expected to decrease by 0.2 percent to 2.0 percent per additional dB. On average, property values would decrease by approximately 0.5 percent per dB. The actual change in value will vary from location to location, and property values are affected by many non-noise-related factors. The frequency of flights and the noise related to them are two of many factors that may affect changes in property values. The total number of daily operations at Ault Field and OLF Coupeville under each alternative is less than the daily operations at several of the airports that were included in the review of relevant technical articles discussed in Section 4.10.2.1, Population Impacts. Therefore, since many non-

noise-related factors can affect property values, the analysis does not attempt to quantify changes in property values as a result of the Proposed Action. In addition, because many factors go into determining property values and because mapping property values would only show current values and not reflect any change in value associated with the Proposed Action, such a mapping effort would not add appreciably to an understanding of the effects of the Proposed Action and, therefore, is not feasible for this analysis.

In a separate study, Frankel (1988) found that economic impacts to noise-affected property owners differed depending on when their properties were purchased. As described in his study, property owners who purchased their property when the location was quiet are the most significantly impacted. Those owners who willingly purchased their property after the airport and flight operations were established would not be economically or monetarily injured. Since these individuals voluntarily purchased their properties after aircraft noise was already occurring, they would have received the property at a discounted price. Those owners who purchased their property after flight operations were already occurring but later experienced an increase in aircraft noise would experience some monetary loss, but these losses would not be as large as those of the first group (Frankel, 1988). More details on this study can be found in Section 4.10.2.1.

While the Navy acknowledges that some decrease in property values may occur as a result of increased operations at Ault Field and OLF Coupeville, it does not anticipate that this decline in value would be substantial enough to significantly affect local governments' property tax receipts. As described in Section 4.10.2.3, while some reductions in property values in the highest noise areas are anticipated, local property values for the area as a whole are expected to experience upward pressure as a result of the influx of additional Navy personnel. Therefore, no substantial changes in property receipts are anticipated as a result of the Proposed Action.

The Proposed Action would not physically occupy any private property or take control of any private property through the use of eminent domain. The Navy recommends that land use within APZs be minimal or low density but does not restrict existing land uses; land use decisions are made by the local government. See Sections 3.5.2.2 and 4.5.2.2 for a more detailed discussion of these topics.

Compensation and/or Mitigation. Numerous public comments have asked for the Navy to pay for various forms of property improvements, or for compensation of various forms. With regard to property improvements, the Navy does not have authority to expend appropriated funds on improvements to state, local, or private property.

Several commenters referenced the FAA's ability to do so as part of its Part 150 program, but that program is specific to the FAA. Specific Congressional authorization and appropriation for the Navy would be required to establish a similar program, and the Navy does not currently intend to seek such an authorization. In addition to addressing sound attenuation, several comments suggested that the Navy should pay for perceived loss of property values, loss of business profitability, personal hearing protection, compensation for leaving the home, or other forms of compensation for losses alleged from aircraft operations.

As discussed in the Navy's response to comments questioning the methodology underlying the noise analysis (see Sections 3.2 and 4.2), noise impacts analyzed in this document are predictive. This approach to noise modeling has been adopted by the FAA and the military services, and approved by reviewing courts as the best available methodology for describing noise impacts on

communities, but, as the EIS notes, this response is a subjective, individual response to stimulus affected by many variables. It is beyond the scope of this assessment to forecast individual response to this impact at the level of whether an individual will be sufficiently disturbed by the aircraft to bring claims against the Navy or whether the impact will rise to the level of a legally compensable taking. Moreover, as noted, the Navy's ability to expend appropriated funds is limited by law. To the extent individuals believe they have experienced damages or injury from Navy activities, they may pursue a claim against the Navy. Several public comments inquired as to whether the Navy would condemn private property. The Navy has no intention of condemning private property as part of the Proposed Action.

Separately, several comments alleged that realtors provide, or have provided, misleading information regarding noise levels near Navy airfields. The Navy has no control over private real estate transactions or whether sellers and/or realtors misrepresent the historical noise environment around a real estate parcel. The Navy believes that all lawful disclosures, including noise, should be provided to a prospective buyer prior to purchase. Island County and the City of Oak Harbor have adopted noise-disclosure ordinances whereby noise disclosure is the responsibility of the property owner and his or her agents.

- **Cost-Benefit Analysis.** The analysis discusses impacts to the natural and human environment in both qualitative and quantitative terms as applicable, but it does not attempt to assign a monetary value to these impacts. A cost-benefit analysis is beyond the scope of this EIS and therefore is not included. Likewise, monetizing major external costs from the Proposed Action--including the impacts of noise, the impacts to property values, the impact of potential accidents, and the impact to tourism--is also beyond the scope of this EIS. In accordance with NEPA, these impacts have been analyzed in the EIS, but their values have not been converted to dollar amounts.

  The purpose of NEPA is to assess the environmental impacts of a proposed federal action. The Proposed Action evaluated in this analysis is described in Section 1.1. A meaningful comparison of the alternatives under consideration must entail a comparison of multiple factors and, as such, does not lend itself to a monetary cost-benefit analysis; moreover, one is not required. As set forth in 40 CFR 1502.23, “For purposes of complying with [the National Environmental Policy Act], the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations.” Given that the purpose and need of the Proposed Action is ultimately to enhance the Navy’s warfighting capability, qualitative considerations such as operational synergy and efficient logistics support weigh more heavily than a pure cost analysis. The EIS evaluates the impacts of each alternative within relevant resource areas, assesses the significance of those impacts, and provides an indication of the considerations relevant and important to a decision.

1.12 Other Reports

The Navy uses the best available science to evaluate human and environmental impacts from the Proposed Action. Throughout the public comment period as well as through individual research, many reports and studies were suggested to the Navy to be reviewed and analyzed in the EIS. Studies utilized for the analysis are summarized in each specific resource area throughout the EIS. The following reports have been developed by independent sources, and the Navy has reviewed their findings in conjunction

with this EIS analysis. In addition to the specific reports listed below, the Navy conducted an expansive literature review on potential health effects of noise on humans based on the U.S. Environmental Protection Agency, the Washington State Department of Health, and other public comment letters. The results of this literature review, which are also mentioned in Section 1.11, are discussed in Appendix A.

1.12.1 San Juan County Jet Aircraft Noise Reporting (2014 to present)

For the past several years, San Juan County and its residents have been logging data related to aircraft noise events in a web-based aircraft noise reporting system (http://www.sjcgis.org/aircraft-noise-reporting/). The information logged is periodically summarized and submitted in batches to the Navy. In addition, the website contains information regarding the Navy's noise complaint contact information, including e-mail and phone.

The Navy is aware of the San Juan Jet Aircraft Noise Reporting system and has reviewed the information submitted. The data are typically reported with such information as Incident Report ID, Loudness, Aircraft Type, Comment, Date, and Time. Although the noise data have value from an anecdotal standpoint and inform the Navy regarding single-event aircraft noise concerns in San Juan County, the individual reports are subjective and do not provide the type of information and timeliness of data from which to draw direct conclusions or to take corrective action. For example, noise complaints received on the NAS Whidbey Island noise complaint hotline are reviewed daily, facilitating a prompt investigation to determine whether aircraft operations were being conducted in an appropriate manner.

For aircraft noise complaint and operational concerns to be of most value, they should be logged directly through the Navy's noise complaint hotline, which has established procedures (see Section 4.2.5) that allow the Navy to be responsive. This will help inform the larger, regional noise picture.

1.12.2 Sandford Fidell Public Comment on the "Significance" Criterion Used for Noise Impacts (2017)

Sandford Fidell provided a comment letter that claimed the "significance" criterion used for noise impacts underestimates the size of the residential population significantly impacted by the Proposed Action because it fails to provide the noise exposure on days when FCLP operations are to be conducted at OLF Coupeville. Fidell contends that the use of 65 dB DNL as a threshold for significant noise impact determination is inappropriate and underestimates the percentage of the population highly annoyed by noise. Fidell's comments are summarized below, with a presentation of the Navy's assumptions and response following.

Underestimation of Number of Population Impacted Due to Proposed Action:

- Fidell describes the Draft EIS as disclosing anticipated environmental impacts by first predicting noise exposure expected from future flight operations and then comparing the predicted quantity of noise exposure with its policy on the "significance" of the predicted exposure levels. Fidell states that disclosure of aircraft noise exposure alone does not directly disclose aircraft noise impacts in residential neighborhoods.
- Fidell criticizes the quantification of aircraft noise exposure as an outdated process that is not easily understood by the public and argues that the Navy should have taken specific measurements of aircraft noise at NAS Whidbey Island rather than rely on software models.
- Fidell concludes that, since the Navy must estimate the future operating conditions, the resulting noise exposure estimates can be no more credible than the computational assumptions used for their analysis. The author states that the Navy's assumption of analyzing

the intermittent FCLP operations on an annual average day (AAD) basis leads to underestimation in both aircraft noise exposure and the size of the population significantly affected by it. Fidell discusses DoD airfield flight activity and how weekday flight activity is often considerably greater than flight activity during weekends and federal holidays. He also discusses that previous studies utilized average busy day (ABD) rather than AAD, as is utilized in the Draft EIS. Utilizing annual average exposure level is more reasonable at large commercial airports, where the pace of operations varies only slightly from day to day and where a predominant direction of air traffic flow exists, according to Fidell. He feels annual averaging is unwarranted when day-to-day variability in operations is extreme.

Underestimation of Noise Exposure at OLF Coupeville during FCLP Operations:

- Fidell states that many readers of the Draft EIS are unlikely to fully understand that the DNL metric represents a notional "annual average" day, which does not correspond to any particular day of the year. OLF Coupeville is not in operation every day, so some days include greater sound exposure than average, while others include no aircraft noise. For this reason, the noise contours presented for OLF Coupeville activity do not accurately represent the aircraft noise exposure generated by Navy aircraft, according to Fidell. He further states that the Draft EIS lacks simple statements about the actual numbers of days per year when OLF Coupeville is used for FCLP operations. Fidell provides decibel-equivalent values for several quantities of operating days per year, from 30 days through 200 days, which would correspond to a 10.9 to 2.6 dB increase in OLF operating-day DNL compared to the annual average DNL depicted in the Draft EIS.

Draft EIS Does Not Specify Significance Criteria Used:

- Fidell contends that the Draft EIS is not clear in the significance threshold utilized for analysis, which ultimately affects the calculation of population significantly exposed in a manner consistent with other U.S. federal agencies, such as the Federal Highway Administration (FHWA, 1997) Noise Abatement Criteria that disclose and interpret hourly, not daily, equivalent (energy-average) sound levels (cf. Table 1, 23 CFR Part 772). The Federal Highway Administration's criterion of the significance of noise impacts in residential neighborhoods is exceeded when actual A-weighted traffic noise levels during any hour of the day exceed 67 dB. Another example provided by Fidell that criticizes basing environmental impact disclosures solely on AAD noise exposure predictions is the Federal Railroad Administration (2012), which considers simple increases in existing sound levels, not just absolute sound levels, as indicative of noise impacts.
- According to Fidell, the Draft EIS relies on a 1992 report published by FICON to predict impacts of aircraft noise on exposed residential populations along with the updated Schultz curve (Fidell et al., 1989, 1991) to provide the link to convert the Navy's predicted noise dose into exposed population expected to be "highly annoyed" and therefore impacted. Fidell states that the FICON report is silent on exactly how the updated Schultz curve supports a definition of the significance of noise exposure in units other than annoyance and that there is no objective or scientific technical justification for inferring a definition of significance of noise exposure from a curvilinear dosage-response relationship. Fidell contends that the Navy's opinion that a DNL value of 65 dB can serve as a threshold of significance of noise exposure intentionally sidesteps its duty under NEPA to disclose noise impacts in the Draft EIS.

- Fidell states that decibel-for-decibel, aircraft noise is more annoying than rail or road noise (Miedema and Vos, 1998; Miedema and Oudschoorn, 2001). ISO's 2016 dosage-response relationship is based on much more social survey information than was available in 1992, it is specific to aircraft noise, and it indicates that considerably greater percentages of the population are highly annoyed by aircraft noise than the 1992 "updated Schultz curve." Indicates. Fidell provides a figure that compares FICON's 1992 dosage-response relationship with ISO's 2016 relationship for aircraft noise, which shows that the FICON relationship under-predicts the proportion of people highly annoyed. If the Navy's definition of the significance of noise exposure were, as claimed in the Draft EIS, truly based on FICON's 1992 dosage-response relationship, it is apparent that to maintain consistency with the current international standard, the Navy would have to redefine the threshold of significance of aircraft noise exposure as 55.5 dB. It follows that this would require the Draft EIS to display noise exposure contours for DNL values 5 to 10 dB lower than those depicted in Figures 6-1 and following of Volume 2 (Appendix A) of the Draft EIS.
- Fidell claims that use of the DNL value of 65 dB as a threshold of "significant" noise impact is incorrect for the following reasons:
    1) The updated Schultz curve of the FICON report erroneously predicts that only 12.3 percent of the population is highly annoyed by noise at a DNL value of 65 dB. It is now known, per ISO 1996-1 (2016), that the prevalence of annoyance with aircraft noise exposure is more than twice as great as that predicted by the updated Schultz curve.
    2) The Navy's opinion is technically obsolete and indefensible because it fails to distinguish between the annoyance created by exposure to aircraft noise and that created by road and rail traffic.
    3) The Navy's opinion is arbitrary because, contrary to the recommendation of the FICON report, it is not based on the annoyance created by its aircraft operations. The criterion of CNR = 100, subsequently transformed mathematically into a DNL value of 65 dB, was based on analyses of complaint behavior and threats of litigation, not on the attitude of annoyance.
    4) The Navy's policy is unsupported by its claim that the policy is based on the 1992 FICON report. This claim is self-evidently erroneous for two principal reasons. First, the 1992 FICON report nowhere prescribes how or why the "updated Schultz Curve" in the report compels the Navy to define a DNL value of 65 dB as a threshold of significant noise impact. Second, the FICON report merely reiterates prior claims about quantities of noise exposure that were adequate to suppress complaints and litigation approximately 40 years before publication of the FICON report.

Assumption/Methodological Errors/Response

The Navy's use of AAD computation of DNL is consistent with the FAA methodology as described in FAA Regulation 14 CFR Part 150, as well as consistent with other DoD services (e.g., Air Force Instruction AFI 32-7063). This methodology defines yearly averaged DNL as the metric to be used for evaluating the cumulative impacts of multiple events, which consolidates the effects of intensity, duration, frequency, and time of occurrence.

The correlation between DNL and percentage of people highly annoyed is not precise and is affected by many variables, both emotional and physical (i.e., community opinion on necessity of activity that generates noise, number of years residing in the area, activity at the time an individual hears the noise, season, predictability of noise, control over the noise, etc.). The Draft EIS includes both the overall annual average DNL as well as significant additional analysis focusing on the changes in DNL exposure. The change in DNL, if assessed for both average and busy day, would yield identical values because the roughly 1.5 dB higher DNL value would apply to all alternatives and scenarios (including the No Action Alternative). Additionally, the use of busy day would fail to account for the benefit the Navy's minimal weekend operations would have on those days, which are days when people are less likely to be away from their homes at work. Also, ABD used for an analysis with multiple scenarios can be misleading. For example if an airfield doubles operations but also doubles its flying days, the resulting DNL will not change with all else being equal. The activity at OLF Coupeville only occurs when FCLP training is needed, which means operations occur during a minority of days per year, and no aircraft events occur on the remaining days. To provide some historical context, information on the number of active flying days at OLF Coupeville has been added to Section 1.4 and ranged between 10 and 36 days per year from 2015 to 2017.

It is important to realize that a typical or busiest day during the No Action Alternative would not change substantively for the Proposed Action. The change proposed at OLF Coupeville is primarily to increase the number of days of OLF operations per year to support a larger number of annual FCLPs. The use of "busy day" DNL without the inclusion of "average day" DNL risks misleading the public because the proposed conditions would prove identical to existing conditions.

The use of 65 dB DNL as a threshold for significance is consistent with the FAA's use of this metric (as well as all other DoD services). FAA Regulation 14 CFR Part 150 is the primary federal regulation guiding and controlling planning for aviation noise compatibility on and around commercial airports, and it explicitly requires the use of 65 dB DNL as a threshold for determining land use compatibility. Dense residential land use in locations exposed to 65 dB DNL or greater is generally considered incompatible. As this threshold of 65 dB DNL is used for determining a high potential for annoyance and because a large number of people will be exposed to noise that is associated with a high risk of annoyance in the case of this Proposed Action, we consider it significant.

Potential for impact to humans (both direct and perceived) is a major concern. As described in the Draft EIS and supporting appendices and Final EIS and supporting appendices, many dozens of studies have tried to determine annoyance attributable to airport or airfield operations through various metrics, and all methodologies have shortcomings that can produce differing results when non-noise conditions are changed.

The Navy and DoD, following the FAA's lead, have adopted the same 65 dB DNL threshold for determining incompatible land uses for AICUZ studies. An AICUZ shares a similar goal to the FAA Part 150 study, which informs local policy-makers of potential incompatible land uses. FICON (1992) and ISO 1996-1 (2016) predict approximately 12.5 percent and 25 percent of people exposed to 65 dB DNL to be highly annoyed, respectively.

Given the uncertainty in predicting the proportion of populations highly annoyed and the variability due to many factors, the Navy analyzed populations within the 65 dB DNL noise contour but also geographically depicted noise levels for the 55 dB and 60 dB DNL noise contour and analyzed

supplemental metrics (see Sections 3.2 and 4.2). The ISO suggest a different standard, but the FICON is the standard recognized by federal agencies that is being used in this analysis.

1.12.3 State of Washington Department of Health Public Comment (2017)

The Washington State Department of Health provided a public comment on the Draft EIS in letter format, providing the following three recommendations: 1) provide evidence to assure NOISEMAP model estimates are applicable for use at NAS Whidbey Island, 2) improve the description of the current state of science around noise and public health—specifically, nonauditory health effects, and 3) conduct a health impact analysis. An attachment summarized noise and health studies that the State of Washington Department of Health recommended be reviewed for potential inclusion in the Final EIS. The three recommendations from the State of Washington Department of Health are discussed in more detail below.

- **Comment/Recommendation No. 1: NOISEMAP model estimates' applicability to NAS Whidbey Island**
    - The comment states that the Draft EIS did not provide evidence that the NOISEMAP model accurately predicts noise exposure under conditions at NAS Whidbey Island but instead that the model has been validated for use at military airfields.
    - Each metric for exposure used for an outcome should be measured under appropriate conditions, and the model estimates need to be compared to these actual values to identify the model's predictive nature.
    - The Draft EIS should provide greater detail on how this modeling software has been updated to address ongoing findings within the health outcomes arena and include a discussion pertaining to the portion of the population highly annoyed by noise outside of the 65 dB DNL.
- **Comment/Recommendation No. 2: Improve description of the current state of science regarding nonauditory health effects**
    - The comment explains the methodology used in the Draft EIS to analyze annoyance, speech interference, sleep disturbance, and noise-induced hearing impairment. The comment takes issue with the Draft EIS use of "definitive causal and significant relationship" as the threshold for analyzing the potential for nonauditory health impacts due to aircraft noise and that research to date indicates that adverse health effects are initiated by chronic stress and/or sleep disturbance. The comment explains that if an odds ratio is determined to be statistically significant, then it should be discussed in terms of the percentage of the population affected. The comment further recommends including noise effects from non-aircraft noise sources in the analysis.
- **Comment/Recommendation No. 3: Conduct a health impact assessment**
    - The comment states that, based on recent literature reviews conducted by the State of Washington Department of Health, noise levels similar to those reported on Whidbey Island are associated with annoyance, sleep disturbance, cognitive impairment, and adverse cardiovascular outcomes, so a health impact assessment should be performed for susceptible groups of people on Whidbey Island.

Assumptions/Issues/Response

The NOISEMAP model is capable of accounting for varying terrain elevation, ground impedance, and weather conditions (temperature, relative humidity, and barometric pressure). The analysis performed in support of the Draft EIS utilized NAS Whidbey Island specific data for all of the above-mentioned parameters of NOISEMAP modeling to fully account for the specific environment associated with NAS Whidbey Island. All aircraft flight profiles were modeled with detailed altitude and power settings based on input from pilots and ATC personnel at NAS Whidbey Island. The result is an analysis that fully accounts for the specific nature of the conditions at NAS Whidbey Island rather than of a generic airfield.

The modeling software has been updated to NOISEMAP 7.3 (released March 2017), and one update included improvements to the sound propagation algorithms. This most recent update has increased capability to add single-event noise metrics such as number of events above a user-specified sound level to the modeling outputs. These resulting metric value outputs are then compared with thresholds identified in the scientific literature for impact analysis as appropriate. The software generally does not directly compute impacts.

In preparing the Final EIS, the Navy reviewed and considered the information and data contained in an additional 260 published articles, which include the documents recommended by the State of Washington Department of Health, the USEPA, and other public commenters. Studies with additional data not already included in the Draft EIS have been added to the discussion, as applicable. See Appendix A-8 for details on the literature review.

Although the EIS does not include a stand-alone Health Impact Assessment (HIA), by following the Navy's NEPA policy as prescribed in OPNAV M-5090.1, the EIS analysis meets and greatly exceeds the standards of HIAs. Furthermore, the EIS analysis satisfies the best practices identified in a HIA review, as described in "Minimum Elements and Practice Standards for Health Impact Assessments, Version 3, dated September 2014" (Bhatia et al., 2014). The EIS documents extensive public stakeholder engagement, with a transparent literature review on nonauditory health impacts; assesses the potential noise effects using best available science (data, methods, and metrics); assesses air quality and socioeconomic aspects of the Proposed Action, including vulnerable population groups (children, minorities, and the low-income population); and discusses reasonable and actionable noise mitigation actions as appropriate for a military airfield with a vital defense mission. For a detailed comparison of HIAs and this EIS, see Appendix I, Community Health and Learning Review.

1.12.4 Paul Schomer Public Comment on Aircraft Noise and Hearing Protection (2017)

Paul D. Schomer of Schomer and Associates, Inc., reviewed a table of acoustical measurement data, presumably taken at five locations adjacent to OLF Coupeville. Although the source of the data is not stated in the comment, the five locations, referred to as "positions" by Schomer, appear to coincide with those presented in the JGL Acoustics, Inc., report, *Whidbey Island Military Jet Noise Measurements* (JGL Acoustics, Inc. 2013). The data include the duration of time that sound levels measured exceeded specified thresholds, from 85 through 115 A-weighted decibels (dBA), in 3-dB increments. Schomer calculated the percentage of full dosage at each sound level from the total allowed for Navy workers and combined the result to estimate the percentage of maximum daily noise dosage. Schomer considered the source data to contain one "session" of aircraft training events and multiplied the results by two to simulate the effect of two flying sessions occurring in a single day. Schomer concludes that at Position 1, the dosage would reach 115 percent of Navy-allowable exposure. Although this calculation is

accurate, the reasoning behind it is flawed. The hearing protection time weighted average is for a daily exposure to noise. FCLP sessions will not be a daily occurrence at OLF Coupeville; therefore, this analysis does not account for non-consecutive periods where an individual's hearing would recover/rest. The analysis of these "loud" events and hearing is taken into account by the potential hearing loss analysis, which is provided in the EIS analyses (see Sections 3.2 and 4.2 for more details). Schomer also calculated the noise exposure at Positions 2, 3, and 4 to reach 45, 29, and 92 percent of maximum daily dosage, respectively. Position 5 was not analyzed. From the images provided in the JGL report, Position 1 appears to be located southeast of the OLF Coupeville runway, adjacent to a residential yard. The JGL report proposes that this location represents some of the greatest sound levels generated in the OLF area.

In response, occupational noise dosage guidelines are created to provide safe thresholds to protect workers over an 8-hour work day, with the assumption that this exposure would continue for their entire working life of 40 years. OLF Coupeville is not active every day, and while it is difficult to predict how many days the airfield will be utilized per year in the future, historically, from 2015 and 2017, there were between 34 and 36 active flying days per year. Additionally, people spend time inside and away from their residence, so it is very unlikely any individuals would exceed an excessive lifetime dosage. Just the reduction in sound levels achieved by building attenuation with windows open (an approximately 15 dB noise reduction) would result in only 2 percent of the daily allowable noise dosage for the same two aircraft flying sessions calculated by Schomer.

The EIS concludes that there would be significant noise impacts to surrounding areas due to loud, intrusive noise generated by Navy aircraft, and the number of occurrences of intrusive events would increase under the Proposed Action analyzed. This is discussed extensively within Sections 3.2 and 4.2 of the EIS where the DNL noise metric and several supplemental metrics are used to evaluate community annoyance and disturbances due to aircraft activity. Also, an analysis of potential hearing loss is used to evaluate the loud noise events with respect to an individual's hearing, making for a comprehensive noise analysis.

1.12.5 Michael Shuman's Report on the Economic Costs of the NAS Whidbey Island Complex (2017)

In 2017, Michael Shuman, an independent consultant hired by the Sustainable Economy Collective, authored a report entitled *Invisible Costs: The $122 Million Price Tag for the Naval Air Station Whidbey Island* and submitted it as a comment to the Draft EIS. In this report, Shuman contends that the positive economic impacts of the NAS Whidbey Island complex are overstated in both the Draft EIS and in other independent economic literature and that the true costs of the Navy's presence in Island County are much larger than acknowledged.

In this report, Shuman states that the Island County economy would be larger, more diverse, and more resilient in the absence of the NAS Whidbey Island complex. The author bases his analysis on the erroneous assumption that if the NAS Whidbey Island complex were to close, civilian employment in a different sector and/or economic activity in a different sector would automatically replace all current military employment and/or all current economic stimulus generated by military spending.

Shuman goes on to analyze the differences between the economic impact generated by military personnel and the economic impact generated by hypothetical civilian employees. The Navy concedes that military and civilian personnel do have different spending patterns and, therefore, do have different economic impacts. However, Shuman contends that the estimated positive economic impact of the

complex is over-inflated because the estimates do not consider the amount of economic impact that could have occurred if these military personnel were civilians. This analysis is speculative and is beyond the scope of this EIS. The EIS forecasts what the economic impacts of the Proposed Action would be, not what the economic impacts would be of switching the NAS Whidbey Island complex to a civilian use.

Estimates of the positive economic impact of the NAS Whidbey Island complex and the positive economic impact implementation of the Proposed Action would have on the regional economy described in the EIS were generated using input-output models. The U.S. Bureau of Economic Analysis' Regional Input-Output Model System was utilized to forecast the impact of the Proposed Action. An input-output model works by analyzing existing linkage between industries and utilizes past spending patterns within a regional economy to forecast how a change in final demand in one industry would change the final demand of another. Since the NAS Whidbey Island complex already has been operating in Island County, the industrial linkages and spending patterns associated with the Navy's presence are already incorporated within the model; therefore, the differences in spending patterns between civilian employees and military personnel have been accounted for in the EIS analysis.

In his report, Shuman also contends that military personnel generate significantly less local tax revenue than their civilian counterparts. He assumes that military personnel do most, if not all, of their spending on base and in tax-exempt, Navy-controlled commissaries. He also cites the fact that the federal property is exempt from local taxes. The Navy concedes that military personnel do spend a portion of their income at on-base, tax-exempt retailers and that the Navy does not pay local taxes. However, these topics are beyond the scope of this EIS. The EIS analyzes the economic and fiscal impacts of the Proposed Action, not the overall fiscal impact of the NAS Whidbey Island complex on local governments' tax revenues.

Section 4.10.2.1, Population Impacts, provides forecasts of the expected increase in local tax receipts that would occur under each alternative. These forecasts were developed by assuming that the additional personnel at the NAS Whidbey Island complex under each alternative would generate a similar per capita amount of tax revenue as current residents. Given the fact that no new federally controlled property will be purchased, no new Navy housing will be built, and that all additional personnel assigned to the NAS Whidbey Island complex will be housed in the local community under each of the action alternatives, the impact to property tax receipts from the additional personnel would be the same or slightly greater than the current per capita levels. Military personnel who reside off base would be required to pay property taxes either directly or indirectly through their mortgage or rental payments. Since the current per capita tax receipts include military personnel living in federally controlled, tax-exempt housing while all additional personnel would be housed off base, the current per capita levels would slightly undercount the expected increase in property tax receipts.

Per capita sales and use tax receipts are likely to be similar or slightly less than current per capita figures. While the Navy acknowledges that military spending patterns differ from civilian spending patterns, these differences have already been incorporated into measurements of current sales and use tax receipts. The proportion of military versus civilian households in affected communities is not expected to change substantially. Therefore, existing per capita sales and use tax receipts will already include military spending patterns.

Finally, a major objection that Shuman raises in his report is that the EIS does not monetize the externalities associated with the Proposed Action. Shuman feels that major external costs from the Proposed Action, including the health impacts of noise, the impacts to property values, potential

accidents, and the impact to tourism, have not been adequately considered and calculated. Shuman makes some attempts to quantify these impacts.

As required under NEPA, each of these topics has been analyzed and evaluated in Chapter 4 of this Final EIS. See Section 4.2 for a discussion of the health impacts of noise, see Section 4.10 for a discussion of impacts to property values, and see Section 4.3 for a discussion of accident potential. Additional text has been added to Section 4.10 during the Final EIS phase to describe and evaluate potential impacts to tourism.

It should be noted that NAS Whidbey Island contributes significantly to local economies in Island County and to a lesser degree in Skagit County. With approximately 10,000 employees, the installation is four times the size of the next-nearest employer in Island, San Juan, Skagit, and Whatcom Counties (Island County EDC, 2013). Based on a 2013 study by the Island County Economic Development Council, the military payroll for the installation contributed $726 million into Island County's economy and $15 million into Skagit's economy annually, and federal civilian payroll contributed $107 million annually. Furthermore, the number of veterans living near the installation is three times higher than the national average. In 2011, veterans in Island County and Skagit County received, respectively, $44 million and $28 million in retirement and disability payments. While not a comprehensive economic report, the 2013 Island County Economic Development Council study describes the direct and indirect benefits of wages, salaries, and benefits attributable to the installation. The study included medical insurance (Tricare) reimbursements to local health care providers, financial assistance to local schools, credit purchases, volunteers and donations to community service programs, service contracts to hire local residents with disabilities, conservation programs, and medical evacuation and rescue support to area residents and visitors.

As set forth in 40 CFR 1502.23, "For purposes of complying with [the National Environmental Policy Act], the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations." Given the purpose and need as defined in Section 1.3, qualitative considerations are primary. The EIS evaluates the impacts of each alternative within relevant resource areas, assesses the significance of those impacts, and provides an indication of the considerations relevant and important to a decision. The Navy is not making a decision on selection of alternatives based on financial criteria; rather, the Navy is weighing the relative impacts of each alternative to its mission, operational capabilities and efficiencies, training, personnel, and environmental and fiscal budget authorization factors. Accordingly, a cost-benefit analysis would not aid the decision and is beyond the scope of NEPA. Likewise, it is beyond the scope of this EIS to critique the selected topics discussed in Shuman's cost-benefit analysis and the methodologies he utilized to calculate the value of these impacts.

1.12.6 National Park Service Acoustical Monitoring Report for Ebey's Landing National Historical Reserve (2016)

Background. The Natural Sounds and Night Skies Division of the NPS collected acoustical data to measure aircraft noise at two locations within Ebey's Landing National Historical Reserve. Acoustic monitoring systems were installed and recorded data for 31 days on NPS property in Ebey's Landing National Historical Reserve; this monitoring process collected continuous audio and SPL readings for over 700 hours (the systems collected continuous audio data for 731 hours at EBLA001 and 741 hours at EBLA002). The report provides measured metrics as follows:

- **LA_{eq} (or L_{eq}) –** Equivalent Sound Level is the equivalent continuous SPL in dB that would contain the same sound energy as a time-varying sound. The "A" denotes A-weighted sound.
- **L_{dn} (also known as DNL) –** Day-Night Average Sound Level is a cumulative metric that accounts for all noise events in a 24-hour period, with a penalty of 10 dB given to operations taking place at night between 10:00 p.m. and 7:00 a.m.
- **%TA –** Percent Time Above is the percentage of total time that the A-weighted noise level is at or above a threshold.
- **Number of events above 70 dBA –** Number of events above metric gives the total number of events that exceed a noise-level threshold during a specified period of time.

The equipment consisted of Larson Davis 831 sound level meters, which conform to Class 1 standards and are appropriate for the measurements performed. As shown in Table 1 of the NPS report, over the course of over 700 hours of audio data collection, the total time audible for all military aircraft was approximately 10 hours and 25 minutes for EBLA001 and 28 hours and 56 minutes for EBLA002. This equates to approximately 1.4 percent and 3.9 percent of the audio data collection time, respectively. Therefore, the NPS report confirms that while the Navy aircraft operations are highly intermittent and are loud when aircraft are flying, there are long periods of time between noise events during which there is no military aircraft activity.

With respect to the noise events recorded, noise above 60 dBA occurred less than 1 percent of the time at either recording location (see Table 3 of the NPS report). Overall, the NPS report is consistent with the Navy's modeled noise data presented in the EIS. However, there are still some concerns with respect to the preparation of the NPS report.

Thresholds. To provide additional context on the relevance of the SPL thresholds, the NPS selected six SPL thresholds (35, 45, 52, 60, 70, and 130 dBA) for its analysis, which are presented in Table 2 and Table 6 of the NPS report. As discussed below, some of these thresholds may not be appropriate to support the report's conclusions:

- **35 dBA threshold (related to health):** The NPS selected the 35 dB level assuming that exposure to noise causes increases in blood pressure and heart rate in sleeping individuals. This 35 dBA "threshold" was derived by a study of noise at locations around four European airports with nighttime flights, specifically Athens (Greece), Malpensa (Italy), Arlanda (Sweden), and London Heathrow (UK) (Haralabidis et al., 2008). The Haralabidis study had a total of 4,861 participants, between the ages of 45 and 70, where samples were taken from representative populations exposed to various levels of aircraft and vehicular traffic noise around airports, based upon noise contours. Following the application of a series of nine exclusion criteria that could affect study results, the final sample of individuals consisted of 140 subjects across the four geographic locations.

  However, in examining the Haralabidis study, this threshold was inappropriately applied within the NPS report because it was simply the threshold for counting a noise "event" and not necessarily a threshold of any identified adverse effects. Since this threshold is so low, and in many cases well below ambient noise levels, it is not surprising that there were many events that exceeded this threshold. Further, to the extent the study found that noise affected blood pressure, the finding was limited to nighttime vehicular noise. In addition, Haralabidis found

that the increase in blood pressure associated with vehicular traffic noise events was less significant than the increase in blood pressure associated with a snoring partner.

- **35 dBA threshold (related to classroom learning):** The NPS report references the desired classroom background sound level as 35 dB (from the American National Standards Institute S12.60-2002). This is an indoor hourly Equivalent Sound Level (L_{eq}) that corresponds to an outdoor 8-hour L_{eq} of 60 dBA, or higher depending on building attenuation. Therefore, applying a desired indoor noise level of 35 dB to assess potential classroom learning interference to a measured outdoor noise is inappropriate. The EIS uses outdoor modeled noise levels and then applies building sound attenuation to reach an indoor sound level to assess classroom learning interference.
- **45 dBA threshold:** The 45 dBA threshold was selected by the NPS to evaluate the recommended maximum noise levels inside bedrooms and is derived from the WHO (2000). As stated within *Guidelines for Community Noise,* the scope of the WHO's effort is to "…derive guidelines for community noise is to consolidate actual scientific knowledge on the health impacts of community noise and to provide guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments" (WHO, 2000). Therefore, the 45 dBA interior nighttime level identified by NPS and in the WHO recommendation (WHO, 2000) is not a threshold for determining adverse health effects but a guideline or target to inform and for use by policy makers and governing authorities.

  The 45 dBA threshold identified for sleep disturbance is the indoor maximum A-weighted sound level (L_{max}), which corresponds to an outdoor L_{max} of 60 or 70 dBA for windows opened and closed, respectively. Therefore, applying a desired indoor bedroom noise level of 45 dB to assess potential sleep disturbance to a measured outdoor noise without proper sound attenuation is inappropriate.
- **70 dBA threshold:** The 70 dBA threshold identified as the risk for hearing impairment is a 24-hour L_{eq} level and only applies to the most sensitive 1 percent of the population, requires 40 years of daily exposure, and assumes the person spends all time outdoors to be exposed to all aircraft noise events. Berglund et al. (1999) states "…hearing impairment is not expected to occur at LA_{eq}, 8-hour levels of 75 dB(A) or below, even for prolonged occupational noise exposure."

Assumption/Methodological Errors

In reviewing the NPS report, there are several instances where incorrect assumptions or errors in methodological practices were made. These are briefly outlined individually below:

- The NPS study incorrectly identifies Growlers operating on the Low-Tactical Air Navigation flight tracks as the primary driver for the noise events at the western measurement site. The Low-Tactical Air Navigation track and flight profile is only applicable to the P-3/P-8 aircraft, and Growlers do not perform this type of operation. The Growler FCLP and interfacility operations cause the noise events in these areas.
- The NPS report presents a series of spectrograms from the two measurement locations (EBLA001 and EBLA002), which are graphs/plots showing sound levels over a given period of time. The presentation of spectrographs comparing a military jet to a commercial jet look drastically different primarily due to location and relative position of the source and receiver, not due to the type of sound source (i.e., military aircraft versus commercial aircraft).

Additionally, the commercial jet recording appears to be of a single event recorded over a 2-minute period, while the military spectrogram appears to depict five FCLP passes by a single aircraft over approximately a 5-minute period, which can be misleading to a reader.

- It appears that military and commercial events were identified solely by their "signature." This could be effective if first-person observation over a sufficient portion of the 31-day measurement duration was able to determine that commercial aircraft consistently used flight paths drastically different from military flight paths. However, no mention of this is made in the NPS report, so the accuracy of the categorization between military and commercial events is unclear.
- The NPS report measured a 31-day L_{dn} (DNL) of 73.6 and 54.7 dBA at EBLA001 and EBLA002, respectively (Table 9 of the NPS report). Aircraft activity varies throughout the year; therefore, 31 days of measurements cannot reliably be extrapolated to compute annual average daily DNL for the entire year, which is the federally approved metric presented in the EIS.

Results Comparison/Conclusions

The NPS report concludes that elevated levels of anthropogenic noise from aircraft exist in Ebey's Landing National Historical Reserve, with the highest occurrence at EBLA002, but at lower sound levels than at EBLA001. As outlined below, the EIS now provides a closer comparison of the results of the NPS report to those contained within the EIS:

- As a result of evaluating the NPS report and based on public comments received, the Navy added several POIs between the Draft EIS and the Final EIS to the noise analysis for supplemental metrics. Two of the POIs added to the noise analysis for the EIS were EBLA001 and EBLA002, which correspond to the NPS measurement points (identified as POIs P18 and P17, respectively, in the noise analysis and presented in Sections 3.2 and 4.2). A tabular comparison between the NPS report's measured data and the EIS's modeled data for the No Action Alternative is provided below (the No Action Alternative is used as the closest modeled alternative to the conditions when the NPS measurements were taken).

	SEL (in dB)		*L_{max} (in dB)*	
Point of Interest	***NPS***	***EIS***	***NPS***	***EIS***
NPS (EBLA001)/EIS (P18) – Reuble Farmstead	117	114	113	109
NPS (EBLA002)/EIS (P17) – Ferry House	96.6	96	85	85

- EBLA001 (P18) is nearly underneath some of the FCLP flight paths modeled for the No Action Alternative. With aircraft at low altitudes of 500 to 800 feet over EBLA001 (P18), small changes in the flight path location or altitude can have a relatively large effect on the sound levels on the ground at EBLA001 (P18). Since the noise study for the EIS models "average daily flight tracks," it essentially is analyzing the center of a handful of common flight paths. On the other hand, the NPS recorded all events over a 31-day period, which captured flights at the extremes of flight paths. Figure 10 of the NPS report shows a relatively high concentration of events around 108 dB L_{max} with events spread up to 113 dB and down to 102 dB. Therefore, it is possible that the NPS maximum recorded SEL and L_{max} were a result of a few aircraft events that deviated from

either the planned flight path or altitude, or both. Regardless, the differences between the NPS and the noise study of 3 to 4 dB are reasonable and consistent with each other.

- EBLA002 (P17) is further from the OLF flight paths, and therefore small differences in aircraft flight path contribute a much smaller difference in sound levels measured/computed at this POI. The fact that the results are nearly identical for EBLA002 (P17) agrees with the hypothesis that relatively small differences between the modeled average flight path (model in the noise study for the EIS) and the closest recorded flight event (measured by the NPS) can cause moderate differences in sound levels at locations on the ground near the flight path.

Overall, although the NPS's noise report differs in a variety of ways from the affected environment modeled for calendar year 2021 in this EIS, the results of the study appear consistent with the Navy's noise analyses. Furthermore, the NPS's monitoring report demonstrates that, while military aircraft are loud, military aircraft operations are highly intermittent, with long periods of no military aircraft activity. For example, the report demonstrates that audible aircraft noise (Table 7 of the NPS Report) above 60 dB (normal conversation levels) occurred less than 1 percent of the time during the study period. The Navy does not dispute the potential for Growler operations to produce noise vibrations; however, the current scientific studies of noise vibrations on buildings and, more specifically, historic properties are unique to the circumstances of the structures and noise produced. Although studies are limited, the available data suggest that sounds lasting more than 1 second above the sound level of 130 C-weighted decibels (dBC) are potentially damaging to structural components. A 2012 study by Kester and Czech considered Growler overflights at 1,000 feet above ground level in takeoff, cruise, and approach configuration power conditions and measured 115 dBC under takeoff conditions, up to 101 dBC when cruising, and 109 dBC at approach (with gear down). Using a very conservative estimate to add 6 dB to convert A-weighted measurements to C-weighted measurements, these levels are still much less than the 130 dBC criterion. Therefore, damage would not be expected. When comparing the highest recorded sound pressures reported in the NPS report within Ebey's Landing National Historical Reserve of 113 dBA and 85 dBA at Reuble Farmstead and Ferry House, and conservatively converting these A-weighted measurements to C-weighted measurements, it is unlikely that sound pressures of 119 dBC and 91 dBC would approach a sound level greater than or equal to 130 dBC.

1.12.7 Dahlgren Opinion Paper on the Public Health Impact of Aircraft Noise on Residents in the Vicinity of Whidbey Island (2015)

Background

A 2015 opinion paper developed by Dr. James Dahlgren, a toxicologist and "diplomat of the American Board of Internal Medicine, Occupational and Environmental Medicine; Toxicology," was reviewed as part of this EIS. Writing to support litigation on behalf of the Citizens of the Ebey's Reserve for a Healthy, Safe, & Peaceful Environment (*Citizens of the Ebey's Reserve for a Healthy, Safe, & Peaceful Environment* v. *U.S. Department of the Navy, et al.)*, Dahlgren provided his opinion regarding the impact on public health from aircraft noise on residents in the vicinity of NAS Whidbey Island. His opinion is based on review of general aircraft noise research and surveys from individuals expressing opinions regarding their health.

Assumptions/Methodological Errors

Review of the Dahlgren paper found incorrect application of noise metrics and conclusions drawn from poor assumptions or lacking of support in peer-reviewed scientific literature. These issues are outlined individually below:

Application of Noise Metrics and Sound Measurements:

- The first page presents a graphic "…that describes where jet aircraft noise compares with other loud noise," but this graphic contains health effect conditions alongside noise level. There is no source cited for the graphic, and it therefore cannot be substantiated or confirmed. The graphic does not identify the noise measure metric utilized, but it is suspected to be sound pressure level (SPL). However, many of the effects from which Dahlgren draws conclusions (i.e., sleep and communication disturbance, etc.) are not directly associated with the instantaneous SPL metric but instead with a number of nighttime events above a certain maximum level or equivalent sound level (L_{eq}).
- Dahlgren states on page 3, "The high-level noise exposure from a combat jet flying over a person has been shown in a scientific study to causes a significant increase in blood pressure and 'shock' to the body, with some individuals becoming acutely ill from the noise." His report also states, "If the noise rises and subsides quickly, such as occurs in this case when there are multiple jets flying one after the other, the blood pressures do not return to the pre-noise level and continues to climb higher and higher. This is shown in the graphic above from a published, peer-reviewed study of combat jet noise by Michalak and colleagues." The Navy reviewed the cited paper by Michalak et al., which studied residents aged 70 to 89 in a senior citizen's home who were exposed to noise via headphones, not actually exposed to jets as they flew overhead (Michalak et al., 1990). This Michalak report analyzes blood pressure increase over time while participants are exposed to four noise events and categorizes noise events into slow rise-time events (+7.5 dB/sec) and fast rise-time events (+75 dB/sec). The noise attributable to OLF operations generates a slow increase in sound level (rise-time rate) that varies from less than +1 dB/sec to approximately +5 dB/sec, so the slow rise-time events are more appropriate for comparison to aircraft activities at airfields such as at the NAS Whidbey Island complex. The participant responses in Michalak et al. to fast rise-time events are not applicable to the aircraft operations at OLF Coupeville; however, this is what Dahlgren uses for comparison. Dahlgren misapplied fast time-rise noise to an OLF airfield environment, and the "shock" and "startle" as described in Michalak et al. would not apply to the aircraft activity at the OLF. Therefore, the conclusions stated by Dahlgren are not accurate.
- Dahlgren also states on page 6, "The noise pattern at Central Whidbey Island has been measured and the noise levels are higher than the Michalak study. The noise measured at OLF Coupeville is illustrated by this graphic derived from JGL's study." The graphic presented is a generic "triangle" wave, which, to the Navy's knowledge, does not appear anywhere in the JGL study. However, this overly simplified wave is inconsistent with any acoustic measurements of aircraft overflights.
- Dahlgren states on page 10, "In 1978 the US EPA published a monograph on noise pollution and recommended the community noise levels not exceed 70 decibels to prevent hearing loss (3) (EPA 1978)." The L_{eq} of 70 dB described here as a universal threshold for the potential for hearing loss is misleading. The USEPA document presents 70 dB for sound that is heard

continuously throughout a 24-hour period. As aircraft activity at OLF Coupeville is intermittent in nature, it does not fit this description, and people do not spend all of their time outdoors, so there would be an additional level of sound attenuation applied when inside a building.

Scientific Support for Conclusions:

- Dahlgren states on page 2, "The longer-term, noise level exposure is strongly associated with permanent hypertension, heart attacks, anxiety, depression, gastrointestinal changes, and learning impairment. The association in epidemiological studies is not the only evidence that noise causes adverse health effects: there are animal and mechanistic studies that explain how noise pollution at the levels and circumstance present on Central Whidbey Island causes these health problems. The weight of the evidence provided shows that noise is causative of serious injuries." However, no specific references are cited to justify those statements (or to afford the Navy the ability to review), and Dahlgren's conclusionary statements are not supported by the vast body of science in this area (as documented in the EIS, contained within the health literature review conducted and provided in Sections 3.2 and 4.2, and Appendix A).
- Dahlgren continues on page 10, "A study of noise and whole body vibration (the Navy study indicates that whole body vibration, i.e., shaking of buildings, is caused by the Growler Jets) finds that the combination of noise and vibration is additive, causing more health problems than with noise alone (Yamanaka, K. et al. 1982)." Whole body vibration is a very specific term referring to vibrations transferred to the human body through direct contact, such as vibration experienced by a jackhammer operator or fork-lift operator. The Navy study referenced in Dahlgren's report is the 2012 Environmental Assessment, which analyzed the potential for windows to rattle due to low-frequency vibration but did not find evidence that the Growler would cause "whole body vibration" to humans (Navy, 2012). The Yamanaka study referenced in Dahlgren's report describes the results of self-administered health questionnaires combined with measurements of noise near the Shinkansen high speed "bullet train." Road noise has been found to have different effects than aircraft noise (Schreckenberg et al., 2010). Rail noise is associated with different effects than aircraft noise, due in part to vibrations generated directly through the rails that may vibrate nearby structures in a manner very different from aircraft overflights (Schreckenberg and Guski, 2015). Therefore, drawing conclusions from the Yamanaka study for rail noise and applying the concepts to aircraft noise is not appropriate and can be misleading.
- Dahlgren discusses noise-induced hearing loss on page 11 and then provides a sample audiogram without a referenced medical document or source. It is not clear whether that audiogram is an actual audiogram or simply a representation of what an audiogram of someone with noise-induced hearing loss would look like (or whether the individual has a history of exposure to high occupational noise levels); therefore, the Navy cannot review or substantiate Dahlgren's use of this information.
- Another misleading statement is made on page 12: "WHO quoted numerous high quality studies to document the deadly effect of noise on cardiovascular health." However, in reviewing the World Health Organization (WHO) monograph, it described statistically significant but minor effects after considering many studies, not all of which consistently agreed with each other.
- Dahlgren includes a number of references intended to show evidence that noise exposure causes hypertension in adults and children; however, this is not substantiated by the text. There

is a difference between association and causation. The latter is often very difficult to prove, as there are usually many variables that can contribute to an effect. For instance, the EIS examines the Haralabidis reference, which found increases in systolic blood pressure of 6.2 millimeters of mercury for aircraft events (about 6 percent) and an increase of 7.4 millimeters of mercury (about 7 percent) for other indoor noises, such as snoring: a snoring partner had similar impacts on blood pressure to aircraft events (Haralabidis et al., 2008). An association is what these references show, and further studies are necessary to identify which variables actually cause the adverse effect.

- Dahlgren states on page 17, "The non-auditory adverse health effects of sound include stomach ulcers and other GI problems (60). (Da Fonseca, 2006)." The graphic included is of rat stomach tissue, showing the direct impact of sound waves on the tissue. This is misleading because directing sound waves at stomach tissue in a rat is not comparable or representative to what the Whidbey Island residents experience. The referenced study also examined the effects of infrasound on gastric mucosal blood flow in rats. The method subjected rats to pure tones of 8, 16, and 32 Hertz at sound levels ranging from 80 dB to 130 dB. The sound spectra for the EA-18G presented in Figure 7-4 of the October 2012 Wyle noise study calculated SPLs between 70 and 78 dB for those low frequencies when the aircraft is only 1,000 feet from the observer (Kester and Czech, 2012). The rats in the study were exposed to sound levels with nearly 400 times more energy than the Growlers at NAS Whidbey Island create at those frequencies.
- Dahlgren claims on page 19, "The science quoted above indicates that there is solid uncontroverted evidence that health problems have occurred in the exposed population. If the flights continue more health damage will occur." This statement is misleading for two reasons: 1) none of the articles quoted studied the Whidbey Island residents, and 2) the document presented no supporting, peer-reviewed evidence.

Conclusions

The validity of the arguments and more general statements made in the report cannot be determined or authenticated. The document was not published in a peer-reviewed journal and does not meet the standard of inclusion in this EIS analysis. No physician was consulted to substantiate the health complaints, and Dahlgren reaches conclusions that are justified neither by the literature cited nor by data from Whidbey Island residents. In addition, Dahlgren commonly refers to the JGL Acoustics, Inc., report, *Whidbey Island Military Jet Noise Measurements* (JGL Acoustics, Inc., 2013) for information on noise measurements at OLF Coupeville. This report is discussed separately within this section.

As stated above, overall, this report relies on conclusions on individuals' health that are not based on reviews of the medical records of the individuals in question, some conclusions appear to have no supporting basis, and some conclusions are not consistent with, or are contrary to, the references cited in the report. The Navy has considered the best available science in the development of the Aircraft Noise Study for this EIS and provides a detailed discussion of its findings in Sections 3.2 and 4.2, as well as in Appendix A.

1.12.8 JGL Acoustics, Inc., Report on Whidbey Island Military Jet Noise Measurements (2013)

Background

The report summarizes measurements of noise from Navy jets operating at NAS Whidbey Island performed by Jerry G. Lilly of JGL Acoustics, Inc. (JGL). Noise measurements were conducted on a single

day (May 7, 2013) at five locations near OLF Coupeville, utilizing the Bruel & Kjaer models 2238 and 2270, which are Class 1 sound level meters that are appropriate for aircraft overflight noise measurements.

Assumptions and Errors

Review of the JGL report identified several methodological errors:

- JGL used a 1-second recording rate while the standard is 1/8 second; however, this discrepancy would not have a significant effect on the results.
- The author attempts to calculate L_{dn} (DNL) using less than one hour of measurements by utilizing the average SEL of events measured on May 7, 2013. The resulting DNL presented in Table 4 differs from the 2005 AICUZ, and the author identifies the shortcomings of this approach as follows: "There may be several reasons for this discrepancy, including aircraft type and percentage of nighttime flights, but the main reason has to do with the annual average. Because the jets do not fly every day, when you average the 'noisy' days with the 'quiet' days, the L_{dn} values become lower (diluted) (Lilly, 2013)." Additional causes for variability include runway direction flown, "night pattern" versus "day pattern" flight profiles, and the skill of the individual pilot. In order to more accurately estimate the DNL attributable to aircraft overflights, measurements must be taken over an extended period of time--on the order of weeks or several months--to gather a better picture of all types of flight operations and their variability over time.
- The author states, "In this analysis, I have assumed that all jets are the EA-18G aircraft and the number of military jet over-flights is 4,834 per year at Position 1 (bounces using either path 14 or 32) and 3,784 at Positions 2 through 4 (bounces using path 32), which I understand to be the actual number of over-flights from 2012 (Lilly, 2013)." The numbers 14 and 32 refer to runway heading direction, which would affect whether the aircraft are approaching the runway while flying past Position 1 or departing the runway. It is not clear from the report which way aircraft were operating during the measurements, but the sound levels may vary greatly between the two, depending upon the relative microphone location.
- The JGL report concludes that the maximum sound level (L_{max}) is well above the levels requiring hearing protection and is high enough to potentially result in permanent hearing loss. Although this would be true if an individual remained outdoors at that location continuously over decades and was exposed to all aircraft activity, the risk of permanent hearing loss is reduced dramatically when those conditions are not met. The EIS addresses the potential for hearing loss using a method similar to the USEPA's Guidelines for Noise Impact Analysis, and potential hearing loss is discussed in further detail in both Sections 3.2 and 4.2.

Results Comparison/Conclusions

The single-event sound levels presented in Table 1 of the JGL report appear to have been gathered accurately and align with those computed in the EIS. Highest maximum A-weighted level of 119 dBA at Position 1 found by JGL correlates well with the EIS modeled noise results for POI R06, which is in the same general area and had an estimated L_{max} of 117 dBA.

The author concludes that L_{dn} (DNL) is less than ideal to assess annoyance due to aircraft operations and that L_{max} and SEL would be more appropriate for OLF activity given the more sporadic operating frequency. As stated in Section 3.2, DNL is the federally accepted standard by the FAA and DoD for

assessing annoyance due to aircraft operations. However, the EIS goes beyond DNL contours to specific points of interest (POIs) to perform additional impact analysis (sleep disturbance, speech interference, classroom learning disruption, etc.) as well as providing SEL and L_{max} values ranked by event.

The JGL report determines that the 2005 AICUZ DNL results differ significantly from those calculated from the 2013 measurements, which is to be expected given the difficulty in estimating DNL that represents a year of events averaged over one day by measuring less than one hour of aircraft activity. The JGL report can serve as an accurate snapshot of typical noise levels in the OLF generated by aircraft overflights, but the methodology employed cannot accurately predict average daily DNL.

1.13 Clarification and Changes to the Environmental Impact Statement

Several updates were applied to the noise analysis between release of the Draft EIS and the Final EIS , which include:

1. updating the noise model using the latest NOISEMAP Version 7.3 software
2. applying refinements to certain flight profiles/aircraft operating assumptions
3. incorporating the effects of Precision Landing Mode (PLM), also known as Maritime Augmented Guidance with Integrated Controls for Carrier Approach and Recovery Precision Enabling Technologies (MAGIC CARPET), into the noise analysis
4. updating the number of pilots per squadron

These changes reduced the total number of operations and total number of FCLPs at the NAS Whidbey Island complex. Additionally, the Navy updated the analysis in the Final EIS to incorporate two additional FCLP distribution scenarios that may further mitigate noise impacts at Ault Field and OLF Coupeville. The Navy announced these changes to the Final EIS in a press release distributed September 22 , 2017.

For several years, the Navy has been developing technology to make landing on a carrier easier and safer. This effort has resulted in the Navy's projected Fleet-wide implementation of PLM technology (also known as MAGIC CARPET). PLM makes aircraft carrier approaches and landings more automated, resulting in a safer environment for Navy pilots. This technology will reduce the workload and training required for pilots to develop and maintain proficiency at carrier landings. PLM has proven so successful that the Navy has decided to accelerate its Fleet-wide implementation.

While it was premature to consider reductions in FCLP requirements for the NAS Whidbey Island complex in the Draft EIS, based upon subsequent successful testing and operational use of this technology, the Navy has included more complete information in the Final EIS analysis. Operational factors, including incorporation of PLM and a reduced number of pilots assigned to each squadron (two fewer pilots per carrier squadron), have been factored into the analysis and reduce FCLP requirements at the NAS Whidbey Island complex when compared to projections in the Draft EIS. The Final EIS has been updated to account for a 20-percent reduction in FCLP requirements related to incorporation of PLM into the Fleet, which leads to a reduction in the number of FCLP operations.

In addition to the three scenarios analyzed in the Draft EIS, two new scenarios have been included in the Final EIS to determine how the distribution of FCLP operations affect noise impacts at Ault Field and OLF Coupeville. The five scenarios analyzed in the Final EIS include:

- Scenario A (from Draft EIS): 20 percent of all FCLP conducted at Ault Field and 80 percent conducted at OLF Coupeville

- Scenario B (from Draft EIS): 50 percent of all FCLP conducted at Ault Field and 50 percent conducted at OLF Coupeville
- Scenario C (from Draft EIS): 80 percent of all FCLP conducted at Ault Field and 20 percent conducted at OLF Coupeville
- Scenario D (New for Final EIS): 30 percent of all FCLP conducted at Ault Field and 70 percent conducted at OLF Coupeville
- Scenario E (New for Final EIS): 70 percent of all FCLP conducted at Ault Field and 30 percent conducted at OLF Coupeville

Based on implementation of the new PLM technology as well as a reduced number of pilots per squadron applied to this Final EIS analysis, there was a commensurate reduction or change under certain resource areas. For example, between the Preferred Alternative (Alternative 2, Scenario A) in the Draft EIS and the Final EIS, there was a 13-percent reduction in total airfield operations and a 30-percent reduction in total FCLP operations. Additionally, the Final EIS includes 36 fewer personnel and 50 fewer dependents as compared to the Draft EIS under Alternative 2, Scenario A. Total acreage within the 65 dB DNL noise contour was reduced by 2 percent for the Preferred Alternative between the Draft EIS and the Final EIS, while total population within the 65 dB DNL noise contour was reduced by 2 percent. There was a 13-percent reduction in carbon dioxide equivalent (CO_2e) emissions between the Draft EIS and Final EIS under the Preferred Alternative. Table 1.13-1 presents a comparison of the Preferred Alternative between the Draft EIS and Final EIS and the commensurate reduction or change under certain resource areas. For more details on the selection of the Preferred Alternative, see Section 2.4, Preferred Alternative.

Table 1.13-1 Comparison of the Preferred Alternative (Alternative 2, Scenario A) from Draft EIS to Final EIS

	Draft EIS	*Final EIS*	*Change from Draft EIS to Final EIS*
Total Annual Airfield Operations at NAS Whidbey Island Complex	129,100	112,100	13% reduction
Total Annual FCLPs at NAS Whidbey Island Complex	42,000	29,600	30% reduction
Total Acreage within the 65 dB DNL Noise Contour	23,643	23,246	2% reduction
Total Population within the 65 dB DNL Noise Contour	12,684	12,487	2% reduction
Total Action-Related CO_2e Emission Increases (metric tons per year)	156,669	136,783	13% reduction
Growler Personnel	4,768	4,732	36 fewer personnel
Dependents	6,537	6,487	50 fewer dependents
Projected Increase in School-aged Children	341	324	17 fewer school-age children

Notes:

[1] Changes between the Draft EIS and Final EIS include a 20-percent reduction in FCLP training requirements related to incorporation of Precision Landing Mode (PLM) (aka MAGIC CARPET) technology into the Fleet and a reduction in the number of pilots assigned to each squadron (two fewer pilots per carrier squadron). While it was premature to consider reductions in FCLP requirements for the NAS Whidbey Island complex in the Draft EIS, based upon successful testing and operational use of this technology, the Navy has incorporated the use of PLM into the Final EIS analysis; therefore, the anticipated 20-percent reduction to FCLP requirements and the associated reduction in FCLP operations has been applied to the No Action Alternative as well as the action alternatives associated with the Proposed Action in the Final EIS.

Key:
dB = decibel
DNL = day-night average sound level
FCLP = Field Carrier Landing Practice
CO_2e = carbon dioxide equivalent
OLF = Outlying Landing Field Coupeville

Table 1.13-2 presents a detailed comparison of certain data by resource area to show the differences between the Draft EIS and Final EIS across all alternatives and scenarios related to implementation of PLM and a reduction in squadron personnel and associated dependents. Resource areas include annual aircraft operations and FCLPs, noise associated with aircraft operations, Growler personnel and dependents, education/school-aged children, greenhouse gases, and a comparison between the quantities presented in the Draft EIS and the quantities presented in the Final EIS.

Table 1.13-2 Comparison of Certain Resource Areas from Draft EIS to Final EIS[1]

	Scenario A (20/80)[2]	*Scenario B (50/50)*	*Scenario C (80/20)*	*Scenario D[3] (30/70)*	*Scenario E[3] (70/30)*
Total Annual Airfield Operations					
No Action Alternative	**DRAFT EIS:** Total: 88,600 Ault Field: 82,100 OLF Coupeville: 6,500				
	FINAL EIS: Total: 84,700 Ault Field: 78,200 OLF Coupeville: 6,500				
Action Alternative 1	**DRAFT EIS:** Total: 129,900 Ault Field: 94,400 OLF Coupeville: 35,500	**DRAFT EIS:** Total: 129,800 Ault Field: 107,500 OLF Coupeville: 22,300	**DRAFT EIS:** Total: 130,000 Ault Field: 120,800 OLF Coupeville: 9,200	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: Total: 112,600 Ault Field: 87,300 OLF Coupeville: 25,300	**FINAL EIS:** Total: 111,200 Ault Field: 95,300 OLF Coupeville: 15,900	**FINAL EIS:** Total: 109,800 Ault Field: 103,200 OLF Coupeville: 6,600	**FINAL EIS:** Total: 112,200 Ault Field: 90,000 OLF Coupeville: 22,200	**FINAL EIS:** Total: 110,100 Ault Field: 100,400 OLF Coupeville: 9,700
Action Alternative 2	**DRAFT EIS:** Total: 129,100 Ault Field: 95,100 OLF Coupeville: 34,000	**DRAFT EIS:** Total: 129,100 Ault Field: 107,700 OLF Coupeville: 21,400	**DRAFT EIS:** Total: 129,100 Ault Field: 120,300 OLF Coupeville: 8,800	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: Total: 112,100 Ault Field: 88,000 OLF Coupeville: 24,100	**FINAL EIS:** Total: 110,700 Ault Field: 95,500 OLF Coupeville: 15,200	**FINAL EIS:** Total: 109,500 Ault Field: 103,200 OLF Coupeville: 6,300	**FINAL EIS:** Total: 111,800 Ault Field: 90,600 OLF Coupeville: 21,200	**FINAL EIS:** Total: 110,000 Ault Field: 100,700 OLF Coupeville: 9,300
Action Alternative 3	**DRAFT EIS:** Total: 128,800 Ault Field: 94,900 OLF Coupeville: 33,900	**DRAFT EIS:** Total: 128,700 Ault Field: 107,400 OLF Coupeville: 21,300	**DRAFT EIS:** Total: 128,700 Ault Field: 120,000 OLF Coupeville: 8,700	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: Total: 111,800 Ault Field: 87,700 OLF Coupeville: 24,100	**FINAL EIS:** Total: 110,500 Ault Field: 95,300 OLF Coupeville: 15,200	**FINAL EIS:** Total: 109,200 Ault Field: 102,900 OLF Coupeville: 6,300	**FINAL EIS:** Total: 111,400 Ault Field: 90,300 OLF Coupeville: 21,100	**FINAL EIS:** Total: 109,600 Ault Field: 100,300 OLF Coupeville: 9,300

Table 1.13-2 Comparison of Certain Resource Areas from Draft EIS to Final EIS[1]

	Scenario A (20/80)[2]	*Scenario B (50/50)*	*Scenario C (80/20)*	*Scenario D[3] (30/70)*	*Scenario E[3] (70/30)*
Annual FCLP Operations					
No Action Alternative	**DRAFT EIS:** Total: 20,800 Ault Field: 14,700 OLF Coupeville: 6,100				
	FINAL EIS: Total: 17,400 Ault Field: 11,300 OLF Coupeville: 6,100				
Action Alternative 1	**DRAFT EIS:** Total: 43,800 Ault Field: 8,700 OLF Coupeville: 35,100	**DRAFT EIS:** Total: 43,800 Ault Field: 21,900 OLF Coupeville: 21,900	**DRAFT EIS:** Total: 43,900 Ault Field: 35,100 OLF Coupeville: 8,800	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: Total: 31,000 Ault Field: 6,100 OLF Coupeville: 24,900	**FINAL EIS:** Total: 31,000 Ault Field: 15,500 OLF Coupeville: 15,500	**FINAL EIS:** Total: 31,100 Ault Field: 24,900 OLF Coupeville: 6,200	**FINAL EIS:** Total: 31,000 Ault Field: 9,200 OLF Coupeville: 21,800	**FINAL EIS:** Total: 31,000 Ault Field: 21,700 OLF Coupeville: 9,300
Action Alternative 2	**DRAFT EIS:** Total: 42,000 Ault Field: 8,400 OLF Coupeville: 33,600	**DRAFT EIS:** Total: 42,000 Ault Field: 21,000 OLF Coupeville: 21,000	**DRAFT EIS:** Total: 42,000 Ault Field: 33,600 OLF Coupeville: 8,400	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: Total: 29,600 Ault Field: 5,900 OLF Coupeville: 23,700	**FINAL EIS:** Total: 29,600 Ault Field: 14,800 OLF Coupeville: 14,800	**FINAL EIS:** Total: 29,600 Ault Field: 23,700 OLF Coupeville: 5,900	**FINAL EIS:** Total: 29,700 Ault Field: 8,900 OLF Coupeville: 20,800	**FINAL EIS:** Total: 29,700 Ault Field: 20,800 OLF Coupeville: 8,900
Action Alternative 3	**DRAFT EIS:** Total: 41,900 Ault Field: 8,400 OLF Coupeville: 33,500	**DRAFT EIS:** Total: 41,900 Ault Field: 21,000 OLF Coupeville: 20,900	**DRAFT EIS:** Total: 41,800 Ault Field: 33,500 OLF Coupeville: 8,300	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: Total: 29,600 Ault Field: 5,900 OLF Coupeville: 23,700	**FINAL EIS:** Total: 29,600 Ault Field: 14,800 OLF Coupeville: 14,800	**FINAL EIS:** Total: 29,600 Ault Field: 23,700 OLF Coupeville: 5,900	**FINAL EIS:** Total: 29,600 Ault Field: 8,900 OLF Coupeville: 20,700	**FINAL EIS:** Total: 29,600 Ault Field: 20,700 OLF Coupeville: 8,900

Table 1.13-2 Comparison of Certain Resource Areas from Draft EIS to Final EIS[1]

	Scenario A (20/80)[2]	*Scenario B (50/50)*	*Scenario C (80/20)*	*Scenario D[3] (30/70)*	*Scenario E[3] (70/30)*
Noise Associated with Aircraft Operations: Number of Acres and Total Population within the 65 dB DNL Noise Contour					
No Action Alternative	**DRAFT EIS:** Total: • 19,933 acres • 11,033 people Ault Field: • 12,174 acres • 8,717 people OLF Coupeville: • 7,759 acres • 2,316 people				
	FINAL EIS: Total: • 19,821 acres • 11,171 people Ault Field: • 12,414 acres • 8,941 people OLF Coupeville: • 7,407 acres • 2,230 people				

Table 1.13-2 Comparison of Certain Resource Areas from Draft EIS to Final EIS[1]

	Scenario A (20/80)[2]	*Scenario B (50/50)*	*Scenario C (80/20)*	*Scenario D[3] (30/70)*	*Scenario E[3] (70/30)*
Action Alternative 1	**DRAFT EIS:** Total: • 23,810 acres • 12,791 people Ault Field: • 13,247 acres • 9,159 people OLF Coupeville: • 10,563 acres • 3,632 people	**DRAFT EIS:** Total: • 23,623 acres • 13,299 people Ault Field: • 13,780 acres • 10,044 people OLF Coupeville: • 9,843 acres • 3,255 people	**DRAFT EIS:** Total: • 22,968 acres • 13,547 people Ault Field: • 14,355 acres • 10,696 people OLF Coupeville: • 8,613 acres • 2,851 people	**DRAFT EIS:** • N/A	**DRAFT EIS:** • N/A
	FINAL EIS: Total: • 23,423 acres • 12,576 people Ault Field: • 13,226 acres • 9,110 people OLF Coupeville: • 10,197 acres • 3,466 people	**FINAL EIS:** Total: • 23,107 acres • 12,989 people Ault Field: • 13,616 acres • 9,855 people OLF Coupeville: • 9,491 acres • 3,134 people	**FINAL EIS:** Total: • 22,014 acres • 13,021 people Ault Field: • 13,922 acres • 10,253 people OLF Coupeville: • 8,092 acres • 2,768 people	**FINAL EIS:** Total: • 23,402 acres • 12,935 people Ault Field: • 13,395 acres • 9,562 people OLF Coupeville: • 10,007 acres • 3,373 people	**FINAL EIS:** Total: • 22,610 acres • 13,050 people Ault Field: • 13,818 acres • 10,119 people OLF Coupeville: • 8,792 acres • 2,931 people

Table 1.13-2 Comparison of Certain Resource Areas from Draft EIS to Final EIS[1]

	Scenario A (20/80)[2]	*Scenario B (50/50)*	*Scenario C (80/20)*	*Scenario D[3] (30/70)*	*Scenario E[3] (70/30)*
Action Alternative 2	**DRAFT EIS:** Total: • 23,643 acres • 12,684 people Ault Field: • 13,194 acres • 9,112 people OLF Coupeville: • 10,449 acres • 3,572 people	**DRAFT EIS:** Total: • 23,452 acres • 13,178 people Ault Field: • 13,717 acres • 9,978 people OLF Coupeville: • 9,735 acres • 3,200 people	**DRAFT EIS:** Total: • 22,748 acres • 13,330 people Ault Field: • 14,230 acres • 10,502 people OLF Coupeville: • 8,518 acres • 2,828 people	**DRAFT EIS:** • N/A	**DRAFT EIS:** • N/A
	FINAL EIS: Total: • 23,246 acres • 12,487 people Ault Field: • 13,164 acres • 9,078 people OLF Coupeville: • 10,082 acres • 3,409 people	**FINAL EIS:** Total: • 22,913 acres • 12,876 people Ault Field: • 13,535 acres • 9,781 people OLF Coupeville: • 9,378 acres • 3,095 people	**FINAL EIS:** Total: • 21,665 acres • 12,814 people Ault Field: • 13,788 acres • 10,095 people OLF Coupeville: • 7,877 acres • 2,719 people	**FINAL EIS:** Total: • 23,216 acres • 12,817 people Ault Field: • 13,329 acres • 9,498 people OLF Coupeville: • 9,887 acres • 3,319 people	**FINAL EIS:** Total: • 22,413 acres • 12,889 people Ault Field: • 13,707 acres • 9,978 people OLF Coupeville: • 8,706 acres • 2,911 people

Table 1.13-2 Comparison of Certain Resource Areas from Draft EIS to Final EIS[1]

	Scenario A (20/80)[2]	*Scenario B (50/50)*	*Scenario C (80/20)*	*Scenario D[3] (30/70)*	*Scenario E[3] (70/30)*
Action Alternative 3	**DRAFT EIS:** Total: • 23,708 acres • 12,716 people Ault Field: • 13,210 acres • 9,116 people OLF Coupeville: • 10,498 acres • 3,600 people	**DRAFT EIS:** Total: • 23,581 acres • 13,226 people Ault Field: • 13,773 acres • 9,989 people OLF Coupeville: • 9,808 acres • 3,237 people	**DRAFT EIS:** Total: • 22,811 acres • 13,325 people Ault Field: • 14,230 acres • 10,483 people OLF Coupeville: • 8,581 acres • 2,842 people	**DRAFT EIS:** • N/A	**DRAFT EIS:** • N/A
	FINAL EIS: Total: • 23,265 acres • 12,483 people Ault Field: • 13,133 acres • 9,050 people OLF Coupeville: • 10,132 acres • 3,433 people	**FINAL EIS:** Total: • 22,982 acres • 12,880 people Ault Field: • 13,535 acres • 9,762 people OLF Coupeville: • 9,447 acres • 3,118 people	**FINAL EIS:** Total: • 21,764 acres • 12,824 people Ault Field: • 13,766 acres • 10,077 people OLF Coupeville: • 7,998 acres • 2,747 people	**FINAL EIS:** Total: • 23,239 acres • 12,817 people Ault Field: • 13,300 acres • 9,474 people OLF Coupeville: • 9,939 acres • 3,343 people	**FINAL EIS:** Total: • 22,428 acres • 12,884 people Ault Field: • 13,669 acres • 9,960 people OLF Coupeville: • 8,759 acres • 2,924 people
Growler Personnel and Dependents					
No Action Alternative	**DRAFT EIS:** 4,104 personnel 5,627 dependents				
	FINAL EIS: 4,104 personnel 5,627 dependents				
Action Alternative 1	**DRAFT EIS:** 4,475 personnel 6,136 dependents	**DRAFT EIS:** 4,475 personnel 6,136 dependents	**DRAFT EIS:** 4,475 personnel 6,136 dependents	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: 4,439 personnel 6,086 dependents	**FINAL EIS:** 4,439 personnel 6,086 dependents	**FINAL EIS:** 4,439 personnel 6,086 dependents	**FINAL EIS:** 4,439 personnel 6,086 dependents	**FINAL EIS:** 4,439 personnel 6,086 dependents

Table 1.13-2 Comparison of Certain Resource Areas from Draft EIS to Final EIS[1]

	Scenario A (20/80)[2]	*Scenario B (50/50)*	*Scenario C (80/20)*	*Scenario D[3] (30/70)*	*Scenario E[3] (70/30)*
Action Alternative 2	**DRAFT EIS:** 4,768 personnel 6,537 dependents	**DRAFT EIS:** 4,768 personnel 6,537 dependents	**DRAFT EIS:** 4,768 personnel 6,537 dependents	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: 4,732 personnel 6,487 dependents	**FINAL EIS:** 4,732 personnel 6,487 dependents	**FINAL EIS:** 4,732 personnel 6,487 dependents	**FINAL EIS:** 4,732 personnel 6,487 dependents	**FINAL EIS:** 4,732 personnel 6,487 dependents
Action Alternative 3	**DRAFT EIS:** 4,481 personnel 6,144 dependents	**DRAFT EIS:** 4,481 personnel 6,144 dependents	**DRAFT EIS:** 4,481 personnel 6,144 dependents	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: 4,445 personnel 6,094 dependents	**FINAL EIS:** 4,445 personnel 6,094 dependents	**FINAL EIS:** 4,445 personnel 6,094 dependents	**FINAL EIS:** 4,445 personnel 6,094 dependents	**FINAL EIS:** 4,445 personnel 6,094 dependents
Education: Projected Number of School-aged Children Relocating to the Region as a Result of Changes in EA-18G Growler Personnel Loading at NAS Whidbey Island Compared to the No Action Alternative Levels					
No Action Alternative	**DRAFT EIS:** No additional students				
	FINAL EIS: No additional students				
Action Alternative 1	**DRAFT EIS:** 191 additional students				
	FINAL EIS: 173 additional students				
Action Alternative 2	**DRAFT EIS:** 341 additional students				
	FINAL EIS: 324 additional students				
Action Alternative 3	**DRAFT EIS:** 195 additional students				
	FINAL EIS: 176 additional students				
Greenhouse Gases: Total Action-Related Mobile CO_2e Emissions (metric tons per year)					
No Action Alternative	**DRAFT EIS:** 99,521				
	FINAL EIS: 96,954				
Action Alternative 1	**DRAFT EIS:** 156,214	**DRAFT EIS:** 147,057	**DRAFT EIS:** 138,385	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: 135,904	**FINAL EIS:** 128,422	**FINAL EIS:** 121,440	**FINAL EIS:** 133,543	**FINAL EIS:** 123,305

Table 1.13-2 Comparison of Certain Resource Areas from Draft EIS to Final EIS[1]

	Scenario A (20/80)[2]	*Scenario B (50/50)*	*Scenario C (80/20)*	*Scenario D[3] (30/70)*	*Scenario E[3] (70/30)*
Action Alternative 2	**DRAFT EIS:** 156,669	**DRAFT EIS:** 147,832	**DRAFT EIS:** 139,356	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: 136,783	**FINAL EIS:** 129,577	**FINAL EIS:** 122,878	**FINAL EIS:** 134,549	**FINAL EIS:** 125,151
Action Alternative 3	**DRAFT EIS:** 155,766	**DRAFT EIS:** 147,436	**DRAFT EIS:** 138,522	**DRAFT EIS:** N/A	**DRAFT EIS:** N/A
	FINAL EIS: 135,827	**FINAL EIS:** 129,174	**FINAL EIS:** 122,012	**FINAL EIS:** 133,601	**FINAL EIS:** 124,265

Notes:

[1] Changes between the Draft EIS and Final EIS include a 20-percent reduction in FCLP operations related to incorporation of Precision Landing Mode (PLM) (aka MAGIC CARPET) technology into the Fleet and a reduction in the number of pilots assigned to each squadron (two fewer pilots per carrier squadron). While it was premature to consider reductions in FCLP requirements for the NAS Whidbey Island complex in the Draft EIS, based upon successful testing and operational use of this technology, the Navy has incorporated the use of PLM into the Final EIS analysis; therefore, the anticipated 20-percent reduction to FCLP requirements and the associated reduction in FCLP operations has been applied to the No Action Alternative as well as the action alternatives associated with the Proposed Action in the Final EIS.

[2] All five scenarios are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] Scenarios D and E were not analyzed in the Draft EIS. These two new scenarios were added to the Final EIS to further determine how the distribution of FCLP operations affects noise impacts at Ault Field and OLF Coupeville.

Key:

CO_2e = carbon dioxide equivalent
dB = decibel
DNL = day-night average sound level
FCLP = Field Carrier Landing Practice
N/A = Not applicable
OLF = Outlying Landing Field Coupeville

The Final EIS also addresses comments that were received during the public comment period that followed the release of the Draft EIS.

The Navy revised portions of the Final EIS in response to numerous comments received on the Draft EIS to provide technical edits or clarifications and include updated or additional information. While these revisions improve the accuracy and thoroughness of the analysis presented in the Draft EIS, they do not alter conclusions regarding the nature or magnitude of impacts to resources. Substantive revisions from the Draft EIS to the Final EIS are detailed here and include the following.

1.13.1 Executive Summary

- Portions of the Executive Summary were revised to reflect corresponding changes in the main text of the EIS.

1.13.2 Chapter 1: Purpose and Need for the Proposed Action

- Section 1.8, Agency Participation and Intergovernmental Coordination, was updated to include the latest consultation information.
- Section 1.10 (Public Participation: Draft EIS Review) was added to summarize the Draft EIS review, comment, and public outreach process. This section includes information on the Draft EIS notifications, public meetings, and public comments, along with a summary of comment topics and commenters.
- Section 1.11 (Public Participation: Comment Themes) was added to discuss specific comment themes and identify recurring topics raised across the three public comment periods (Scoping 2013, Scoping 2014, and Draft EIS Release). This section details each comment theme and discusses how the comment theme was addressed within the EIS.
- Section 1.12 (Other Reports) replaced the discussion in Section 1.9.3 of the Draft EIS on third-party documents suggested to the Navy for review in the EIS analysis. Since the release of the Draft EIS, the list of third-party reports and studies grew from three to eight documents. The following is a list of the eight documents that have been reviewed by the Navy for consideration in this analysis:
    - San Juan County Jet Aircraft Noise Reporting (2014 to present)
    - Sandford Fidell Public Comment on the “Significance” Criteria Used for Noise Impacts (2017)
    - State of Washington Department of Health Public Comment (2017)
    - Paul Schomer Public Comment on Aircraft Noise and Hearing Protection (2017)
    - Michael Shuman’s Report on the Economic Costs of the NAS Whidbey Island Complex (2017)
    - National Park Service Acoustical Monitoring Report for Ebey’s Landing National Historical Reserve (2016)
    - Dahlgren Opinion Paper on the Public Health Impact of Aircraft Noise on Residents in the Vicinity of Whidbey Island (2015)
    - JGL Acoustics, Inc., report, *Whidbey Island Military Jet Noise Measurements* (2013)

1.13.3 Chapter 2: Proposed Action and Alternatives

- Section 2.2 was revised to clarify the requirement for a suitable FCLP airfield within 50 nautical miles of Ault Field.
- Section 2.4, Alternatives Considered but Not Carried Forward for Further Analysis, was expanded to clarify reasons for eliminating some alternatives from further consideration in this EIS.

1.13.4 Chapter 3: Affected Environment and Chapter 4: Environmental Consequences

Chapters 3 and 4 are complementary and discuss existing and potential future conditions, respectively, for specific resource areas that may be impacted by the Proposed Action. Revisions to Chapters 3 and 4 are noted below by resource topic in the order in which they appear in the EIS.

1.13.4.1 Airspace and Airfield Operations

- An FCLP pattern altitude figure (Figure 3.1-6) was added for clarification of FCLP pattern altitudes.
- Updates were made to Sections 3.1.2 and 4.1.2 to add clarifying information related to flight altitudes in Military Operations Areas.
- Updates were made to Sections 3.1.2.1, 4.1.2.1, 4.1.3.1, and 4.1.4.1 to add clarifying information related to OLF Coupeville pattern altitudes and expected runway utilization.
- Figure 4.1-1 was updated to align with text.
- Sections 3.1.2.1 and 4.1.2.1 were revised to better explain why the length of the OLF Coupeville runway does not represent a safety risk.

1.13.4.2 Noise Associated with Aircraft Operations

- Several updates were applied to the noise modeling/analysis between release of the Draft EIS and the Final EIS, which include 1) updating the noise model using the latest version of NOISEMAP (Version 7.3); 2) applying refinements to certain flight profiles/aircraft operating assumptions based upon third-party review; 3) incorporating the effects of PLM (aka MAGIC CARPET) into the noise analysis; and 4) adjusting the number of pilots per squadron. These changes are discussed individually below:
    - The noise analysis was updated using the latest NOISEMAP Version 7.3 model. The most recent approved version of NOISEMAP (released March 2017) involves the inclusion of supplemental metrics in the noise-calculation module, in addition to general code fixes for the program.
    - Refinements were applied to certain flight profiles/aircraft operating assumptions based upon input from a third-party review of the noise modeling inputs.
    - The updated noise modeling for the Final EIS incorporates the implementation of PLM technology at NAS Whidbey Island by the time the Proposed Action is implemented; therefore, the anticipated 20-percent reduction to FCLP requirements and the associated reduction in FCLP operations have been applied to the No Action Alternative as well as the action alternatives associated with the Proposed Action.

  - The noise analysis also updated the number of pilots per squadron for the Fleet carrier squadrons.
- Section 3.2.2, Noise Metrics and Modeling, was revised as follows:
  - Additional text was added to explain why NOISEMAP represents the most current model and best available science.
  - A discussion was added to better explain why modeling represents best available science in predicting future noise impacts, particularly for aircraft that are not yet operating, and for noise impacts over large areas.
  - Discussion was added on how the noise model is validated and the specific inputs added into the model to make it site specific (i.e., terrain).
  - Information was added to clarify that the aircraft noise model is based upon actual measurements.
  - A discussion was added to help demonstrate how modeling results are consistent with noise levels reported by other sources, including on-site measurements.
  - Discussion was expanded on thresholds for supplemental metrics.
- Noise mitigation discussion was expanded to include:
  - Updates were made to Section 3.2.4.1, under Existing Noise Mitigation, as well as to Section 4.2.4, Noise Mitigation. The updated information references Appendix H (new), which summarizes the Navy's noise-mitigation efforts.
  - Sections 3.2.4 and 4.2.6 were revised to discuss implementation of PLM Fleet-wide and how PLM has been incorporated into the analysis. The modeled noise contours and supplemental noise data in Sections 3.2 and 4.2 have been updated to incorporate PLM.
  - Noise abatement text was updated with the information from the latest NAS Whidbey Island Air Operations Manual.
- As discussed further in Section 3.2.2.1, 65 dB DNL is the established federal standard for determining potential for high annoyance. This level has been identified in both the Federal Aviation Administration's (FAA's) Part 150 Program and the Department of Defense's (DoD's) Air Installations Compatible Use Zones (AICUZ) Program (including the individual Air Force and Navy programs) as a threshold for land use recommendations. Consistent with this guidance, 65 dB DNL is used to show areas with potential for high annoyance in this analysis. However, aircraft noise does occur outside the 65 dB DNL contour, and individuals may have different reactions to it. In order to more fully reflect the noise environment, the Draft EIS included noise contours of 60 dB DNL, as well as detailed noise analysis for specific points of interest. In response to public comments, the Navy has expanded the analysis in the Final EIS to show geographic areas subject to greater than 55 dB DNL.
- For the Supplemental Noise Metrics/Discussion, Sections 3.2 and 4.2, new POIs were added based on public comments. A total of 18 additional POIs were added, for a total of 48 analyzed. In addition, the supplemental metrics modeled at certain POIs were expanded; for instance, all POIs now have outdoor speech interference metrics applied to them.
- Discussion was expanded to clarify that noise was studied outside of the DNL contours per supplemental metrics and POIs.

- The single-event noise analysis was modified to include a table separate from the SEL/L_{max} metrics in order to present the number of events above a threshold of 80 dB L_{max}, 90 dB L_{max}, and 100 dB L_{max}.
- The Probability of Awakening metric was revised as part of the update from NOISEMAP 7.2 to 7.3.
- Discussion of health impacts related to noise (i.e., potential hearing loss) was expanded.
- Nonauditory health effects were discussed as follows:
    - The Navy expanded its nonauditory health effects literature review and bibliography to include journals and research recommended by the Washington State Department of Health, the USEPA, and others in their comments on the Draft EIS. Details of this review are located in Appendix A of the Aircraft Noise Study (Appendix A of this EIS) and summarized in Section 3.2.3.7.
    - A new technical appendix (Appendix I, Community Health and Learning Review) was created to provide details on Island County health factors, local school district test scores and graduation rates, and a comparison of topics discussed in health impact assessments and this EIS.

1.13.4.3 Public Health and Safety

- Sections 3.3.2.1 and 4.3.2.1 were updated to add clarifying information related to the Growler's safety record.
- Accident Potential Zone (APZ) analysis was updated based on changes in FCLP requirements.
- The number of children living within the noise contours was updated.
- Additional locations where children congregate was added to the analysis.

1.13.4.4 Air Quality

- A general discussion was provided in Section 3.4.1 of other potential aircraft emissions, and more details and clarified information were provided on specific hazardous air pollutants. Discussions on proper procedures and specific conditions for dispensing chaff and dumping fuel were clarified.
- A verified description of test cell use at NAS Whidbey Island test cell facilities was provided in Section 3.4.2.
- Section 4.4.2.2 was revised to include additional quantified operations-related emissions from stationary sources for Alternative 1.
- Discussion was added of potential changes to the existing Title V permit related to temporary construction equipment, boilers, and heaters that require review for possible permit changes. No new stationary sources are expected as part of the Proposed Action.
- Section 4.4.2.1.3 was revised to include mobile operations-related emissions for Alternative 1.
- Qualitative discussions were added to refine the analysis regarding chaff, fuel dumping, and hazardous air pollutants. Also added was a discussion of emissions dispersion.
- Conclusion statements were added to demonstrate compliance with National Ambient Air Quality Standards in Sections 4.4.2, 4.4.3, and 4.4.4.

1.13.4.5 Land Use

- Section 3.5.2.2 was revised to include additional details on the AICUZ program, including municipality involvement, responsibilities of the municipality, and enforcement of the AICUZ program.
- Additional details were added to Section 3.5 on potentially incompatible land uses, current land uses within APZs, and noise disclosures for each municipality.
- A new subsection was added within Sections 3.5 and 4.5, Community Character.
- Sections 3.5 and 4.5 were revised under Recreation and Wilderness to include discussion of one wilderness area within the study area, Williamson Rocks, part of the San Juan Islands National Wildlife Reserve. Information and analysis related to the following activities was also added:
    - Camping at Deception Pass State Park, Rhododendron Park, and Fort Casey State Park
    - Recreation outside of designated parks/recreation areas, including community centers and gathering places
    - School sporting events and sports at local ball fields
- Additional studies on the impacts of aircraft noise on recreational experiences that were referenced in comments on the Draft EIS were reviewed and incorporated into Section 4.5.2.2.
- The discussion of impacts to the management of Ebey's Landing National Historical Reserve was revised based on information provided by the National Park Service in comments on the Draft EIS.
- The analysis in Section 4.5.2.2 was updated to include the potential impact of noise events over 50 dB to recreation and outdoor areas within the study area. The Draft EIS analyzed the potential impact of noise events over 65 dB.

1.13.4.6 Cultural Resources

- Section 3.6.1.1 was revised to include information regarding the Section 106 process.
- Section 3.6.1.2 was revised to include additional text on selecting the area of potential effect. This revision included clarification on areas included within the area of potential effect and areas not included in the analysis.
- Figure 3.6-1 was revised regarding the boundaries of the Ebey's Landing National Historical Reserve and the Central Whidbey Island Historic District. This figure also was revised to include the aggregate Area of Potential Effects (APE) based on the revised noise contours and the inclusion of Ebey's Landing National Historical Reserve.
- Section 3.6.2 was revised to account for additional study conducted by the Navy for its Section 106 evaluations. It includes additional text to describe the demolition of some of the buildings located at Ault Field. Text also was added in the OLF Coupeville and Island County sections, to reference Section 106 consultation and the evaluation of the historic properties (individually listed and contributing resources) that are located within Ebey's Landing National Historical Reserve.
- Text was added to consider landscape areas within Ebey's Landing National Historical Reserve.

- Additional background discussion was added for OLF Coupeville and the community of Coupeville.
- Section 106 consultation updates were included to account for the additional correspondence that has occurred since the Draft EIS.
- Section 4.6.2.1.1 was revised to include a discussion of Building 115.

1.13.4.7 American Indian Traditional Resources

- No substantive changes were made to these sections.

1.13.4.8 Biological Resources

- This section was updated based on the outcome of agency consultation for biological resources.
- Additional literature was reviewed and included, and text was revised where applicable.
- Sections 3.8 and 4.8 were revised to include information related to population density and estimates, breeding habitat, and noise and wildlife-strike impacts consistent with the U.S. Fish and Wildlife Service consultation.
- Section 4.8 was revised to include the following:
    - Text on sensory disturbance, other types of anthropogenic disturbance, and discussion of potential impacts to fitness and population effects was added.
    - Pigeon guillemot research was added.
    - Research results were added from a study on aircraft impacts to shorebirds and from a military noise (i.e., helicopter) study on the Mexican spotted owl.
    - Content was added related to aircraft disturbance on ungulates, small mammals, and frogs.
- Text regarding sensory disturbances “habituated” and “no significance” was edited to reflect that the Proposed Action may have impacts on wildlife (including various species groups).
- For marine species, text was revised related to acoustic impacts consistent with agency consultations.

1.13.4.9 Water Resources

- No substantive revisions were made to Water Resources.

1.13.4.10 Socioeconomics

- The population discussion was revised to include transient (summertime vacationer and seasonal worker) populations.
- Growler personnel and distribution of Navy households data were updated.
- Under Economy, Employment, and Income, discussion was added on quality of life/community character, in coordination with land use analysis.
- Clarification was added for how the analysis defines the economic study area.
- The economic analysis was expanded to include discussion of agriculture output and employment for Island County, including a discussion of seasonal workers for Island County.
- A discussion was included of impacts on property values from expanding the APZs.

- Housing affordability and housing availability in the affected region were discussed in greater detail in Sections 3.10 and 4.10.
- Revisions were made to Sections 3.10 and 4.10 to add a discussion of tourism, including data on hotel stays/employment.

1.13.4.11 Environmental Justice

- Sections 3.11 and 4.11 were updated with regrouped census data to include Hispanic/Latino populations within minority populations in accordance with recommendations on best practices for environmental justice analysis from the Federal Interagency Working Group on Environmental Justice.
- Impacts to seasonal workers and population flux (summer) were added.

1.13.4.12 Transportation

- Section 3.12 was revised to include discussion of seasonal variations in traffic on Whidbey Island, information on the condition of Deception Pass Bridge, and the county emergency evacuation plans.
- Updates were made to Section 4.12.2.1 to include additional information on proposed traffic circles and indirect impacts to public transit.
- Sections 3.12.2.2 and 4.12.2.1 were updated with discussion of traffic safety.
- Sections 3.12 and 4.12 were updated with the most recent traffic counts available from the Washington Department of Transportation.
- Impacts were revised based on changes in Growler personnel and distribution of Navy households.

1.13.4.13 Infrastructure

- Impacts were revised based on changes in Growler personnel and distribution of Navy households.

1.13.4.14 Geological Resources

- Geologic hazards information related to liquefaction, landslides, and earthquakes in Section 3.14 was updated with data on recent seismic activity.

1.13.4.15 Hazardous Materials and Wastes

- Text related to perflourinated chemicals, water well testing, and Navy public outreach efforts was updated with current information.

1.13.4.16 Climate Change and Greenhouse Gases

- Washington State updates were added to Section 3.16.1.3, State Polices Related to Climate Change.
- Section 4.16.2.2, Changes in Greenhouse Gas Emissions for Alternative 1, was updated.
- Clarification was provided on other greenhouse gas emissions (nitrous oxide, methane).

- Quantification and discussion was provided of average emissions per aircraft, per year, and comparison to car emissions.
- The State of Washington's greenhouse gas reduction goals were addressed under the Climate Leadership Act.

1.13.5 Chapter 5: Cumulative

- A discussion on segmentation was added to Section 5.2.
- Table 5-1 was updated with new projects, revised project dates (as appropriate), and additional details.
- Cumulative impacts and indirect effects were updated for Air Quality, Land Use, Biological Resources, and Socioeconomics.

1.13.6 Chapter 6: Other Considerations Required by NEPA

- No substantive revisions were made to Chapter 6.

1.13.7 Chapter 7: References

- To support revised and additional chapter text, a number of additional references have been added.

1.13.8 Appendices

- Appendix A, Aircraft Noise Study (Revised): this appendix was revised, as follows, per changes applied to the noise analysis between release of the Draft EIS and the Final EIS: 1) updating the noise model using the latest version of NOISEMAP (Version 7.3, released March 2017); 2) applying refinements to certain flight profiles/aircraft operating assumptions based upon third-party review of noise modeling inputs; 3) including the 20-percent reduction to FCLP requirements and the associated reduction in FCLP operations that have been applied to the No Action Alternative from the implementation of PLM across the No Action Alternative as well as the action alternatives associated with the Proposed Action; and 4) updating the number of pilots per squadron
- Appendix B, Air Emissions Calculations (Updated): stationary and mobile operations-related emissions data were updated for Alternative 1.
- Appendix C, Federal and State Agency Coordination (Updated): correspondence included for biological, coastal zone resource, and cultural consultations was updated to reflect new correspondence sent and received.
- Appendix D, Transportation Trip Generation Data (No Change): no substantive changes were made.
- Appendix E, Land Use Data, High-tempo FCLP Year (Updated): data were updated per changes made to the noise analysis.
- Appendix F, Environmental Justice Data, High-tempo FCLP Year (Updated): data were updated per changes made to the noise analysis.
- Appendix G, Civilian Airfield Analysis (No Change): no substantive changes were made to this analysis.

- Appendix H, Noise Mitigation (New): this new appendix was compiled to provide an overview of the noise mitigation measures at the NAS Whidbey Island complex.
- Appendix I, Community Health and Learning Review (New): this new appendix includes Island County health factors, local school district test scores and graduation rates, and a comparison of Health Impact Assessments and EISs.
- Appendix J, 2013 Scoping Information (New): this appendix was added to include public outreach items published during the 2013 scoping effort. Items include press releases, newspaper notifications, and public meeting materials.
- Appendix K, 2014 Scoping Information (New): this new appendix was added to include public outreach items published during the 2014 scoping effort. Items include press releases, newspaper notifications, and public meeting materials.
- Appendix L, 2016 Draft EIS Public Information Meetings (New): this new appendix was added to include public outreach items published during the 2016 Draft EIS release effort. Items include press releases, newspaper notifications, and public meeting materials.
- Appendix M, Draft EIS Public Commenting and Response Key (New): this new appendix includes a summary of the public commenting review process, coded comment responses, and an index of all comments with their assigned responses.

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2 Proposed Action and Alternatives

This chapter describes the Proposed Action, the process for selecting the range of alternatives considered in this Environmental Impact Statement (EIS), and the alternatives carried forward or eliminated from further analysis.

2.1 Proposed Action

In June 2013, the United States (U.S.) Department of Defense (DoD) Appropriations Act of 2014 added additional EA-18G "Growler" aircraft and the necessary funding to augment the Growler community. Therefore, on September 5, 2013, the U.S. Department of the Navy (Navy) announced the preparation of an EIS to evaluate the potential environmental effects associated with the potential introduction of 13 additional aircraft.

In spring 2014, the Chief of Naval Operations (CNO) submitted an Unfunded Requirements List that included 22 additional Growler aircraft as part of the *Budget of the U.S. Government, Fiscal Year 2015*. An unfunded budget request represents a list of resources the Navy deems necessary to perform its mission but for which there is no current funding. Standing alone, an unfunded budget request neither ensures nor provides for additional funding, and, therefore, there is no certainty that requested funding could be provided by Congress. Nonetheless, since there is a possibility that additional Growler aircraft could be purchased in the future, the Navy elected to revise the scope for the EIS effort in order to be transparent with the public as to future possibilities. The revised scope for this EIS was announced in October 2014. Subsequently, Congress authorized the purchase of additional Growler aircraft in 2015 and 2016.

Beginning as early as 2018, the Navy proposes to:

- continue and expand existing Growler operations at the Naval Air Station (NAS) Whidbey Island complex, which includes field carrier landing practice (FCLP) by Growler aircraft that occurs at Ault Field and Outlying Landing Field (OLF) Coupeville
- increase electronic attack capabilities by adding 35 or 36 aircraft to support an expanded DoD mission for identifying, tracking, and targeting in a complex electronic warfare environment
- construct and renovate facilities at Ault Field to accommodate additional Growler aircraft
- station additional personnel and their family members at the NAS Whidbey Island complex and in the surrounding community

This EIS does not analyze impacts of Growler training occurring at existing range complexes, Military Operations Areas (MOAs), and testing ranges because this analysis has been performed in other National Environmental Policy Act (NEPA) documents. The Navy prepares separate NEPA documents addressing home basing and training because each of these documents is focused on the specific action that occurs at these locations. These actions are separated from other actions by their purpose and need, independent utility, timing, and geographic location. Growler operations at the NAS Whidbey Island complex do not automatically trigger larger military training activities in the Pacific Northwest. Likewise, Navy military readiness activities proceed independently of whether this Proposed Action is implemented. Moreover, NEPA documents that address training typically analyze various training activities of many different types of aircraft and ships within an existing military range, whereas this EIS

focuses on the facilities and functions to support Growler operations at the NAS Whidbey Island complex.

Throughout the NEPA process, the Navy sought to provide timely information for public transparency. Because the Draft EIS did not include a Preferred Alternative, the Navy took steps to announce the Preferred Alternative as soon as it was determined. On June 25, 2018, the Navy identified Alternative 2, Scenario A, as the Preferred Alternative ahead of the publication of the Final EIS. Alternative 2, Scenario A, provides the best training for Navy pilots and impacts the fewest number of residents living in the community. See Section 2.4 for more detail on the Preferred Alternative.

The next step in the NEPA process is a Record of Decision, which will occur no sooner than 30 days following the publication of the Final EIS. While NEPA and Council on Environmental Quality (CEQ) regulations required public comment on the Draft EIS, the regulations do not require a public comment period following the release of the Final EIS. The Navy considered all 4,335 public comments received on the Draft EIS and refined the Final EIS with updated information that improves the accuracy and thoroughness of the Final EIS analysis. Although the conclusions of the Draft EIS and Final EIS remain the same, the operational changes announced in September 2017 (i.e., the reduced number of pilots as defined by the latest information on the enhanced Electronic Attack mission and the implementation of Precision Landing Mode [PLM], also known as Maritime Augmented Guidance with Integrated Controls for Carrier Approach and Recovery Precision Enabling Technologies [MAGIC CARPET]) had an overall benefit of lessening the impacts across all alternatives and scenarios. The Final EIS provides clarifications and identifies changes that were made to the Draft EIS (see Section 1.13). The Navy response to public comment is provided in Appendix M.

2.2 Development of the Range of Action Alternatives

In developing the proposed range of alternatives that meet the purpose of and need for the Proposed Action, the Navy carefully reviewed important considerations for the Growler community and Navy aviation training in addition to considering public comments. This review included requirements for Growler squadron training in light of Title 10 responsibilities, existing training requirements and regulations, existing Navy infrastructure, and CNO guidance to support operating naval forces. Considerations included:

- The NAS Whidbey Island complex is home to the Navy's Growler mission, including the training squadron, all U.S.-based squadrons, and substantial infrastructure and training ranges that have been established during the past 45-plus years and as supported by previous NEPA analysis regarding Growler operations.
- location of suitable airfields that provide for the most realistic training environment
- distance aircraft would have to travel to accomplish training
- expense of duplicating capabilities that already exist at Ault Field
- operational readiness and synergy of the small Growler community
- access to training ranges, Special Use Airspace (SUA), and military training routes
- effective use of existing infrastructure
- management of aircraft inventories, simulators, maintenance equipment, and logistical support
- effective use of personnel to improve operational responsiveness and readiness

- existing land use and public health and safety concerns

The Navy established requirements for FCLP airfields in order to ensure that FCLP realistically trains naval aviators to land on an aircraft carrier and used these requirements to inform the development of alternatives. These requirements are crucial because landing on an aircraft carrier is perhaps the most difficult operation in military aviation. To be suitable for FCLP, the airfield should have the following attributes:

- Field elevation is at or below 1,000 feet above mean sea level, in order to duplicate the atmospheric conditions at sea.
- Runway width, length, and weight-bearing capacity are sufficient to safely support tactical jet aircraft.
- The runway is aligned with the prevailing winds, with a painted simulated carrier landing area for day operations and flush-deck lighting to simulate the carrier landing area for night operations.
- Ambient lighting is low in order to duplicate the at-sea carrier environment at night as closely as possible.
- Maximum transit distance from the home field is 50 nautical miles, which is the distance a Growler can travel on a fuel load in order to conduct eight to 10 FCLP passes with sufficient fuel to return to its home field with required reserves.
- The airfield is not beneath the lateral limits of Class B or C airspace.
- Airspace permits the replication of the aircraft carrier landing pattern.
- The airfield is available 24/7 to support the exclusive use of FCLPs without interruption, except in the case of emergency.
- Suitable arresting gear is available at the airfield or at another airfield within 17 nautical miles to assist an aircraft landing in the case of an emergency.
- A MK-14 Improved Fresnel Lens Optical Landing System (IFLOLS), a Manually Operated Visual Landing Aid System, and supporting equipment are available. Because the Navy only has 27 IFLOLS worldwide and this equipment is no longer being manufactured, the Navy would have to move an existing system or contract for the manufacture of an additional IFLOLS if the FCLPs were to be conducted at an airfield that does not currently support them.
- A Landing Signal Officer work station is available with the necessary supporting equipment, including a weather terminal, ultra-high frequency and very high frequency radios, IFLOLS controls, an Aldis lamp for emergency communications, and an abeam position marker light visible to pilots in the FCLP landing pattern.

Furthermore, the Navy evaluated past home basing decisions, reconsidered alternatives previously eliminated from analysis, and considered options suggested by the public during two scoping periods. Section 2.3 describes alternatives that meet the purpose of and need for the Proposed Action and are analyzed in this EIS. Section 2.4 explains the reasons for eliminating some alternatives from further consideration in this EIS.

2.3 Alternatives Carried forward for Analysis

Under the Proposed Action, the Navy is evaluating potential environmental impacts of continuing and increasing airfield operations, establishing facilities and functions at Ault Field to support an expanded Growler mission, and associated personnel changes for the following alternatives. The EIS evaluates the No Action Alternative as well as three action alternatives for implementing the Proposed Action.

2.3.1 No Action Alternative

The CEQ regulations (40 Code of Federal Regulations 1502.14[d]) require an EIS to evaluate the No Action Alternative. The No Action Alternative provides a benchmark that typically enables decision makers to compare the magnitude of potential environmental effects of the proposed alternatives with conditions in the affected environment.

Under the No Action Alternative, the Proposed Action would not occur; this means the Navy would not operate additional Growler aircraft and would not add additional personnel at Ault Field, and no construction associated with the Proposed Action would occur. The No Action Alternative would not meet the purpose of or need for the Proposed Action; however, the conditions associated with the No Action Alternative serve as reference points for describing and quantifying the potential impacts associated with the proposed alternatives. For this EIS, the Navy analyzes 2021 as the representative year for the No Action Alternative because it represents conditions when events at Ault Field for aircraft loading, facility and infrastructure assets, personnel levels, and number of aircraft unrelated to the Growler Proposed Action are expected to be fully implemented and complete. Therefore, with these other actions complete, the analysis isolates the impacts of this Proposed Action of adding additional Growler aircraft and personnel and associated construction. Conditions that are evaluated as implemented and fully complete prior to 2021 include the following:

- the P-3C Orion/EP-3 will be retired from the Navy in 2021
- six P-8A Poseidon squadrons will be home based at Ault Field by 2020
- projected volumes of transient and other aircraft utilizing Ault Field in 2021 based on current and historical volumes of these aircraft
- with full implementation of PLM, also known as MAGIC CARPET, FCLP requirements are expected to be reduced, conservatively, by 20 percent

2.3.2 Action Alternatives

The basic action alternatives assessed in this EIS consist of force structure and operational changes to support an expanded DoD capacity and include variations of the following factors:

- number of aircraft assigned per squadron
- number of expeditionary squadrons
- number of personnel
- distribution of Growler FCLP aircraft operations at Ault Field and OLF Coupeville (under all scenarios for each alternative)
- each force structure alternative has different personnel numbers, which has additional impacts on the environment

- Fundamental to understanding the differences in force structure between the action alternatives is understanding the three types of Electronic Attack squadrons home based at the NAS Whidbey Island complex--carrier squadrons, expeditionary squadrons, and the training squadron--and the training requirements for each squadron type. The number of FCLPs that would be conducted in the complex is dictated by the type of squadron.

Carrier Squadrons

Carrier squadrons operate from an aircraft carrier when deployed. Aircrews must conduct FCLP on land prior to deployment in order to gain initial carrier landing qualification and in order to reestablish qualification. Qualifications are temporary because the skill is perishable, and, after a certain period, qualifications must be reestablished by aircrews conducting FCLP before being allowed to land on the ship. Currently, nine carrier squadrons are at Ault Field. Under each alternative analyzed in this EIS, including the No Action Alternative, nine carrier squadrons would continue to be home based at Ault Field.

Expeditionary Squadrons

These squadrons are deployed from Ault Field and operate from various land bases throughout the world. Because they are land based, they do not normally conduct FCLP. The expeditionary squadrons support Regional Combatant Commander requirements, U.S. Air Force expeditionary wings, U.S. Marine Corps expeditionary forces, and joint coalition forces. These squadrons do not train at OLF Coupeville. Currently, three expeditionary active squadrons and one expeditionary reserve squadron are at Ault Field.

Training Squadron (also known as the Fleet Replacement Squadron, or FRS)

The training squadron provides post-graduate training for assigned personnel (aircrews and maintainers). Training is provided for both carrier and expeditionary aircrews. The only Growler training squadron is home based at Ault Field.

Action Alternative 1

Alternative 1 would expand carrier capabilities by adding three additional aircraft and additional squadron personnel to each of the existing nine carrier squadrons and augmenting the FRS with eight additional aircraft and additional squadron personnel (a net increase of 35 aircraft). Alternative 1 would add an estimated 335 Navy personnel and 459 dependents to the region.

Action Alternative 2

Alternative 2 would expand expeditionary and carrier capabilities by establishing two new expeditionary squadrons, adding two additional aircraft and additional squadron personnel to each of the nine existing carrier squadrons, and augmenting the FRS with eight additional aircraft and additional squadron personnel (a net increase of 36 aircraft). Alternative 2 would add an estimated 628 Navy personnel and 860 dependents to the region.

Action Alternative 3

Alternative 3 would expand expeditionary and carrier capabilities by adding three additional aircraft and additional squadron personnel to each of the three existing expeditionary squadrons, adding two additional aircraft and additional squadron personnel to each of the nine existing carrier squadrons, and augmenting the FRS with nine additional aircraft and additional squadron personnel (a net increase of 36 aircraft). Alternative 3 would add an estimated 341 Navy personnel and 467 dependents to the region.

Scenarios Analyzing FCLP Distribution

This EIS analyzes the distribution of annual Growler FCLPs between Ault Field and OLF Coupeville resulting from the three alternatives. Annual FCLPs are calculated based on the number of FRS Growler pilots requiring initial Growler carrier landing training and the number of Fleet pilots requiring recurring carrier landing training, not by the number of Growler aircraft. Scheduling of FCLPs includes some uncertainty and variability because these operations are tied to global events, weather, and aircraft carrier operations, and therefore scheduling requires flexibility to conduct FCLPs between two airfields.

Although the number of aircraft appear similar in the alternatives, the force structure arrangement is significant in that this determines the manner in which aircrew train using these additional aircraft, which has differing impacts on the environment (i.e., the squadron type determines its FCLP requirement and the number of personnel stationed in the local area). An alternative that has an increased number of carrier aircraft would result in increased FCLP requirements, which would result in increased noise impacts to the community because of the intense and focused nature of FCLPs when they occur. This is equally true for alternatives that increase the number of training aircraft, which also increases the demand for FCLPs. In contrast, alternatives that would increase expeditionary squadrons and not carrier squadrons would have a correspondingly lower noise impact on the environment because expeditionary aircraft do not normally require FCLP. Likewise, the differences in force structure result in differing numbers of personnel and their families being stationed in the local community. This has different impacts on housing, social services, schools, and other socioeconomic factors between the alternatives.

In order to determine how the distribution of Growler FCLP operations may affect noise impacts at OLF Coupeville and Ault Field, this EIS evaluates the following five sub-alternatives, which are operational scenarios (analyzing varying distribution of Growler FCLP operations at Ault Field and OLF Coupeville) for each alternative listed above:

- **Scenario A**
  Twenty percent of all FCLPs conducted at Ault Field and 80 percent of all FCLPs conducted at OLF Coupeville
- **Scenario B**
  Fifty percent of all FCLPs conducted at Ault Field and 50 percent of all FCLPs conducted at OLF Coupeville

- **Scenario C**
  Eighty percent of all FCLPs conducted at Ault Field and 20 percent of all FCLPs conducted at OLF Coupeville
- **Scenario D**
  Thirty percent of all FCLPs conducted at Ault Field and 70 percent of all FCLPs conducted at OLF Coupeville
- **Scenario E**
  Seventy percent of all FCLPs conducted at Ault Field and 30 percent of all FCLPs conducted at OLF Coupeville

The analysis includes the continuation and expansion of Growler operations at the NAS Whidbey Island complex, including FCLPs at Ault Field and OLF Coupeville. In addition, the analysis includes all flight operations of other aircraft at the NAS Whidbey Island complex. Total airfield operations are considered all aircraft operations that occur, and these include Touch-and-Goes, Depart and Re-enter, Ground Controlled Approaches, and FCLPs. Total airfield operations include all aircraft for Ault Field and OLF Coupeville (see Table 2.3-1). Total operations may differ between alternative and scenario due to varying training requirements and randomness inherent in modeling. In addition, the percentages depicted are used for general description of the scenarios. The proposed level of activity for each alternative and associated scenario is quantified in Table 2.3-1. The above five scenarios (A, B, C, D, and E), in combination with the alternatives described in Table 2.3-1 (Alternatives 1, 2, and 3), provide a total of 15 alternative scenarios that are fully evaluated in this EIS analysis. The Secretary of the Navy will be able to select a final alternative/scenario or combination from the range of 15 analyzed in this EIS.

Table 2.3-1 Total Airfield Operations by Alternative for the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

EIS Alternatives	*Growler Force Structure Changes*	*Additional Growler Aircraft by Role*	*Total Growler Aircraft at Ault Field*[1]	*Total Operations at NAS Whidbey Island Complex*[2, 3, 4,5]
No Action Alternative (No additional Growler Aircraft)	• None	• None	82	Total • 84,700 Ault Field • 78,200 OLF Coupeville • 6,500
Alternative 1 (+35 additional Growler Aircraft)	• 3 additional aircraft to each existing carrier squadron • Additional training squadron aircraft	• 27 carrier squadron aircraft • 8 training aircraft	117	Total • Scenario A: 112,600 • Scenario B: 111,200 • Scenario C: 109,800 • Scenario D: 112,200 • Scenario E: 110,100 Ault Field • Scenario A: 87,300 • Scenario B: 95,300 • Scenario C: 103,200 • Scenario D: 90,000 • Scenario E: 100,400 OLF Coupeville • Scenario A: 25,300 • Scenario B: 15,900 • Scenario C: 6,600 • Scenario D: 22,200 • Scenario E: 9,700
Alternative 2 (+36 additional Growler Aircraft)	• 2 new expeditionary squadrons • 2 additional aircraft to each existing carrier squadron • Additional training squadron aircraft	• 10 expeditionary squadron aircraft • 18 carrier squadron aircraft • 8 training aircraft	118	Total • Scenario A: 112,100 • Scenario B: 110,700 • Scenario C: 109,500 • Scenario D: 111,800 • Scenario E: 110,000 Ault Field • Scenario A: 88,000 • Scenario B: 95,500 • Scenario C: 103,200 • Scenario D: 90,600 • Scenario E: 100,700 OLF Coupeville • Scenario A: 24,100 • Scenario B: 15,200 • Scenario C: 6,300 • Scenario D: 21,200 • Scenario E: 9,300

Table 2.3-1 Total Airfield Operations by Alternative for the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

EIS Alternatives	*Growler Force Structure Changes*	*Additional Growler Aircraft by Role*	*Total Growler Aircraft at Ault Field*[1]	*Total Operations at NAS Whidbey Island Complex*[2, 3, 4,5]
Alternative 3 (+36 additional Growler Aircraft)	• 3 additional aircraft to each existing expeditionary squadron • 2 additional aircraft to each existing carrier squadron • Additional training squadron aircraft	• 9 expeditionary squadron aircraft • 18 carrier squadron aircraft • 9 training aircraft	118	Total • Scenario A: 111,800 • Scenario B: 110,500 • Scenario C: 109,200 • Scenario D: 111,400 • Scenario E: 109,600 Ault Field • Scenario A: 87,700 • Scenario B: 95,300 • Scenario C: 102,900 • Scenario D: 90,300 • Scenario E: 100,300 OLF Coupeville • Scenario A: 24,100 • Scenario B: 15,200 • Scenario C: 6,300 • Scenario D: 21,100 • Scenario E: 9,300

Notes:

1 These are operational aircraft, and it is possible for additional Growler to be present at the NAS Whidbey Island complex (e.g., undergoing maintenance or in caretaker status). Airfield operations are determined by mission requirements and training needs for pilots and aircrews, not by the number of aircraft present.

2 Total airfield operations at NAS Whidbey Island complex are approximate for each scenario. Total airfield operations include FCLPs as well as all other operations. Detailed airfield operations tabulated by airfield and alternative/scenario are provided in Sections 3.1 and 4.1.

3 Total operations for each scenario combine the operations at Ault Field and OLF Coupeville for that specific scenario. Total operations may differ between alternative and scenario due to variability in training requirements and randomness inherent in modeling.

4 Since the publication of the Draft EIS, two new operational scenarios for each action alternative have been added to the analysis. In addition, several updates were applied to the noise analysis: incorporation of Precision Landing Mode, which reduced FCLP requirements by approximately 20 percent across all scenarios and led to a reduction in FCLP operations, and updating the number of pilots per squadron (reduction); see Section 1.13.

5 Total airfield operations are considered all aircraft operations that occur, and these include Touch-and-Goes, Depart and Re-enter, Ground Controlled Approaches, and FCLPs. Total airfield operations include all aircraft for Ault Field and OLF Coupeville.

Key:
EIS = Environmental Impact Statement
NAS = Naval Air Station
OLF = outlying landing field

Scenarios are based on the distribution of Growler FCLPs between Ault Field and OLF Coupeville (Table 2.3-2). The FCLP percentages for each scenario that are expressed in this analysis are intended to analyze levels of total aircraft operations. The percentages are not intended to provide a firm division of FCLPs between airfields but instead are used for general description of the scenarios; the distribution of FCLPs will be based on the level of activity presented in Table 2.3-2. From a purely operational perspective, the Navy would prefer to use OLF Coupeville for all FCLPs because it more closely replicates the pattern and conditions at sea, and therefore provides superior training. However, because the Navy recognizes that noise impacts to the community are an unavoidable adverse effect of the Proposed Action, this EIS analyzes five operational scenarios at the expense of ideal training.

Several updates were applied to the noise analysis between release of the Draft EIS and the Final EIS, which include 1) updating the noise model using the latest version of NOISEMAP (Version 7.3); 2) applying refinements to certain flight profiles/aircraft operating assumptions; 3) incorporating the effects of PLM into the noise analysis; and 4) updating the number of pilots per squadron. These changes reduced the total number of operations and total number of FCLPs at the NAS Whidbey Island complex (see Section 1.13).

Table 2.3-2 Comparison of FCLPs by Alternative at the NAS Whidbey Island Complex[1]

Alternative[2]	*Ault Field*	*OLF Coupeville*	*Total FCLPs*
Alternative 1			
Scenario A (20/80 FCLP Split)	6,100	24,900	31,000
Scenario B (50/50 FCLP Split)	15,500	15,500	31,000
Scenario C (80/20 FCLP Split)	24,900	6,200	31,100
Scenario D (30/70 FCLP Split)	9,200	21,800	31,000
Scenario E (70/30 FCLP Split)	21,700	9,300	31,000
Alternative 2			
Scenario A (20/80 FCLP Split)	5,900	23,700	29,600
Scenario B (50/50 FCLP Split)	14,800	14,800	29,600
Scenario C (80/20 FCLP Split)	23,700	5,900	29,600
Scenario D (30/70 FCLP Split)	8,900	20,800	29,700
Scenario E (70/30 FCLP Split)	20,800	8,900	29,700
Alternative 3			
Scenario A (20/80 FCLP Split)	5,900	23,700	29,600
Scenario B (50/50 FCLP Split)	14,800	14,800	29,600
Scenario C (80/20 FCLP Split)	23,700	5,900	29,600
Scenario D (30/70 FCLP Split)	8,900	20,700	29,600
Scenario E (70/30 FCLP Split)	20,700	8,900	29,600
No Action Alternative	***11,300***	***6,100***	***17,400***

Notes:

1 This table includes FCLP operations only. Total airfield operations include FCLPs as well as all other operations. Detailed airfield operations tabulated by airfield and alternative/scenario are provided in Sections 3.1 and 4.1.

2 The FCLP percentages for each scenario that are expressed in this analysis are intended to analyze levels of operations at Ault Field and OLF Coupeville. The percentages are not intended to provide a firm division of FCLPs between airfields but instead are used for general description of the scenarios; the distribution of FCLPs will be based on the level of activity presented in the table above. Training requirements may require FCLPs that fall within a range of these operations.

3 FCLP operations may differ between alternative and scenario due to variability in training requirements and randomness inherent in modeling.

2.3.3 Description of Alternatives

2.3.3.1 Aircraft and Personnel Loading

All action alternatives would result in an increase in personnel when compared to No Action Alternative at Ault Field. The increase in personnel across the three alternatives would range from 335 to 628 to support the addition of 35 or 36 new aircraft assigned to Ault Field as a result of this Proposed Action (Table 2.3-3).

Table 2.3-3 Aircraft, Personnel, and Dependents by Alternative for the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Alternative	*Growler Aircraft Loading*	*Total Growler Aircraft*	*Growler Personnel Loading*	*Total Growler Personnel*	*Dependents*
No Action Alternative	• 9 carrier squadrons (45 aircraft) • 3 expeditionary squadrons (15 aircraft) • 1 Reserve Squadron (5 aircraft) • 1 training squadron (17 aircraft)	82	• 517 Officer • 3,587 Enlisted	4,104	5,627
Alternative 1	• 9 carrier squadrons (72 aircraft) • 3 expeditionary squadrons (15 aircraft) • 1 Reserve Squadron (5 aircraft) • 1 training squadron (25 aircraft)	117 (+35)	• 597 Officer • 3,842 Enlisted	4,439 (+335)	6,086 (+459)
Alternative 2	• 9 carrier squadrons (63 aircraft) • 5 expeditionary squadrons (25 aircraft) • 1 Reserve Squadron (5 aircraft) • 1 training squadron (25 aircraft)	118 (+36)	• 619 Officer • 4,113 Enlisted	4,732 (+628)	6,487 (+860)
Alternative 3	• 9 carrier squadrons (63 aircraft) • 3 expeditionary squadrons (24 aircraft) • 1 Reserve Squadron (5 aircraft) • 1 training squadron (26 aircraft)	118 (+36)	• 597 Officer • 3,848 Enlisted	4,445 (+341)	6,094 (+467)

2.3.3.2 Aircraft Operations

The Navy used the Naval Aviation Simulation Model as the best available tool for modeling airfield flight operations to support the noise assessment and other operational planning (Tables 2.3-1 and 2.3-2).

The Naval Aviation Simulation Model is a computer-based simulation model that quantitatively assesses airfield and airspace capacity, analyzing a wide range of military aviation operational alternatives, under proposed alternatives. All action alternatives would result in an increase in total annual airfield operations over the No Action Alternative at the NAS Whidbey Island complex, with operations split between Ault Field and OLF Coupeville. Growler operations would be conducted in a manner similar to current Navy aircraft training missions conducted at the NAS Whidbey Island complex. Annual airfield operations would increase approximately 29 percent to 33 percent (depending on the alternative and scenario selected) over the No Action Alternative.

2.3.3.3 Facility and Infrastructure Requirements

The Proposed Action would require certain facilities and infrastructure to support the necessary training, maintenance, and operational requirements. The Navy evaluated existing and planned facility resources at Ault Field to identify the types and sizes of additional and/or modified facilities and infrastructure needed to support the Proposed Action. The Navy developed conceptual plans for modifying existing assets (e.g., buildings) or constructing new facilities and infrastructure where needed to resolve deficiencies. New construction, renovation, and modification of facilities and infrastructure would be required for each alternative. A general description of the facilities and infrastructure required for additional Growler aircraft and personnel, and to meet the needs of the Proposed Action, is provided below:

- **Airfield Pavement**
  Airfield pavement design is determined predominantly by the airfield traffic, maximum gross weight of the aircraft the airfield must support, and environmental conditions to which the pavement will be subjected.
- **Aircraft Parking Apron**
  Aircraft parking aprons consist of paved areas in proximity to maintenance hangars; they provide parking space, tie-down locations, and areas to perform maintenance for aircraft. Each parking apron provides sufficient area to allow safe separation between parked aircraft and taxi lanes for aircraft movement.
- **Flight Training and Briefing Building**
  This building provides space for briefing rooms and classrooms, instructor pilot offices, ready rooms, flight planning rooms, flight simulators, and other support space.
- **Maintenance Hangars**
  Maintenance hangars provide equipment and personnel with a weather-protected shelter for inspection, servicing, maintenance, and emergency shelter for operational aircraft as well as general administration of squadron operations.
- **Aircraft Armament Storage**
  Armament storage provides space and utilities to perform maintenance on bomb racks, wing and centerline pylons, missile launchers, and adapters.

- **Mobile Maintenance Facility**
  A storage area that provides space to store Mobile Maintenance Facility tactical support vans along with their major and ancillary equipment prior to and after deployment.

Figure 2.3-1 shows the locations of all required facilities under each alternative. New Growler aircraft would be accommodated by existing Growler parking apron space. Enough space currently exists to park 103 Growler aircraft on the parking apron adjacent to Growler hangar spaces. The completion of ongoing military construction projects in June 2018 will increase the number of aircraft parking spots to 113. New construction under all alternatives to support new Growler aircraft and personnel would include additional armament storage, hangar facilities, Mobile Maintenance Facility storage area, and expanded personnel parking areas to augment existing Growler support facilities. Throughout construction, all alternatives would require temporary hangar facilities to support squadron functions until permanent facilities are completed. Once construction is complete, all temporary facilities will be removed. All three alternatives would require repairs to an inactive taxiway for aircraft parking in addition to expanded hangar space. All planned construction activities would occur on the north end of the flight line at Ault Field. New parking areas, maintenance facilities, and aircraft armament storage would be constructed along Enterprise Road at the north end of Charles Porter Road. No construction would be required at OLF Coupeville because it is capable of supporting increased operational requirements in its current state. Details include:

- Temporary hangar facilities, which would be placed over existing impervious surface, would be utilized throughout construction to support squadron functions until permanent facilities are completed. Once construction is complete, all temporary facilities will be removed.
- Repairs would be made to an inactive taxiway for aircraft parking in addition to expanded hangar space.
- A two-squadron hangar would be constructed on the flight line adjacent to Hangar 5.
- Hangar 12 would be expanded to accommodate additional training squadron aircraft and personnel.
- Operational storage Building 115 would be demolished.

Under any of the alternatives, planned land disturbance for construction activities under all alternatives would be 10.1 acres. Once constructed, facilities and parking would add up to 2.3 acres of new impervious surface at the installation. Prior to implementation of the Proposed Action, all appropriate permits and authorizations will be obtained.

Figure 2.3-1
Ault Field
Planned Facility Activities under Alternatives 1, 2, and 3
Whidbey Island, Island County, WA

2.4 Preferred Alternative

The Navy did not identify a Preferred Alternative prior to publication of the Draft EIS in November 2016 because it was evaluating operational and environmental considerations necessary to make that determination. The Navy announced the Preferred Alternative on June 25, 2018, prior to release of the Final EIS, in order to provide timely information to the public once it had been identified.

Alternative 2, adding 36 Growler aircraft to the NAS Whidbey Island complex, has been identified as the Preferred Alternative. This alternative best meets operational demands by both establishing two new expeditionary squadrons and adding two aircraft to each squadron that operates off aircraft carriers. The number of total FCLPs is driven by the number of pilots and not by the number of aircraft. Each pilot must conduct a certain number of FCLPs prior to conducting landings on an aircraft carrier. Scenario A has been identified as the preferred scenario under Alternative 2 for FCLP distribution because it results in the least disruption of other operations at Ault Field, provides the best training for Navy pilots, and impacts the fewest number of residents living in the community. Under this scenario, 88,000 total operations would occur at Ault Field, with 24,100 at OLF Coupeville. Of these 24,100 operations at OLF Coupeville, 23,700 would be EA-18G Growler FCLPs. Since each airfield "operation" is defined as either a takeoff or landing, under this scenario, about 12,000 FCLP "passes" would occur annually at OLF Coupeville.

Both airfields will have an increase in total operations, the majority of which will be at Ault Field. Ault Field is a busy, multi-mission airfield, while OLF Coupeville is the preferred and ideal field for FCLP. OLF Coupeville has been continuously used for FCLP since the late 1960s, and its pattern best replicates the carrier landing pattern, thereby building and reinforcing the correct habit patterns and muscle memory for aviators. OLF Coupeville sits atop a 200-foot ridge surrounded by flat terrain, an isolated setting similar to that of an aircraft carrier operating on the open sea. The low level of man-made lighting around OLF Coupeville and the ability to completely darken the field also provide a setting that closely resembles at-sea conditions from the pilots' perspective and provides the most realistic FCLP training in the Northwest Region

Unlike OLF Coupeville, Ault Field sits in a valley surrounded by higher terrain, limiting pattern options and providing a visual picture unlike conditions at sea. The City of Oak Harbor and Ault Field both have artificial lighting and visual cues not experienced by pilots at sea. Conducting FCLPs at Ault Field creates congestion that results in delays and degrades available training time in the ranges. FCLP at Ault Field often disrupts departures and arrivals of other aircraft not participating in FCLP; this disruption results in extended flight tracks and longer hours of operation, which in turn affect more residents living in the community. The interruption of other vital operations by FCLP operations at Ault Field has become increasingly problematic with the addition of three more Maritime Patrol and Reconnaissance squadrons to NAS Whidbey Island that operate the P-8A Poseidon, which is replacing the P-3C Orion.

The Preferred Alternative includes analysis of changes to Navy training that will reduce impacts to local communities. The reductions the Navy studied are based on two factors: 1) the number of pilots needing training, and 2) a reduced FCLP requirement due to PLM. Both factors decreased overall FCLP requirements from the 42,000 presented in the Draft EIS to 29,600 annually--a 30-percent reduction under the Preferred Alternative.

2.5 Alternatives Considered but Not Carried Forward for Further Analysis

The following alternatives were considered but not carried forward for detailed analysis in this EIS because they did not meet the purpose of and need for the project or were otherwise deemed unreasonable.

2.5.1 Previously Scoped Alternatives

When the Navy initially proposed this action in the fall of 2013, it considered action alternatives based on the number of proposed Growlers that were expected in potential Congressional appropriations envisioned at that time (up to 13 additional Growler aircraft). The Navy then added alternatives in the fall of 2014 that included additional aircraft, for a total of up to 36 Growler aircraft. Since that time, Congress appropriated more Growlers than were envisioned in two of the alternatives considered during the fall of 2014--which were to add up to 13 and 22 additional Growler aircraft, respectively. Because these two alternatives presented during the fall of 2014 did not include all the aircraft appropriated by Congress, these two alternatives were removed from further analysis.

2.5.2 Moving Some or All of the Growler Community Aircraft Elsewhere

The Navy considered but eliminated re-locating Growler aircraft to alternative locations, which would essentially entail moving some or all of the Growler community to another location. The Navy's Electronic Attack community has been based at NAS Whidbey Island for over 45 years. As a result, Ault Field has developed into a "center of excellence" supporting every aspect of the Navy's Airborne Electronic Attack mission to meet operational readiness objectives and to help train the next generation of aircrews and maintenance personnel to support their community. The Secretary of Defense directed that the tactical Airborne Electronic Attack mission be the exclusive responsibility of the Navy, ensuring a consistent and highly specialized skill set necessary to support operations from land and from the sea. Therefore, the Navy is required to preserve and cultivate the expertise and knowledge base of the Growler community to support DoD requirements. This community is composed not only of active duty and reserve aircrew and maintenance personnel, but also a training squadron, civilian maintenance experts, training schools, and dedicated Growler facilities that only exist at NAS Whidbey Island for squadron-level training, as highlighted below. Continuing to maintain the Growler community at Ault Field maximizes the efficiency of its support facilities, simulation devices, training, and doctrine development and the utilization of on-site support personnel in order to leverage those resources to define, to assess, and to integrate the highly specialized tactical skill sets necessary to support the Airborne Electronic Attack mission. The elimination of alternatives that considered moving some or all of the Growler community to other locations remains consistent with historical Navy decisions. Any alternative that divides or splits the unique Electronic Attack community into multiple sites does not meet the purpose and need of the Proposed Action. This is because any alternative that divided or split this relatively small tactical community would reduce the efficiency and effectiveness of this highly specialized community for the reasons noted below.

The decision for single-site home basing is reviewed annually under the CNO's strategic laydown and dispersal plan and is consistent with Navy aviation policy to maximize efficiency of operations by co-locating operational squadrons with support functions, training ranges, and airfields, for squadron-level training.

2.5.2.1 Single Siting the Growler Community at Ault Field

2.5.2.1.1 Operational Synergy

Having a single hub for the Growler community promotes the most effective cooperation of command structure, squadrons, and schools to efficiently use personnel, aircraft, equipment, and facilities to achieve the Electronic Attack mission and allows for:

- **Co-located leadership.** Ault Field is the home of the U.S. Pacific Fleet's Electronic Attack Wing, which oversees all of the Navy's Growler squadrons. Commander, Electronic Attack Wing Pacific, interacts daily with the Growler squadrons and the FRS to ensure standardization in operations and maintenance of this small community, management of aircraft inventories and manpower resources, and technical leadership across the Growler community.
- **Community-wide efficiencies through daily interactions.** Efficiencies are realized through shared maintenance and logistics efforts, flight line service support, and sharing aircraft and support equipment when necessary. The concentration of Growler squadrons and schools facilitates efficient reassignment of resources between squadrons when necessary.
- **Effective knowledge transfer within the Growler community.** Success in the Growler community is assisted by the concentration in one place of Growler squadrons and schools and the effective transfer of knowledge through more effective communication, better understanding of training concepts, and more collaboration on innovative strategies. This allows personnel to interact on a daily basis to develop new tactics, standardize procedures, and cultivate community-wide knowledge to support this unique and highly specialized operational mission. New members to the Growler community learn from personnel already residing in the community. This insures basic and advanced skill sets are learned, refined and assessed in order to help train the next generation of aircrews and maintenance personnel using the best practices and maintaining the highest standards within the community.
- **Personnel efficiencies.** Once personnel complete their training, they can be immediately transferred to carrier or expeditionary Growler squadrons without the need to relocate to another geographic area. Co-location of the training squadron with carrier and expeditionary squadrons eases the process of transferring personnel and avoids the costs associated with "permanent change of station" moves. The moving costs of personnel and their family members represent a significant portion of the Navy's annual budget. Specifically, the Navy's budget for such moves was $937,745,000 in Fiscal Year 2016, out of a total of $28,262,396,000 for all personnel costs (Navy, 2015a). Any reduction in moves not only saves money, but it reduces the impact on personnel and their family members and facilitates operational deployment schedules by eliminating downtime associated with personnel relocation moves.

2.5.2.1.2 Proximity to Training Ranges and Special Use Airspace, and Electromagnetic Frequency Availability

The northern Puget Sound region of the Pacific Northwest has uniquely unencumbered SUA and military training routes (MTRs) due primarily to the relatively low volume of commercial air traffic. This limited air traffic and clear airspace allows this SUA and these MTRs to support Growler training, including current and future training requirements. Numerous other SUAs and MTRs that support larger installations and aviation communities are at or near capacity due in part to highly congested airspace. Additionally, through more than 45 years of operating in the Pacific Northwest, the Navy's Electronic

Attack community obtained unparalleled access to electromagnetic frequency bands critical to electronic attack training. Unique training areas near Ault Field support the Growler community and include:

- Naval Weapons Systems Training Facility (NWSTF) Boardman/Restricted Area 5701/Boardman MOA. This range provides more than approximately 47,000 acres of land and approximately 360 square nautical miles (nm^2) of SUA. The property was formally transferred from the Air Force to the Navy in November 1960. NWSTF Boardman is the principal regional air-to-ground range, providing the only terrestrial impact area and restricted low-altitude training airspace for use by NAS Whidbey Island-based student and Fleet aircrews. NWSTF Boardman and its associated airspace also support occasional training requirements of other DoD units, and the SUA is used by DoD offices to conduct Unmanned Aircraft System testing and training.
- Northwest Training Range Complex, including overland and overwater SUA, seaspace, and mobile threat emitter simulators. This range complex covers more than approximately 122,000 nm^2 of ocean and 46,000 nm^2 of airspace, including:
    - Darrington Operating Area. This area is a stationary altitude reservation activated through the Federal Aviation Administration (FAA) for Growler use for functional check flights and electronic counter-measure training.
    - Olympic, Okanagan, and Roosevelt MOAs, including associated Air Traffic Control Assigned Airspace, which represent the primary area for Growler training. These areas provide more than approximately 11,000 nm2 of airspace.
    - Pacific Northwest Electronic Warfare Range. This area includes electronic emitters that transmit signals skyward to Growler aircraft for aircrews to detect, locate, and identify.

2.5.2.1.3 Efficient Use of Existing Infrastructure

With the exception of one forward deployed carrier squadron to Japan, Ault Field is the single location for the Navy's Growler manpower and infrastructure support, which cannot be duplicated without extensive construction, disruptive relocation of military personnel and family members, and the purchase of additional equipment to duplicate that which already exists at Ault Field, as described below:

- **Location of specialized Growler weapons systems**
  The Growler has unique and specialized weapons systems, the ALQ-99 and ALQ-218. There is a limited inventory of the ALQ-99 and ALQ-218 pods. Therefore, pod assets must be shared, and single siting ensures optimal reliability, maintenance, and availability of this unique weapon system. Ault Field currently maintains the specialized equipment necessary to maintain the ALQ-99 and ALQ-218 weapons systems.
- **EA-18G-specific training schools**
  Ault Field is the home of the Center for Naval Aviation Tactical Technical Unit, which is the only center for Growler-unique aircraft maintenance training, and the Electronic Attack Weapons School, which provides comprehensive advanced training to Growler aircrews and extensive weapons-related training to Growler ordnance and maintenance personnel.
- **Growler-specific flight simulators**
  The Navy currently has six Growler flight simulators, and all of them are located at Ault Field.

Flight simulators are used on a daily basis by Growler squadrons and the FRS to satisfy a myriad of flight-training requirements. Modern military simulators are multi-million dollar sophisticated equipment with dedicated support facilities, and moving some or all of the Growler community would necessitate the construction of additional simulators otherwise not needed.

- **Fleet Readiness Center Northwest**
  The Fleet Readiness Center Northwest provides intermediate and depot-level aircraft maintenance support for the Growler-specific aircraft components and other aircraft based at Ault Field. Single siting the Growler enables efficient maintenance and logistics support of Growler-unique aircraft components.

2.5.2.2 Relocating Growlers Elsewhere

Some members of the public have suggested moving all Growler squadrons to another installation. No installation exists that could absorb the entire Growler community without excessive cost and major new construction. Furthermore, moving all Growler squadrons to another installation would only move the potential environmental impacts from one community to another community.

Others have suggested re-locating some of the aircraft to different installations. Growler aircraft are unique platforms and cannot be based away from the larger Growler community without a significant duplication of Growler-specific infrastructure that currently exists only at Ault Field, as detailed above. Split siting Growler squadrons at different locations would require unreasonable duplication of manpower, training, and logistics resources that currently exist at Ault Field and would thereby increase annual recurring costs (i.e., manpower and supply) and require major infrastructure investments (i.e., construction and procurement of equipment and Growler-specific pilot-training simulators). Basing some Growler squadrons at an alternative location would result in new logistical and administrative inefficiencies (e.g., longer logistics chains and more personnel reassignments, with associated delays between training and Fleet assignment). Therefore, re-locating new aircraft at alternative locations would degrade the Growler community's overall effectiveness and does not meet the purpose of and need of the Proposed Action.

Comments have specifically suggested that additional aircraft be re-located to the following Navy installations:

2.5.2.2.1 NAS Lemoore (Kings County and Fresno County, California)

NAS Lemoore is the Navy's west coast master strike-fighter base. By 2020, it will be home to more than 250 FA-18E/F Super Hornet and F-35C Lightning II strike-fighter aircraft and more than 8,700 personnel. As such, NAS Lemoore is already operating above its designed physical capacity and would require extensive construction of hangars, training facilities, and housing to support additional aircraft, equipment, and personnel. The large concentration of resident strike-fighter aircraft place a heavy demand on NAS Lemoore's local airspace and training ranges, leaving little availability to accommodate additional squadrons. Unlike NAS Whidbey Island, NAS Lemoore does not have an OLF that can be used to disperse FCLPs. Therefore, relocating Growler squadrons to NAS Lemoore would further tax an already limited capacity to prepare pilots for carrier operations. Because strike-fighter squadrons at NAS Lemoore do not employ electronic attack, the Navy does not have agreements with the Federal Communications Commission and FAA necessary to support live electronic training as it does in the Pacific Northwest. Given the proximity of Lemoore's training ranges to dense air traffic corridors and population centers, obtaining access to critical frequency bands in the Southern California area is highly

unlikely. Finally, NAS Lemoore is classified as a Clean Air Act nonattainment area, and adding additional aircraft, along with major new construction, would aggravate that condition and complicate the state's efforts to come into compliance with air quality standards.

2.5.2.2.2 Naval Air Facility El Centro (Imperial County, California)

Naval Air Facility (NAF) El Centro is an austere training facility with a small permanent party presence of approximately 700 military and civilian personnel. It is not a home base for Fleet or training squadrons and, therefore, is not resourced to provide the necessary personnel, logistics and training support functions and facilities to support home basing of Growler squadrons and a large permanent party presence. It is a Fleet training complex resourced to provide temporary training detachment support with limited capability to provide transient support functions. As demonstrated by the analysis conducted in the U.S. Navy F-35C West Coast Home Basing EIS in 2014, home basing aircraft at NAF El Centro would fundamentally change the nature of the facility and could cost over $800 million, which is cost prohibitive. Such an undertaking would require the continued resolve of Congress to support special appropriations and authorizations to replace facilities and training ranges that already exist at NAS Whidbey Island complex and within the Pacific Northwest. As a unique Fleet training complex, NAF El Centro is an indispensable asset for rotary-wing and undergraduate training squadrons as well as the Navy Flight Demonstration Squadron all of whom depend on El Centro's current capabilities and continued availability. Home basing Growler squadrons at NAF El Centro would consume airfield facilities and services, reducing availability of the El Centro training complex to its current users, and disrupting proven training practices and uses of training ranges. Finally, NAF El Centro is also classified as a Clean Air Act nonattainment area, and adding additional aircraft, along with major new construction, would aggravate that condition and complicate the state's efforts to come into compliance with air quality standards.

2.5.2.2.3 Naval Air Weapons Station China Lake (Kern, San Bernardino, and Inyo Counties, California)

Naval Air Weapons Station (NAWS) China Lake is 2,283 feet above sea level, which exceeds the Navy siting criterion of 1,000 feet or less elevation necessary to simulate carrier operations at sea. NAWS China Lake is a Research, Development, Test, and Evaluation (RDT&E) installation with resources to provide support to a small population of RDT&E personnel. It does not have the housing, training, and maintenance infrastructure to home base operational squadrons. In addition to the limited infrastructure at NAWS China Lake, the Electronic Attack mission would interfere with the installation's primary mission. Specifically, because of the time-criticality and expense of RDT&E operations, such operations would have scheduling priority over Fleet Growler squadrons if based at NAWS China Lake, thus limiting availability of local training ranges to support Growler squadron training and readiness.

2.5.2.2.4 NAS Oceana (Virginia Beach, Virginia)

NAS Oceana is the Navy's east coast strike-fighter master jet base, supporting more than 250 FA-18C Hornet and FA-18E/F Super Hornet aircraft. There is no excess physical capacity of hangars and aircraft parking ramps to accommodate additional aircraft. In addition, Navy Auxiliary Landing Field Fentress, the primary FCLP facility for Oceana-based squadrons, has a well-documented schedule capacity shortfall that would be exacerbated by additional squadrons. As is the case with NAS Lemoore, the strike-fighter squadrons at NAS Oceana do not employ electronic attack and therefore have not established agreements with local agencies to transmit on certain critical frequencies in the local training areas.

2.5.2.2.5 Marine Corps Air Station Cherry Point (Craven County, North Carolina)

Marine Corps Air Station (MCAS) Cherry Point has been suggested as potential siting location due to the presence of the Marine Corps' Electronic Attack community. However, that community operates the EA-6B Prowler aircraft, which has very little commonality with the Growler and therefore would not offer synergies in maintenance or training. Even if co-location with the Marine Corps Electronic Attack community offered benefits, they would not be long-lived as the Marine Corps will retire the EA-6B and its electronic attack mission by the end of 2019. Any surplus infrastructure capacity that would have existed at MCAS Cherry Point due to the phase out of the Marine Corps' existing Electronic Attack community (approximately 20 legacy EA-6B aircraft) would be subsumed by the imminent home basing of eight squadrons of U.S. Marine Corps F-35B Lightning II aircraft (128 aircraft) to replace 68 AV-88 Harrier aircraft at MCAS Cherry Point. Finally, MCAS Cherry Point does not have an OLF for fixed-wing aircraft, which would be critical for FCLP, and one is not located within a reasonable distance except for NALF Fentress, which is, as noted above, already taxed to meet current FCLP demands from NAS Oceana. Constructing a new OLF would result in new, significant impacts to the surrounding environment.

In summation, other than Ault Field, no other Navy location in the contiguous U.S. has the facilities and functions to support the Electronic Attack mission or offers the operational benefits associated with single siting the community.

2.5.3 Conducting FCLP Elsewhere

The Navy considered but eliminated the following options for conducting FCLP elsewhere:

2.5.3.1 Regional Military Airfields

No other DoD-controlled airfields are within 50 nautical miles (nm) of Ault Field. Training locations need to be located within 50 nm of their home base due to fuel constraints. The two closest DoD airfields are Joint Base Lewis-McChord, which is approximately 80 nm away, and Army Air Field Gray, which is approximately 90 nm away (see Section 2.2). These airfields exceed the maximum transit distance for Growler FCLP and do not meet other criteria for FCLP. Both airfields are located in areas with higher population densities than OLF Coupeville, which increases the amount of ambient lighting at night, thereby degrading training, and also exposes a larger civilian population to aircraft noise. In addition, many of these regional military airfields are multi-mission bases, and conducting FCLPs at these bases would present significant disruptions to their operations.

2.5.3.2 Regional Civilian Airfields

While private or municipal airfields are in the local area, civilian airfields are generally not reasonable choices for tactical jet aircraft FCLP for a variety of reasons. Civilian airfields do not have the equipment necessary to support FCLP, and the cost of adding these improvements would be excessive. All civilian air traffic would need to be suspended during FCLP because slower civilian aircraft mixing with tactical jet aircraft in the traffic pattern would pose an unacceptable safety risk. Exclusive use of an airfield for FCLPs could violate the FAA Grant Assurance program requirement that civilian airfield users have equal right to the airfield. Nonetheless, in order to fully explore whether any civilian airfields could reasonably be considered as alternative FCLP locations for Ault Field-based Growler aircraft, civilian airfields up to 75 nm from Ault Field were identified and reviewed for suitability. This review determined that no civilian airfields appear suitable for FCLP. The Civilian Airfield Analysis sets the maximum desired

distance from Ault Field to the FCLP airfield at 50 nm in order to allow transit, a full set of FCLP landings, and return with acceptable fuel reserves without refueling. The study considered airfields out to 75 nm to ensure a suitable field outside of the Navy's desired distance was not missed in the analysis. The study presents a matrix listing all public-use civilian airfields within 75 nm of Ault Field and compares them against various criteria based on Navy policy, such as having a maximum field elevation of 1,000 ft above MSL and being within 17 nm of a runway with arresting gear in the event of emergencies. Other criteria developed for the screening include the number of current annual operations at the civilian airfield, runway length, and alterations to standard landing patterns. A full explanation is provided in Appendix G, Civilian Airfield Analysis.

2.5.3.3 Detachment Training Out of the Region

Significantly increasing FCLP detachments is not a reasonable alternative. It is not sustainable operationally as a long-term solution because it takes aircraft away from the home base for other aircrew training opportunities, reduces aircraft service life due to extensive transit, increases time personnel spend away from their home base during critical months leading to a deployment, and requires not just aircrew and aircraft but also aircraft maintenance personnel, making them unavailable at Ault Field during the duration of the detachment. Significantly increasing detachments also increases operational and training costs for squadron and unit training that is not currently funded. The negative impact on operational readiness resulting from detachment training is the reason why an OLF is collocated with each Navy installation that has carrier-based aircraft, including NAS Oceana and Ault Field.[7]

2.5.3.4 Construct a New OLF

Constructing a new OLF is highly speculative and would require years, if not decades, to accomplish. Such an undertaking would require the continued resolve of Congress to support special appropriations and authorizations to purchase the land and easements necessary to construct the airfield. It is difficult to justify construction of a new OLF when OLF Coupeville fully satisfies the Navy's requirement and is already located in an area that meets OLF siting criteria, including low ambient lighting and low population density. Construction of a new OLF would be prohibitively expensive. Although exact cost estimates are not available, the Navy analyzed construction of an OLF on the east coast and estimated in 2012 the construction would cost in the range of $300 million to $500 million. Although the Navy recognizes that NEPA is intended to be, in part, a forcing function to help spur analysis of alternatives that may be outside the jurisdiction of the agency, or which may require additional Congressional appropriations, analyzing an alternative that would result in the construction of an entirely new OLF goes against the standards established by the CEQ's regulations regarding the purpose of analyzing alternatives. CEQ Regulation Section 1502.1 notes that reasonable alternatives are those that would "avoid or minimize adverse impacts or enhance the quality of the human environment." Thus, the purpose of analyzing alternatives is not just to analyze different ways of implementing a proposed action; rather, the alternatives are intended to show different ways of mitigating environmental impact. Constructing a new OLF runs counter to this goal of mitigating environmental impacts because it would require, at a minimum, a change in land ownership and land use; loss of natural habitat or the loss of

[7] NAS Lemoore has carrier-based aircraft but does not have a collocated OLF because it has an offset parallel runway that allows for FCLPs to be conducted simultaneously while other airfield operations occur on the parallel runway.

production of forest lands and agricultural lands; ground disturbance and earthwork necessary to contour the land in preparation for construction; and the construction of runway pavements, runway lighting, utility runs, and stormwater conveyance features. Although moving FCLPs away from OLF Coupeville to a new OLF may reduce noise impacts and air quality to the community immediately surrounding OLF Coupeville, it would result in significantly more adverse impacts to the environment to support new construction of an OLF and airfield operations in another location. Moreover, any potential reduction of noise and air quality impacts near OLF Coupeville could be offset by an increase in noise at a new OLF, depending on where it would be sited relative to the old OLF. This could result in only shifting noise and air quality impacts from one community to another community. Considering that the population densities in the rural areas of the Pacific Northwest near NAS Whidbey Island that would be suitable for construction of an OLF are similar to those near OLF Coupeville, and more often higher population densities, there is likely to be no net environmental gain regarding noise impacts with any move from OLF Coupeville. Considering the nature of the geography in the Pacific Northwest, there is very limited land suitable for an OLF close enough to NAS Whidbey Island and not already heavily developed or with large resident communities. Constructing a new OLF could result in significant adverse impacts to individual communities that may be subject to inverse condemnation proceedings necessary for the Navy to assume ownership of land necessary to construct a new runway, in addition to surrounding easements to support airfield operations and to limit incompatible development. This could also adversely affect the socioeconomic resources of the receiving locality that would lose a tax base once that land transfers to federal ownership. The amount of additional new construction could result in more adverse environmental impacts than the continued use of existing facilities. It is also speculative because it is unclear whether a suitable location exists for a new OLF. No commenter has suggested what location would be suitable for an OLF that would provide for lessened environmental impacts to the community. In reviewing possible locations, the Navy notes that locations to the west of Ault Field are not readily available due to the proximity of the Olympic National Park and due to concerns with moving an OLF closer to this park and wilderness area. Locations to the south and east have higher civilian population densities than those around OLF Coupeville, and, additionally, the land rises significantly to the east very quickly after the coastline. Locations to the north would not be feasible due to the presence of the San Juan Islands National Monument and the Canadian border.

2.5.3.5 Anchor an Aircraft Carrier off the Coast

Landing on an aircraft carrier, especially at night, is perhaps the most hazardous aviation task. FCLP is conducted by pilots during their initial Growler training syllabus and by more experienced pilots renewing their training to demonstrate proficiency and to qualify to perform carrier landings. FCLP is conducted at land-based facilities to provide pilots the opportunity to simulate carrier landing operations in an environment where the risks associated with at-sea carrier operations can be safely managed. FCLP needs to be conducted at a land-based facility such that FCLP approaches can be performed and evaluated by Landing Signal Officers to ensure proficiency under both daytime and nighttime conditions before exposing aircrew to the dangers of at-sea operations. Using an anchored aircraft carrier would inappropriately replace the stepped progression of FCLP to gain proficiency under more controlled, land-based conditions. Furthermore, an anchored aircraft carrier would create a navigation hazard to commercial shipping and recreational boating and would still be subject to weather, tides, swells and other wave energy associated with various sea state conditions that could affect its availability to safely conduct FCLP. Finally, per Navy regulations to ensure the safety of the aircrew, pilots may not land on an aircraft carrier at sea without completing FCLP on land.

2.5.3.6 Exclusive use of Simulators

There is simply no substitute for an aviator to conduct training in a real aircraft, in real airspace, for perfecting FCLP at an on-shore airfield before attempting to land on an aircraft carrier. The Navy has learned how to best prepare pilots for the very demanding task of landing on an aircraft carrier and believes it has achieved the right combination of simulated and live training. In addition, the Navy uses flight simulation extensively for training. While simulator training is extremely valuable, it cannot replace the feel and physiological conditions experienced through live FCLP and cannot be used exclusively to certify pilots for landing on an aircraft carrier. Just as one wouldn't expect a pilot to fly a commercial airliner solo after learning how to fly only on simulators, it would be too hazardous to allow naval aviators to perform the most dangerous task in military aviation, landing on an aircraft carrier, after using simulators only for their training.

2.6 Summary of Alternatives Considered

Table 2.6-1 provides an overview of the No Action Alternative, three action alternatives, and five scenarios under each action alternative considered in this EIS.

Table 2.6-1 Summary of Alternatives Considered in the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

	Aircraft Changes		*Personnel Changes*	*Distribution of Flights*
Alternative	*New Squadrons/ Increase in Aircraft*	*Total Operations at NAS Whidbey Island Complex*[1, 2, 3]	*Net Change in Number of Growler Personnel and Dependents*	*Percent of FCLP at Ault Field vs. OLF Coupeville*
No Action Alternative (No new Growler Aircraft)	No new Growler aircraft. Existing aircraft: • 9 carrier squadrons (45 aircraft) • 3 Expeditionary squadrons (15 aircraft) • 1 Reserve Squadron (5 aircraft) • FRS (17 aircraft)	Total • 84,700 Ault Field • 78,200 OLF Coupeville • 6,500	No new personnel (existing personnel 4,104, existing dependents 5,627)	N/A
Alternative 1 (+35 Additional Growler Aircraft)	• 3 new aircraft to each existing carrier squadron 8 new training aircraft for FRS	Total • Scenario A: 112,600 • Scenario B: 111,200 • Scenario C: 109,800 • Scenario D: 112,200 • Scenario E: 110,100 Ault Field • Scenario A: 87,300 • Scenario B: 95,300 • Scenario C: 103,200 • Scenario D: 90,000 • Scenario E: 100,400 OLF Coupeville • Scenario A: 25,300 • Scenario B: 15,900 • Scenario C: 6,600 • Scenario D: 22,200 • Scenario E: 9,700	+335 personnel +459 dependents	Scenario A: 20/80 Scenario B: 50/50 Scenario C: 80/20 Scenario D: 30/70 Scenario E: 70/30

Table 2.6-1 Summary of Alternatives Considered in the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

	Aircraft Changes		*Personnel Changes*	*Distribution of Flights*
Alternative	*New Squadrons/ Increase in Aircraft*	*Total Operations at NAS Whidbey Island Complex[1, 2, 3]*	*Net Change in Number of Growler Personnel and Dependents*	*Percent of FCLP at Ault Field vs. OLF Coupeville*
Alternative 2 (+36 Additional Growler Aircraft)	• 2 new expeditionary squadrons (10 new aircraft) • 2 additional aircraft to each existing carrier squadron (18 new aircraft) • 8 new training aircraft for FRS	Total • Scenario A: 112,100 • Scenario B: 110,700 • Scenario C: 109,500 • Scenario D: 111,800 • Scenario E: 110,000 Ault Field • Scenario A: 88,000 • Scenario B: 95,500 • Scenario C: 103,200 • Scenario D: 90,600 • Scenario E: 100,700 OLF Coupeville • Scenario A: 24,100 • Scenario B: 15,200 • Scenario C: 6,300 • Scenario D: 21,200 • Scenario E: 9,300	+628 personnel +860 dependents	Scenario A: 20/80 Scenario B: 50/50 Scenario C: 80/20 Scenario D: 30/70 Scenario E: 70/30
Alternative 3 (+36 Additional Growler Aircraft)	• 3 additional aircraft to each existing expeditionary squadrons (9 new aircraft) • 2 additional aircraft to each existing carrier squadron (18 new aircraft) • 9 new training aircraft for FRS	Total • Scenario A: 111,800 • Scenario B: 110,500 • Scenario C: 109,200 • Scenario D: 111,400 • Scenario E: 109,600 Ault Field • Scenario A: 87,700 • Scenario B: 95,300 • Scenario C: 102,900 • Scenario D: 90,300 • Scenario E: 100,300 OLF Coupeville • Scenario A: 24,100 • Scenario B: 15,200 • Scenario C: 6,300 • Scenario D: 21,100 • Scenario E: 9,300	+341 personnel +467 dependents	Scenario A: 20/80 Scenario B: 50/50 Scenario C: 80/20 Scenario D: 30/70 Scenario E: 70/30

Table 2.6-1 Summary of Alternatives Considered in the Environmental Impact Statement for EA-18G Growler Airfield Operations at the Naval Air Station Whidbey Island Complex

Alternative	Aircraft Changes		Personnel Changes	Distribution of Flights
	New Squadrons/ Increase in Aircraft	Total Operations at NAS Whidbey Island Complex[1, 2, 3]	Net Change in Number of Growler Personnel and Dependents	Percent of FCLP at Ault Field vs. OLF Coupeville

Notes:

1 Since the publication of the Draft EIS, two new operational scenarios for each action alternative have been added to the analysis. In addition, several updates were applied to the noise analysis that included incorporation of Precision Landing Mode, which reduced FCLP requirements by approximately 20 percent across all scenarios and led to a reduction in FCLP operations, and updating the number of pilots per squadron (reduction); see Section 1.13.

2 Total airfield operations are considered all aircraft operations that occur, and these include Touch-and-Goes, Depart and Re-enter, Ground Controlled Approaches, and FCLPs. Total airfield operations include all aircraft for Ault Field and OLF Coupeville.

3 Total operations may differ between alternative and scenario due to variability in training requirements and randomness inherent in modeling.

Key:

FCLP = field carrier landing practice
FRS = Fleet Replacement Squadron
N/A = not applicable
OLF = Outlying Landing Field

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3 Affected Environment

Chapter 3 provides a description of the existing environmental resource areas and existing conditions that could be affected from implementing any of the alternatives. For the affected environment analysis, environmental conditions for each resource are evaluated using the best available data for that specific resource. Depending on the resource and best available data, the affected environment conditions may vary. For example, the noise discussion uses the year 2021 to describe the affected environment because 2021 represents conditions when previous aircraft loading decisions unrelated to the Proposed Action are expected to be fully implemented and complete, whereas the biological resource discussion uses the most current and best available species data sets and surveys to inform the analysis. All potentially relevant resource areas were considered for analysis in this Environmental Impact Statement (EIS). In compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ), and United States (U.S.) Department of the Navy (Navy) regulations, the discussion of the affected environment focuses only on those environmental resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of its potential environmental impacts. Resources at and in the vicinity of the Naval Air Station (NAS) Whidbey Island complex (Ault Field, Seaplane Base, and Outlying Landing Field [OLF] Coupeville) would be affected by changes in aircraft operations, personnel loading, and new construction. Therefore, the analysis of the affected environment includes the following: airspace and airfield operations; noise associated with aircraft operations; public health and safety; air quality; land use compatibility; cultural resources; American Indian traditional resources; biological resources; water resources; socioeconomics; environmental justice; transportation; infrastructure; geological resources, hazardous materials and waste; and climate change and greenhouse gases (GHGs). Section 1.5, Scope of Environmental Analysis, provides more detail on which environmental resource areas were considered for analysis in this EIS.

3.1 Airspace and Airfield Operations

This discussion of airspace includes current uses and controls of the airspace. The Federal Aviation Administration (FAA) manages all airspace within the U.S. and its territories. Airspace, which is defined in vertical and horizontal dimensions and by time, is considered a finite resource that must be managed for the benefit of all aviation sectors, including commercial, general, and military aviation.

This section describes the existing airfield operations at Ault Field and OLF Coupeville, and the airspace in which the EA-18G "Growlers" would operate in the vicinity of their home base location. The study area for airspace is the NAS Whidbey Island complex, which includes Ault Field, OLF Coupeville, and the airspace surrounding the airfields. This chapter does not address training operations occurring at existing range complexes, Military Operations Areas (MOAs), and testing ranges in locations outside of the NAS Whidbey Island complex that support aircraft squadrons stationed at Ault Field because operations in these training and testing areas have been evaluated qualitatively and quantitatively under separate NEPA documentation listed in Section 1.6. Specifically, see the 2005 *Environmental Assessment for Replacement of EA-6B Aircraft with EA-18G Aircraft at Naval Air Station Whidbey Island, Washington* (Navy, 2005b); the 2012 *Environmental Assessment for the Expeditionary Transition of EA-6B Prowler Squadrons to EA-18G Growler at Naval Air Station Whidbey Island, Oak Harbor, Washington* (Navy, 2012); the 2014 *Pacific Northwest Electronic Warfare Range Environmental Assessment* (Navy, 2014c); and the 2015 *Northwest Training and Testing (NWTT) EIS/OEIS* (Navy, 2015d).

3.1.1 Airspace and Airfield Operations, Regulatory Setting

Specific aviation and airspace management procedures and policies to be used by the Navy are provided by Office of the Chief of Naval Operations Instruction (OPNAVINST) 3710.7U, *Naval Aviation Training and Operating Procedure Standardization (NATOPS) General Flight and Operating Instructions* and OPNAVINST 3770.2L, *Airspace Procedures and Planning Manual*.

Airspace management is defined as the direction, control, and handling of flight operations in the "navigable airspace" that overlies the geopolitical borders of the U.S. and its territories. Navigable airspace is considered to be airspace above the minimum altitudes of flight, typically 500 feet or greater, prescribed by regulations implemented under United States Code (U.S.C.) Title 49, Subtitle VII, Part A, and includes airspace needed to ensure safety in the takeoff and landing of aircraft (49 U.S.C. § 40102).

Congress has charged the FAA with responsibility for developing plans and policy for the use of the navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of the airspace (49 U.S.C. § 40103[b]; FAA Order JO 7400.2K [FAA, 2014]). The FAA considers multiple and sometimes competing demands for airspace in relation to commercial, general, and military aviation. Specific rules and regulations concerning airspace designation and management are listed in FAA Order JO 7400.2K (FAA, 2014). Special Use Airspace (SUA) is airspace of defined dimensions wherein activities must be confined because of their nature or wherein limitations may be imposed upon aircraft operations that are not a part of those activities (FAA, 2014). The types of SUA areas are Prohibited Areas, Restricted Areas, MOAs, Warning Areas, Alert Areas, Controlled Firing Areas, and National Security Areas. SUA (e.g., MOAs as well as Alert Areas) and Military Training Routes (MTRs) relevant to this EIS are defined below.

- **Military Operations Area**
  A MOA is established to separate certain non-hazardous military activities from Instrument Flight Rule (IFR)[8]
- aircraft traffic and to identify for Visual Flight Rule (VFR) aircraft traffic where military activities are conducted. MOAs exist at altitudes up to, but not including, 18,000 feet above mean sea level (MSL). Air Traffic Controlled Assigned Airspace (ATCAA) is an extension of the MOA above 18,000 feet. Civilian VFR traffic is allowed in MOAs, in which case both civilian and military aircraft use "see-and-avoid" procedures. Generally, civilian pilots avoid flying through MOAs because of the likelihood of encountering a fast-moving military jet.
- **Alert Area (A-)**
  An Alert Area is airspace that may contain a high volume of pilot training activities or an unusual type of training activity.
- **Military Training Route**
  MTRs are IFR and VFR flight corridors used by military aircraft for low-altitude, high-speed, terrain-following training. MTRs are generally positioned below 10,000 feet above MSL for operations at speeds in excess of 250 nautical miles (nm) per hour, or knots. MTRs have a centerline with defined horizontal limits on either side of the centerline and vertical limits expressed as minimum and maximum altitudes along the flight track. (FAA, 2016)

[8] The Federal Aviation Regulations define IFR as "rules and regulations established by the FAA to govern flight under conditions in which flight by outside visual reference is not safe" (U.S. Legal, 2016).

3.1.2 Airspace and Airfield Operations, Affected Environment

3.1.2.1 Airspace Classification and Flight Tracks

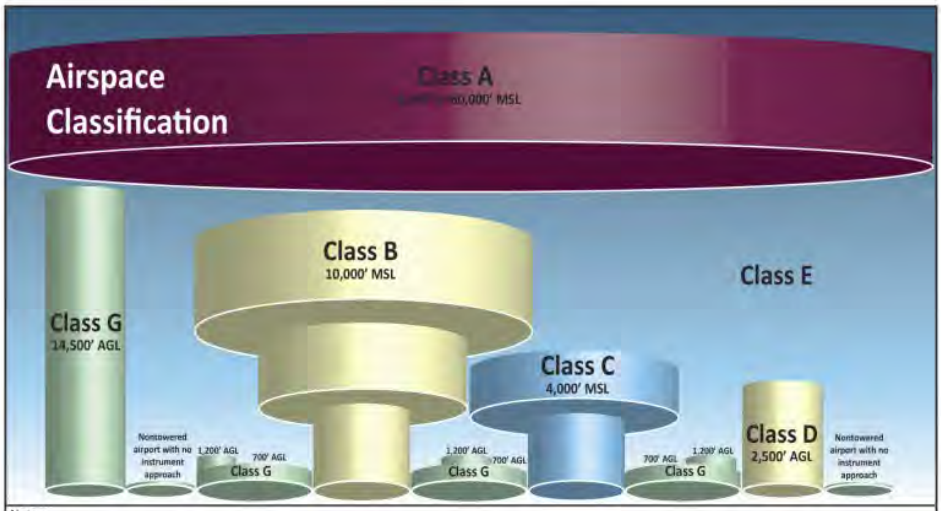
3.1.2.1.1 Ault Field

Under the National Airspace System, the airspace above Ault Field is designated as Class C airspace (Figures 3.1-1 and 3.1-2). The Class C airspace around Ault Field is:

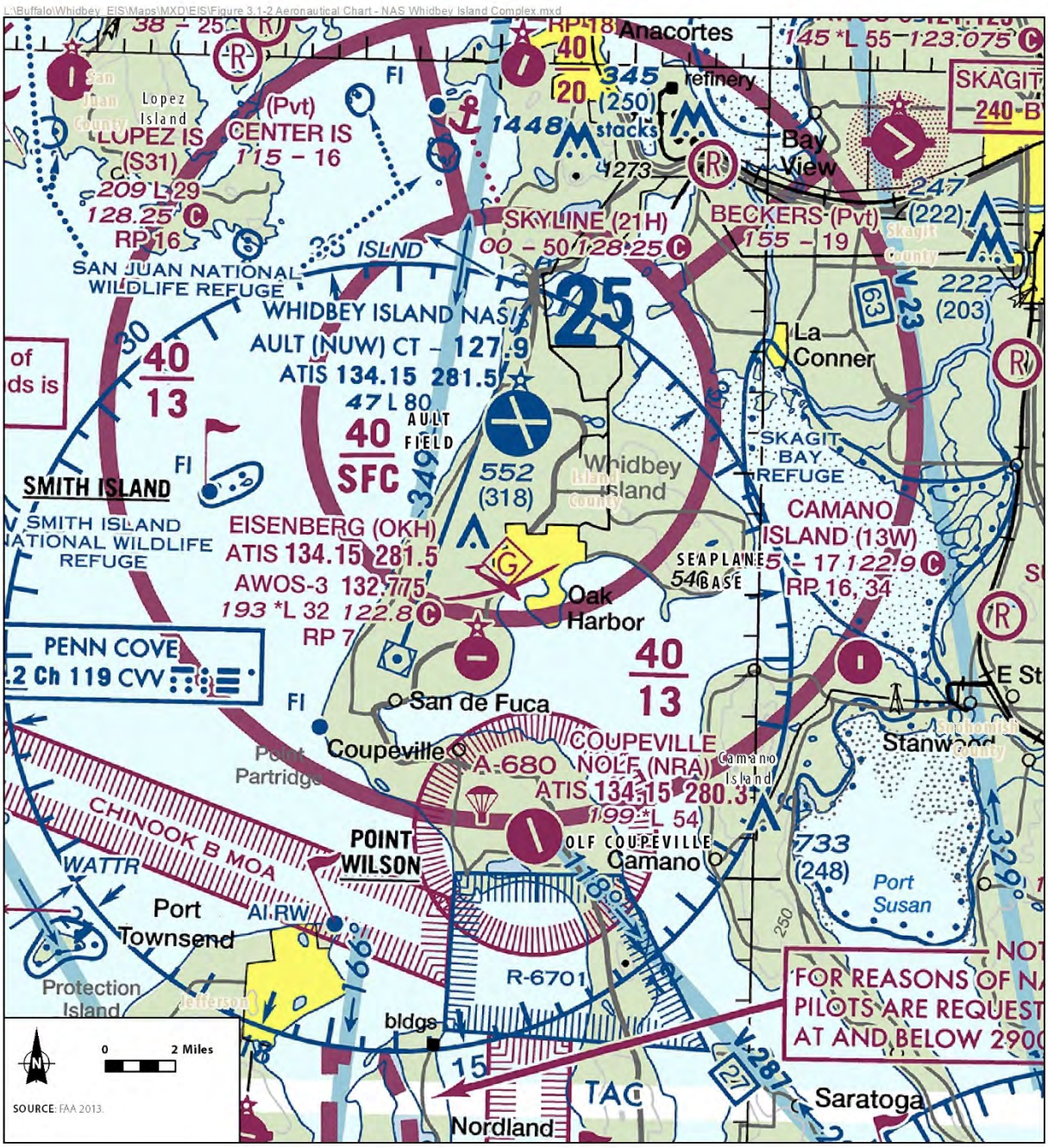
- airspace extending upward from the surface to 4,000 feet above MSL within a 5-nm radius of Ault Field
- airspace that extends upward from 1,300 feet above MSL to 4,000 feet above MSL within a 10-nm radius of the airport from the 050° bearing (toward Bay View in Skagit County) from the airport clockwise to the 345° bearing (toward Cypress Island) from the airport
- airspace extending upward from 2,000 feet above MSL to 4,000 feet above MSL within a 10-nm radius of the airport from the 345° bearing from the airport clockwise to the 050° bearing from the airport

Air Traffic Control (ATC) services to all aircraft operating within the Class C airspace are provided by the NAS Whidbey Island ATC Facility, located at Ault Field, which is responsible for the safe, orderly, and expeditious flow of both civil and military air traffic and provides the en route traffic control service within 2,100 square miles of the airspace surrounding the Class C airspace. Growler aircraft depart Class C airspace to train in the Olympic, Okanogan, Roosevelt, and Boardman MOA/R-5706 and arrive via FAA flight routes and flight handling. That phase of each flight is under control of the FAA.

Figure 3.1-1 Cross Section of Controlled and Uncontrolled Airspace Classes



Notes:
1. Class A - Spanning from 18,000 to 60,000 feet MSL, Class A airspace mostly supports long-distance commercial and military aircraft. All flight operations must be under Air Traffic Control (ATC) radar coverage and have a clearance prior to entry.
2. Class B - Airspace surrounding the busiest airports in the U.S. (e.g., Phoenix, Los Angeles, Atlanta, etc.) normally beginning at the surface in the immediate airport area and extending higher as the distance from the airport increases, up to an upper limit of 10,000 feet MSL
3. Class C - Similar to Class B, but around moderately busy airports (e.g., Chicago Midway, Boise, Jacksonville, etc.) with a vertical limit of 4,000 feet above the airport.
4. Class D- This class extends from the surface to 2,500 feet AGL around airports with a control tower and not otherwise within Class B or Class C airspace.
5. Class E - Usually Class E airspace begins at 1,200 AGL and extends up to but not including 18,000 feet MSL. No ATC clearance or radio communication is required for flights under Visual Flight Rules.
6. Class F - There is no Class F airspace in the U.S.
7. Class G - Includes all airspace not otherwise classified below 60,000 feet MSL. Class G airspace is typically the airspace very near the ground; 700 or 1,200 feet AGL near airports adjacent to Class B, C or D airspace, and below 14,500 beneath Class E airspace away from airports.
Source: Derived from FAA 2008



Additional Airport Information

- Private "(Pvt)"- non-public use having emergency or landmark value
- Military - Other than hard-surfaced; all military airports are identified by abbrevations AFB, NAS, AAF, etc.

Airports

- Hard-surfaced runways 1,500 ft. to 8,069 ft. in length
- Hard-surfaced runways greater than 8,069 ft. or some multiple runways less than 8,069 ft.
- Class E Airspace with floor 1,200 ft. or greater above surface that abuts Class G Airspace
- Prohibited, Restricted,and Warning Areas
- Alert Area and MOA (Military Operations Area)

Airport Traffic Service and Airspace Information

- Class D Airspace
- Ceiling of Class D Airspace in hundreds of feet (A minus ceiling value indicated surface up to but not uncluding that value.)
- Class E (surface) Airspace
- Class E Airspace with floor 700 ft. above surface
- IR211 MTR-Military Training Route

Class E Airspace low altitude Federal Airways are indicated by center line

Intersection- Arrows are directed towards facilities with established intersections

132° → V 66 109

Total mileage between NAVAIDs on direct Airways

Figure 3.1-2
Aeronautical Chart
NAS Whidbey Island Complex
Whidbey Island, Island County, WA

3.1.2.1.2 OLF Coupeville

The airspace above OLF Coupeville is designated as Alert Area-680, a type of SUA that is designated as such because it may contain a high volume or an unusual type of pilot training activities (Figure 3.1-2) (FAA, 2014). The Alert Area airspace around OLF Coupeville extends upward from the surface to 3,000 feet above MSL and within a 1.5-nm radius of the airport in all directions.

3.1.2.1.3 Military Operations Areas

The Olympic MOAs overlay both land (the Olympic Peninsula) and sea (extending to 3 nm off the coast of Washington into the Pacific Ocean). The lower limit of the Olympic MOA is 6,000 feet above MSL but not below 1,200 feet above ground level (AGL), and the upper limit is up to but not including 18,000 feet above MSL, with a total area coverage of 1,614 square nautical miles (nm^2). Above the Olympic MOAs is the Olympic ATCAA, which has a floor coinciding with the Olympic MOAs' ceiling. The ATCAA has an upper limit of 35,000 feet.

The Chinook A and B MOAs are adjacent to R-6701 over the eastern portion of the Strait of Juan de Fuca (Chinook MOA A) and Admiralty Inlet (Chinook MOA B). Both Chinook MOAs cover 56 nm^2 of surface area and have a floor of 300 feet and a ceiling of 5,000 feet.

The Okanogan MOA is located above north-central Washington and covers 4,364 nm^2 in area. This MOA is divided into A, B, and C sections. Okanogan A is available from 9,000 feet to 18,000 feet. Okanogan MOAs B and C have a floor of 300 feet AGL and a ceiling of 9,000 feet. The ATCAAs corresponding to the Okanogan MOA extend the airspace to 50,000 feet.

The Roosevelt MOA is located just east of the Okanogan MOA and covers an area of 5,413 nm^2. This MOA is divided into two sections. Roosevelt MOA A has a floor of 9,000 feet and a ceiling of 18,000 feet. Roosevelt MOA B has a floor of 300 feet AGL and a ceiling of 9,000 feet. ATCAAs associated with the Roosevelt MOA extend its airspace to 50,000 feet.

The Boardman MOA is located within 200 nm of NAS Whidbey Island, in Boardman, Oregon. The MOA, along with R-5701 and 5706, supports Naval Weapons Systems Training Facility Boardman and is the Navy's primary training range on the west coast for conducting low-altitude air-combat maneuvers.

3.1.2.1.4 Military Training Routes

There are six VFR MTRs (VRs) (VR-1350, VR-1351, VR-1352, VR-1353, VR-1354, and VR-1355) and six IFR MTRs (IRs) (IR-341, IR-342, IR-343, IR-344, IR-346, and IR-348) that provide ingress or egress from the NAS Whidbey Island complex or other SUA within 250 nm of NAS Whidbey Island.

Operations on VRs are conducted only when the weather exceeds the minimum requirements. For example, flight visibility must be 5 miles or more and ceiling must be 3,000 feet or above. The VRs have a floor as low as 200 feet AGL on some routes. Additionally, aircraft are directed to avoid towns and populated areas by 1 nm or overfly 1,000 feet AGL and to avoid airports by 3 nm or overfly 1,500 AGL. Over sparsely populated areas, aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

Operations on IRs are conducted only when an ATC clearance has been obtained. Unless the route segment is annotated "For use in VMC conditions only," each route segment shall contain an altitude that is suitable for flight in Instrument Meteorological Conditions. The IRs have a floor of 500 feet AGL and a ceiling of over 11,000 feet. MTR operations under the No Action Alternative are reflected in Table

3.1-1. Table 3.1-2 lists representative potential single-event sound levels for Growler operations on the MTR routes listed in Table 3.1-1.

Table 3.1-1 Annual Military Training Route Operations[1] in the Affected Environment

Route	*Annual Operations*
IR-341	12
IR-342	7
IR-343	0
IR-344	192
IR-346	62
IR-348	34
Total IFR Routes	**308**
VR-1350	743
VR-1351	108
VR-1352	62
VR-1353	26
VR-1354	5
VR-1355	1,058
Total VFR Routes	**2,002**
Total All Routes	**2,310**

Note:
[1] Estimated

Key:
IFR = Instrument Flight Rules
VFR = Visual Flight Rules

Table 3.1-2 Representative Sound Levels for Growler Aircraft in Level Flight

Aircraft Altitude above Ground[3] (ft)	*Aircraft Speed (Knots)*	*Power Setting[4] (%NC)*	*Sound Exposure Level[2] (dBA)*	
			Underneath Flight Path	*1 Mile to Either Side of Flight Path*
200	400	84.5[1]	116	77
500			109	82
1,000			104	84
1,500			100	84
2,000			97	84
5,000			87	81
10,000			77	75

Notes:
[1] Power setting of 84.5% corresponds with MR_NMAP MID SPD TRAINING RT
[2] Sound Exposure Level computed using MR_NMAP v2.2; values rounded to nearest decibel
[3] Modeled weather conditions: 55° Fahrenheit, 74% relative humidity; consistent with NAS Whidbey Island EIS modeling
[4] Modeled Growler as FA-18E/F aircraft, which shares same engine and airframe

3.1.2.2 Airfield Operations

Key Point: Although flight tracks are represented as single lines on maps, they depict the predominant path aircraft fly over the ground. Depending on the type of flight track, aircraft can be several miles left or right of the flight track depicted on maps.

Aircraft flying patterns at, arriving at, or departing from Ault Field and OLF Coupeville normally fly routes called flight tracks. Flight tracks were developed to aid in the safe and efficient flow of air traffic and were established based on community impact, obstacle clearance, civil air traffic routes and available airspace, and navigational aid coverage, as well as current operational characteristics of aircraft operating at both airfields. Although flight tracks are represented as single lines on maps, they actually depict the predominant path aircraft fly over the ground. The actual path of an aircraft over the ground is affected by aircraft performance, pilot technique, ATC instruction, other air traffic, noise-abatement procedures, and weather conditions (see Section 3.2.4.2 for a discussion on noise-abatement procedures and Appendix H for noise mitigation measures). Depending on the type of flight track, aircraft can be several miles left or right of the flight track depicted on maps. Growler aircraft arrival and departure flight tracks associated with Ault Field are depicted in Figure 3.1-3. The interfacility flight tracks shown in Figure 3.1-4 are used to provide an efficient and standard method of depicting aircraft departing from Ault Field, arriving at OLF Coupeville, and returning to Ault Field. Closed-loop flight tracks are the depiction of continuous approach, landing, and take-off events at the same runway, for operations such as field carrier landing practice (FCLP), and are shown in Figures 3.1-4 and 3.1-5.

Ault Field is the home base location for the Growler community, including nine carrier squadrons, three expeditionary squadrons, one expeditionary reserve squadron, and one training squadron. The training squadron provides initial and refresher Growler qualification training, including FCLP for all first-tour Growler aircrews and refresher training for Growler aircrews returning to a squadron after non-flying assignments. FCLP events occur at Ault Field as well as at OLF Coupeville. The carrier squadrons deploy on aircraft carriers and conduct periodic FCLP to requalify to land on aircraft carriers. Expeditionary squadrons, including the reserve squadron, deploy to land-based locations and therefore do not normally require periodic FCLP prior to deployment.

Ault Field consists of two intersecting runways, Runway 07/25 and Runway 14/32 (Figure 1.2-2). Both runways are 8,000 feet long and 200 feet wide. Ault Field is available for use 7 days per week, 24 hours per day. Aircraft generally take off into the wind for optimum safety and performance. Prevailing surface winds are from the southeast between October and March and from the southwest between April and September. Therefore, the prevailing wind direction as well as noise-abatement procedures result in Runways 25 and 14 being the most frequently used runways at the station. Approximately 46 percent of the airfield operations are assigned to Runway 25, and 32 percent are assigned to Runway 14. Runways 07 and 32 are used less frequently; 16 percent of the airfield operations are assigned to Runway 07, and 6 percent are assigned to Runway 32.

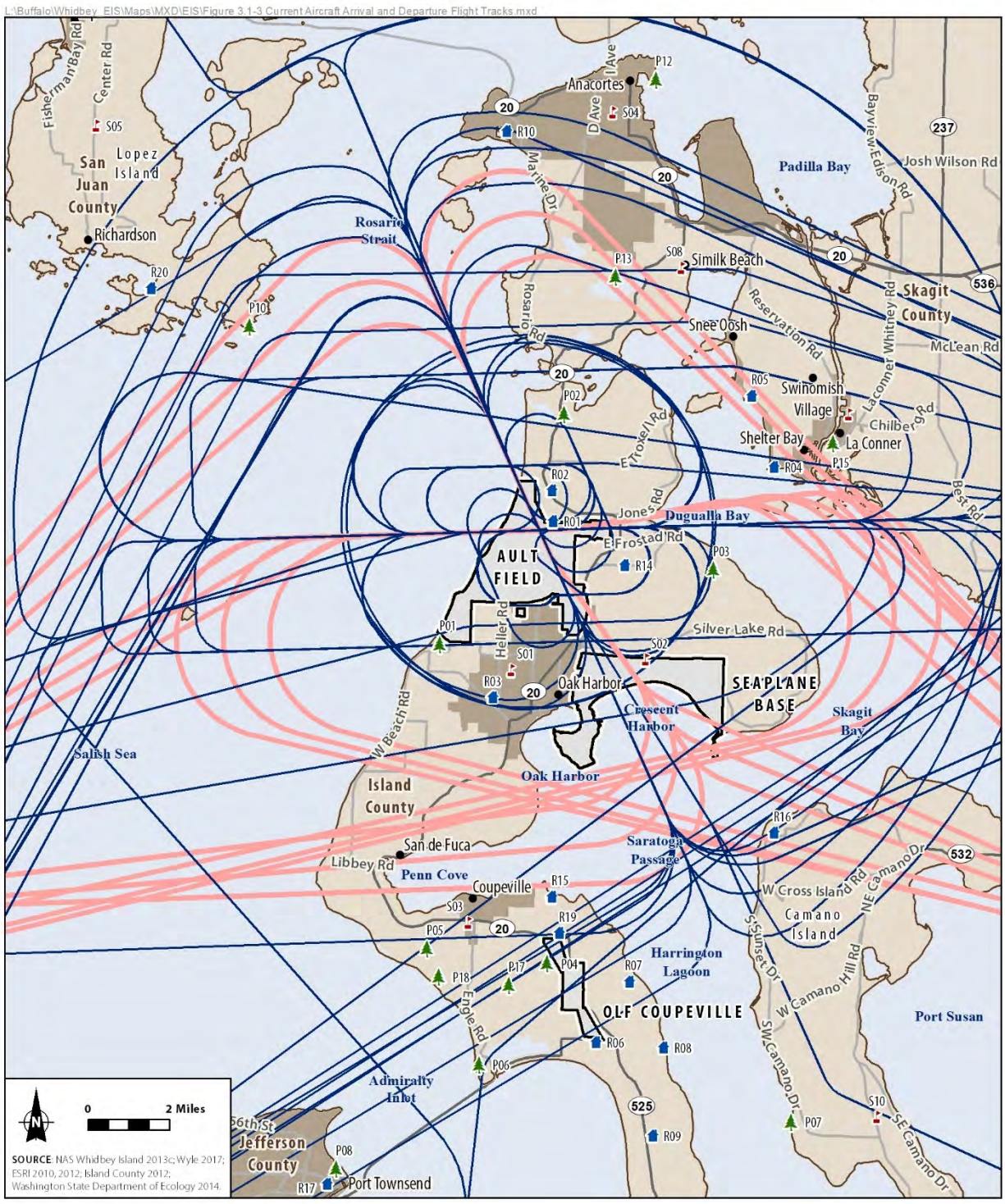


Figure 3.1-3
Current Aircraft Arrival and Departure Flight Tracks at NAS Whidbey Island Complex
Whidbey Island, Island County, WA

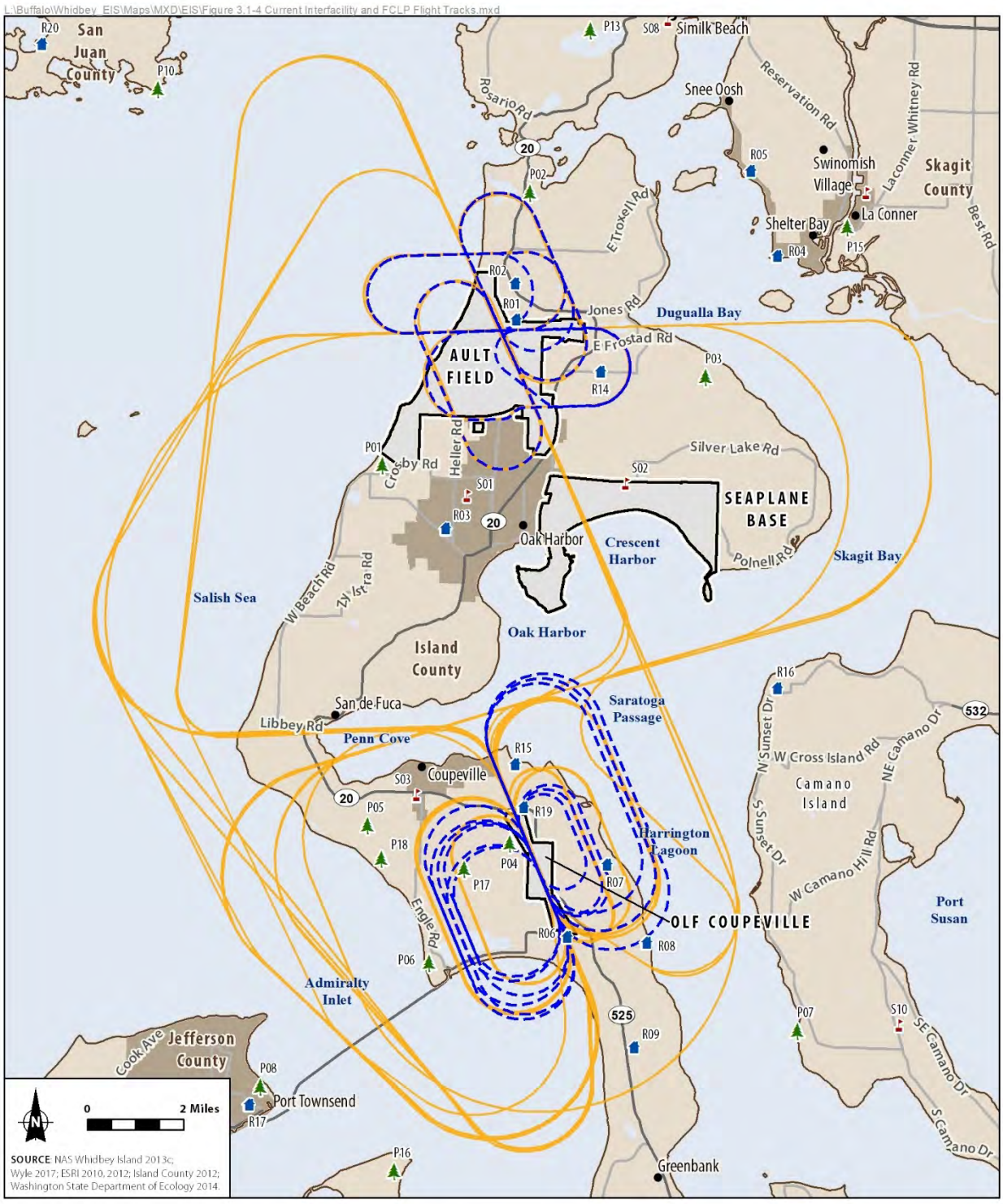


Figure 3.1-4
Current Interfacility and FCLP Flight Tracks
Whidbey Island, Island County, WA

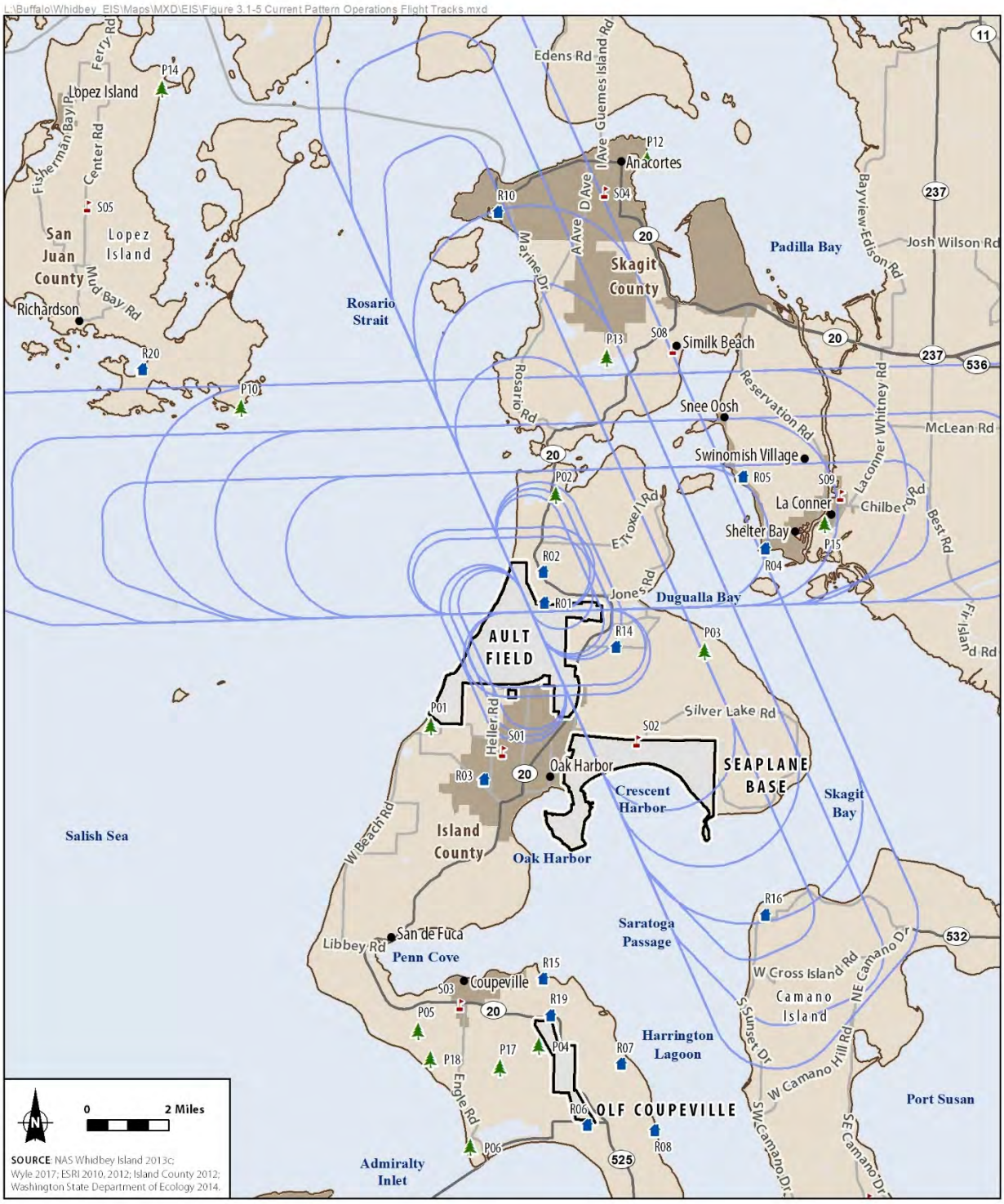


Figure 3.1-5
Current Pattern Operations Flight Tracks
Whidbey Island, Island County, WA

OLF Coupeville consists of one runway, Runway 14/32. The runway is 5,400 feet long and 200 feet wide. While OLF Coupeville is available for use 7 days per week, 24 hours per day, several noise-abatement procedures have been adopted in recent years, such as publishing FCLP schedules and, when practical, avoiding conducting operations on school test days and weekends. Use of OLF Coupeville is determined by operational requirements and, similar to Ault Field, runway use is determined by prevailing winds and the performance characteristics of the Growler. The runway utilization goal at OLF Coupeville has been to split FCLPs equally between Runways 14 and 32. In recent years, however, due to a non-standard pattern on Runway 14, the utilization of Runway 14 has been significantly lower. This narrower day pattern requires an unacceptably steep angle of bank for the Growler due to performance differences from the former Prowlers flying the pattern. Additionally, the extended night pattern requires an improper glide slope, providing negative training to the aircrew.

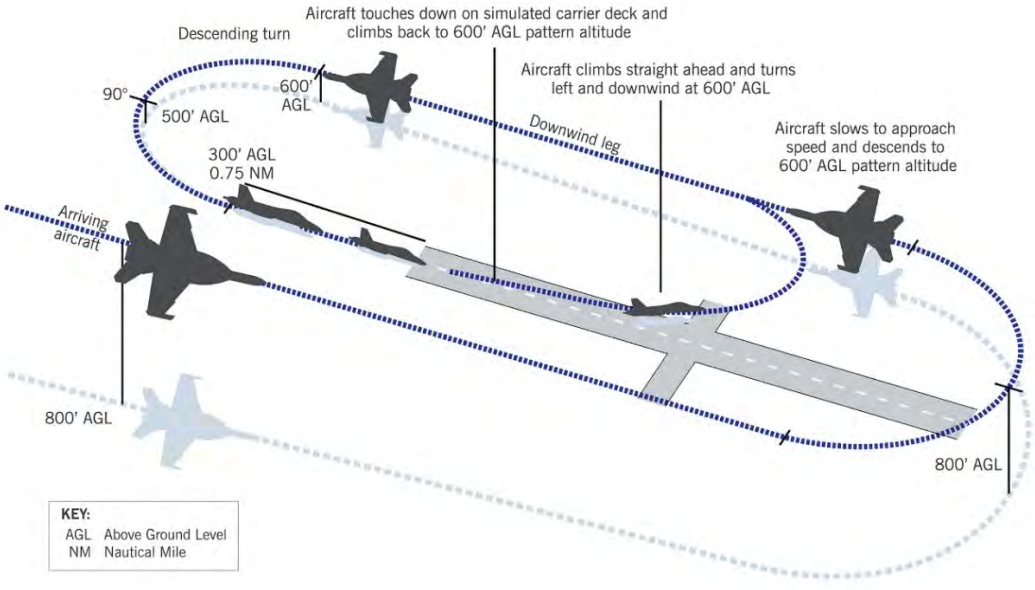
As squadrons prepare for deployment on an aircraft carrier, activity at both Ault Field and OLF Coupeville significantly increases, with periods of concentrated FCLP training followed by little to no FCLP training occurring for several days and weeks after deployment has occurred. A typical FCLP training session lasts for about 45 minutes, with three to five aircraft participating, and sessions may occur several times during a 24-hour period. The need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. Since Ault Field is a major airfield supporting home based aircraft as well as transient aircraft, a larger number of operations occur at Ault Field than at OLF Coupeville, which is primarily used for FCLP.

A flight operation refers to a single takeoff or landing associated with a departure or arrival of an aircraft. A flight operation also may be part of a training maneuver (or pattern). Basic flight operations at Ault Field are:

- **Departure**
  An aircraft taking off to a local or non-local training area or as part of a training maneuver (e.g., the departure part of a touch-and-go [T&G])
- **Arrival**
  An aircraft landing on the runway after returning from a local or non-local training range, or as part of a training maneuver (e.g., the arrival part of a T&G). The three basic types of arrivals are:
    - **Straight-In/Full-Stop Arrival**
      An aircraft lines up to the runway centerline several miles away from the airfield, descends gradually, lands, comes to a full stop, and then taxis off the runway.
    - **Overhead Break Arrival**
      An aircraft approaches the runway at altitude above the ground. Approximately halfway down the runway, the aircraft performs a 180-degree turn to enter the landing pattern. Once established in the pattern, the aircraft performs a second 180-degree, descending turn to land on the runway. This event is an expeditious arrival using VFR.
    - **Instrument Approach**
      An aircraft approach, conducted under both IFR (i.e., when aircraft are flown referring only to the aircraft instrument panel for navigation) and VFR conditions, provides realistic training for both Navy aircrews and air traffic controllers.

- **Pattern Operation**
  An aircraft arrival followed by a departure. Each pattern is considered two operations: the landing or approach is counted as one operation, and the takeoff is counted as another. Pattern operations include the following types:
    - **Touch-and-Go**
      An aircraft lands on a runway and takes off without coming to a full stop. After touching down, the pilot immediately goes to full power and takes off again.
    - **Field Carrier Landing Practice**
      The required flight training that immediately precedes (and qualifies) aircrews for carrier-landing operations. These operations are conducted on a runway that simulates an aircraft carrier flight deck. FCLP is generally flown in a left-hand, closed-loop, racetrack-shaped pattern, ending with a T&G landing or a low approach with the Landing Signal Officer present and grading the proficiency of the pilot. The pattern should simulate, as closely as practicable, the conditions aircrews would encounter during actual carrier landing operations at sea; see Figure 3.1-6.
    - **Ground Controlled Approach/Carrier Controlled Approach**
      An aircraft lands with guidance from ground-based air traffic controllers to practice and conduct arrivals under actual or simulated adverse-weather conditions. Air traffic controllers provide aircrews with verbal course and elevation information, allowing them to make an instrument landing during IFR conditions. Ground Controlled Approach (GCA) training is conducted in both IFR and VFR conditions to provide realistic training for both Navy aircrews and air traffic controllers. Carrier Controlled Approach training is similar to GCA but with the Landing Signal Officer present.

Figure 3.1-6 Standard FCLP Pattern Altitudes (AGL)



For this EIS, the Navy used the Naval Aviation Simulation Model as the best available tool for modeling operational capacity of the airfield flight operations because it provides operational data input to the noise model and supports assessment of airspace and airfield operations. As part of the noise analysis, flight operations were modeled for an "average year" at Ault Field and OLF Coupeville. An average year represents conditions that are projected to occur on an annual basis (i.e., a typical operating tempo at the NAS Whidbey Island complex). The number and type of flight operations in the affected environment for the NAS Whidbey Island complex are those associated with calendar year 2021, which represents the operations after the transition from the P-3C Orion to the P-8A Poseidon aircraft, thereby isolating the changes in the operational environment for this Proposed Action. Therefore, the affected environment is the same as the No Action Alternative in which no additional Growlers are stationed at NAS Whidbey Island. In addition to average year operations, high-tempo FCLP year data are provided for the purpose of qualitative analysis when FCLP activity would be expected to increase over average conditions. The high-tempo FCLP year represents conditions when, during the period modeled for this noise study, the most FCLPs were expected to occur.

3.1.2.2.1 Average Annual Airfield Operations

The affected environment (2021) for airfield flight operations is reflected in Table 3.1-3. During scoping, some commenters suggested that the noise analysis for OLF Coupeville should use a concept found in the Navy's Air Installations Compatibility Use Zones (AICUZ) Instruction (Chief of Naval Operation Instruction 11010.36C) known as "Average Busy Day" (ABD). This measure of operational levels is highly conservative by accounting for noise only when flight operations occur and concentrating on those days when flight operations exceed the average number of flights for that airfield. The Navy believes the ABD is inappropriate for this document. First, it should be noted that ABD is an operational-level concept devised in the AICUZ program, and the intent of the AICUZ instruction is to help prevent incompatible development from affecting the flying mission of a Navy airfield. The AICUZ program encourages the use of the most conservative assumptions regarding projected airfield operations in order to prevent future encroachment, even if future operational assumptions may be somewhat speculative. Consequently, this underlying goal to prevent incompatible encroachment can result in overstated noise impacts. The intent of this EIS is to support informed decision-making regarding the Proposed Action, not to support the AICUZ program's goals to prevent incompatible encroachment. Therefore, this EIS uses the best available science as required under NEPA to develop an accurate analysis of potential noise impacts from the Proposed Action. Moreover, because of the interaction between Ault Field and OLF Coupeville, an accurate analysis requires a common measure. In several alternatives, the noise contours of Ault Field and OLF Coupeville merge, and using different units of measure at each airfield would result in inaccuracy to the noise analysis. It would provide two results that are not directly comparable. Finally, the alternatives, and particularly the sub-alternatives that provide for greater operations at OLF Coupeville, would make the ABD an inappropriate measure based on volume of operations. As the AICUZ instruction notes, the yearly average noise level, known as "Average Annual Day (AAD)," is the preferred unit of measure that the Navy believes accurately represents the noise impacts that may arise from the Proposed Action. The ABD metric is controversial due to the potential for inaccuracy noted above. Finally, the U.S. Air Force, which first adopted the ABD metric in 1977, has eliminated it from the Air Force AICUZ instruction (Air Force Instruction 32-7063, Air Installations Compatible Use Zones Program, dated December 18, 2015), and the Air Force Noise Program instruction (Air Force Instruction 32-7070, Air Force Noise Program, April 21, 2016) specifies the use of AAD. The day-night average sound level (DNL) noise zones are based on the AAD level in accordance with U.S. Department of Defense

(DoD) Instruction (DoDI) 4165.57. Similarly, the Navy has begun the review to determine whether it should follow suit and eliminate ABD from the AICUZ program.

Table 3.1-3 Annual Modeled Affected Environment Operations[1] at Ault Field and OLF Coupeville (Average)

Aircraft Type	*FCLP*	*Other Operations[3]*	*Total*
Affected Environment for Ault Field			
Growler	11,300	53,000	64,300
P-8	0	9,700	9,700
H-60	0	900	900
C-40	0	1,000	1,000
Transient[2]	0	2.300	2.300
Total Airfield Operations	**11,300**	**66,900**	**78,200**
Affected Environment for OLF Coupeville			
Growler	6,100	0	6,100
P-8	0	0	0
H-60	0	400	400
C-40	0	0	0
Transient	0	0	0
Total Airfield Operations	**6,100**	**400**	**6,500**
Total Affected Environment for Ault Field and OLF Coupeville			
Growler		53,000	70,400
P-8	0	9,700	9,700
H-60	0	1,300	1,300
C-40	0	1,000	1,000
Transient	0	2,300	2,300
Total Airfield Operations	**17,400**	**67,300**	**84,700**

Source: Wyle, 2017

Notes:

1 Rounded to nearest 100 if ≥ to 100; rounded to the nearest 10 if ≥ 10 (and less than 100); rounded to 10 if between 1 and 9.

2 Transient aircraft are not permanently stationed at Ault Field.

3 The term "Other Operations" includes Touch-and-Goes, Depart and Re-enter, Ground Controlled Approaches, and Carrier Controlled Approaches (FCLPs are not included under "Other Operations") for P-8A, C-40, and MH-60 aircraft at Ault Field and C-40 and MH-60 aircraft at OLF Coupeville.

Key:
FCLP = field carrier landing practice
OLF = outlying landing field

Under the No Action Alternative, the modeled projections for airfield operations in 2021 at Ault Field and OLF Coupeville, aircrews would perform approximately 78,200 flight operations annually at Ault Field during an average year. As shown on Table 3.1-3, approximately 82 percent of 2021 flight operations are performed by the Growler during the average year. Approximately 88 percent of the total operations during an average year at Ault Field are conducted during the DNL acoustic day (i.e., 7:00 a.m. through 10:00 p.m.). The DNL metric is the energy-averaged sound level measured over a 24-hour period, with a 10-decibel (dB) adjustment assigned to noise events occurring between 10:00 p.m.

and 7:00 a.m. (acoustic night). Approximately 84 percent of the total annual operations during an average year at OLF Coupeville are conducted during acoustic day (7:00 a.m. through 10:00 p.m.).

3.2 Noise Associated with Aircraft Operations

This discussion of noise includes the types or sources of noise in the human environment. While other noise sources occur at Ault Field (such as noise from vehicle traffic and construction), the ambient noise environment is dominated by aircraft noise; therefore, this analysis specifically discusses noise associated with aircraft operations. The Proposed Action includes some construction activities; however, the noise generated from those activities would be temporary in nature and negligible when compared to the noise generated by the aircraft.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. The perception and evaluation of sound involves three basic physical characteristics:

- intensity: the acoustic energy, which is expressed in terms of sound pressure, in dB
- frequency: the number of cycles per second the air vibrates, in hertz (Hz)
- duration: the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. The primary human response to noise is annoyance, which is defined by the U.S. Environmental Protection Agency (USEPA) as any negative subjective reaction on the part of an individual or group (USEPA, 1974) (see Appendix A, Aircraft Noise Study). The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual. While aircraft are not the only sources of noise in an urban or suburban environment, they are readily identified by their noise output and are given special attention in this EIS. In this context, an "event" is a single aircraft overflight, ground run-up, arrival, departure, or pattern operation. In-depth background information on noise, including its effect on many facets of the environment, is provided in Appendix A, Aircraft Noise Study.

3.2.1 Basics of Sound and the A-weighted Sound Level

The loudest sounds that can be comfortably heard by the human ear have intensities a trillion times higher than those of sounds barely heard. Because of this vast range, it is unwieldy to use a linear scale to represent the intensity of sound. As a result, a logarithmic unit known as the decibel (abbreviated dB) is used to represent the intensity of a sound, also referred to as the sound level. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Berglund and Lindvall, 1995).

All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second, or Hz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale, which places less weight on very low and very high frequencies in order to replicate human hearing sensitivity. The general range of human hearing is from 20 to 20,000 cycles per second, or Hz; humans hear best in the

range of 1,000 to 4,000 Hz. A-weighting is a frequency-dependent adjustment of sound level used to approximate the natural range and sensitivity of the human auditory system. Table 3.2-1 provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

Table 3.2-1 Subjective Responses to Changes in A-weighted Decibels

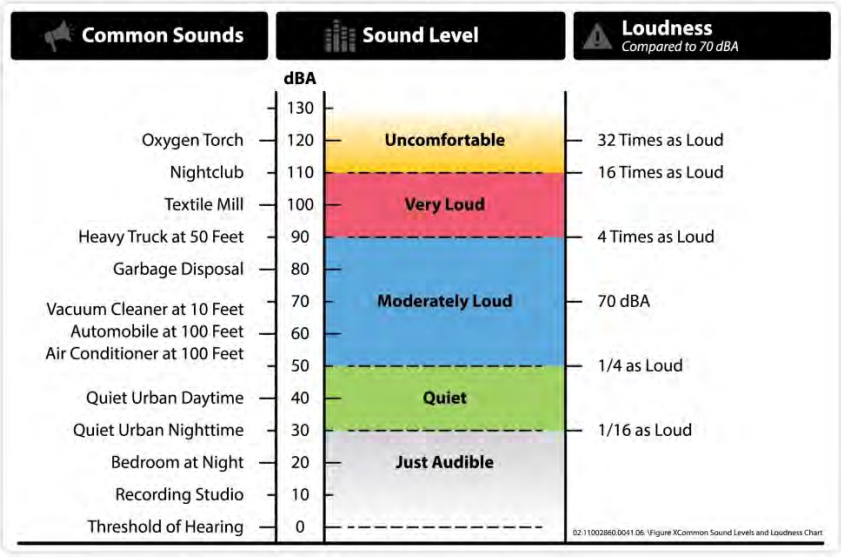
Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic: twice or half as loud
20 dB	Striking: a four-fold change

Key:
dB = decibel

Figure 3.2-1 is a chart of A-weighted sound levels (dBA) from typical noise sources. Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources are time-varying events and reach a maximum sound level during an event, such as a vehicle passing by. Sounds can also be part of the ambient environment (e.g., urban daytime, urban nighttime) and are described by averages taken over extended periods of time. A variety of noise metrics have been developed to describe noise, particularly aircraft noise, in different contexts and over different time periods, as discussed in Section 3.2.2.

Aircraft noise varies with time. During an overflight, noise starts at the background level, rises to a maximum level as the aircraft flies above the receiver, then returns to the background level as the aircraft recedes into the distance. A number of metrics can be used to describe aircraft operations—from a particular individual aircraft event to the cumulative noise effect of all aircraft events over time.

Figure 3.2-1 A-weighted Sound Levels from Typical Sources



Sources: Harris, 1979; FICAN (Federal Interagency Committee on Aviation Noise), 1997

3.2.2 Noise Metrics and Modeling

A "metric" is a method for measuring or quantifying a particular characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise levels so they can be compared in a standardized way. The noise metrics used in this EIS are described in summary format below and in a more detailed manner in Appendix A, Aircraft Noise Study.

Aircraft noise levels are represented in this EIS by various noise metrics that are generated by a computer model and not actual, on-site noise measurements at Ault Field or OLF Coupeville. Computer modeling provides a tool to describe the noise environment and assess community noise exposure. The noise environment for the Final EIS was modeled using a program called NOISEMAP Version 7.3 (March 29, 2017), whereas NOISEMAP Version 7.2 was utilized for the Draft EIS. Version 7.3 of NOISMAP was released between the Draft EIS and Final EIS; therefore, the noise data were remodeled in order to incorporate the best available science. More details on this are presented in Section 3.2.4.

Key Point: NOISEMAP uses a library of actual noise measurements. Using NOISEMAP allows the Navy to compare existing conditions and proposed changes.

NOISEMAP draws from a library of actual aircraft noise measurements obtained in a controlled environment in order to obtain the most accurate measurements. The Growler was modeled in NOISEMAP using FA-18E/F "Super Hornet" data because both aircraft have the same engines and airframes. The Navy has conducted two noise-measurement flyovers for the FA-18 E/F Super Hornet: one in June 1997 at NAS Patuxent River, Maryland, and another in November 2000 at NAS Lemoore, California. The actual noise measurements from these flyovers were incorporated into the NOISEMAP database known as NOISEFILE. Starting with these noise data, NOISEMAP then incorporates all of the site-specific operational data (types of aircraft, number of operations, flight tracks, altitude, speed of aircraft, engine power settings, and engine maintenance run-ups), environmental data (average humidity and temperature), and surface hardness and terrain data that contribute to the noise environment (see Appendix A, Aircraft Noise Study). The DoD uses NOISEMAP as the accepted standard noise modeling program for assessing potential noise exposure from fixed-wing aircraft. NOISEMAP is routinely updated and validated through extensive study (Lundberg, 1991; Speakman, 1989; Lee, 1982; Seidman and Bennett, 1981; Rentz and Seidman, 1980; Bishop et al., 1977; and Dunderdale, Horonjeff, and Mills, 1976) to provide the best possible noise modeling results for these applications. It also encompasses the most extensive database of actual military aircraft noise measurements, which are validated through subsequent testing and used for installation-specific noise analyses.

In addition, analyzing the noise environment by using this model allows for a comparison of existing conditions and proposed changes or alternative actions that do not currently exist or operate at the installation. For these reasons, on-site noise monitoring is seldom used at military air installations for NEPA analyses, especially when the aircraft mix and operational tempo are not uniform. The results of the NOISEMAP modeling are the noise metrics discussed below.

3.2.2.1 Day-night Average Sound Level

The DNL metric is the energy-averaged sound level measured over a 24-hour period, with a 10-dB nighttime adjustment. DNL does not represent a sound level heard at any given time but instead represents long-term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of their average noise exposure measured in DNL

(Schultz, 1978; USEPA, 1978). For additional details related to the latest analysis regarding people highly annoyed and related noise exposure, refer to Appendix A1 (Section A1.3.1) of the Aircraft Noise Study (Appendix A). DNL has been determined to be a reliable measure of long-term community annoyance with aircraft noise and has become the standard noise metric used by the FAA, USEPA, DoD, Federal Interagency Committee on Noise, American National Standards Institute (ANSI), and World Health Organization, among others, for measuring noise impacts. As DNL is the federal standard, many state and local governments, including Island County, have included DNL contours in their land use planning and zoning ordinances.

DNL values are average quantities, mathematically representing the continuous sound level that would be present if all of the variations in sound level that occur over a 24-hour period were averaged to have the same total sound energy. The DNL metric quantifies the total sound energy received and is therefore a cumulative measure, but it does not provide specific information on the number of noise events or the individual sound levels that occur during the 24-hour day. The DNL metric also adds an additional 10 dB to nighttime (10:00 p.m. to 7:00 a.m., also known as "acoustic night") sound levels to account for heightened human sensitivity to noise when ambient sound levels are low, such as when sleep disturbance could occur.

The results of the modeling are DNL noise contours, or lines connecting points of equal value, usually in 5-dB increments (for example [e.g.], 65 dB DNL and 70 dB DNL). The modeled DNL contours are depicted on noise contour maps, which provide a visual depiction of the overall geographic area covered by the different levels of noise.

DNL contours are calculated based on modeled aircraft noise events using NOISEMAP; calculated noise contours therefore do not represent measured noise levels at the airfields. Noise exposure in DNL contours is typically analyzed within contour bands, or ranges of DNL exposure, which cover the land areas between two contour lines. The DNL noise contour ranges used in this analysis include the following:

- 65 to less than 70 dB DNL
- 70 to less than 75 dB DNL
- Greater than or equal to 75 dB DNL

Per DoDI 4165.57, DNL noise contours are used for recommending land uses that are compatible with aircraft noise levels. Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments (Schultz, 1978); a consistent relationship exists between DNL and the level of annoyance experienced (refer to Appendix A, Aircraft Noise Study). DoD recommends land use controls beginning at the 65 dB DNL level. Research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 dB DNL (FICUN [Federal Interagency Committee on Urban Noise], 1980). Most people are exposed to sound levels of 50 to 55 DNL or higher on a daily basis. Therefore, the 65 dB DNL contour is used to help determine compatibility of military aircraft operations with local land use, particularly for land use surrounding airfields, and is the lower threshold for this analysis.

While the DNL noise metric is the federal standard for analyzing the cumulative noise exposure from all aircraft operations, the DoD has developed additional metrics to supplement the noise analysis. Supplemental metrics and analysis tools provide more detailed noise exposure information for the decision process and improve the discussion regarding noise exposure. The DoD Noise Working Group

(DNWG) product *Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics* (DNWG, 2013) was used to determine the appropriate metrics and analysis tools for this EIS.

3.2.2.2 Equivalent Sound Level

The Equivalent Sound Level (L_{eq}), measured in dB, is a cumulative noise metric that represents the average sound level (on a logarithmic basis) over a specified period of time—for example, an hour, a school day, daytime, nighttime, weekend, facility rush periods, or a full 24-hour day (i.e., the L_{eq} for a full 24-hour day is similar to the DNL metric but for the fact that the DNL metric includes the additional 10 dB for those events during acoustic night). In this EIS, the effect of noise interference in the school classroom is analyzed using L_{eq}, which describes the cumulative noise environment based on the noise events (i.e., aircraft overflights) that occur in an 8-hour school day.

3.2.2.3 Sound Exposure Level

The sound exposure level (SEL) metric is a composite metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of total sound energy of the entire acoustic event, but it does not directly represent the sound level heard at any given time. During an aircraft overflight, SEL captures the total sound energy for the noise event, meaning as the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. The total sound energy from the entire event is then condensed into a 1-second period of time, and the metric represents the total sound exposure received. SEL has proven to be a good metric to compare the relative exposure of transient sounds, such as aircraft overflights, and is the recommended metric for sleep disturbance analysis (DNWG, 2013). In this EIS, SEL is used to describe the sound exposure of a single aircraft event for aircraft stationed at Ault Field. The effect of noise on sleep disturbance is also analyzed using SEL.

3.2.2.4 Maximum Sound Level

The highest dBA level measured during a single event where the sound level changes value with time (e.g., an aircraft overflight) is called the maximum A-weighted sound level (L_{max}). During an aircraft overflight, the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. L_{max} defines the maximum sound level occurring for a fraction of a second. For aircraft noise, the "fraction of a second" over which the maximum level is defined is generally 1/8 second (ANSI [American National Standards Institute], 1988). For sound from aircraft overflights, the SEL is usually greater than the L_{max} because an individual overflight takes seconds, and the L_{max} occurs instantaneously. In this EIS, the effects of noise on speech interference, including speech in the classroom and potential effects on recreation, are evaluated using L_{max}.

3.2.2.5 Number of Events above a Threshold Level

The Number of Events above a Threshold Level metric provides the total number of noise events (e.g., aircraft overflights) that exceed a selected noise-level threshold during a specified period of time (DNWG, 2013). Combined with the selected noise metric, L_{max} or SEL, the Number of Events above a Threshold metric is symbolized as NAXXmetric (NA = number of events above, XX = dB level, metric =

L_{max} or SEL). For example, the L_{max} and SEL Number of Events above a Threshold metrics are symbolized as NA75L_{max} and NA75SEL, respectively, with 75 dB as the example dB threshold level. This would mean that an NA 75 L_{max} value of 20 is defined as 20 events exceeding 75 dB L_{max} during the analysis period (such as a day). In this EIS, an L_{max} threshold is selected to analyze speech interference, including indoor speech interference in the classroom and outdoor speech interference during recreation. An SEL threshold is selected for analysis of sleep disturbance.

3.2.3 Noise Effects

An extensive amount of research has been conducted regarding noise effects, including annoyance, speech interference, classroom/learning interference, sleep disturbance, effects on recreation, potential hearing loss, and nonauditory health effects. These effects are summarized below, and for further discussion, see Appendix A, Aircraft Noise Study.

3.2.3.1 Annoyance

As previously noted, the primary effect of aircraft noise on exposed communities is long-term annoyance, defined by USEPA as any negative subjective reaction on the part of an individual or group (USEPA, 1974). The scientific community has adopted the use of long-term annoyance as a primary indicator of community response, and there is a consistent relationship between DNL and the level of community annoyance (FICON [Federal Interagency Committee on Noise], 1992).

3.2.3.2 Speech Interference (Indoor)

Indoor speech interference associated with aircraft noise is a primary cause of annoyance for communities. Speech interference can cause disruption of routine activities, such as enjoyment of radio or television programs, telephone/mobile phone use, or family conversation, giving rise to frustration or irritation. In extreme cases, speech interference may cause fatigue and vocal strain to individuals who try to communicate over the noise. In this EIS, the analysis of indoor speech interference is based on the number of events per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the instantaneous maximum sound level of 50 dB indoors (50 dB L_{max}) (DoD, 2009a; Sharp et al, 2009).

3.2.3.3 Classroom/learning Interference

A review of the scientific literature (see Appendix A, Aircraft Noise Study) indicated that there has been limited research in the area of aircraft noise effects on children and classroom/learning interference. Research suggests that environments with sustained high background noise can have a variety of effects on children, including effects on learning and cognitive abilities and various noise-related physiological changes. Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that aircraft noise can affect the academic performance of school children. Physiological effects in children exposed to aircraft noise and the potential for health effects have been the focus of limited investigation. Two studies have been conducted, both in Germany, that examined potential physiological effects on children from noise. One examined the relationship between stress hormone levels and elevated blood pressure in children residing around the Munich airport. The other study was conducted in diverse geographic regions and evaluated potential physiological changes (e.g., change in heart rate and muscle tension) related to noise. The studies showed that there may be some relationship between noise and these health factors; however, the researchers noted that further study is needed in order to differentiate the specific cause and effect to understand the relationship (DNWG, 2013).

This EIS focuses on classroom/learning interference using two metrics. The first is the 8-hour Equivalent Sound Level ($L_{eq[8]}$), which describes the cumulative noise environment based on the noise events (i.e., aircraft overflights) that occur in an 8-hour school day, and the second is the number of events above (NA) a threshold level. The analysis of the effects of noise on school-aged children through classroom/learning inference are similar to those for speech interference, although the analysis is based on the number of daily indoor events over an 8-hour school day (8:00 a.m. to 4:00 p.m.) that exceed a particular sound level. To maintain the ambient sound level in typical classrooms of 35 to 40 dB L_{eq}, outdoor equivalent noise levels would need to be below 60 dB $L_{eq(8)}$, assuming an average noise level reduction with windows closed (DNWG, 2009, 2012).

The next step is to assess the magnitude of classroom interference using an NA metric. For this analysis, it is recommended that an interior noise level of 50 dB L_{max} be used because this represents a level at which a person with normal hearing can clearly hear someone (i.e., a teacher) speaking at a level of 50 dB indoors in a classroom setting (DoD, 2009a; Sharp et al., 2009). Normal conversation is about 60 dB, but this is assumed to be for up-close, person-to-person conversation; therefore, the level of 50 dB is used for classroom/learning interference to account for children who may be sitting in the back of the classroom. Therefore, the analysis shows the number of hourly events above the 50 dB L_{max} level, which would represent the number of times a student would potentially be unable to hear an instructor in a classroom setting.

The analysis presented in this EIS, as discussed above, assumes a certain level of sound attenuation associated with standard school building construction. However, currently, and potentially in the future, portable classrooms may be utilized at schools around the NAS Whidbey Island complex. These portable classrooms most likely would have a slightly lower sound attenuation than a standard school building. Therefore, the noise levels presented may be lower than expected in a portable classroom.

3.2.3.4 Sleep Disturbance

Disturbance of sleep is a concern for communities exposed to nighttime aircraft noise. The DoD guidelines for evaluating sleep disturbance are based upon methodology and standards developed by ANSI and the Acoustical Society of America in 2008 (ANSI, 1988; DNWG, 2009). It is based upon a probability curve and the relationship between the indoor SEL value and the probability of awakening. In this EIS, the effect of aircraft noise on sleep is evaluated using an indoor SEL noise metric. This metric represents the probability of awakening at least once during a night of average aircraft noise activities. The SELs are based upon the particular type of aircraft, flight profile, power setting, speed, and altitude relative to the receptor. The results are then presented as a percent probability of awakening (USEPA, 1974).

3.2.3.5 Outdoor Speech Interference: Potential Noise Effects on Recreation and Outdoor Activities

Outdoor speech interference, similar to indoor speech interference, can cause disruption of routine activities being conducted outdoors, such as hiking, participating in or being a spectator at ball games, working in the yard, or camping in a park. In this EIS, the analysis of outdoor speech interference is based on the number of events per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the instantaneous maximum sound level of 50 dB L_{max} outdoors. It is assumed that this noise level would be above background and normal conversation sound levels and may cause disturbance for individuals outdoors. It should be noted that based upon public comments received on the Draft EIS, the L_{max} level

used as the threshold for determining outdoor speech interference was lowered from 65 dB in the Draft EIS to 50 dB in the Final EIS.

3.2.3.6 Potential Hearing Loss

> A temporary threshold shift can result from exposure to loud noise over a given amount of time, yet the hearing loss is not necessarily permanent (e.g., from attending a loud concert).
>
> A permanent threshold shift usually results from repeated exposure to high noise levels, when the ears are not given adequate time to recover from the strain and fatigue of exposure (e.g., from a very noisy work environment, such as a factory).
>
> (DNWG, 2013)

Hearing loss is generally interpreted as a decrease in the ear's sensitivity or acuity to perceive sound (i.e., a shift in the hearing threshold to a higher level). This change can either be a temporary threshold shift or a permanent threshold shift. The 1982 *U.S. EPA Guidelines for Noise Impact Analysis* provides that people who experience continuous, daily exposure to high noise in the workplace over a normal working lifetime of 40 years, with exposure lasting 8 hours per day for 5 days per week, beginning at an age of 20 years old, may be at risk for a type of hearing loss called Noise Induced Permanent Threshold Shift (NIPTS). NIPTS defines a permanent change in hearing level, or threshold, caused by exposure to noise (USEPA, 1982). NIPTS can result from repeated exposure to high noise levels, during which the ears are not given adequate time to recover. A temporary threshold shift can eventually become a NIPTS over time with repeated exposure to high noise levels. Even if the ear is given time to recover from temporary threshold shift, repeated occurrence may eventually lead to permanent hearing loss. The point at which a temporary threshold shift results in a NIPTS is difficult to identify and varies with a person's sensitivity to noise. According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable (USEPA, 1974). There is no known evidence that an NIPTS of less than 5 dB is perceptible or has any practical significance for the individual affected, which is supported by the fact that the variability in audiometric testing is generally assumed to be plus or minus 5 dB.

As stated previously, NIPTS is stated in terms of the average threshold shift at several frequencies that can be expected from daily exposure to noise over a normal working lifetime. This workplace exposure standard is not intended to accurately describe the impact of intermittent noise events such as periodic aircraft overflights but is presented as a "worst-case" analytical tool. This analysis assumes that individuals are outdoors at the location of their residence for 40 years and exposed to all aircraft activity. To put the conservative nature of this analysis into context, the national average of time spent indoors is approximately 87 percent (or almost 21 hours of the day) (Klepeis et al., n.d.). With intermittent aircraft operations and the time most people spend indoors, it is very unlikely that individuals would experience noise exposure that would result in hearing loss. Nonetheless, this analysis is provided per DoD policy directive to support informed decision making.

DoD policy directive requires that hearing loss risk be estimated for the at-risk population, defined as the population exposed to a DNL greater than or equal to 80 dB (DoD, 2009a). To assess the potential for NIPTS, the Navy generally uses the 80 dB DNL contour (i.e., areas with high noise levels) as an initial threshold to identify the population to be analyzed for possible hearing loss (DNWG, 2013). Within this contour, the analysis identifies individuals subject to specific levels of sound using the 24-hour Equivalent Sound Level ($L_{eq[24]}$). $L_{eq(24)}$ is used instead of DNL because characterizing noise exposure in terms of DNL will usually overestimate the assessment of hearing loss risk, particularly at night, because DNL includes an artificial 10 dB weighting factor for aircraft operations occurring between 10:00 p.m. and 7:00 a.m., and this added 10 dB is not sound actually heard by the public.

3.2.3.7 Nonauditory Health Effects

Studies have been conducted to examine the nonauditory health effects of aircraft noise exposure, focusing primarily on stress response, blood pressure, birth weight, mortality rates, and cardiovascular health. Exposure to noise levels higher than those normally produced by aircraft in the community can elevate blood pressure and also stress hormone levels. However, the response to such loud noise is typically short in duration: after the noise goes away, the physiological effects reverse, and levels return to normal. In the case of repeated exposure to aircraft noise, the connection is not as clear. The results of most cited studies are inconclusive, and it cannot be conclusively stated that a causal link exists between aircraft noise exposure and the various type of nonauditory health effects that were studied (DNWG, 2013). This is also summarized in a publication by the Airport Cooperative Research Program, which states, “Despite decades of research, including review of old data and new research efforts, health effects of aviation noise continue to be an enigma. Most, if not all, current research concludes that it is as yet impossible to determine causal relations between health disorders and noise exposure, despite well-founded hypotheses” (ACRP [Airport Cooperative Research Program], 2008). A review of existing literature addressing nonauditory health effects from aircraft noise exposure was included in the Draft EIS. In addition to this and based upon public comment, specifically from the State of Washington Department of Health, the USEPA, and other public comments, requests were received to review additional published articles. In preparation of the Final EIS, the Navy reviewed 260 published articles as suggested by public comment. An in-depth review of these documents is provided in Appendix A, Aircraft Noise Study. The Navy determined that many of these studies had been reviewed already and included in the Navy’s literature review or were referenced in or by studies the Navy has already considered. However, expanded information has been incorporated as appropriate. The studies did not change the overall findings of the Navy’s original literature review. See Appendix A-8 for details on the literature review process. No studies have shown a definitive causal and significant relationship between aircraft noise and health. Inconsistent results from studies examining noise exposure and cardiovascular health have led the World Health Organization to conclude that there was only a weak association between long-term noise exposure and hypertension and cardiovascular effects (WHO [World Health Organization], 2000). A later study also concluded that the relationship between noise exposure and heart disease was inconclusive (Van Kempen et al., 2002). More recently, major studies have been conducted in an attempt to identify an association between noise and health effects, develop a dose-response relationship, and identify a threshold below which the effects are minimal. These studies have produced inconsistent results for associations between aircraft noise and heart health, ranging from no statistical significance to marginal statistical significance. In some cases, the studies did not control for confounding variables such as smoking and poor diet, both of which are known to directly contribute to cardiovascular disease.

Several researchers have examined pooled results from multiple studies examining noise exposure effects on heart health. The outcomes of these pooled studies have also produced inconsistent results. Two such studies found that an exposure-response relationship could not be established for the association between aircraft noise and cardiovascular risk due to methodological differences between studies (Babisch and Kamp, 2009; Babisch, 2013). A third pooled study suggested that aircraft noise could contribute to hypertension, but it noted that the relationship was inconclusive due to limitations in study populations, exposure characterization, and control of confounding variables (Huang et al., 2015). Finally, Vienneau et al. (2013) found that the risk of heart disease per 10 dB increase in noise exposure had marginal statistical significance, but the relationship between noise exposure and mortality from heart disease was not statistically significant.

3.2.3.8 Vibration Effects from Aircraft Operations

In addition to the noise effects on the population outlined above, noticeable structural vibration may result from certain aircraft operations at either Ault Field or OLF Coupeville. Depending on the aircraft operation, altitude, heading, power settings, and the structure, certain vibration effects may be observed. Typically, the structural elements that are most susceptible to vibration from aircraft noise are windows and sometimes walls or ceilings. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (CHABA, 1977). Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. See Appendix A, Aircraft Noise Study, for additional details on noise-induced vibration effects as well as the Noise and Vibration Associated with Operational Impacts discussion in Section 4.6.2 for more details related to vibration effects on historic structures.

3.2.4 Noise, Affected Environment

This section outlines the affected noise environment as modeled for Calendar Year 2021 (CY 21), when the P-3C Orion to P-8A Poseidon aircraft transition will be complete; however, the modeled CY 21 noise environment does not include the additional Growlers associated with the Proposed Action, which is discussed in Section 4.2.4. This allows the noise modeling to isolate the changes to the noise conditions associated specifically with this Proposed Action. The noise conditions associated with aircraft activity at Ault Field and OLF Coupeville are described using the noise metrics outlined in Section 3.2.2.

Many activities at NAS Whidbey Island generate noise and warrant analysis as contributors to the total noise impact. The predominant noise sources consist of aircraft operations, both at and around the airfields, as well as in the airspace. Other activities such as construction, use of aircraft ground support equipment for maintenance purposes, and vehicle traffic produce noise, but such noise generally represents a transitory and negligible contribution to the average noise level environment. Aircraft flight operations and ground engine-maintenance run-ups are the primary source of noise at Ault Field.

Engine maintenance run-ups are used to test engines at low- or high-power settings for defined durations and are conducted at several locations at Ault Field (see Figure 3.2-2) (Navy, 2005a). Engine run-ups are conducted at six locations; four low-power testing locations are along the flight line, and two high-power testing locations are just west of Runway 14/32 and south of Runway 7/25. Aircraft flight operations are the primary source of noise at OLF Coupeville, because pre-flight engine run-ups are not conducted at that facility.

Flight operations at Ault Field are dominated by the Growler and P-8A Poseidon aircraft. The Growler is louder than the P-8A Poseidon and therefore contributes more to the noise environment (i.e., the Growler is the loudest aircraft currently operating at Ault Field) (Wyle, 2012). The flight operations and noise environment at OLF Coupeville are largely the result of Growler aircraft performing FCLP at the OLF.

Several updates were applied to the noise analysis between release of the Draft EIS and the Final EIS, which include 1) updating the noise model using the latest version of NOISEMAP (Version 7.3); 2) applying refinements to certain flight profiles/aircraft operating assumptions; 3) incorporating the effects of Precision Landing Mode (PLM), also known as Maritime Augmented Guidance with Integrated Controls for Carrier Approach and Recovery Precision Enabling Technologies (or MAGIC CARPET), into the noise analysis; and 4) updating the number of pilots per squadron. These updates are discussed individually below. In addition, although not a change to the noise analysis, the presentation of DNL noise contours on the figures in the Final EIS has been revised based upon public comments. The 55 dB DNL noise contour has been added to figures for illustrative purposes (similar to how the 60 dB DNL noise contour was depicted in the Draft EIS). However, the analysis is still based upon the 65 dB DNL noise contour, where areas with noise levels greater than 65 dB DNL are generally not recommended for residential uses.

A comparison table has been added to Section 1.13 (Table 1.13-2) that quantitatively compares the results of the noise analysis, along with certain other resource areas, between the Draft EIS and the Final EIS, and captures the changes associated with implementation of these updates.

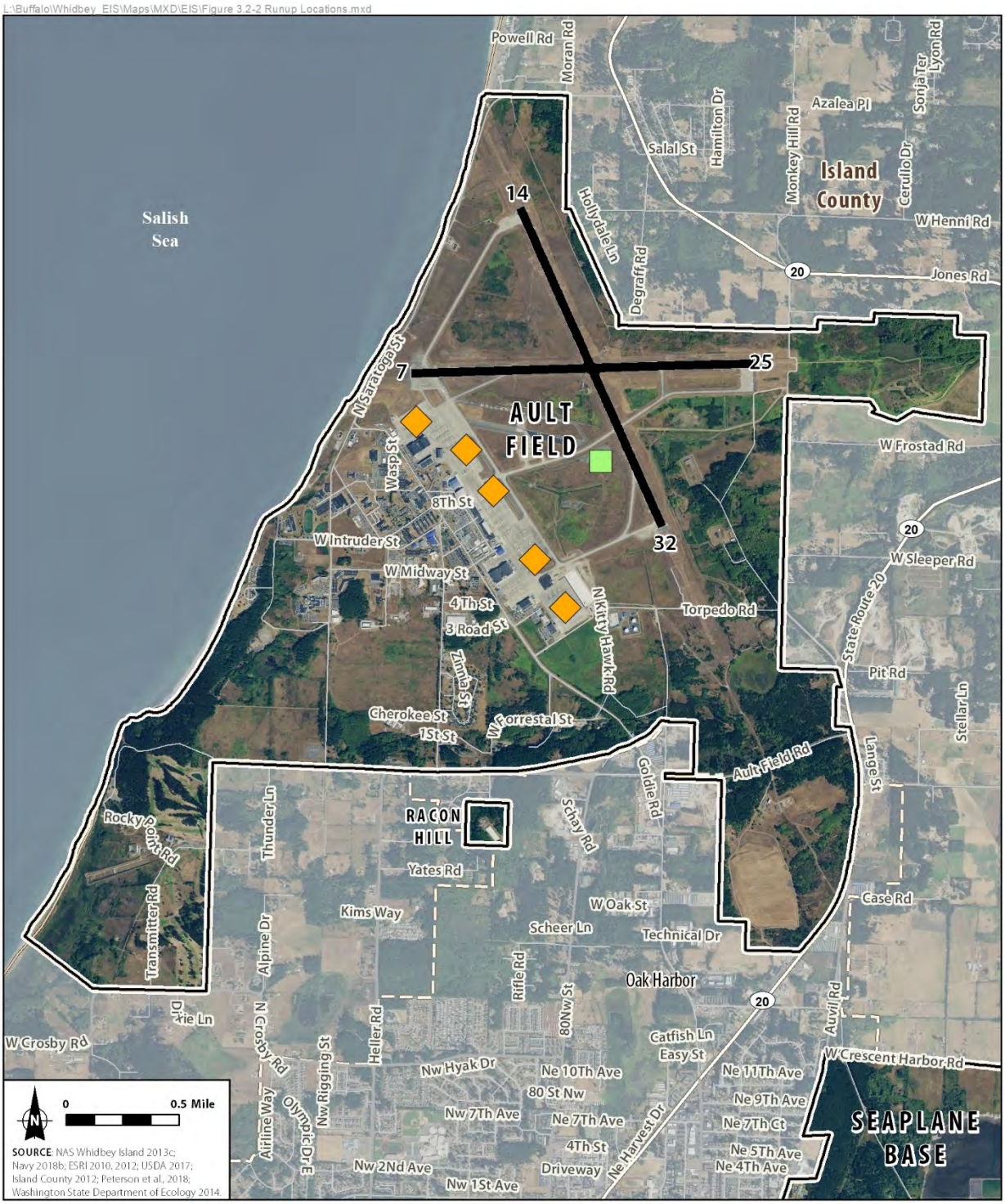


Figure 3.2-2
Engine Run-up Locations at Ault Field
Whidbey Island, Island County, WA

Updating the Noise Model Using the Latest, NOISEMAP Version 7.3 Model

All scenarios were updated for the Final EIS to use the latest release of NOISEMAP, Version 7.3. This updated version of the NOISEMAP software was released in March 2017. The updated NOISEMAP Version 7.3 involves the direct calculation of the supplemental metrics in the noise calculation module (NMap), in addition to some general code fixes. To validate the updated, 7.3 version of NOISEMAP, comparative cases for eight airfields were run using current BaseOps case files. These cases were selected to provide a range of aircraft types, terrain, and operational tempos, and one of the comparative cases included was NAS Whidbey Island. Through this comparative validation, it was found that the DNL calculations provided very similar results between the two versions.

The general code fixes associated with the update to NOISEMAP Version 7.3 focused on a new grid scanning procedure that was required to properly calculate noise in areas with significant changes in terrain elevation (i.e., cliffs). This terrain feature is present around OLF Coupeville, to the west. Under NOISEMAP Version 7.2, a patch was applied to address these anomalies. As part of the update to NOISEMAP Version 7.3, the model was effectively updated to address this terrain calculation anomaly, with similar results as the patch for NOISEMAP 7.2.

In addition, supplemental metrics were compared and validated as part of the version upgrade. Most supplemental metrics are based on SEL and L_{max}. The SEL comparisons were in very good agreement between the two versions, with only minor differences between the different calculation methods (prior to NOISEMAP Version 7.3, supplemental metrics had to be calculated externally from NOISEMAP). The L_{max} comparison showed very good agreement between the two model versions. One difference noted between the analysis for the Draft EIS and Final EIS for the calculation of supplemental metrics was for the probability of awakening estimates. This difference arises from the time-period assumption based on the ANSI criteria for estimating this metric. The standard states that the acoustic nighttime operations, which may occur over a 9-hour period, should be adjusted by a factor of 7/9 to account for the average 7-hour sleep duration. The Draft EIS analysis did not scale the acoustic nighttime operations, so the probability of awakening estimates are lower in the analysis presented in the Final EIS.

Applying Refinements to Certain Flight Profiles/Aircraft Operating Assumptions

Regarding refinements to certain flight profiles/aircraft operating assumptions, through a third-party review of the noise modeling inputs conducted in spring 2017, clarifications were applied when the noise model was updated in NOISEMAP Version 7.3. These clarifications focused on the EA-18G profiles in order to more accurately model nuances in how they fly in certain flight profiles and included the following:

- adjusting the percentage of departures at Ault Field using afterburner (AB) power from 80 percent to 100 percent
- modifying the departure profiles from Ault Field to a slower climb-out rate
- adjusting the flight profile/power settings from overhead break arrivals from the break point to the end of the downwind leg
- increasing the glide slope of the FCLPs at Ault Field to the standard 3°
- correcting OLF Coupeville departure profiles
- correcting the altitude at which night FCLPs were modeled from 1,000 feet AGL to the standard 600 feet AGL to match the daytime pattern

The results of applying these refinements and the updated model changed some results presented in Sections 3.2 and 4.2 of the Final EIS. The most noticeable change is in the DNL noise contours southeast of Ault Field due to refinements made to the departure flight profile and utilization of AB assumptions. The application of other refinements did not alter the DNL contours or supplemental metrics to a large degree.

Incorporation of Precision Landing Mode, also known as MAGIC CARPET, into the Noise Analysis

As noted in the Draft EIS, the Navy has been evaluating PLM technology for many years, and between the release of the Draft EIS and the Final EIS, the successful results of testing indicated significant strides toward implementation of the technology. It is anticipated that by the time the Proposed Action is implemented at NAS Whidbey Island, PLM technology will have been rolled out into the various operating squadrons. Implementation of PLM is expected to decrease the number of required FCLPs by 20 percent, which leads to a decrease in the number of FCLP operations. Therefore, this assumption has been applied to the noise analysis for not only the No Action Alternative (CY 21) but also for all of the proposed alternative/scenario combinations. The PLM technology is not specific to this Proposed Action and would be implemented regardless of which alternative/scenario is chosen at NAS Whidbey Island.

Updating the Number of Pilots per Squadron for the Fleet Carrier Squadrons

Following the release of the Draft EIS, the Navy identified a change in personnel--specifically, a reduced number of pilots to be assigned to Fleet Squadrons at NAS Whidbey Island (two fewer pilots per carrier squadron)--which results in a decrease in projected operations.

3.2.4.1 DNL Noise Contours

DNL noise contours were modeled for an "average year" at Ault Field and OLF Coupeville[9]. An average year represents conditions that are projected to occur on an annual basis—i.e., a typical operating tempo at the NAS Whidbey Island complex. The DNL noise contours for the NAS Whidbey Island complex used in this EIS are those associated with CY 21, when the P-3C Orion to P-8A Poseidon aircraft transition will be complete. By accounting for the P-8A transition, there will be a more accurate representation of the existing environment when the Proposed Action is scheduled to be fully implemented and the environment as it would appear if the agency took no action. Modeling noise for CY 21 will also account for the Navy's implementation of the PLM technology, which will reduce overall FCLP requirements by 20 percent.

DNL noise contours were also modeled for a "high-tempo" FCLP year, which represents conditions when FCLP activity would increase over average conditions. Figures 3.2-3 through 3.2-5 present comparatively both the average year and the high-tempo FCLP year DNL noise contours for the NAS Whidbey Island complex, as well as individually for Ault Field and OLF Coupeville, respectively. As shown in these figures, the difference in the overall noise environment between the impacts of the average year and the high-tempo FCLP year is small; the largest divergence in the noise contours between the impacts of the average year and the high-tempo FCLP year occurs over the water.

[9] These DNL noise contours were modeled specifically for this analysis to determine the change in the noise environment related to the Proposed Action; therefore, they differ from the official noise contours currently on record (discussed in Section 3.5.1.2, Regional Land Use and Land Use Controls).

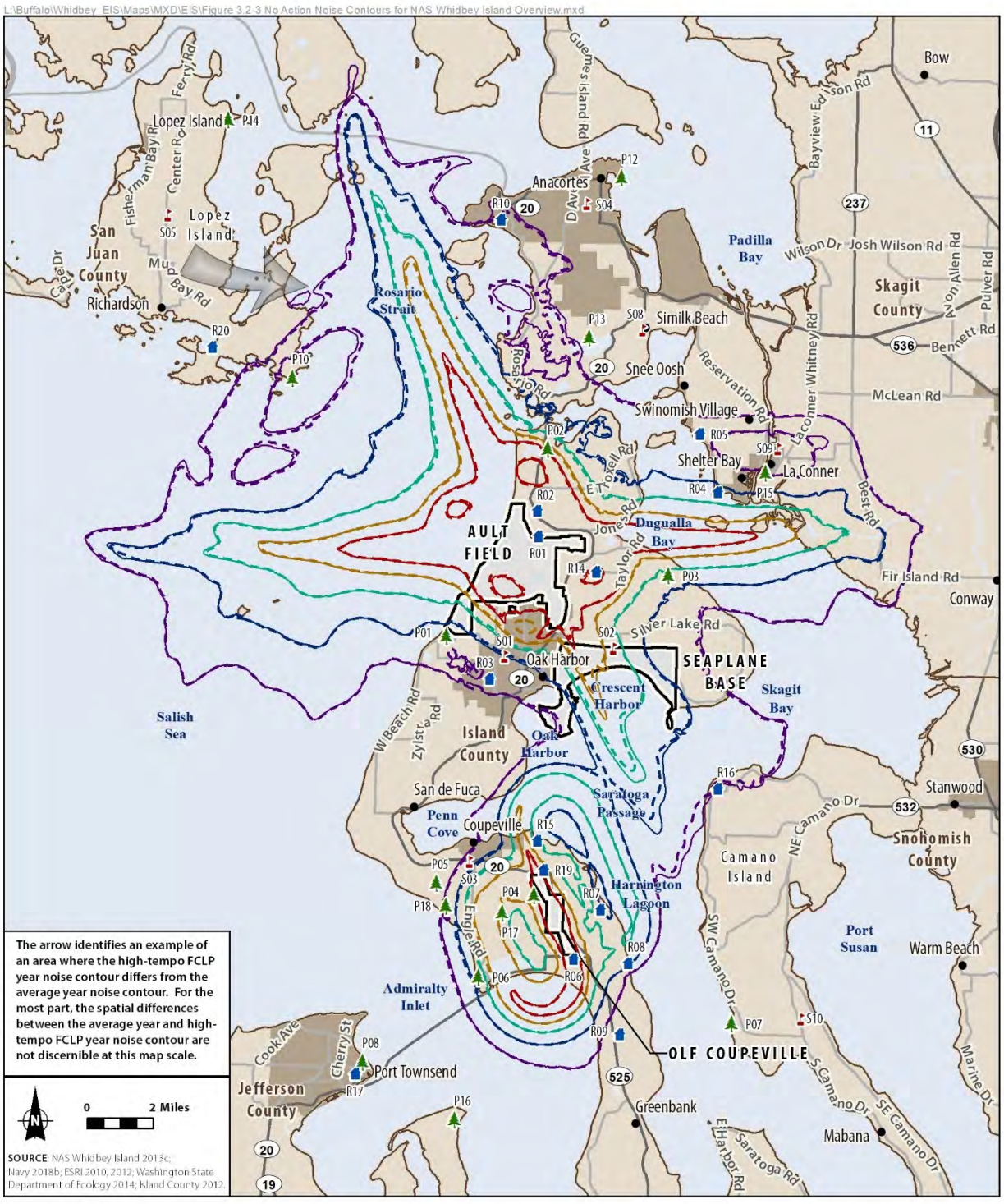


Figure 3.2-3
No Action Environment for NAS Whidbey Island Overview
Whidbey Island, Island County, WA

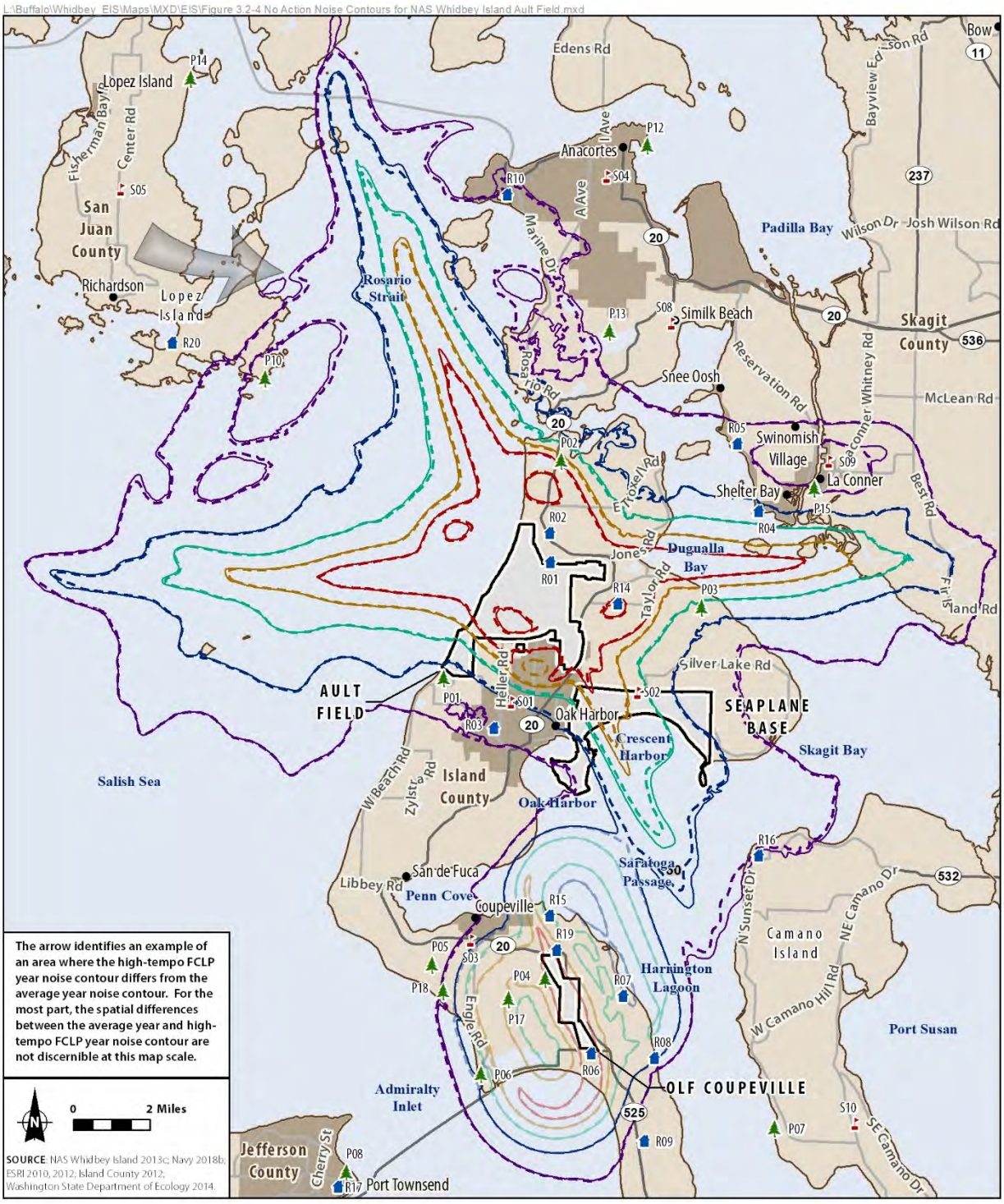


Figure 3.2-4
No Action Environment for Ault Field, NAS Whidbey Island Complex
Whidbey Island, Island County, WA

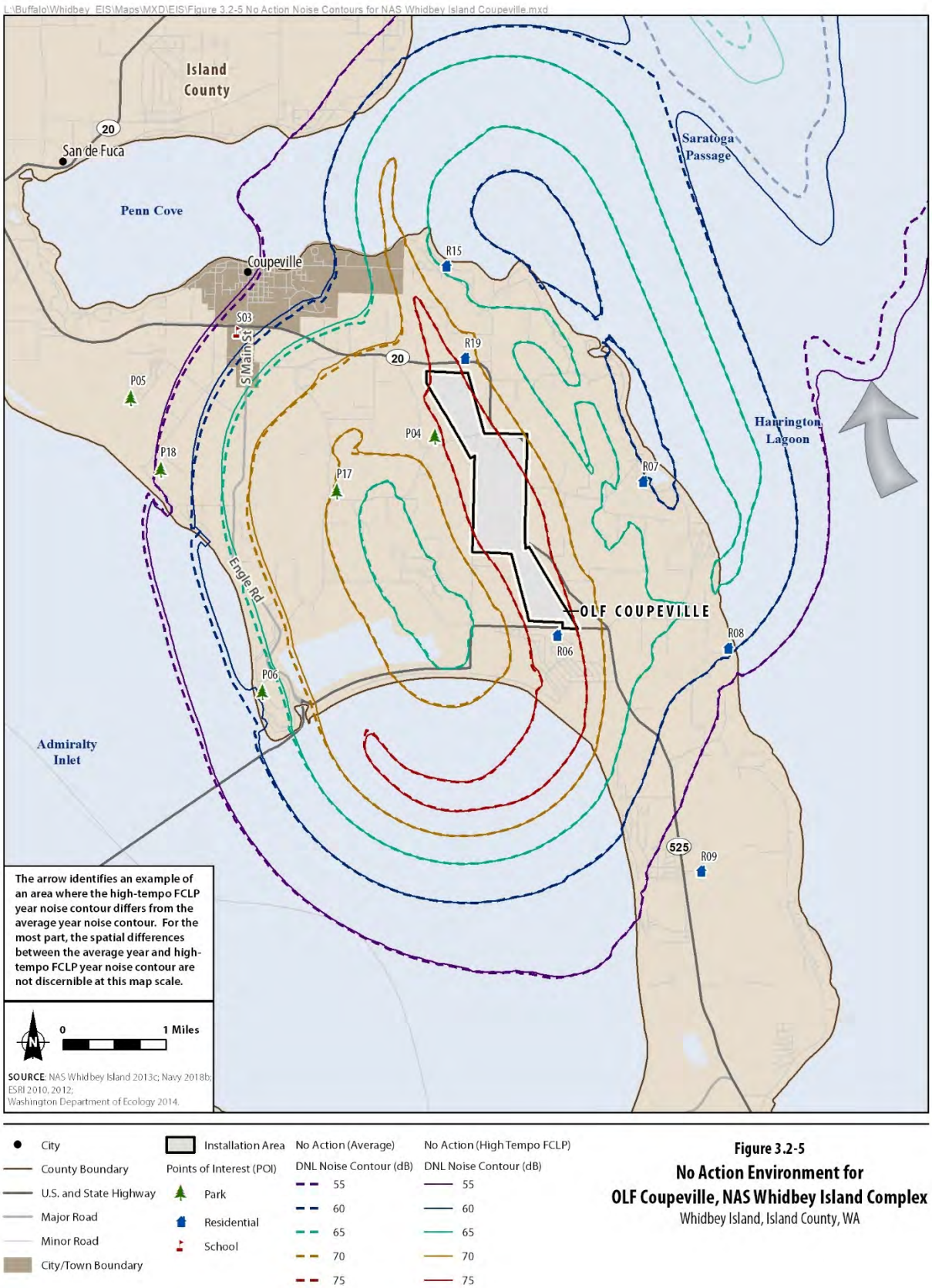


Figure 3.2-5
No Action Environment for OLF Coupeville, NAS Whidbey Island Complex
Whidbey Island, Island County, WA

In addition, as discussed further in Section 3.2.2.1, 65 dB DNL is the established federal standard for determining potential for high annoyance. This level has been identified in both the FAA's Part 150 Program and the DoD's Air Installations Compatible Use Zones (AICUZ) Program (including the individual Air Force and Navy programs), as a threshold for land use recommendations. Consistent with this guidance, 65 dB DNL is used to show areas with potential for high annoyance in this analysis. However, aircraft noise does occur outside the 65 dB DNL contour. In order to more fully reflect the noise environment, the Draft EIS included noise contours of 60 dB DNL as well as detailed noise analysis for specific points of interest (POIs). In response to public comments, the Navy has expanded the analysis in the Final EIS to show geographic areas subject to greater than 55 dB DNL and has analyzed 18 additional POIs.

The 65 dB DNL contour for the average year at Ault Field extends approximately 6 to 10 miles from the four runway endpoints. The length of these lobes is primarily due to the Growler on the approach portion of the GCA patterns (described in Section 3.1), where the aircraft generally descends on a 3-degree glide slope through 3,000 feet AGL, 10 miles from the runway. The 75 dB DNL contour extends approximately 5 miles to the east outside of the installation boundary, primarily due to the Growler on the GCA patterns noted above, as well as VFR approaches, where the aircraft generally descends from 1,800 feet AGL to the runway. The DNL contours at OLF Coupeville are generally driven by the FCLPs conducted at the airfield. The 65 dB DNL contour extends northward past the southern shore of Penn Cove and southward approximately 2 to 3 miles from the runway. The 65 and 70 dB DNL noise contour bands take the shape of two ovals on each side of OLF Coupeville's runway, which corresponds to the FCLP flight tracks.

The off-station area and the estimated population in the modeled noise contour ranges for the average year at Ault Field and OLF Coupeville are listed in Table 3.2-2.

Table 3.2-2 Estimated Acreage and Population within the DNL Contour Ranges[1] for the Average Year at the NAS Whidbey Island Complex (CY 21)

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total[3]*	
DNL Contours	*Area (acres)*	*Pop[2]*	*Area (acres)*	*Pop[2]*	*Area (acres)*	*Pop[2]*	*Area (acres)*	*Pop[2]*
Ault Field	3,596	3,279	3,269	2,283	5,549	3,379	**12,414**	**8,941**
OLF Coupeville	3,681	861	3,088	786	638	583	**7,407**	**2,230**
Total[3]	**7,277**	**4,140**	**6,357**	**3,069**	**6,187**	**3,962**	**19,821**	**11,171**

Notes:

1 Acreage presented does not include areas over water or areas over the NAS Whidbey Island complex.

2 Population counts of people within the DNL contours were computed using 2010 census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville). All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall under the 65+ dB DNL contours. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.

3 Numbers have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

To further illustrate the similarities between the impacts of the average year and the high-tempo FCLP year at Ault Field and OLF Coupeville, the percent difference in the acreage and population within the contours was calculated and is presented in Table 3.2-3. From the average year to the high-tempo FCLP year, there would be approximately 1.1 percent more land area covered, with approximately 5.7 percent more population within the contours.

Table 3.2-3 Percent Difference in the Estimated Acreage and Population within the Average and High-Tempo FCLP Year DNL Contour Ranges for the NAS Whidbey Island Complex (CY 21)

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
DNL Contours	*Area (acres)*	*Pop*	*Area (acres)*	*Pop*	*Area (acres)*	*Pop*	*Area (acres)*	*Pop*
Ault Field	-2.6%	2.1%	-0.3%	17.3%	5.7%	4.5%	**1.7%**	**6.9%**
OLF Coupeville	1.0%	2.4%	-1.1%	0.1%	-0.1%	- <0.1%	**<0.0%**	**0.9%**
Total	**-0.8%**	**2.1%**	**-0.7%**	**12.9%**	**5.1%**	**3.8%**	**1.1%**	**5.7%**

Key:
dB = decibel
DNL = day-night average sound level

The higher the percent change, the larger the deviation between the impacts of the average year and the high-tempo FCLP year DNL noise contours; however, most changes are within +/- 5 percent of zero. The largest percent change is at Ault Field for the population within the 70 to less than 75 dB DNL contour range, which includes an increase of 17.3 percent (or approximately 394 people).

3.2.4.2 Existing Noise Mitigation

3.2.4.2.1 Noise Abatement Policy

It is Commanding Officer, NAS Whidbey Island policy to conduct required training and operational flights with as minimal impact as practicable on surrounding communities. All aircrews using Ault Field, OLF Coupeville, Naval Weapons Systems Training Facility Boardman, and the numerous northwest instrument and visual MTRs throughout the Pacific Northwest are responsible for the safe conduct of their mission while complying with published course rules, established noise-abatement procedures, and good common sense. Each aircrew must be familiar with the noise profiles of its aircraft and is expected to minimize noise impacts without compromising operational and safety requirements.

The Navy must follow governing FAA rules and regulations when flying. Arrival and departure corridors into and out of NAS Whidbey Island have been developed in conjunction with the FAA over decades with an emphasis on flying over water and avoiding more densely populated areas. Additionally, these corridors are designed to deconflict military, commercial, and general aviation routes.

NAS Whidbey Island has noise-abatement procedures for assigned and transient aircraft to minimize aircraft noise. Airfield procedures used to minimize/abate noise for operations conducted at the NAS Whidbey Island airfields include optimizing of flight tracks, restricting maintenance run-up hours, runway optimization, and other procedures as provided in NASWHIDBEYINST 3710.7AA as noted below. Additionally, aircrews are directed, to the maximum extent practicable, to employ prudent airmanship techniques to reduce aircraft noise impacts and to avoid sensitive areas except when operational safety dictates otherwise.

Noise sensitivity awareness is practiced at all levels of the chain of command and is discussed at the daily airfield operations briefing, weekly Commanding Officer's Tenant Command meeting, bi-weekly Instrument Ground School Aircrew refresher training, monthly Aviation Safety Council meetings, and quarterly noise working group meetings.

Some examples of the full list of noise-abatement procedures in the NAS Whidbey Island Air Operations Manual (NASWHIDBEYINST 3710.1AA, Jan 10, 2017), which is included in Section 2.3 of Appendix H, are included below. These noise-abatement procedures are reviewed periodically and subject to change in future revisions to the air operations manual.

- Aircrews shall, to the maximum extent possible, employ prudent airmanship techniques to reduce aircraft noise impacts and to avoid noise-sensitive areas except when directed by ATC.
- Sunday Operations: From 7:30 a.m. to noon local time on Sundays, noise-abatement procedures require arrivals, except scheduled FCLP/Carrier Controlled Approach aircraft, VR-61 drilling reservists, and VP-69 drilling reservists, to make full-stop landings.
- High-power turn-ups should not be conducted prior to noon on Sundays or between the hours of 10:00 p.m. and 7:30 a.m. for jets and midnight to 7:30 a.m. for turboprops. For specific operational necessity requirements, defined as preparation for missions other than routine local

training and functional check flights terminating at NAS Whidbey Island, high-power turn-ups may be authorized outside these established hours.

- Wind component and traffic permitting, morning departures prior to 8:00 a.m. shall use Runway 25, and evening arrivals after 10:00 p.m. shall use Runway 7 to maximize flight over open water.
- Make smooth power changes. Large, abrupt changes in power result in large, abrupt changes in sound level on the ground.
- The maximum number of aircraft in the FCLP flight pattern is five. This is so the FCLP pattern stays within the 5-mile radius of the class "Charlie" airspace, aircraft do not get extended and thereby create additional noise impacts, and allowance can be made for non-FCLP aircraft to operate concurrently.
- Avoiding noise-sensitive areas by flying at altitudes of no less than 3,000 feet AGL, except when in compliance with an approved traffic or approach pattern, military training route, or within SUA.

NAS Whidbey Island has historically worked with elected officials from surrounding communities to best minimize impacts where practicable, including not flying at the OLF on weekends and minimizing flight activity during major school testing dates and major community events. NAS Whidbey Island will continue to minimize noise impacts as much as practicable.

3.2.4.2.2 Noise Complaint Process

NAS Whidbey Island's Commanding Officer takes public concerns seriously and has processes in place that allow members of the public to comment about and seek answers to questions about operations at the base, and ensure those comments are reviewed by appropriate members in his command.

It is the policy of NAS Whidbey Island to investigate complaints to determine compliance with FAA regulations and base standard operating procedures (SOPs). These investigations ensure that both Navy and public interests are protected and provide ongoing communication between the base and the local communities. Persons with complaints or comments may call a recorded complaint hotline at (360) 257-6665 or email: comments.NASWI@navy.mil. The information from these comments is gathered by the Operations Duty Officer, who records pertinent information such as the location, time, and description of the noise-generating event. Callers may also request a response or feedback, and should provide name and contact information.

The Operations Duty Officer provides copies of the complaints to the Commanding Officer, Executive Officer, Operations Officer, Community Planning and Liaison Officer, and Public Affairs Officer the following day, and each complaint receives a thorough analysis and a recommendation to address the complaints. Routinely, a playback of audio and video recordings from ATC will be reviewed to verify that all FAA and local procedures were followed and to determine the probable causes of the complaint. When necessary, the base officials may communicate directly with the complainant. The Community Planning and Liaison Officer maintains a file of noise complaints for historical and trend data.

NAS Whidbey Island has an active public relations process to inform members of the public of upcoming FCLPs so that individuals have the ability to plan their personal activities. Information on FCLP training schedules is shared every week with the media in the Puget Sound region and is posted on the command's Facebook and webpage sites every week. Members of the public also have the option to obtain these releases directly by signing up for them through the Public Affairs Office. The command

uses the same process to inform the public about other events that may increase noise or have more impacts on specific areas for short periods of time.

3.2.4.2.3 Air Installations Compatible Use Zones Program

The Navy also has an active AICUZ program that informs the public about its aircraft noise environment and recommends specific actions for the local jurisdictions with planning and zoning authority that can enhance the health, safety, and welfare of those living near Ault Field and OLF Coupeville (see Section 3.5.2.2). The current version of the AICUZ plan for NAS Whidbey Island was published in 2005.

3.2.4.3 Supplemental Noise Analyses

To conduct the supplemental noise analyses to evaluate the noise effects described in Section 3.2.3, a variety of POIs were identified in proximity to Ault Field and OLF Coupeville and based on existing overflight areas in surrounding communities throughout Island County. Input received during the public scoping process was also considered in order to ensure representation of a variety of the communities potentially affected by noise. The wide geographic distribution of POIs provides broad coverage and context to compare the noise effects for the affected environment with the noise effects under each of the alternatives. These POIs include residential areas, parks, and schools. In addition, based upon public comments received between the Draft EIS and Final EIS, an additional 18 POIs were added to the analysis to provide the public and decision makers with more data to compare. These additional POIs included additional residential areas, schools, and parks, as well as two points from the National Park Service's (NPS's) acoustical monitoring report. The two points located in Ebey's Landing National Historical Reserve as identified in that report (designated as EBLA001 [Reuble Farmstead] and EBLA002 [Ferry House]) correspond to POIs P17 and P18, respectively, in this EIS. In addition, the analysis of outdoor speech interference was also included for all POIs, as well as broken out between estimated daytime and nighttime operations for residential areas and schools, as individuals would spend time outdoors at both of those types of locations. In general, the POIs were chosen based upon several factors, including their geographic dispersal from the airfields and being located under flight operations, major or identifiable landmarks, and areas that have had a history of noise impacts. It should be noted that for POIs located close to one another (i.e., within about 0.25 mile, depending on topography), the results will most likely be the same or very similar and thus not add value to the analysis. Furthermore, it is possible to deduce the potential noise impacts at a specific location based on its proximity to analyzed POIs and distance from prominent flight tracks.

The nearest POIs are immediately outside of the installation property, primarily to the north, south, and east. Other POIs are in the surrounding counties of San Juan, Jefferson, Clallam, Snohomish, and Skagit. In addition, one POI was identified in British Columbia, Canada. The POIs chosen for analysis are depicted on Figure 3.2-6 (they are also listed in Table 3.2-4). Different supplemental noise metrics as described in Section 3.2.2 were used to evaluate the noise effects for the selected POIs. These are discussed and presented in the following subsections.

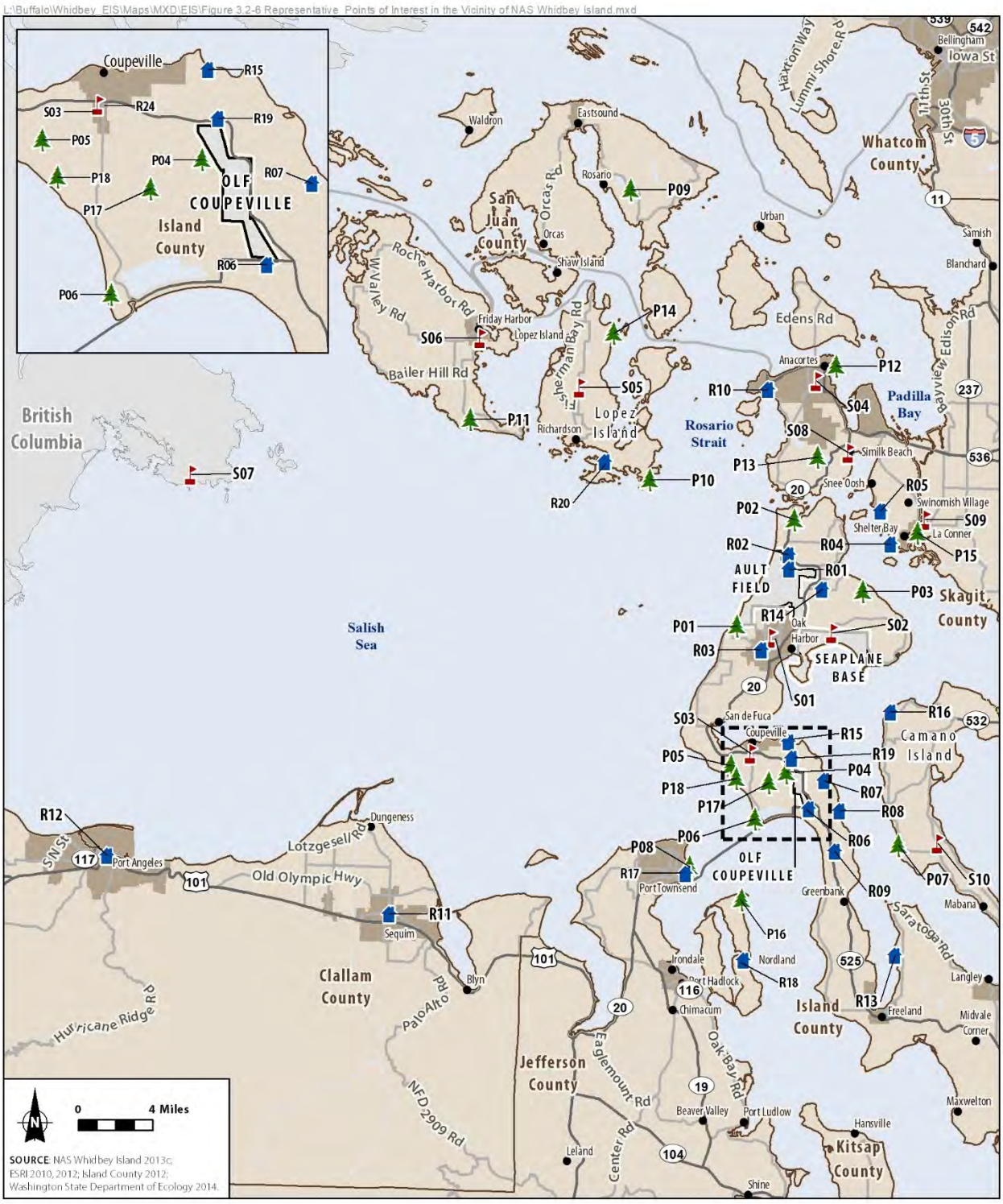


Figure 3.2-6
Representative Points of Interest in the Vicinity of NAS Whidbey Island Complex
Whidbey Island, Island County, WA

3.2.4.3.1 Single Event Noise and Number of Events Above

Several types of metrics are presented in this subsection that address the questions of "how loud" and "how often." First, the maximum SEL value and the L_{max} value are presented for each POI around Ault Field and OLF Coupeville in Table 3.2-4. As described in Section 3.2.2.3, the SEL value is a composite metric that represents both the intensity of a sound and its duration during a single event (i.e., arrival, departure, or T&G). The values presented in Table 3.2-4 are the maximum SELs that would be experienced at each specific POI of all the possible single events by any of the aircraft operating at Ault Field or OLF Coupeville. The L_{max} value is the maximum sound level that occurs during a single event for a "fraction of a second." The values presented in Table 3.2-4 are the highest L_{max} values that would be heard by an individual at each of the specific POI locations of all the possible single events by any of the aircraft operating at Ault Field or OLF Coupeville. Under the No Action Alternative, the maximum SEL and L_{max} values vary widely depending on the location of the POI and its proximity to the airfields and flight tracks.

In addition, to answer the "how often" question, a separate analysis was conducted to estimate the number of events above a maximum noise level threshold ($NAXXL_{max}$) (see Section 3.2.2.5 for a description of this metric). For the purposes of this analysis, three L_{max} noise levels were chosen: 1) Number of events above 80 dB L_{max} ($NA80L_{max}$), 2) Number of events above 90 dB L_{max} ($NA90L_{max}$), and 3) Number of events above 100 dB L_{max} ($NA100L_{max}$). This provides context for the frequency of noise events that an individual may experience at that POI at three different noise levels that may be considered disruptive. See Figure 3.2-1 for sound levels from typical sources.

In Section 4.2, the SEL and L_{max} values (Table 3.2-4) and the number of events above values (Table 3.2-5) are all estimated under the projected operations in 2021, which are then compared to the SEL and L_{max} and number of events above values for the three alternatives.

The SEL and L_{max} values for the POIs analyzed ranged from a high of 121 dB (R01) and 115 dB (R06), respectively, to a low of 51 dB (S06) and 39 dB (S06), respectively.

Table 3.2-4 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)[1]

POI ID and Lat/Long[2]	*Description of POI*	*Maximum SEL (dB)*	L_{max} *(dB)* [1]
Residences			
R01 48.355122; -122.648742	Sullivan Road	121	114
R02 48.366114; -122.649629	Salal Street and N. Northgate Drive	110	101
R03 48.291897; -122.678461	Central Whidbey	101	49
R04 48.376254; -122.531332	Pull and Be Damned Point	99	91
R05 48.401524; -122.544105	Snee-Oosh Point	92	84
R06 48.169790; -122.619302	Admirals Drive and Byrd Drive	118	115
R07 48.191755; -122.602008	Race Lagoon	114	109
R08 48.168517; -122.583276	Pratts Bluff	112	106
R09 48.137037; -122.587917	Cox Rd and Island Ridge Way	92	46
R10 48.493775; -122.678297	Skyline	100	90
R11 48.079530; -123.101824	Sequim	73	60
R12 48.118143; -123.430737	Port Angeles	75	65
R13 48.057425; -122.515732	Beverly Beach, Freeland	75	63
R14 48.340050; -122.609918	E. Sleeper Road and Slumber Lane	104	96
R15 48.221405; -122.644530	Long Point Manor	110	105
R16 48.245995; -122.527024	Rocky Point Heights	100	91
R17 48.117033; -122.760432	Port Townsend	85	N/A
R18 48.051210; -122.691022	Marrowstone Island (Nordland)	68	N/A
R19 48.208534; -122.640093	Island Transit Offices, Coupeville	120	117
R20 48.434580; -122.866529	South Lopez Island (Agate Beach)	95	87

Table 3.2-4 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)[1]

POI ID and Lat/Long[2]	*Description of POI*	*Maximum SEL (dB)*	L_{max} *(dB)*[1]
Schools			
S01 48.301735; -122.668534	Oak Harbor High School	98	90
S02 48.306534; -122.597048	Crescent Harbor Elementary School	104	94
S03 48.211392; -122.688188	Coupeville Elementary School	98	90
S04 48.501364; -122.621279	Anacortes High School	93	83
S05 48.491937; -122.897677	Lopez Island School	76	68
S06 48.527949; -123.014994	Friday Harbor Elementary School	51	39
S07 48.415532; -123.348053	Sir James Douglas Elementary	61	51
S08 48.446455; -122.582687	Fidalgo Elementary School	93	59
S09 48.395565; -122.491437	La Conner Elementary School	92	86
S10 48.145351; -122.468604	Elger Bay Elementary School	83	N/A
Parks			
P01 48.310204; -122.707535	Joseph Whidbey State Park	93	60
P02 48.393363; -122.643917	Deception Pass State Park	107	104
P03 48.339138; -122.562410	Dugualla State Park	105	88
P04 48.197382; -122.646087	Ebey's Landing - Rhododendron Park	114	111
P05 48.201734; -122.710268	Ebey's Landing - Ebey's Prairie	91	78
P06 48.160853; -122.681076	Fort Casey State Park	102	91
P07 48.142916; -122.514472	Cama Beach State Park	82	73
P08 48.122388; -122.75577	Port Townsend	85	N/A
P09 48.646161; -122.844471	Moran State Park	62	51
P10 48.421791; -122.813211	San Juan Islands National Monument	95	85

Table 3.2-4 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)[1]

POI ID and Lat/Long[2]	*Description of POI*	*Maximum SEL (dB)*	*L_{max} (dB)*[1]
P11 48.464855; -123.024295	San Juan Island Visitors Center	64	50
P12 48.513258; -122.599106	Cap Sante Park	82	74
P13 48.442683; -122.618209	Lake Campbell	94	86
P14 48.534433; -122.859918	Spencer Spit State Park	76	63
P15 48.385146; -122.499911	Pioneer Park	92	83
P16 48.097952; -122.694607	Marrowstone Island (Fort Flagler)	85	70
P17 48.189306; -122.666398	Reuble Farm	115	110
P18 48.191819; -122.703613	Ferry House	96	85

Notes:

[1] Typically, and is the case for the majority of the POIs in this analysis, the same aircraft event generates both the SEL and the L_{max}. However, in certain cases when a POI is a farther distance from the airfield, a different event may generate the highest SEL and the L_{max}.

[2] Based upon public comments received, the latitude/longitude coordinates listed in this table correspond to each of the POIs.

[3] The L_{max} metric provided, along with the number of events, is representative of what an individual may hear at this POI and how often; however, there is variability in the number of operations that occur daily because there are periods when there is minimal operational activity and other periods when there are more aircraft operations. In addition, there is some variability in how close the aircraft operation itself is to the POI, as weather, other aircraft traffic, pilot proficiency, etc. can affect the position of an aircraft within the modeled flight track.

Key:

dB = decibel
L_{max} = maximum A-weighted sound level
n/a = not available; the aircraft that generates the highest L_{max} at this POI is the P-8A
POI = Point of Interest
SEL = Sound Exposure Level

Table 3.2-5 Number of Events above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, No Action Alternative (CY 21)

POI ID and Lat/Long[1]	*Description of POI*	*Maximum Sound Level (L_{max}) for Counting Events*	*Annual Average Number of Daily Events*
Residences			
R01	Sullivan Road	Above 80 dB L_{max}	48,311
		Above 90 dB L_{max}	43,603
		Above 100 dB L_{max}	30,199
R02	Salal Street and N. Northgate Drive	Above 80 dB L_{max}	38,892
		Above 90 dB L_{max}	36,058
		Above 100 dB L_{max}	4,771
R04	Pull and Be Damned Point	Above 80 dB L_{max}	4,985
		Above 90 dB L_{max}	370
		Above 100 dB L_{max}	0
R05	Snee-Oosh Point	Above 80 dB L_{max}	2,767
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0
R06	Admirals Drive and Byrd Drive	Above 80 dB L_{max}	3,101
		Above 90 dB L_{max}	2,451
		Above 100 dB L_{max}	2,227
R07	Race Lagoon	Above 80 dB L_{max}	938
		Above 90 dB L_{max}	230
		Above 100 dB L_{max}	183
R08	Pratts Bluff	Above 80 dB L_{max}	368
		Above 90 dB L_{max}	223
		Above 100 dB L_{max}	68
R10	Skyline	Above 80 dB L_{max}	1,548
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0
R14	E. Sleeper Road and Slumber Lane	Above 80 dB L_{max}	40,516
		Above 90 dB L_{max}	10,220
		Above 100 dB L_{max}	0
R15	Long Point Manor	Above 80 dB L_{max}	2,524
		Above 90 dB L_{max}	847
		Above 100 dB L_{max}	41
R16	Rocky Point Heights	Above 80 dB L_{max}	1,525
		Above 90 dB L_{max}	69
		Above 100 dB L_{max}	0
R19	Island Transit Offices, Coupeville	Above 80 dB L_{max}	3,172
		Above 90 dB L_{max}	2,412
		Above 100 dB L_{max}	847
R20	South Lopez Island (Agate Beach)	Above 80 dB L_{max}	112
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0

Table 3.2-5 Number of Events above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, No Action Alternative (CY 21)

POI ID and Lat/Long[1]	*Description of POI*	*Maximum Sound Level (L_{max}) for Counting Events*	*Annual Average Number of Daily Events*
Schools			
S01	Oak Harbor High School	Above 80 dB L_{max}	997
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0
S02	Crescent Harbor Elementary School	Above 80 dB L_{max}	4,436
		Above 90 dB L_{max}	3,957
		Above 100 dB L_{max}	0
S03	Coupeville Elementary School	Above 80 dB L_{max}	1,852
		Above 90 dB L_{max}	316
		Above 100 dB L_{max}	0
S04	Anacortes High School	Above 80 dB L_{max}	112
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0
S09	La Conner Elementary School	Above 80 dB L_{max}	352
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0
Parks			
P02	Deception Pass State Park	Above 80 dB L_{max}	8,950
		Above 90 dB L_{max}	5,479
		Above 100 dB L_{max}	5,449
P03	Dugualla State Park	Above 80 dB L_{max}	16,278
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0
P04	Ebey's Landing - Rhododendron Park	Above 80 dB L_{max}	3,172
		Above 90 dB L_{max}	3,103
		Above 100 dB L_{max}	2,720
P06	Fort Casey State Park	Above 80 dB L_{max}	2,189
		Above 90 dB L_{max}	547
		Above 100 dB L_{max}	0
P10	San Juan Islands National Monument	Above 80 dB L_{max}	481
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0
P13	Lake Campbell	Above 80 dB L_{max}	254
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0
P15	Pioneer Park	Above 80 dB L_{max}	370
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0
P17	Reuble Farm	Above 80 dB L_{max}	3,061
		Above 90 dB L_{max}	1,641
		Above 100 dB L_{max}	693

Table 3.2-5 Number of Events above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, No Action Alternative (CY 21)

POI ID and Lat/Long[1]	*Description of POI*	*Maximum Sound Level (L_{max}) for Counting Events*	*Annual Average Number of Daily Events*
P18	Ferry House	Above 80 dB L_{max}	1,180
		Above 90 dB L_{max}	0
		Above 100 dB L_{max}	0

Notes:
[1] POIs that had zero events above an L_{max} of 80 dB, 90 dB, and 100 dB were omitted from the table. These included POIs R03, R09, R11, R12, R13, R17, R18, S05, S06, S07, S08, S10, P01, P05, P07, P08, P09, P11, P12, P14, and P16.

Key:
dB = decibel
POI = Point of Interest
L_{max} = maximum sound level

For the POIs analyzed, there was a wide range to the number of events above the three defined thresholds (see Table 3.2-5). It should be noted that at 21 of the 48 POIs analyzed, the noise model indicated that there would be zero events above the 80 dB L_{max}; therefore, they were omitted from the table. Some of the highest number of events above the three thresholds were at R01, R02, and R14, which is consistent with the pattern of those POIs that are closest to the airfields experiencing higher noise events and at a higher frequency than those POIs farther away from the airfields.

3.2.4.3.2 Speech Interference (Indoor)

The analysis of indoor speech interference is based on the number of events per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the instantaneous maximum sound level of 50 dB indoors (50 dB L_{max}). Normal conversation is about 60 dB; therefore, the use of a 50 dB indoor level is a very conservative threshold, such that a soft speaking voice could be heard. To convert to interior noise levels, the noise attenuation, known as noise level reduction, provided by the structure (e.g., house or school), with its windows open or closed, must be specified. Table 3.2-6 represents baseline conditions for indoor speech interferences at 20 of the POIs that are in the residential category, as well as 10 schools (commonly located in residential areas).

Table 3.2-6 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)[1]

ID	Description	Average Number of Events per Daytime Hour[2]	
		Windows Open[3]	Windows Closed[3]
Residences			
R01	Sullivan Road	8	8
R02	Salal Street and N. Northgate Drive	8	8
R03	Central Whidbey	5	-
R04	Pull and Be Damned Point	2	1
R05	Snee-Oosh Point	2	1
R06	Admirals Drive and Byrd Drive	-	-
R07	Race Lagoon	-	-
R08	Pratts Bluff	-	-
R09	Cox Rd and Island Ridge Way	-	-
R10	Skyline	-	-
R11	Sequim	-	-
R12	Port Angeles	-	-
R13	Beverly Beach, Freeland	-	-
R14	E. Sleeper Road and Slumber Lane	8	7
R15	Long Point Manor	1	1
R16	Rocky Point Heights	2	1
R17	Port Townsend	-	-
R18	Marrowstone Island (Nordland)	-	-
R19	Island Transit Offices, Coupeville	1	1
R20	South Lopez Island (Agate Beach)	-	-
Schools			
S01	Oak Harbor High School	6	2
S02	Crescent Harbor Elementary School	5	2
S03	Coupeville Elementary School [4]	1	-
S04	Anacortes High School	-	-
S05	Lopez Island School	-	-
S06	Friday Harbor Elementary School	-	-
S07	Sir James Douglas Elementary	-	-
S08	Fidalgo Elementary School	-	-
S09	La Conner Elementary School	1	-
S10	Elger Bay Elementary School	-	-

Notes:

1 Hyphens (-) indicate result equals zero.

2 Number of annual average daily DNL daytime (7:00 a.m. to 10:00 p.m.) events at or above an indoor maximum single-event sound level (L_{max}) of 50 dB, which is a conservative threshold because normal conversation is about 60 dB. See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as "quiet urban daytime" at 40 dB and a garbage disposal at 80 dB.

3 Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively (FICON, 1992).

4 The WhidbeyHealth Medical Center is located within approximately 1,000 feet of the Coupeville Elementary School; therefore, this location was not modeled individually, but similar results for indoor speech interference for Point of Interest S03 would apply to the WhidbeyHealth Medical Center.

3.2.4.3.3 Classroom/learning Interference

To evaluate the potential for classroom/learning interference, noise levels were calculated for each of the schools identified as a POI (in Table 3.2-4) using the $L_{eq(8)}$ metric. The $L_{eq(8)}$ metric provides the average sound level generated by aircraft operations during an 8-hour school day (i.e., from 8:00 a.m. to 4:00 p.m.). To convert to interior noise levels, the noise attenuation, known as noise level reduction, provided by the structure (e.g., school), with its windows open or closed, is incorporated into the model. Also considered in the potential for classroom/learning interference is a metric similar to the speech interference metric called "NA 50 dB L_{max}"—that is, the number of noise events per daytime hour that are above the maximum sound level of 50 dB indoors but confined to only those events that occur during the 8-hour school day (i.e., 8:00 a.m. to 4:00 p.m.). Refer to Section 3.2.2.5 for the description of the number of events above a threshold metric. Table 3.2-7 contains the results of the classroom/ learning interference analysis for the 12 school locations (including the two surrogates) identified for analysis.

Under the No Action Alternative, the outdoor $L_{eq(8)}$ varies depending on the proximity of the school to the airfields; however, the indoor $L_{eq(8h)}$ is below 45 dB for all schools with windows closed and all but one of the schools, Crescent Harbor Elementary School (S02), with windows open. The potential for classroom/learning interference is determined by the number of events above a noise level of 50 dB L_{max}. Therefore, with windows open, the number of events per hour ranges from no events up to a high of five events per hour at Oak Harbor High School (S01) (see Table 3.2-7). With the windows closed, the number of events per hour decreases to a point where the high is two events per hour at both Oak Harbor High School (S01) and Crescent Harbor Elementary School (S02).

Work and homework disturbance were not quantified in the analysis. Generally, the number of work and homework disturbance events can be assumed to be similar to the number of speech interference events or classroom learning interference events. While increased noise will likely lead to increased work and homework disturbance, it is important to note that classroom learning interference tables present average values. This means there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all, thereby creating no potential for classroom learning interference.

Table 3.2-7 Average Number of Events per Hour[1] of Indoor Classroom/learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)[2]

		Indoor			
		Windows Open[3]		Windows Closed[3]	
ID	Description	$L_{eq(8h)}$ (dB)	Events per Hour[4]	$L_{eq(8h)}$ (dB)	Events per Hour[4]
School Surrogates[5]					
R03	Central Whidbey	<45	4	<45	-
R11	Sequim	<45	-	<45	-
Schools					
S01	Oak Harbor High School	<45	5	<45	2
S02	Crescent Harbor Elementary School	52	4	<45	2
S03	Coupeville Elementary School	<45	-	<45	-
S04	Anacortes High School	<45	-	<45	-
S05	Lopez Island School	<45	-	<45	-
S06	Friday Harbor Elementary School	<45	-	<45	-
S07	Sir James Douglas Elementary	<45	-	<45	-
S08	Fidalgo Elementary School	<45	-	<45	-
S09	La Conner Elementary School	<45	1	<45	-
S10	Elger Bay Elementary School	<45	-	<45	-

Notes:

1 For this metric, daily classroom hours are assumed to be 8:00 a.m. to 4:00 p.m.

2 Hyphens (-) indicate result equals zero.

3 Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively (FICON, 1992).

4 Number of average school-day events per hour during an 8-hour school day (8:00 a.m. to 4:00 p.m.) at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold because normal conversation is about 60 dB. See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as "quiet urban daytime" at 40 dB and a garbage disposal at 80 dB.

5 Two residential locations are included in this analysis as "school surrogates" because schools are located near these points.

Key:
dB = decibel
$L_{eq(8)}$ = 8-hour Equivalent Sound Level

3.2.4.3.4 Sleep Disturbance

The analysis of sleep disturbance is a calculation of the probability of awakening from aircraft overflights. Thus, it is based on the outdoor SEL at each of the residential POIs and converted to an indoor SEL. To convert to interior noise levels, the noise attenuation, referred to as noise level reduction, provided by the structure (e.g., house), with its windows open or closed, is incorporated into the model. Events that were considered are those that occur between 10:00 p.m. and 7:00 a.m. Table 3.2-8 presents the results of the sleep disturbance analysis for the 30 POI locations (residences and schools) chosen for analysis. The data show that there is a higher probability of awakening during a night of aircraft activities when the windows are open versus when the windows are closed. There is also variation between the POIs based upon their location with respect to the two airfields and flight tracks.

On the high end of the range, there is a 58-percent chance that an individual would awaken at least once during a night of average aircraft activities at the Sullivan Road POI (R01) with the windows open. At the same location with the windows closed, there is a 43-percent chance that an individual would awaken at least once.

Table 3.2-8 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)

ID	*Description*	*Windows Open[3]*	*Windows Closed[3]*
Residences			
R01	Sullivan Road	58%	43%
R02	Salal Street and N. Northgate Drive	41%	29%
R03	Central Whidbey	16%	8%
R04	Pull and Be Damned Point	19%	9%
R05	Snee-Oosh Point	15%	5%
R06	Admirals Drive and Byrd Drive	9%	6%
R07	Race Lagoon	5%	2%
R08	Pratts Bluff	4%	2%
R09	Cox Rd and Island Ridge Way	3%	2%
R10	Skyline	5%	2%
R11	Sequim	0%	0%
R12	Port Angeles	0%	0%
R13	Beverly Beach, Freeland	2%	0%
R14	E. Sleeper Road and Slumber Lane	37%	25%
R15	Long Point Manor	11%	4%
R16	Rocky Point Heights	9%	3%
R17	Port Townsend	1%	0%
R18	Marrowstone Island (Nordland)	0%	0%
R19	Island Transit Offices, Coupeville	9%	5%
R20	South Lopez Island (Agate Beach)	3%	1%
Schools (near residential areas)[4]			
S01	Oak Harbor High School	20%	12%
S02	Crescent Harbor Elementary School	21%	12%
S03	Coupeville Elementary School	5%	3%
S04	Anacortes High School	2%	1%
S05	Lopez Island School	0%	0%
S06	Friday Harbor Elementary School	0%	0%
S07	Sir James Douglas Elementary	0%	0%
S08	Fidalgo Elementary School	6%	2%
S09	La Conner Elementary School	8%	3%
S10	Elger Bay Elementary School	0%	0%

Notes:

1 For this metric, nightly sleeping hours are assumed to be 10:00 p.m. to 7:00 a.m.

2 This metric represents the probability of awakening at least once during a night of average aircraft noise activities.

3 Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively (FICON, 1992).

4 All school POIs were included in the potential sleep disturbance analysis because of their typical proximity to residential areas.

3.2.4.3.5 Outdoor Speech Interference: Potential Noise Effects on Recreation and Outdoor Activities

The analysis of outdoor speech interference is based on the number of events per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). Table 3.2-9 presents the results of the analysis for the affected environment (CY 21) for all 48 of the POIs because individuals could be outside in parks, at their schools, or at their homes. The metric used for this analysis is "NA50 L_{max}," which means the number of noise events per daytime hour that are above the maximum sound level of 50 dB L_{max} outdoors. This metric has been used previously by the U.S. Air Force in similar studies related to noise and parks.

The data show that there is a range of potential outdoor speech interference that may disturb individuals participating in outdoor activities (recreational, outside school or home) depending on the location of the POI relative to the airfields and flight tracks. On the high end of the range, there is the potential for an average of eight events per hour that could cause daytime outdoor speech interference and disturb individuals at several locations, including P01, P02, R01, R02, R14, and S01. Other POIs average fewer events per hour, and, in 12 out of the 48 cases, it is expected that there would not be any events that would cause outdoor speech interference. In addition, the number of events per hour that could cause nighttime outdoor speech interference, which would give an estimation of how much an individual tent-camping or sleeping outdoors may be disturbed during the night, was also analyzed. These range from two events per hour at 10 of the POIs to zero events per hour at 27 of the POIs.

Table 3.2-9 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)[1]

ID	Description	*Annual Average Outdoor Daily Daytime Events per Hour NA50 L_{max} (2)*	*Annual Average Outdoor Daily Nighttime Events per Hour NA50 L_{max} (2)*
Parks			
P01	Joseph Whidbey State Park	8	2
P02	Deception Pass State Park	8	2
P03	Dugualla State Park	7	2
P04	Ebey's Landing - Rhododendron Park	3	-
P05	Ebey's Landing - Ebey's Prairie	2	-
P06	Fort Casey State Park	1	-
P07	Cama Beach State Park	3	-
P08	Port Townsend	1	-
P09	Moran State Park	-	-
P10	San Juan Islands National Monument	7	1
P11	San Juan Island Visitors Center	-	-
P12	Cap Sante Park	-	-
P13	Lake Campbell	4	1
P14	Spencer Spit State Park	-	-
P15	Pioneer Park	4	1
P16	Marrowstone Island (Fort Flagler)	-	-
P17	Reuble Farm	2	-
P18	Ferry House	2	-

Table 3.2-9 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)[1]

ID	Description	Annual Average Outdoor Daily Daytime Events per Hour NA50 L_{max} [2]	Annual Average Outdoor Daily Nighttime Events per Hour NA50 L_{max} [2]
Residences			
R01	Sullivan Road	8	2
R02	Salal Street and N. Northgate Drive	8	2
R03	Central Whidbey	7	2
R04	Pull and Be Damned Point	7	2
R05	Snee-Oosh Point	7	1
R06	Admirals Drive and Byrd Drive	1	-
R07	Race Lagoon	3	-
R08	Pratts Bluff	1	-
R09	Cox Rd and Island Ridge Way	1	-
R10	Skyline	4	1
R11	Sequim	-	-
R12	Port Angeles	1	-
R13	Beverly Beach, Freeland	-	-
R14	E Sleeper Rd & Slumber Ln	8	2
R15	Long Point Manor	7	1
R16	Rocky Point Heights	4	1
R17	Port Townsend	1	-
R18	Marrowstone Island (Nordland)	-	-
R19	Island Transit Offices, Coupeville	3	1
R20	South Lopez Island (Agate Beach)	3	1
Schools			
S01	Oak Harbor High School	8	2
S02	Crescent Harbor Elementary School	7	2
S03	Coupeville Elementary School	3	-
S04	Anacortes High School	1	-
S05	Lopez Island School	-	-
S06	Friday Harbor Elementary School	-	-
S07	Sir James Douglas Elementary	-	-
S08	Fidalgo Elementary School	4	1
S09	La Conner Elementary School	3	1
S10	Elger Bay Elementary School	-	-

Notes:

1 Hyphens (-) indicate result equals zero.

2 Number of events at or above an outdoor maximum single event sound level (L_{max}) of 50 dB; reflects potential for outdoor speech interference.

Key:

NA50 L_{max} = Number of noise events per daytime hour (7:00 a.m. to 10:00 p.m.) that are above the maximum sound level of 50 dB L_{max}

3.2.4.3.6 Potential Hearing Loss

As stated in Section 3.2.3, people working or living in areas with high noise levels for extended periods can potentially experience hearing loss. As part of this analysis, an evaluation of the risk of potential hearing loss for the population in areas around NAS Whidbey Island was conducted. Following DoD and DNWG guidance for reporting the risk of potential hearing loss, the number of people living within each 1 dB $L_{eq(24)}$ contour band inside the 80 dB DNL contour are represented in Table 3.2-10 (note: the $L_{eq[24]}$ increments presented in the table go below the 80 dB DNL contour because the $L_{eq[24]}$ DNL includes an artificial 10 dB weighting factor for aircraft operations occurring between 10:00 p.m. and 7:00 a.m.).

The table also reports the average NIPTS for the population with an average sensitivity to noise and the 10th percentile NIPTS for the population most sensitive to noise. This population could be considered the young, the elderly, or those predisposed to hearing sensitivity for other reasons. This workplace exposure standard is not intended to accurately describe the impact of intermittent noise events, such as periodic aircraft overflights, but is presented as a "worst-case" analytical tool. This analysis assumes that individuals are outdoors at the location of their residence for 40 years and exposed to all aircraft activity. To put the conservative nature of this analysis into context, the national average of time spent indoors is approximately 87 percent (or almost 21 hours of the day) (Klepeis et al., n.d.). With intermittent aircraft operations and the time most people spend indoors, it is very unlikely that individuals would experience noise exposure that would result in hearing loss. Nonetheless, this analysis is provided per DoD policy directive to support informed decision making.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable (USEPA, 1974). Therefore, using the data provided in Table 3.2-10 for the population with average sensitivity to noise, the level at which there may be a noticeable NIPTS would be at the 84 to 85 dB $L_{eq(24)}$ range and above. At this level and above, an estimated 32 individuals may be vulnerable to NIPTS under the No Action Alternative, all of whom are off base but in the vicinity of Ault Field (there are no individuals around OLF Coupeville at these noise levels or above under the No Action Alternative). The range of potential hearing loss could be up to 8.5 dB for those living around Ault Field. The potential NIPTS values presented in Table 3.2-10 are only applicable in the extreme case of outdoor exposure at one's residence to all of the aircraft events that occur over a period of 40 years. As it is highly unlikely that any individuals would meet all those criteria, the actual potential NIPTS for individuals would be far less than the values reported here.

Because the actual value of NIPTS for any given person will depend on their physical sensitivity to noise, some people could experience more hearing loss than others (DNWG, 2013). Therefore, to capture this, USEPA guidelines provided information on the estimated NIPTS that could be experienced by the 10 percent of the population most sensitive to noise. Using the same 1 dB intervals of $L_{eq(24)}$ contours from Table 3.2-10 and the column identified as the 10th Percentile NIPTS, the population most sensitive to noise is vulnerable to noticeable NIPTS at the 77 to 78 dB $L_{eq(24)}$ range and above. The range of potential hearing loss could be up to 6 dB for the most noise-sensitive population around OLF Coupeville and up to 16.5 dB for the population around Ault Field. As noted previously, it is highly unlikely that any individuals would meet all the criteria of being outdoors at their residence and exposed to all aircraft events over a 40-year period; therefore, the actual potential NIPTS for individuals would be far less than the values reported here.

Table 3.2-10 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level at NAS Whidbey Island Complex (CY 21)

Band of $Leq_{(24)}$ (dB)	*Average NIPTS (dB)[1]*	*10th Percentile NIPTS (dB)[1]*	*Estimated Population[2, 3,4]*		
			Ault Field	*OLF Coupeville*	*Total*
74-75	0.5	3.5	-	-	-
75-76	1.0	4.0	-	31	31
76-77	1.0	4.5	123	45	168
77-78	1.5	5.0	233	47	280
78-79	2.0	5.5	145	24	169
79-80	2.5	6.0	92	7	99
80-81	3.0	7.0	73	-	73
81-82	3.5	8.0	51	-	51
82-83	4.0	9.0	37	-	37
83-84	4.5	10.0	34	-	34
84-85	5.5	11.0	11	-	11
85-86	6.0	12.0	9	-	9
86-87	7.0	13.5	6	-	6
87-88	7.5	15.0	4	-	4
88-89	8.5	16.5	2	-	2
89-90	9.5	18.0	-	-	-
90-91	10.5	19.5	-	-	-
91-92	11.5	21.0	-	-	-

Notes:

[1] NIPTS values rounded to nearest 0.5 dB.

[2] This analysis assumes the population is outdoors and exposed to all aircraft noise events for 40 years. Given the amount of time spent indoors and the intermittent occurrence of aircraft noise events, it is highly unlikely that individuals would meet all the criteria, and the actual potential for hearing loss would be less than the values reported here.

[3] Estimated Population was determined by those living within the 80 dB DNL noise contour around each airfield, including those living on-base at Ault Field (there is no on-base population at OLF Coupeville).

[4] Population counts of people within the DNL contours were computed using 2010 census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block. All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). In addition, per guidance on potential hearing loss, on-base populations at Ault Field have been included in the analysis. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.

Key:

dB = decibel

$L_{eq(24)}$ = 24-hour Equivalent Sound Level

NIPTS = Noise Induced Permanent Threshold Shift

OLF = outlying landing field

3.3 Public Health and Safety

Safety addresses flight safety, Bird/Animal Aircraft Strike Hazard (BASH), and Accident Potential Zones (APZs). The installation-specific document that addresses flight safety concerns is called an AICUZ document, which recommends land uses that are compatible with noise levels, accident potential, and obstruction clearance criteria for military airfield operations. Public health addresses health risks and safety risks to children. Impacts on the general population from noise are described in detail in Section 4.2.

3.3.1 Public Health and Safety, Regulatory Setting

This section includes a discussion of public health and safety from the perspective of the regulatory setting and compliance with Navy policies.

3.3.1.1 Flight Safety

Aircraft safety is based on the physical risks associated with aircraft flight. Military aircraft fly in accordance with Federal Aviation Regulations Part 91, *General Operating and Flight Rules*, which govern such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. These rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. In addition, naval aviators must also adhere to the flight rules, ATC, and safety procedures provided in Navy guidance. Specific Navy requirements are outlined in OPNAVINST 3710.7 (series), the Naval Air Training and Operating Procedures Standardization manual, which provides standard language, communication methods, nomenclature, and flight and operating procedures. This manual also provides processes and procedures that improve combat readiness and achieve a substantial reduction in aircraft mishaps, thereby safeguarding people and resources. Additionally, NAVAIR 00-80T-114, the Naval Air Training and Operating Procedures Standardization Air Traffic Control Manual, provides Navy requirements for ATC services to aircraft utilizing military-controlled airspace. Finally, the joint instruction OPNAVINST 11010.36C/Marine Corps Order 11010.16 provides guidance for administering the AICUZ program, which recommends land uses that are compatible with noise levels, accident potential, and obstruction clearance criteria for military airfield operations. The AICUZ program is intended to protect the public's health, safety, and welfare and to prevent encroachment from degrading the operational capability of military air installations while meeting national security needs and addressing community concerns about aircraft noise and accident potential. The program goals are to protect the safety, welfare, and health of those who live and work near military airfields while preserving the military flying mission.

There is no generally recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through a number of measures. These include, but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace. When these safety measures are implemented, risks are minimized, even though they can never be eliminated.

NAS Whidbey Island maintains emergency and mishap response plans to guide responses to aircraft accidents. These plans assign responsibilities and prescribe functional activities necessary to react to mishaps, whether on- or off-station. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring

security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoDI 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*) (DoD, 2011).

The NAS Whidbey Island complex has conducted EA-18G mishap drills every fiscal year (FY) since 2013. Starting in 2017, NAS Whidbey Island Navy Region Northwest Fire and Emergency Services (NRNW F&ES) led community response planning, to include a fact-gathering seminar with the installation's community partners. NRNW F&ES is building a plan for full community response, and the NAS Whidbey Island Complex Training Department is implementing a "Table Top Exercise". Additionally, "mass casualty training" is incorporated in all of the NAS Whidbey Island complex's annual operational exercises.

Electronic attack squadrons periodically perform mishap drills to simulate how to properly respond to an aircraft mishap. Each squadron may tailor its own scenario for the drill, but all electronic attack squadrons follow the Naval Air Force, U.S. Pacific Fleet and Electronic Attack Wing, U.S. Pacific Fleet Pre-Mishap Plan when executing the drill. A pre-mishap plan describes, in advance, the steps that must be taken when a mishap occurs. The plan also anticipates all reasonable eventualities and devises measures to cope with them. Deficiencies are identified through periodic drills designed to ensure the plan's smooth execution when a mishap occurs, focusing on the flow of information. A checklist of items to complete when executing the plan is standardized. While the contents of each squadron's pre-mishap plan may vary slightly, all plans attempt to be all-inclusive and address coordination with local commands, nearby military aviation facilities, local news media, area law enforcement officials, civil fire and rescue agencies, the USEPA, the FAA, and plans for medical services.

The Navy values safety and professionalism, and has adopted many measures to promote aviation safety within the naval aviation community. Specifically, all Navy pilots use state-of-the-art simulators for training purposes that include all facets of flight operations and comprehensive emergency (such as mechanical failure or bird strike) response procedures that minimize the mishap risks associated with pilot error. Highly trained maintenance crews are trained to perform preventative maintenance actions, maintenance repairs, diagnostic testing of the repair, and flight safety inspections on each aircraft in accordance with Navy regulations. Maintenance activities are monitored to ensure that aircraft are equipped to withstand the rigors of operational and training events, and to identify any maintenance trends that may require a more comprehensive solution. The Navy will periodically initiate "safety stand-downs" to promote aviation safety training along with personal discipline and responsibility. Safety stand-downs are an effective tool for reducing aviation safety risks by focusing on the human factor in aviation safety that complements the traditional skills-based training that Navy pilots and maintenance crews receive. In this EIS, potential impacts to flight safety at NAS Whidbey Island and OLF Coupeville are evaluated by considering the possible changes to risk as a result of the proposed alternatives.

3.3.1.2 Bird/Animal Aircraft Strike Hazard

Potential bird/animal aircraft strikes are another safety concern for aircraft operations. Aircraft strikes of birds or other animals (e.g., bats and deer) are a safety concern because of the potential for damage to aircraft or injury to pilots or local populations if an aircraft crash should occur in a populated area. The presence of resident and migratory birds at NAS Whidbey Island is attributable to both the installation's location within the Pacific Flyway and the occurrence of water-filled ditches, freshwater wetlands, marine shoreline, perch sites, tall brush, and short grass in the vicinity of the runways. All of these conditions attract numerous bird species, and their presence creates a potential BASH risk. Aircraft may encounter birds at altitudes of 30,000 feet above MSL or higher. However, most reported bird strikes occur at an elevation of less than 1,000 feet AGL. Birds, in particular, are drawn to the typical open, grassy areas and warm pavement of an airfield. Although most bird and animal strikes do not result in crashes, they may cause structural and mechanical damage to aircraft. Due to the speed of the aircraft, collisions with birds or other animals can happen with considerable force.

In accordance with OPNAVINST 3750.21 (Policy for Administering the Bird/Animal Aircraft Strike Hazard Program in the U.S. Navy, 23OCT2017), OPNAVINST 3750.6R (Naval Aviation Safety Program), CNIC Instruction 3750.1 (Navy Bird/Animal Aircraft Strike Hazard Program Implementing Guidance, 9AUG2017 [Navy, 2017c]), the CNIC BASH Program Manual, FAA Advisory Circular 150/5200-33 b (28Au07), and FAA Handbook 7110.65, BASH plans are developed for military airfields to reduce the potential for collisions between aircraft and birds or other animals. BASH plans account for seasonal migration patterns, when BASH risks to aircraft can increase. To reduce the potential for BASH, the FAA and the military recommend that land uses that attract birds (e.g., agricultural fields, landfills) be located at least 10,000 feet from an airfield. NAS Whidbey Island has a BASH instruction (August 2013) and has addressed BASH issues while using measures and management strategies from the NAS Whidbey Island Integrated Natural Resources Management Plan (INRMP) (NAS Whidbey Island, 2013a[10]). These measures and management strategies include:

- Monitoring bird activity: this includes making bird counts, maintaining current bird activity maps for the station, providing information on seasonal bird activities, and conducting wildlife hazard assessments.
- Monitoring bird aircraft strike incidences: this includes collecting and identifying dead birds and bird parts from the airfield and aircraft following strikes, reporting incidences, and compiling and reviewing data on incidences.
- Educating pilots and other personnel on BASH and methods of avoiding strikes: this includes efforts to raise pilot awareness of pre-flight and in-flight options.
- Eliminating bird attractants in the vicinity of the airfields: this includes maintaining taller grass height, controlling broad-leaved weeds, maintaining uniformity of cover, controlling invertebrate and rodent pests, eliminating standing water, removing roost and perch sites such as trees, and other techniques. Methods to accomplish this can include chemical application of herbicides and rodenticides, and mechanical habitat manipulation such as mowing, brush hogging, tree cutting, burning and, in some suitable instances, agricultural manipulation under an agricultural outlease.

[10] The INRMP was written in 2012 and finalized in 2013. The final signature was made to it in 2014.

- Implementing active bird control methods: this includes use of pyrotechnic equipment to disperse birds from airfields and the use of netting, shooting, and trapping to remove birds from an area.
- Modifying flight operational procedures: this includes watching for and reporting high hazard periods, modifying timing and formation of approaches and takeoffs under high bird hazard conditions, changing timing of more hazardous low-level routes to accommodate bird movement patterns, and other modifications. (NAS Whidbey Island, 2013a)

In this EIS, potential impacts attributable to changes in BASH potential are analyzed by primarily considering changes in the frequency of aircraft operations at NAS Whidbey Island and OLF Coupeville.

3.3.1.3 Accident Potential Zones

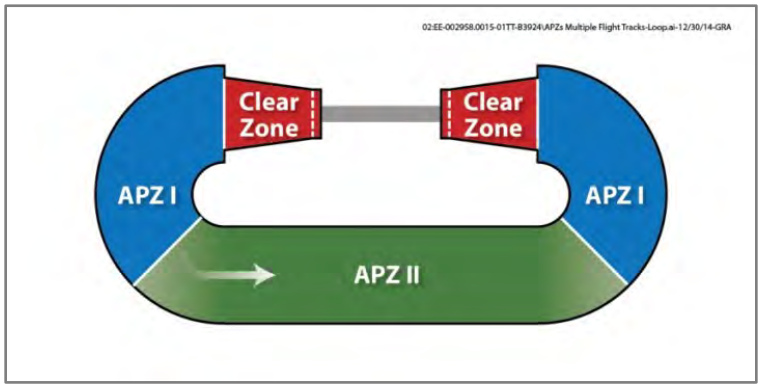
In the 1970s and 1980s, recognizing the need to identify areas of accident potential, the armed services conducted studies of historical aircraft accidents throughout the U.S. The studies showed that most aircraft mishaps occurred on or near the runway, with mishaps diminishing in likelihood with distance. Based on these studies, the Navy and other services have identified APZs. APZs do not predict the likelihood of an aircraft mishap, but they do predict the most likely location of an aircraft accident, if one were to occur. APZs follow departure, arrival, and pattern flight tracks and are based upon analysis of flight operations data and historical aircraft accident data and the location of accidents relative to the airfield. While the likelihood of a mishap is remote, the Navy recommends restricting people-intensive uses within these zones.

Airfield safety clearances and APZs are depicted at military airfields under the AICUZ program. The main goals of the AICUZ program are to protect the health, safety, and welfare of people living or working near military airfields while preserving the defense flying mission. The AICUZ program achieves these goals by promoting land use compatible with aircraft operations.

APZs are areas near airfield runways that are depicted on maps for planning purposes. The Navy recommends that the intensity and density of land uses within APZs be minimal or low to ensure the maximum protection of public health and property. The geometry and criteria for applying standard APZs for Class B runways are defined as follows (adapted from OPNAVINST 11010.36C, *Air Installations Compatible Use Zones [AICUZ] Program*):

- **Clear Zone**
  Extends 3,000 feet immediately beyond the runway and has the highest potential for accidents. It measures 1,500 feet wide at the end of the runway and 2,284 feet wide at its outer edge. A Clear Zone is required for all active runways and should remain undeveloped.
- **APZ-I**
  Extends 5,000 feet beyond the Clear Zone, with a width of 3,000 feet. An APZ-I is typically rectangular; however, when circumstances warrant, the APZ-I may be curved to correspond with predominant flight tracks (see Figure 3.3-1). An APZ-I area is provided for flight tracks that experience 5,000 or more annual operations (departures or arrivals).
- **APZ-II**
  Extends 7,000 feet beyond APZ-I, with a width of 3,000 feet. Similar to APZ-I, the geometric configuration of APZ-II may also be curved. When FCLP is an active aspect of aircraft operations at an installation, APZ-II extends for the entire FCLP track beyond APZ-I, resulting in a closed loop for the entire pattern (Figure 3.3-1).

Figure 3.3-1 Example of APZ-I and APZ-II for an FCLP Flight Track (with APZ-II extended)



Most land uses within the Clear Zone are incompatible with military aircraft operations. For this reason, the Navy's policy is to acquire sufficient real property interests in land within the Clear Zone to ensure that incompatible development does not occur. Within APZ-I and APZ-II, a variety of land uses are compatible; however, high-density residential and people-intensive uses (e.g., schools, apartments, etc.) should be restricted because of the greater risk in these areas.

In this EIS, potential impacts attributable to the number of operations conducted at NAS Whidbey Island and OLF Coupeville are analyzed in accordance with OPNAVINST 11010.36C, which sets APZ requirements for Navy airfields. The number and types of operations proposed under each alternative determine whether changes may be warranted under the AICUZ program.

3.3.1.4 Environmental Health Risks and Safety Risks to Children

President Clinton issued Executive Order (EO) 13045, Environmental Health Risks and Safety Risks to Children, on April 21, 1997. This order requires each federal agency to "make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and shall . . . ensure that its policies, programs, activities, and standards address disproportionate risks to children." This order was issued because a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks.

3.3.2 Public Health and Safety, Affected Environment

3.3.2.1 Flight Safety

The NAS Whidbey Island complex's course rules are designed to promote safety in air operations and to meet Fleet training requirements (Navy, 2014b). The mixture of turboprop aircraft, jet-powered aircraft, helicopters, and noise-abatement restrictions result in complex traffic patterns and procedures. Changes to existing course rules and operating procedures in SUA (e.g., the designation of Alert Areas or Restricted Areas) are communicated by the FAA's Notice to Airman process to inform aircrews of items that affect safety, local flight data, temporary flight restrictions, and special notices.

3.3.2.1.1 Potential for Aircraft Mishaps

The primary safety concern with regard to military aircraft training operations is the potential for aircraft mishaps to occur. Aircraft mishaps could be caused by mid-air collisions with other aircraft or objects,

weather, mechanical failures, pilot error, or BASH (See Sections 3.3.2.2 and 4.3.2.2). Although mishap rates from previous years cannot predict future mishap rates, reviewing mishap data from previous years is helpful in providing perspective. Aircraft mishaps are categorized based on the extent of property damage, loss of life, or disability they cause. Class A mishaps are the most severe, with total property damage of $2 million or more, or a fatality or permanent total disability. A Class A mishap does not necessarily equate to a crash and loss of aircraft. For instance, damage to an engine occurring during a flight could cost over $2 million to repair and be categorized as a Class A mishap even though the aircraft returned safely to an airfield. Mishap rates are calculated in terms of the number of mishap events per 100,000 flying hours, with combat hours excluded. Emergency and mishap response involves the procedures and equipment needed to react to mishaps on or off the installation. Elements of this response include rescue, fire suppression, security, and investigation.

From October 1, 2008, to September 30, 2017, the Growler community conducted approximately 187,642 flight hours of operations from land-based airfields. During that 9-year period, the Growler community experienced four Class A mishaps while operating from land, equivalent to a mishap rate of 2.13 per 100,000 flight hours, none of which involved a "crash." The primary safety concern relevant to this Proposed Action is the potential for Growler mishaps around Ault Field and OLF Coupeville. Two of these four Class A mishaps from land-based operations occurred at Ault Field, and both involved ground operations. The remaining two were flight-related mishaps that did not occur at the NAS Whidbey Island complex. Table 3.3-1 presents Growler Class A Mishap data from October 1, 2008, through September 30, 2017, from land-based operations.

Table 3.3-1 EA-18G Growler Mishap Data from FY 2009 through FY 2017 for Land-based Operations

Fiscal Year	*Growler (EA-18G) Class A Mishaps for Land-based Operations*
2009	1
2010	0
2011	0
2012	0
2013	0
2014	0
2015	1
2016	1[1]
2017	1[1]
Total	**4**[2]

Source: Naval Safety Center, 2017c

Notes:

1 Mishap occurred during ground operations at Ault Field.

2 Of the four Class A mishaps occurring during land-based operations within that nine-year period, two were flight-related mishaps that did not occur at the NAS Whidbey Island complex.

In the unlikely event of an aircraft emergency or mishap, NAS Whidbey Island maintains emergency and mishap response plans to guide responses to an aircraft incident (to include its own search and rescue plan), should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to mishaps, whether on or off the station. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed.

3.3.2.1.2 Length of Runway at OLF Coupeville

High-performance jet aircraft have operated safely at OLF Coupeville for decades. The runway length at OLF Coupeville fully supports the operations conducted there—namely, FCLPs and helicopter operations. The runway of OLF Coupeville is 5,400 feet long and does not meet the recommended 8,000-foot length, as per unified facilities criteria (UFC 3-260-01), to conduct "full-stop" landings. However, since OLF Coupeville is specifically intended to support fixed-wing FCLPs, it is not intended to be utilized for aircraft to come to a complete stop. A full-stop landing would only occur at OLF Coupeville in the event of an aircraft emergency where no other airfield or runway was available. OLF Coupeville's runway length meets the Electronic Attack Wing's EA-18G SOP requirements for an emergency landing. See Appendix G for a civilian airfield analysis conducted for this EIS.

3.3.2.1.3 Potential for Natural Disasters

The potential for natural disasters is a fact of life in any location. Natural disasters such as earthquakes, volcanoes, tsunamis, and storms accompanied by high winds may have a potentially catastrophic impact on the facilities at NAS Whidbey Island and OLF Coupeville. With the exception of weather-related events, very little warning, if any, may accompany some of these naturally occurring phenomena. However, through the use of SOPs that have been developed over decades of flying and millions of flight hours of experience, the risks associated with operating in earthquake- and volcano-prone locations are significantly reduced. Furthermore, the Navy has collaborated with federal, state, and local agencies in emergency preparedness drills to rehearse potential scenarios and disasters, to test and improve emergency response plans, and to define cooperative aid agreements in order to better support the nation and the community during unexpected times of need or a catastrophic event. For example, air traffic controllers are trained in how to recognize the radar signature of volcanic plumes, thus enabling proper control of air traffic patterns in and around potentially hazardous volcanic activity. Significant earthquakes may cut off the power supply to radar facilities, but back-up facilities, such as power generators and secondary radar installations, can be utilized to ensure a safe flying environment is maintained. Additionally, virtually no geo-location within the U.S. is *not* adversely impacted by these types of naturally occurring events. Earthquakes, tornadoes, hurricanes, and severe isolated thunderstorms with associated downdrafts can and will have significant negative impacts on flight operations anywhere in the country. No place is immune from the impact of such natural events, but with proper procedures in place, the risks associated with operating in and around areas that may experience these events is significantly reduced.

3.3.2.2 Bird/Animal Aircraft Strike Hazard

NAS Whidbey Island contains diverse habitat. When habitat diversity increases, the number of species attracted to an airfield also increases. This diverse habitat structure is desirable for many avian species but can be hazardous to flight operations. The greatest potential BASH risk occurs at Ault Field due to the presence of water-filled ditches, freshwater wetlands, marine shoreline, perch sites, tall brush, and short grass in the vicinity of the runways, all of which attract numerous bird species.

To reduce the potential for collisions between aircraft and birds or other animals, NAS Whidbey Island has prepared and implemented a BASH plan (NAS Whidbey Island, 2013a). The BASH plan establishes a Bird Hazard Working Group and outlines roles and responsibilities for implementation of the plan, as well as provides guidance to minimize bird/animal strike hazards to military aircraft operating at NAS Whidbey Island, including OLF Coupeville. The plan includes procedures to decrease the attractiveness of the airfield to birds as well as operational procedures to avoid high-hazard situations. To reduce the attractiveness of the runway area to birds, the area is kept clear of most vegetation, except grasses. In addition, the grass is mowed periodically. Birds occurring in the runway area are dispersed from the flight line area by U.S. Department of Agriculture (USDA) Wildlife Services staff, under permits from the U.S. Fish and Wildlife Service (USFWS). See Section 4.8.2.1 for the impacts related to biological resources at the NAS Whidbey Island complex. The natural resources manager secures the appropriate permits from USFWS, and the NAS Whidbey Island airfield manager ensures compliance by USDA Wildlife Services staff.

From a wildlife management perspective at NAS Whidbey Island, diverse habitats provide all three of the essential items for birds: food, water, and shelter. Food is in the form of small mammals and/or fruit/seed-bearing vegetation. The existing shelter provides hiding, loafing, nesting, and thermal cover, as well as excellent habitat for a thriving prey base of insects, mice, voles, and rabbits. The prey base is the main attractant for many bird species, including several species of raptors, such as bald eagles (*Haliaeetus leucocephalus*), red-tailed hawks (*Buteo jamaicensis*), rough-legged hawks (*B. lagopus*), and northern harriers (*Circus cyaneus*), which can pose an airstrike hazard. Growler aircraft operating at NAS Whidbey Island have had 71 BASH incidents from November 2005 through December 2017, none of which resulted in a Class A mishap (Naval Safety Center, 2015a, 2015b, 2018).

3.3.2.3 Accident Potential Zones

Flight operations for military airfields are analyzed during the AICUZ process to determine whether APZs are warranted. This analysis includes arrival, departure, and pattern flight tracks. Generally, APZs are warranted for predominant flight tracks that have 5,000 or more operations per year.

Figure 3.3-2 and Figure 3.3-3 present the NAS Whidbey Island APZs and OLF Coupeville Clear Zones produced as part of the installation's 2005 AICUZ Study (Navy, 2005a). As shown, the majority of the Clear Zones for Ault Field are located on station or offshore in the Strait of Juan de Fuca. Nearly all of the lands associated with the Clear Zones at OLF Coupeville are Navy-owned property. The boundaries of APZ-I and APZ-II extend off station into the local community. Portions of the APZ-Is, and, to a larger extent, APZ-IIs, are located over non-Navy property, specifically to the east and southeast. See sections 3.5 and 4.5, Land Use, for background and impact analysis related to areas under the APZs. OLF Coupeville also had APZs recommended as part of the 1986 AICUZ process that reflected the FCLP patterns of the time; however, the recommended APZs were never adopted by the local municipality. During the 2005 AICUZ process, it was determined that additional APZ coverage was not warranted at that time because operational numbers were below the threshold (approximately 5,000 operations per approach or departure flight track) for the establishment of APZs at that location. Clear Zones, however, are established for all active runways regardless of the number of annual operations conducted on them.

Island County has designated the entire closed loop of the FCLP patterns at Ault Field under the same land use controls as APZ-II. In addition, the City of Oak Harbor extended the portion of the APZ that is within city limits to increase the margin of protection.

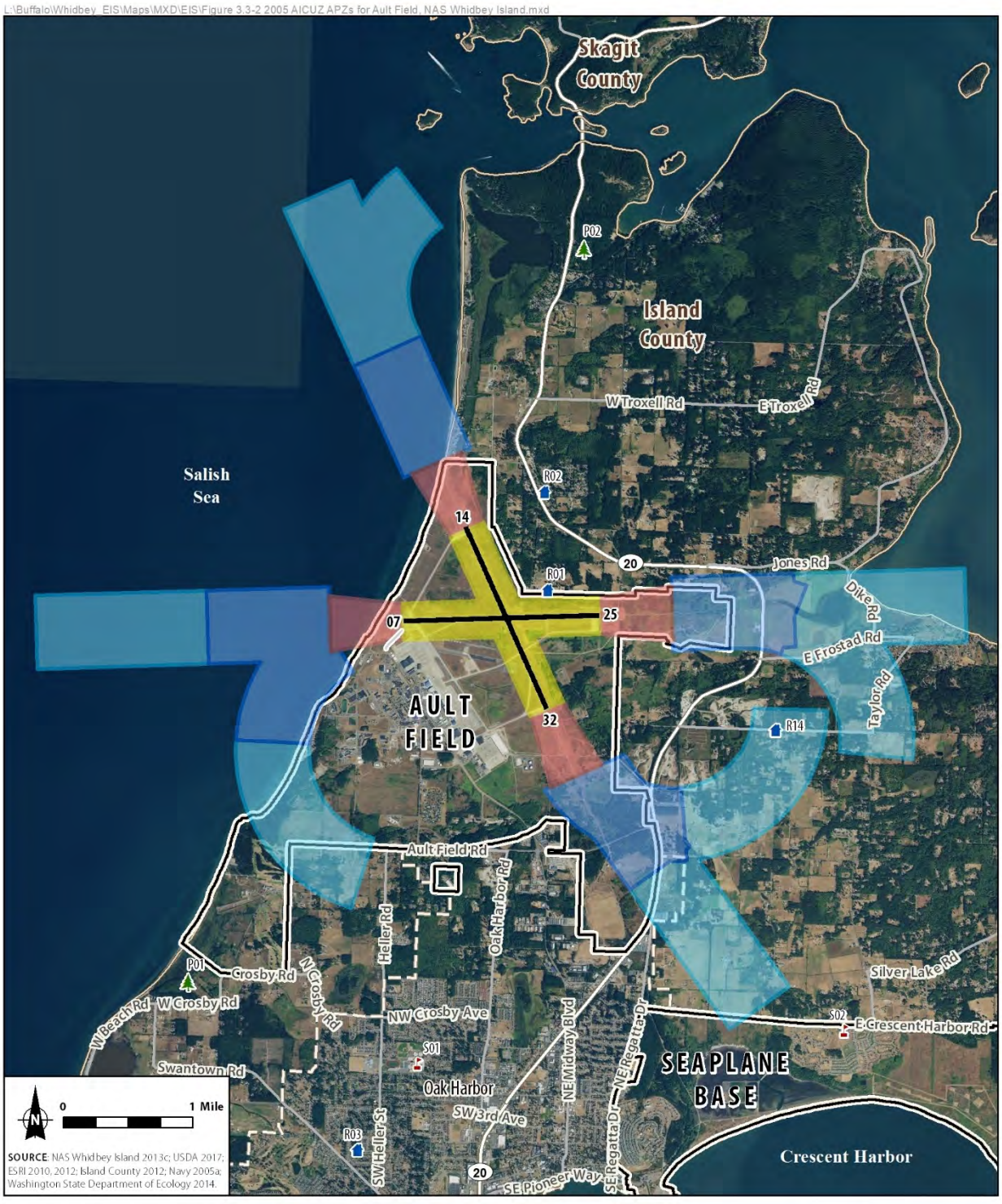


Figure 3.3-2
2005 AICUZ APZs for Ault Field, NAS Whidbey Island
Whidbey Island, Island County, WA

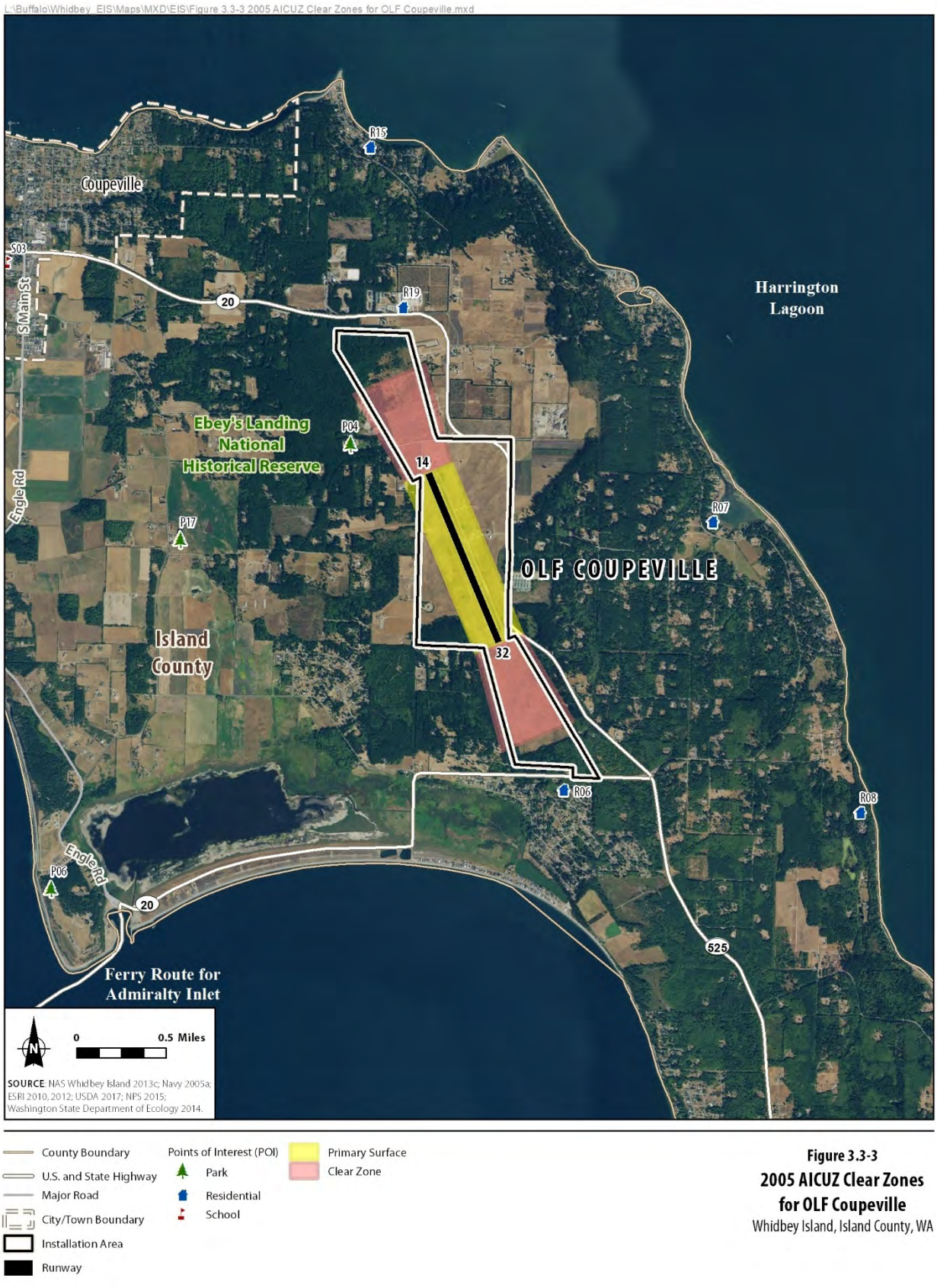


Figure 3.3-3
2005 AICUZ Clear Zones for OLF Coupeville
Whidbey Island, Island County, WA

3.3.2.4 Environmental Health Risks and Safety Risks to Children

According to EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (April 21, 1997), a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because children's neurological, immunological, digestive, and other bodily systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weight than adults; children's sizes and weight may diminish their protection from standard safety features; and children's behavior patterns may make them more susceptible to hazards because they are less able to protect themselves.

As a result, EO 13045 states:

> "[To] the extent permitted by law and appropriate, and consistent with the agency's mission, each Federal agency: (a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

EO 13045, Section 2-202, defines "covered regulatory action" as any substantive action in a rulemaking, initiated after the date of this order or for which a notice of proposed rulemaking is published 1 year after the date of this order, that is likely to result in a rule that may:

(a) be "economically significant" under EO 12866 (a rulemaking that has an annual effect on the economy of $100 million or more or would adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities); and

(b) concern an environmental health risk or safety risk that an agency has reason to believe may disproportionately affect children.

In summary, EO 13045 only applies to rules that:

- are initiated after April 21, 1997, or for which a notice of proposed rulemaking was published on or after April 21, 1998
- are economically significant
- concern health or safety risks that the agency has reason to believe may disproportionately affect children

If a rulemaking is not covered by EO 13045 but it discusses environmental health or safety, the USEPA's internal guidance indicates it is advisable to characterize children's risk to the extent the data are available.

The first step in analyzing impacts to children's health is to determine whether EO 13045 applies to the Proposed Action. The EO applies to rulemaking. The Proposed Action does not constitute a rulemaking as referenced in the EO. Therefore, the EO technically does not apply.

The second step (assuming the federal action is a rulemaking) is to determine whether the agency action is economically significant. EO 13045 adopts the definition of "economically significant" from EO 12866, "Regulatory Planning and Review," as any rulemaking that "may have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities.

With respect to the Proposed Action, the level of noise in the No Action Alternative (and Proposed Action) is likely considered adverse by the community, thus impacting the environment in an adversely material way.

The third step is to determine what constitutes a disproportionate risk or impact to children's health.

Section 2-203 defines "Environmental health risks and safety risks" as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breath (*sic*), the food we eat, the water we drink or use for recreation, the soil we live on, and the products we use or are exposed to)."

According to USEPA guidance (see 2006), disproportionate risks or impacts to children, in general, may occur when:

- children are more sensitive to a particular pollutant or agent being considered in the rulemaking, or
- children are more likely to be exposed or are likely to be exposed to higher levels of the pollutant or agent than adults are.

With regard to the Proposed Action, it is arguable that noise is not the type of health or safety risk contemplated by the EO. However, assuming it is, studies show that environments with sustained high background noise can have a variety of effects on children, including effects on learning and cognitive abilities and various noise-related physiological changes. The studies showed that there may be some relationship between noise and these health factors; however, the researchers noted that further study is needed in order to differentiate between the specific cause and effect to understand their relationship (DNWG, 2013). Children under the greater than 65 dB DNL noise contour are at a greater risk of experiencing these impacts (see Section 3.2).

Additionally, the risk of an aircraft mishap resulting from the number of aircraft operations, especially within designated Clear Zones and APZs, may create a potential disproportionate safety risk if children are more likely to be exposed, such as when a school or park falls within the Clear Zones or APZs. The potential safety risks are analyzed with respect to the populations of children within the Clear Zones and APZs, which also fall fully within the DNL noise contours. In an effort to comply with the spirit of the EO, the Navy identified the number of children potentially affected by the No Action Alternative and the Proposed Action. To determine whether children are potentially subjected to disproportionate risks or impacts, the Navy determined the number of children potentially impacted under the No Action Alternative (and later under the Proposed Action).

The baseline for analyzing health risks and safety risks to children is based on the census block groups that either fully or partially fall within the modeled No Action Alternative greater than 65 dB DNL noise contours. The analysis also considered schools and daycare centers located within the modeled No Action Alternative greater than 65 dB DNL noise contours.

Four schools and two licensed daycare centers are located within the greater than 65 dB DNL contours: the Coupeville Middle/High Schools, Crescent Harbor Elementary School, Home Connection School, Olympic View Elementary School, Regatta CDC, and Ebey Academy. Crescent Harbor Elementary school is part of the Oak Harbor School District and has 493 students enrolled in grades K through 4. Home Connection School and Olympic View Elementary School are also part of the Oak Harbor School District and, respectively, have 302 students enrolled in grades K through 12 and 456 students enrolled in grades K through 4. The Coupeville Middle School and High School are located in the same complex. Coupeville Middle School has 228 students in grades 6 through 8, while 276 students in grades 9 through 12 are enrolled in the High School (Washington State Office of the Superintendent of Public Instruction, 2018). Ebey Academy is a daycare center in Coupeville and has a licensed capacity of 54 children (Child Care Center, 2018a). Regatta CDC is a daycare facility in Oak Harbor and has a licensed capacity of 218 children (Child Care Center, 2018b). Only two of these schools (Crescent Harbor Elementary School and the Home Connection School) would be within the greater than 65 dB DNL contours under the No Action Alternative during the average year. Olympic View Elementary School would only be affected by the greater than 65 dB DNL contours under the No Action Alternative during a high-tempo FCLP year. Neither of the childcare centers discussed above would be affected by the 65 dB DNL contours under the No Action Alternative during either the average year or the high-tempo FCLP year.

Table 3.3-2 provides a list of census block groups impacted by the No Action Alternative greater than 65 dB DNL contours and includes information on the total population and the percentage of residents who are 19 years of age or younger living in each affected census block group. Table 3.3-3 presents 2010 data for residents 19 years of age and younger living in the greater than 65 dB DNL contours under the No Action Alternative and identifies the number of schools and daycare centers affected by the No Action Alternative. Figure 3.11-1 (in the Environmental Justice section) shows the location of the affected census block groups and the No Action Alternative DNL contours for Ault Field and OLF Coupeville. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field] and the Seaplane Base) have been excluded from the analysis.

Assuming that the population affected by the No Action Alternative greater than 65 dB DNL contours has similar demographic characteristics to the population of its census block groups as a whole, an estimated 2,799 children 19 years of age and younger would reside in areas affected by noise within the No Action Alternative greater than 65 dB DNL contours in 2020. This figure equates to approximately 25.1 percent of the total population within the No Action Alternative greater than 65 dB DNL contours (see Table 3.3-3). Three schools are located within the modeled No Action Alternative greater than 65 dB DNL noise contours (see Table 3.3-3).

Table 3.3-4 shows the total population within the existing Clear Zones and APZs for Ault Field and Clear Zones for OLF Coupeville. As shown on the table, a total of 315 children reside within the APZs for Ault Field, and an additional 17 children reside within the Clear Zones for OLF Coupeville. As described in Section 3.3.1.3, Clear Zones and APZs represent areas of higher risk of incidents based on historical mishap data at multiple airfields. However, unless there is a place where children congregate within an APZ, such as a school, there is not a disproportionate safety risk to children. As shown on Figures 3.3-2 and 3.3-3, no schools are located within the existing Clear Zones and APZs at Ault Field and Clear Zones at OLF Coupeville. A small portion of Rhododendron Park, which is used for passive recreation, is located in the Clear Zone at OLF Coupeville. This area is not expected to be a place where children congregate.

Table 3.3-2 Percentage of Children Living in Census Block Groups Affected by the NAS Whidbey Island Complex under the No Action Alternative

Census Block Group/County	*Total Population*[1]	*Total Population of Persons 19 Years of Age and Younger*	*Percent Population Aged 19 or Younger*
Island County			
Block Group 1, Census Tract 9701	1,102	288	26.1%
Block Group 2, Census Tract 9701	1,502	318	21.2%
Block Group 1, Census Tract 9702	1,633	327	16.2%
Block Group 1, Census Tract 9703	791	208	26.3%
Block Group 2, Census Tract 9703	1,203	321	26.7%
Block Group 3, Census Tract 9703	1,044	231	22.1%
Block Group 4, Census Tract 9703	1,951	384	19.7%
Block Group 1, Census Tract 9704	951	288	30.3%
Block Group 2, Census Tract 9704	2,256	650	28.8%
Block Group 1, Census Tract 9706.01	1,299	372	27.9%
Block Group 1, Census Tract 9708	1,484	398	26.8%
Block Group 1, Census Tract 9710	1,470	257	17.5%
Block Group 1, Census Tract 9711	2,019	425	21.1%
Block Group 2, Census Tract 9711	1,270	212	16.7%
Block Group 3, Census Tract 9713	1,762	206	11.7%
Skagit County			
Block Group 2, Census Tract 9521	658	138	21.0%
Block Group 3, Census Tract 9527	906	220	24.3%

Source: USCB, 2012d

Notes:

[1] Total population is the total 2010 population for the entire census block group as reported by the U.S. Census Bureau. These figures may be greater than the total number of residents affected by noise within the day-night average sound level (DNL) contours because in most instances only a portion of the census block group falls under the DNL contours.
No Action Alternative DNL contours extend into portions of Jefferson and San Juan Counties. However, no permanent residences are located where the DNL contours extend into these counties; therefore, these counties have been excluded from further analysis.
Population on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have been excluded.

Table 3.3-3 Number and Percent of Children and Schools Affected by the NAS Whidbey Island Complex under the No Action Alternative

DNL Contours	*Total Population*[1]	*Total Population 19 Years of Age and Younger*	*Percent of Residents 19 Years of Age and Younger*	*Number of Schools and Licensed Daycares*
65-70 DNL	4,033	1,020	25.3%	2
70-75 DNL	3,010	762	25.3%	0
75+ DNL	3,859	956	24.8%	1
Total Affected Population/Schools	**10,902**	**2,738**	**25.1%**	**3**

Source: USCB, 2012d; Washington State Office of the Superintendent of Public Instruction, 2018; Child Care Center, 2018a; Child Care Center, 2018b.

Note:

[1] Total population is the estimated number of residents living within the Ault Field and the OLF Coupeville DNL contours. These estimates were computed by utilizing the U.S. Census Bureau's 2010 Census of Population and Housing data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range. This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville). A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017).

Key:
DNL = day-night average sound level
OLF = outlying landing field

Table 3.3-4 Number and Percent of Children Affected by the Clear Zones and APZs at Ault Field and Coupeville OLF under the No Action Alternative

APZs	*Total Affected Population*	*Total Affected Population 19 Years of Age or Younger*	*Percent of Affected Population 19 Years of Age and Younger*
Ault Field Existing Clear Zones and APZs	1,830	315	17.2%
OLF Coupeville Existing Clear Zones	95	17	17.9%

Source: USCB, 2012d.

3.4 Air Quality

This discussion of air quality includes criteria pollutants and Hazardous Air Pollutants (HAPs), including standards, permitting, and existing sources. Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors, including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. This section also discusses GHG emissions as they relate to air permitting conditions. The effects of GHG emissions and climate change are discussed in Section 3.16.

Most air pollutants originate from human-made sources, including mobile sources (e.g., aircraft, cars, trucks, buses) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., some building materials and cleaning solvents). Air pollutants are also released from natural sources such as volcanic eruptions and forest fires.

3.4.1 Air Quality, Regulatory Setting

3.4.1.1 Criteria Pollutants and National Ambient Air Quality Standards

The Clean Air Act (CAA) is the primary federal statute governing the control of air quality. The CAA designates six pollutants as "criteria pollutants" for which the USEPA has established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare (see Table 3.4-1). The criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone, suspended particulate matter less than or equal to 10 microns in diameter, fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead. CO, SO_2, NO_2, lead, and some particulates are emitted directly into the atmosphere from emissions sources. Ozone and some NO_2 and particulates are formed through atmospheric chemical reactions from other pollutant emissions (called precursors) that are influenced by weather, ultraviolet light, and other atmospheric processes.

NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards are designed to protect public welfare, such as prevent damage to farm crops, vegetation, and buildings. Some pollutants have long-term and short-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

States may also establish their own ambient air quality standards that are more stringent than those set by federal law. The Washington Administrative Code (WAC) Chapters 173-476 provides details regarding ambient air pollution standards in consideration of public health, safety, and welfare in the State of Washington, which has adopted the federal standards.

Areas that are in compliance with the NAAQS are designated as attainment areas. Areas that do not meet NAAQS for criteria pollutants are designated "nonattainment areas" for that pollutant.

Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are also required to adhere to maintenance plans to ensure continued attainment.

The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan for each non-attainment or maintenance pollutant (including the pollutant's precursor) to achieve (non-attainment) or maintain (maintenance) compliance with the appropriate NAAQS for that pollutant. These plans, known as State Implementation Plans (SIPs), are developed by state and local air quality management agencies and submitted to the USEPA for approval.

Table 3.4-1 National and State Ambient Air Quality Standards

Pollutant		*Primary/ Secondary*	*Averaging Time*	*Level*	*Form*
Carbon Monoxide (CO)		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead (Pb)		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3 [1]	Not to be exceeded
Nitrogen Dioxide (NO_2)		Primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	Annual	53 ppb	Annual mean
Ozone (O_3)		Primary and Secondary	8-hour	0.070 ppm[2]	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	Primary	Annual	12 µg/m^3	Annual mean, averaged over 3 years
		Secondary	Annual	15 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		Primary	1-hour	75 ppb[3]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Sources: USEPA, 2016a; Washington State Department of Ecology, 2015a

Notes:

1 In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

2 Final Rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

3 The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a State Implementation Plan call under the previous SO_2 standards (40 Code of Federal Regulations 50.4[3]). A State Implementation Plan call is a U.S. Environmental Protection Agency action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required National Ambient Air Quality Standards.

Key:

FR = *Federal Register*
µg/m^3 = micrograms per cubic meter
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ppb = parts per billion
ppm = parts per million

3.4.1.2 General Conformity

The General Conformity Rule is part of the CAA promulgated by the USEPA to ensure that the actions of federal departments or agencies conform to the applicable SIP. The General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas.

The NAS Whidbey Island complex is in Island County, which is within the Olympic-Northwest Washington Intrastate Air Quality Control Region (AQCR). The Washington Department of Ecology is responsible for implementing and enforcing state and federal air quality regulations in Washington. The Northwest Clean Air Agency (NWCAA) is responsible for air quality management in Island, Whatcom, and Skagit Counties (NWCAA, 2018). Island County is classified by the USEPA as unclassified/attainment for all criteria pollutants (USEPA, 2018a). Therefore, a General Conformity evaluation is not required. The analysis of a Navy action under NEPA, however, must identify and evaluate any federal, state, or local air quality requirements that apply to the project.

3.4.1.3 Hazardous Air Pollutants

In addition to the NAAQS for criteria pollutants, national standards exist for HAPs, which are regulated under Section 112(b) of the 1990 CAA Amendments. The National Emission Standards for HAPs regulate HAP emissions from stationary sources (40 Code of Federal Regulations [CFR] part 61).

HAPs emitted from mobile sources are called Mobile Source Air Toxics (MSATs). MSATs are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. The USEPA identified six of the MSAT HAP compounds: benzene, butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter (USEPA, 2015a). Unlike the criteria pollutants, there are no NAAQS for benzene and other HAPs. The primary control methodologies for these pollutants for mobile sources involve reducing their content in fuel and altering the engine operating characteristics to reduce the volume of pollutant generated during combustion. The USEPA estimates that in 2030 the MSAT Rules would reduce total emissions of MSATs by 330,000 tons and volatile organic compound (VOC) emissions (precursors to ozone and $PM_{2.5}$) by over 1 million tons (USEPA, 2015a).

3.4.1.4 Permitting

New Source Review and Prevention of Significant Deterioration Review (Preconstruction Permit)

New major stationary sources and major modifications at existing major stationary sources are required by the CAA to have an air pollution permit before commencing construction. The review process for major stationary sources is required whether the major source or major modification is planned for nonattainment areas or attainment and unclassifiable areas. In general, permits for sources in attainment areas and for other pollutants regulated under the major source program are referred to as Prevention of Significant Deterioration (PSD) permits. Additional PSD permitting thresholds (250 tons per year per criteria pollutant, 25 tons per year for total HAPs, and 10 tons per year for any single HAP) apply to increases in stationary source GHG emissions. PSD permitting can also apply to a new major stationary source (or any net emissions increase associated with a modification to an existing major stationary source) that is constructed within 6.2 miles of a Class I area and which would increase the 24-hour average concentration of any regulated pollutant in that Class I area by 1 microgram per cubic meter or more. Navy installations comply with applicable permit requirements under the PSD program per 40 CFR section 51.166.

Title V (Operating Permit)

The Title V Operating Permit Program consolidates all CAA requirements applicable to the operation of a source, including requirements from the SIP, preconstruction permits, and the air toxics program. It applies to stationary sources of air pollution that exceed the major stationary source emission thresholds, as well as other non-major sources specified in a particular regulation. The program includes a requirement for payment of permit fees to finance the operating permit program whether implemented by the USEPA or a state or local regulator. Navy installations subject to Title V permitting shall comply with the requirements of the Title V Operating Permit Program, which are detailed in 40 CFR Part 70 and all specific requirements contained in their individual permits. Title V Permitting is covered by the WAC 173-401 and is managed by the NWCAA in the Northwest Washington Intrastate AQCR, which includes Island, Skagit, and Whatcom Counties (NWCAA, 2018).

Greenhouse Gases

GHGs are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

The USEPA has established permitting requirements for GHG emissions and issued the Final *Mandatory Reporting of Greenhouse Gases Rule* on September 22, 2009 (USEPA, 2009). GHGs covered under the Final *Mandatory Reporting of Greenhouse Gases Rule* are carbon dioxide (CO_2), methane, nitrogen oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. (USEPA, 2016b). Each GHG is assigned a global warming potential. The global warming potential is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of one. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons (MT) or more per year of GHG emissions as carbon dioxide equivalent (CO_2e) are required to submit annual reports to USEPA.

GHG emissions are also regulated under PSD and Title V permitting programs, and this regulation was initiated by a USEPA rulemaking issued on June 3, 2010, known as the GHG Tailoring Rule (USEPA, 2016c). While GHG emissions alone cannot be a basis for CAA permitting, sources that are already Title V major emission sources can be considered major GHG emission sources. GHG emissions thresholds for permitting of stationary sources are an increase of 75,000 tpy of CO_2e at existing major sources and facility-wide emissions of 100,000 tpy of CO_2e for a new source or a modification of an existing minor source. The 100,000 tpy of CO_2e threshold defines a major GHG source for both construction (PSD) and operating (Title V) permitting, respectively. GHG reporting is required in the State of Washington under WAC 173-401-200 (19) and (35) (9/10/11) (NWCAA, 2018).

3.4.2 Air Quality, Affected Environment

Air quality within the NWCAA jurisdiction is considered good. In 2016, Washington's Department of Ecology submitted recommended designation information for the 2015 8-hour ozone NAAQS (70 ppb), noting that 2013-2015 ambient air data collected at Anacortes established a design value of 42 ppb, the lowest level in the state and significantly lower than the standard (Bellon, 2016).

The most recent criteria pollutant emissions inventory data for Island, Skagit, and Whatcom Counties based on the 2014 National Emissions Inventory (USEPA, 2018a) are shown in Table 3.4-2. VOC and nitrogen oxide emissions are used to represent ozone generation because they are precursors of ozone. These emissions represent stationary and mobile emissions within each county; however, Navy aircraft emissions are not included in the inventory.[11] Refer to Section 3.16 for regional GHG inventory data.

Table 3.4-2 Northwest Clean Air Agency Jurisdiction Air Emissions Inventory, 2014

Location	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
Island County	2,764	4,959	14,286	849	1,222	707
Skagit County	9,675	24,481	36,050	1,009	3,020	1,572
Whatcom County	10,089	32,504	78,310	8,147	5,623	2,806
NWCAA Jurisdiction Total	**22,528**	**61,944**	**128,646**	**10,005**	**9,865**	**5,085**

Source: USEPA, 2018a

Note: Measurements in tons per year.

Key:
AQCR = Air Quality Control Region
CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide
VOC = volatile organic compound

3.4.2.1 NAS Whidbey Island Complex Stationary Source Emissions

Currently, the primary emission units at the NAS Whidbey Island complex are boilers and heaters, painting and depainting operations, gasoline dispensing stations, and stationary internal combustion engines. In addition, the following operations take place at the complex: training exercises at a fire training facility, use of ozone-depleting-compound-containing equipment, asbestos handling, activities at an explosive ordnance demolition unit, generation of fuel odors, and potentially other nuisance emissions. Four test cell locations, where aircraft engines removed from aircraft are mounted to stationary facilities for repair and maintenance, are considered stationary emission sources, with specific permitting requirements (NWCAA, 2016). Growler engines (F414-GE-400) are not tested at NAS Whidbey Island test cell facilities (NAS Whidbey Island Operations Command, 2016).

Ault Field at the NAS Whidbey Island complex is considered a designated major source under Title V of the CAA because the facility has the potential to emit more than 100 tons per year of CO, NO_X, sulfur oxides, and VOCs, and more than 25 tons per year of combined HAPs. These air pollutants are defined as regulated air pollutants in WAC 173-401 (NWCAA, 2016). Therefore, the NAS Whidbey Island complex has an Air Operating Permit (AOP) to comply with CAA Title V permitting requirements. The NAS Whidbey Island AOP requires semiannual and annual reports to be submitted to the NWCAA as part of the facility's ongoing compliance demonstration. Annually, the responsible corporate official certifies compliance with all applicable requirements in the AOP term by term and whether the facility was fully or intermittently in compliance with each term. Annual reporting has demonstrated that actual annual

[11] Navy aircraft and mobile emissions are not included in the Washington State inventory.

emissions historically have been below major source emission thresholds (See Table 3.4-3). NAS Whidbey Island also reports small amounts of stationary source HAPs totaling about 7 tons per year (NAS Whidbey Island, 2016).

Table 3.4-3 NAS Whidbey Island Complex Criteria Pollutant Air Emissions Inventory

Year	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
2007	16	12	18	0	23	16
2008	14	9	16	0	21	14
2009	12	16	14	0	21	14
2010	12	14	14	0	21	13
2011	8	43	10	1	17	17
2012	8	23	11	0	18	16
2013	11.3	35.0	9.2	0.2	15.3	14.0
2014	7.7	29.4	8.6	0.2	13.8	12.8
2015	7.3	30.4	8.2	0.3	6.0	4.8
2016	9.4	51.7	9.2	0.4	5.3	4.6

Sources: NWCAA, 2013; NAS Whidbey Island, 2013b, 2017b; Stewart, 2017

Note: Measurements in tons per year.

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide
VOC = volatile organic compound

In addition to criteria pollutants and HAPs, the NAS Whidbey Island complex also reports GHG emissions from stationary sources, as required under WAC 173-401-200 (19) and (35) (9/10/11) (NWCAA, 2016). Recent annual GHG emissions reported for the NAS Whidbey Island complex are shown in Table 3.4-4.

NAS Whidbey Island has improved electricity efficiency through implementation of several building renovation projects, resulting in a decrease in energy use and stationary source GHG emissions (NAS Whidbey Island, 2016).

Table 3.4-4 NAS Whidbey Island Complex Reported Annual GHG Air Emissions Inventory, Required Stationary Sources Only

Year	*CO_2*	*CH_4[1]*	*N_2O[2]*	*MT of Total CO_2e Emissions*
2009	11,407	NR	NR	11,407
2010	11,129	5	21	11,155
2011	15,939	8	0	15,947
2012	17,843	8.4	13.6	17,864
2013	16,542	7.14	12.4	16,562
2014	11,357	5	6	11,371
2015	13,373	6.3	7.7	13,387
2016	13,560	6.5	8.0	13,575

Sources: NWCAA, 2013; NAS Whidbey Island, 2013b, 2017; Stewart, 2018

Notes: Measurements in metric tons (MT) CO_2e per year totals may not sum because of rounding.

1 2010-2013 values calculated using global warming potential (GWP) of CH_4 = 21; 2014-2016 GWP for CH_4 = 25

2 2010-2013 GWP of N_2O = 310; 2014-2016 GWP for N_2O = 298

Key:
CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
GWP = global warming potential
N_2O = nitrous oxide
NR = not reported

3.4.2.2 NAS Whidbey Island Complex Mobile Source Emissions

The NAS Whidbey Island complex produces mobile source emissions from air station operations, including aircraft operations (flight operations at Ault Field and OLF Coupeville and maintenance at Ault Field), employee commuting, and use of other mobile equipment. Emissions of concern include criteria pollutants and the six priority HAPs identified in MSAT regulations. As noted above, mobile emissions are not covered by the existing air permit and are not subject to stationary source thresholds and requirements. Mobile emissions are not included in emission totals reported for the AOP, and aircraft emissions are not included in county emissions inventory totals from the National Emissions Inventory reported in Table 3.4-2.

Aircraft emissions are estimated based on fuel use; however, there is not a direct relationship between emissions and fuel burned. At different power settings, the aircraft will burn fuel at different rates and combustion efficiency, resulting in very different emission rates depending on the type of emission. VOCs (which include HAPs) are emitted at the highest rates when the aircraft is on the ground and idling at a low combustion efficiency. NO_x emissions are higher at high power settings and are correlated to combustion temperature, while CO emissions are higher at lower power settings and during AB mode, due to incomplete combustion. To account for these differences, various emission indexes are

established for different engine settings by the Navy's Aircraft Environmental Support Office (AESO) to determine total emission rates for each operation. To estimate these emission rates, AESO assumes power settings, time-in-mode, and fuel flow rates for all parts of each operation, including flight time and time on the ground. An unknown percentage of GCA box operations may occur just outside Island County, in Skagit, San Juan, and Snohomish Counties. GCA box operations account for approximately 5 percent of estimated emissions under this action. It has been conservatively assumed that all emissions occur within Island County

HAP emissions from aircraft are a subset of the VOC totals quantified in Table 3.4-5. The VOCs identified in MSAT regulations as having the greatest influence on health are benzene, butadiene, formaldehyde, acrolein, and acetaldehyde. The total of these HAP emissions represents 24 percent of the reported VOCs (FAA, 2009) and also one-third of a small percentage of personally owned vehicle (POV) VOC emissions (AWMA, 2017). Diesel particulate matter is not applicable to jet fuel use.

Emissions estimates were developed using the Navy's AESO emission factors for aircraft emissions (AESO, 2017a, 2017b, 2015) and the USEPA's Motor Vehicle Emission Simulator (MOVES2014) (USEPA, 2015c) emission factors for Island County for personnel commuting emissions. Ground support equipment emissions at NAS Whidbey Island were estimated using a ratio of aircraft landing and takeoff operations to reported ground support equipment at NAS Lemoore in Appendix 1D of the Navy's F-35C West Coast Homebasing EIS (Navy, 2014d). Refer to Appendix B for assumptions and calculations. Table 3.4-5 provides a summary of the existing mobile emissions associated with the Proposed Action.

As with aircraft emissions, HAPs from employee commuting and other mobile equipment are a small percentage of VOC emissions and are negligible. Airborne emissions of lead are not addressed in this EIS because no known significant lead emission sources are associated with the Proposed Action.

Table 3.4-5 NAS Whidbey Island Existing Criteria Pollutant Mobile Air Emissions, Growler Operations Only

Operations	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
Ault Field EA-18G Aircraft	402.45	592.72	1,580.19	34.84	178.53	178.53
OLF EA-18G Aircraft	45.39	1.06	22.97	2.97	12.60	12.60
Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total Existing Mobile Emissions	490.38	697.05	2,126.00	42.07	299.71	220.96

Note: Measurements in tons per year.

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = outlying landing field
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
tpy = tons per year
VOC = volatile organic compound

3.4.2.3 Chaff

Growler aircraft have the capability to deploy chaff, which consists of tiny, light, aluminum and glass fibers that when released from aircraft provide a cloud that will disrupt hostile targeting and missile guidance to defend the aircraft against attack. Chaff can be considered a large particulate matter emission; however, it is not under 10 micrometers in size, which would categorize it as a criteria pollutant. The particulate matter can remain airborne for anywhere from 10 minutes to 10 hours, becoming widely dispersed before it reaches land. Training with chaff is conducted not only to familiarize pilots with using its deployment strategy but also to train combat response to chaff use. While chaff is used in combat training exercises at designated training ranges outside this Proposed Action's study area (Navy, 2015d), it is not used during operations at Ault Field or OLF Coupeville; therefore, its use is not affected by the Proposed Action.

3.4.2.4 Fuel Dumping

Routine fuel dumping does not occur around the NAS Whidbey Island complex. In the event of an emergency, Growler aircraft may conduct fuel dumping. This is the practice of releasing jet fuel from the aircraft's fuel tank(s) to reduce the weight of the aircraft in order to provide a safe landing weight. As stated in OPNAV 3710.7V (Navy, 2016a), whenever practicable, fuel shall not be jettisoned (dumped) below an altitude of 6,000 feet above the terrain. The NAS Whidbey Island Air Ops Manual, NASWHIDBEYINST 3710.1AA, states fuel dumping is to be accomplished at or above 8,000 feet AGL and performed, except in an emergency, under radar control, over water adjacent to Smith Island. In the event of an emergency and conditions dictate jettisoning at a lower altitude, every effort shall be made to avoid populated areas. The resulting dumped fuel is dispersed into the atmosphere above the typical mixing height of 3,000 feet (AESO, 2017b); therefore, the dumped fuel is dispersed and would not fall to the ground in the immediate area. Because OLF training sorties are specifically planned operations, aircraft participating in them are provided with the proper amount of fuel and safety reserves to safely complete the operations; therefore, they do not carry excess fuel that would require dumping.

3.5 Land Use

This discussion of land use includes current and planned uses and the regulations, policies, or zoning that may control the proposed land use. The term land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. For instance, natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity; descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Zoning data for Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville were used to assess land use surrounding the NAS Whidbey Island complex. For the purposes of this study and in order to handle nomenclature differences, land use categories across Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville were standardized into broader, uniform land use categories to normalize different nomenclatures used between the municipalities. The

standardized categories correspond to the Standard Land Use Coding Manual land use categories, which are used in the Navy's AICUZ program (OPNAVINST 11010.36C, October 2008). The standardized categories are as follows: Agriculture, Commercial, Federal[12], Industrial, Open Space/Forest, Parks, Residential[13], Rural[14], and Transportation[15].

3.5.1 Land Use, Regulatory Setting

In many cases, land use descriptions are codified in installation master planning and local zoning laws. OPNAVINST 11010.40 establishes an encroachment management program to ensure operational sustainment by identifying encroachment impacts and requiring active engagement with the local community to help promote compatible land development. Additionally, OPNAVINST 11010.36C and Marine Corps Order 11010.16 provide guidance for administering the AICUZ program, which recommends land uses that are compatible with noise levels, accident potential, and obstruction clearance criteria for military airfield operations.

The Coastal Zone Management Act (CZMA) of 1972 establishes a federal-state partnership to provide for the comprehensive management of coastal resources. Coastal states and territories develop state-specific coastal management programs to balance resource protection and coastal development needs. The Washington Coastal Zone Management Program lays out the policy to guide the use, protection, and development of land and ocean resources within the state's coastal zone. Under the CZMA, federal activities that affect coastal uses or resources must be conducted in a manner consistent with enforceable policies of a state's coastal zone management plan to the maximum extent practicable. If the federal agency determines that the proposed action will result in effects to a state's coastal uses or resources, a Coastal Consistency Determination is prepared, which discusses how the action is fully consistent or consistent to the maximum extent practicable with the state's federally approved enforceable policies. If the federal agency determines that its actions will have no effect on the coastal uses and resources, then it may issue a Negative Determination. Federal lands, which are "lands the use of which is by law subject solely to the discretion of the Federal Government, its officers, or agents," are statutorily excluded from the state's "coastal zone." If, however, the proposed federal activity affects

[12] NAS Whidbey Island complex boundaries are included within the Federal category.

[13] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[14] "Rural" is low density, which includes a variety of living and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[15] Transportation includes gaps within zoning layers for each of the municipalities that appeared, through aerial photography, to be roads; however, this transportation category does not cover all streets within municipalities.

coastal resources or uses beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA federal consistency requirement applies.

3.5.2 Land Use, Affected Environment

The following discussions provide a description of the affected environment for each of the categories under land use resources for the NAS Whidbey Island complex and portions of the City of Oak Harbor, Town of Coupeville, Island County, and Skagit County. Existing land use conditions, plans, policies, and recommendations are provided in the following documents: the *2005 Air Installations Compatible Use Zones Study Update for Naval Air Station Whidbey Island and Outlying Landing Field Coupeville, Washington* (Navy, 2005a), the *Island County Comprehensive Plan (2011 Update)* (Board of Island County Commissioners, Island County Planning Commission, and Island County Department of Planning and Community Development, 1998), and the *City of Oak Harbor 2010 Comprehensive Plan and Zoning Code* (City of Oak Harbor, 2010). These and other land use planning documents are described below in Section 3.5.2.1 and Section 3.5.2.2.

Land use is interrelated with other resource areas including noise, socioeconomics, biological resources, and cultural resources, and their impacts are discussed in Section 4.5. The impact analysis in this EIS for land use focuses on those areas affected by proposed construction and airfield and airspace operations. This analysis relies not only on zoning designations but also on compatible land use recommendations in APZs and DNL noise contours as defined by the AICUZ program.

3.5.2.1 On-station Land Use and Land Use Controls at the NAS Whidbey Island Complex

Ault Field

Ault Field occupies 4,325 acres on the north end of Whidbey Island in Island County, Washington. The airfield is bordered on the south by the City of Oak Harbor and on the west by the Strait of Juan de Fuca. Approximately 1,040 acres (23 percent) of Ault Field has been developed. The remaining land area is undeveloped and supports various vegetation communities and runway Clear Zones. A fence surrounds all of Ault Field, except for the area along the Strait of Juan de Fuca shoreline. The airfield occupies the northeast portion of Ault Field and has two 8,000-foot intersecting runways, Runways 07/25 and 14/32. Aircraft operations areas are located south and west of the runways and include aircraft parking ramps, taxiways, aircraft maintenance hangars, a passenger terminal, an ATC tower, and various other support facilities. Other developed areas near Ault Field include housing and administration, operational support, personnel support, and recreational facilities. Access to the airfield is provided for authorized personnel only.

Construction projects associated with the Proposed Action are recommended in developed and adjacent undeveloped areas in the aircraft operations area south and west of the runways (Figure 2.3-1).

Outlying Landing Field Coupeville

OLF Coupeville occupies 677 acres approximately 10 nm south of Ault Field. The airfield has one 5,400-foot runway, Runway 14/32. Aircraft operations include FCLP, and due to the nature of this facility as an OLF, on-installation facilities consist of six buildings that are associated with airfield operations, logistics and supply, and training and utilities shore capability areas. There are no plans to construct any additional facilities at OLF Coupeville under the Proposed Action.

Seaplane Base

The Seaplane Base is located approximately 5 miles southeast of Ault Field and occupies 2,784 acres along 10 miles of Crescent Harbor shoreline. Approximately 23 percent of the land area is developed and is used for housing and community support facilities, jet fuel off-loading, ordnance storage, and training for the explosive ordnance disposal units and other Navy and military commands.

Development within Ault Field, OLF Coupeville, and the Seaplane Base is controlled, guided, or influenced by the following plans, programs, and policies:

- NAS Whidbey Island Activity Overview Plan (2004)
- NAS Whidbey Island INRMP (NAS Whidbey Island, 2013a)
- NAVFAC Land Use Controls Implementation Plan – NAS Whidbey Island (Navy, 2009)
- NAS Whidbey Island Integrated Cultural Resources Management Plan (ICRMP) (Navy, 2016c)
- NAS Whidbey Island Installation Development Plan (2016)

NAS Whidbey Island Activity Overview Plan (2004)

The Activity Overview Plan is a land use and facilities plan supporting the long-range vision (15 to 20 years) for the NAS Whidbey Island complex. Prepared in 2004, the Activity Overview Plan is a planning tool for the station and incorporates information from special studies, such as the NAS Whidbey Island Airfield Recapitalization Plan. It includes an analysis of the station's future aircraft and squadron-loading scenarios, including replacement of the P-3C Orion aircraft with the P-8A Poseidon; baseline conditions and future operational needs of the mission-critical, mission-support, and personnel-support departments; and analysis of development constraints and development opportunity areas.

The Activity Overview Plan also contains a strategic action plan that identifies land use policy, land-holdings strategy, and project recommendations. Among these recommendations is the protection of the NAS Whidbey Island complex as a critical Navy air operations asset. It recommends that siting new facilities be consistent with flight line expansion areas and land use restrictions to preserve operations.

NAS Whidbey Island Integrated Natural Resources Management Plan

The Sikes Act (16 U.S.C. 670a et seq., as amended) is the primary driver behind development and implementation of this INRMP. In addition to the Sikes Act, this INRMP has been prepared consistent with guidance and regulations provided in DoD Instruction 4715.03, OPNAVINST 5090.1D, OPNAV M-5090.1, associated Navy Guidance (Navy, 2014a), and a series of DoD and Navy guidance memoranda on the Sikes Act and INRMPs. The NAS Whidbey Island INRMP was completed by the installation in January 2012, finalized in December 2013, and approved by the Navy and partner agencies in January 2014 (NAS Whidbey Island, 2013a). The overall goal of the plan is to integrate management activities with all programs and mission requirements while sustaining, promoting, and restoring the health and integrity of the NAS Whidbey Island complex ecosystems. The INRMP identifies land, water, plant, fish, and wildlife resources on the installation. The document guides both short-term resource management activities and long-range planning.

The NAS Whidbey Island Environmental Division is responsible for programmatic oversight, management, and supervision of natural resources management at the station.

NAVFAC Land Use Controls Implementation Plan – NAS Whidbey Island

The Land Use Controls Implementation Plan describes the procedures for implementing the institutional and engineering controls required by Records of Decision issued pursuant to remediation conducted under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, for Operable Units (OUs) 1 through 5 on the NAS Whidbey Island complex (Navy, 2009). Four OUs are located at Ault Field, and one is located on the Seaplane Base. Since the 1940s, the station has generated a variety of hazardous wastes, contaminating soils, sediments, and groundwater (USEPA, 2016d). The Records of Decision were signed by the Navy, USEPA, and the Washington Department of Ecology. Remediation construction was completed in September 1997, human exposure and contaminated groundwater exposures are under control, and the OUs at Ault Field and the Seaplane Base are ready for anticipated use (USEPA, 2016d).

NAS Whidbey Island Integrated Cultural Resources Management Plan

The ICRMP describes policies, procedures, and responsibilities for meeting cultural resources compliance and management requirements at the NAS Whidbey Island complex. The ICRMP summarizes previous archaeological investigations and historic surveys that have been completed at the site and identifies management actions that should be completed in compliance with Section 106 and Section 110 of the National Historic Preservation Act (NHPA). The overall goal of the ICRMP is to assist the NAS Whidbey Island complex in meeting its statutory and regulatory requirements for identification and protection of cultural resources in a manner that is compatible with the station's mission (Navy, 2016c).

NAS Whidbey Island Installation Development Plan (2016)

The NAS Whidbey Island Installation Development Plan provides a comprehensive framework for the orderly physical development of the installation and reflects the NAS Whidbey Island complex's official direction on facility and site development planning. The Installation Development Plan establishes a vision for the installation's physical infrastructure and places intentional emphasis on mission requirements, developmental constraints and opportunities, and courses of action that will lead to the optimal use of lands, facilities, and resources that elevate the installation's long-range (25-year) performance. As such, the Installation Development Plan is intended to be a living document with the capacity to incorporate flexibility to account for changing conditions, priorities, and programs to guide short-, mid-, and long-range investment decisions. The Installation Development Plan addresses mission and facility requirements; natural, environmental, cultural, and operation constraints; transportation and circulation networks; climatic changes; utility networks; encroachment; and local community context. Goals and objectives of the Installation Development Plan include: enhance mission readiness; optimize real property assets; provide a secure and safe environment; enhance quality of life; and practice exemplary resource stewardship.

3.5.2.2 Regional Land Use and Land Use Controls

The majority of land surrounding Ault Field and OLF Coupeville is rural, with large tracts of undeveloped forestland, agricultural land, and scattered residential subdivisions at higher densities. Numerous state and federal park lands as well as areas of water also surround the NAS Whidbey Island complex.

Other land uses in the vicinity of Ault Field include:

- a mixture of residential, industrial/light manufacturing, commercial, parks, and agricultural development south of Ault Field in the City of Oak Harbor

- commercial, agricultural, residential, and industrial/light manufacturing uses along State Route (SR) 20, which extends along the eastern boundary of Ault Field
- rural, residential, agricultural, commercial, and parks, including Deception Pass State Park north of Ault Field and Hope Island State Park northeast of Ault Field
- Joseph Whidbey State Park to the southwest and various public, private, and Navy-owned marinas, boat launches, campgrounds, beaches, hiking trails, and golf courses

Portions of the airfield at OLF Coupeville lie within, and are bordered by Ebey's Landing National Historical Reserve, including forested and agricultural areas with low-density residential uses, and clustered residential development in a few neighborhoods. Other land uses in the vicinity of OLF Coupeville include:

- a mixture of residential, commercial, park, public building, and church uses north of OLF Coupeville in the Town of Coupeville
- Rhododendron Park, located northwest of the OLF, which includes three ball fields, picnic areas, playgrounds, and campsites, and Fort Casey State Park, located southwest of the installation along the coast of Admiralty Bay

Other land uses of interest include Admirals Cove Beach Club (south of OLF Coupeville) and Whidbey General Hospital (northwest of OLF Coupeville).

The Seaplane Base is bordered by Crescent Harbor to the south, and residential and commercial land uses within the City of Oak Harbor to the west. The majority of land to the north and east of the Seaplane Base is largely residential, interspersed with agricultural and rural land uses.

Development around Ault Field, OLF Coupeville, and the Seaplane Base is controlled, guided, or influenced by the following plans, programs, and policies:

- AICUZ Program
- NAS Whidbey Island AICUZ Update (2005)
- Washington Growth Management Act (1990, 2005) (WGMA)
- Island County Comprehensive Plan (2011, 2016 revision anticipated) and Zoning Ordinance (current)
- City of Oak Harbor Comprehensive Plan (2010, 2016 revision anticipated) and Zoning Ordinance (current)
- Town of Coupeville Comprehensive Plan (2003) and Zoning Ordinance (current)

The AICUZ program was established in the early 1970s by the DoD to analyze operational training requirements and to address communities' concerns about aircraft noise and accident potential. The primary goal of the AICUZ program is to protect the public's health, safety, and welfare and to maintain the operational capability of military airfield operations (see Section 3.3).

As part of the AICUZ process, noise zones, APZs, and recommendations to promote community development compatible with air operations are defined. The AICUZ document, and the noise zones, APZs, and recommendations, serve as a land use planning tool for local planning agencies. The Navy encourages land use development that is compatible with noise zones and APZs surrounding a military airfield (see Table 3.5-1). The key to the program's success is intergovernmental coordination. An active

local command effort to work with surrounding communities to prevent incompatible development in the vicinity of military airfields is the foundation of the program's success.

Table 3.5-1 AICUZ Land Use Recommendations

Land Use Category[2]	*DNL Noise Contours*[1]			*APZs*[1]		
	65-69 dB DNL	*70-74 dB DNL*	*>75 dB DNL*	*CZ*	*APZ-I*	*APZ-II*
Agriculture	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Commercial	Compatible	Compatible	Compatible	Incompatible	Compatible/ Incompatible[3]	Compatible
Federal[4]	Compatible	Compatible	Compatible	Incompatible	Compatible	Compatible
Industrial	Compatible	Compatible	Compatible	Incompatible	Compatible/ Incompatible[3]	Compatible
Open Space/Forest	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Parks	Compatible	Compatible	Compatible/ Incompatible[3]	Incompatible	Compatible	Compatible
Residential[5]	Incompatible[3]	Incompatible[3]	Incompatible[3]	Incompatible	Incompatible	Compatible/ Incompatible[6]
Rural[7]	Compatible	Compatible	Compatible	Incompatible	Incompatible	Compatible
Transportation[8]	Compatible	Compatible	Compatible	Incompatible	Compatible	Compatible

Source: OPNAVINST 11010.36C

Notes:

1 OPNAVINST 11010.36C and the AICUZ Program provide land use recommendations within DNL noise contours and APZs.

2 The recommended uses are generalized; for more detail on land use (per the 1965 Standard Land Use Coding Manual number) recommendations, see OPNAVINST 11010.36C.

3 As defined by OPNAVINST 11010.36C, some uses in this land use category are recommended compatible with restrictions, while others are recommended incompatible with exceptions, depending on the specific parameters of the development in question. For more detail regarding land use recommendations, see OPNAVINST 11010.36C

4 "Federal" land use includes federally zoned land. "Federal" does not include the Installation boundary.

5 "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

6 As defined by OPNAVINST 11010.36C, single detached units at a maximum density of two dwelling units/acre and cluster development to achieve this density are compatible within APZ-II. All other residential development is incompatible.

7 "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

8 The "Transportation" class was created by identifying any gaps in the combined land use layer that appeared to be roads and categorizing them as "Transportation." This "Transportation" land use category does not cover all streets in the region.

Air installations and local government agencies with planning and zoning authority share the responsibility for preserving land use compatibility near an air installation. NAS Whidbey Island seeks to reduce aircraft noise impacts, to the extent practicable and without compromising flight safety or operational capability, through adherence to operational guidance and procedures (see Section 3.2.4.2.1 for noise mitigation). The installation command also works with state and local planning officials to implement the objectives of the AICUZ program and strives to educate and inform the local civilian community of the mutual benefits of an active AICUZ program.

Concurrently, local governments are responsible for protecting the health, safety, and welfare of their respective residents. The AICUZ program provides recommendations based on operations on base that can be used by local planning agencies to promote compatible land uses off base, surrounding the airfield. The desire is for the local governments to recognize the recommendations from the AICUZ study and regulate development around the airfield through zoning ordinances (i.e., noise disclosures and building codes). It is the responsibility of the local planning agencies to elect to implement or adopt the recommendations of the AICUZ program. The AICUZ program does not regulate land uses off base.

Operational and training requirements, aircraft mix, tempo of aviation activity, maintenance procedures, and community development seldom remain static. Therefore, to maintain accuracy, AICUZ studies are updated periodically. The Navy will perform an AICUZ Update upon completion of this EIS and share official recommendations with the community.

3.5.2.2.1 NAS Whidbey Island AICUZ Update (2005)

As part of the AICUZ Update, a noise study was conducted. The AICUZ Study Update for NAS Whidbey Island's Ault Field and OLF Coupeville, Washington (Navy, 2005a) analyzes Calendar Year 2003 (CY 03) and Calendar Year 2013 (CY 13) noise contours and APZs for aircraft operations. CY 03 represents existing conditions, and CY 13 represents projected conditions resulting from the transition from the EA-6B to the EA-18G aircraft. The 2005 AICUZ Study Update serves to examine land use planning and zoning parameters related to aircraft operations, noise, and safety and provide recommendations that can be used to further promote compatible land use surrounding Ault Field and OLF Coupeville. Land use compatibility within the noise zones around Ault Field and OLF Coupeville is evaluated in Section 4.5.2.1.

3.5.2.2.2 Washington State Growth Management Act (1990, 2005)

The WGMA was adopted in 1990 because the Washington state legislature found that uncoordinated and unplanned growth posed a threat to the environment, sustainable economic development, and the quality of life in Washington. The WGMA requires state and local governments to manage Washington's growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, and preparing comprehensive plans and implementing them through capital investments and development regulations. The WGMA has been amended several times, including in 2005, when provisions were added to address development around military installations. The 2005 amendment recognizes that military installations are of particular importance to the economic health of Washington's economy and quality of life. As such, the WGMA requires that county and city comprehensive plans restrict development in the vicinity of military installations that is incompatible with the installation's ability to carry out its mission requirements.

Furthermore, to build on direction and processes for compatible land use planning as a result of the WGMA, the Washington Department of Commerce released a civilian-military land use study in December 2016 that provided recommendations to improve compatible land use planning through partnerships, to clarify processes, to amend legislation, and to allocate funds (for the resolution of land incompatibility issues, protection of habitat, and conservation of rural areas) (The Spectrum Group, 2016).

3.5.2.2.3 Island County Comprehensive Plan (2011, 2016) and Zoning Ordinance (2016)

Washington state law requires every jurisdiction to have a comprehensive, long-term plan for its future development. The Island County Comprehensive Plan is a guide for the county on how to approach growth and development. The original Island County Comprehensive Plan was adopted in 1984. The Board of Island County Commissioners adopted a more comprehensive and integrated document in 1998 (Board of Island County Commissioners, Island County Planning Commission, and Island County Department of Planning and Community Development, 1998) consisting of 10 elements, or chapters; this was updated in 2008. More recent updates of the policy plan, land use and parks and recreation elements of the plan, were completed in 2011. The most recent revision to this plan was adopted in December 2016 (Island County, 2016d), and it most notably included updates to defined Urban Growth Areas and Joint Planning Areas.

The comprehensive plan acknowledges the county's association with the NAS Whidbey Island complex as well as the impacts associated with aircraft operations at Ault Field and OLF Coupeville. The plan designates an "Airport and Aviation Safety Overlay," which represents the high-noise areas of Island County where special land use controls are necessary to assure public health, welfare, and safety. This overlay recommends that future land use adjacent to Ault Field and OLF Coupeville be maintained as rural to encourage low-density development within the air station's DNL contours and APZs.

Island County adopted the APZs from the 2005 NAS Whidbey Island AICUZ, as well as a closed-loop APZ for FCLP pattern operations at Ault Field, to implement the airport and aviation safety overlay district through the county's zoning ordinance and other elements of the Island County Code (see Figure 3.5-1). The overlay applies additional standards to properties located within underlying zoning districts. These standards include noise-level reduction requirements ranging between 25 dB and 30 dB, depending on structure type, location within DNL contours, and disclosure. Island County designates airport noise zone 2 (60 to 70 DNL) and airport noise zone 3 (greater than 70 DNL). Further, as described in Section 3.5.2.2.3, Island County has implemented an airport and aviation safety overlay district that applies additional standards to properties located within underlying zoning districts. These standards include noise-level reduction requirements ranging between 25 dB and 30 dB, depending on structure type; location within DNL contours (greater than 60 DNL); and real estate disclosure. Additionally, all new structures, or alterations to existing structures, in airport noise zone 2 and 3 must achieve a minimum of 25 dBA and 30 dBA noise level reduction, respectively. "Alterations to existing structures" refers to "any construction which would result in a change in height or lateral dimensions of an existing structure" (Island County, 2016a). All building permits in airport noise zones 2 and 3 are reviewed for consistency with Island County Code 14.01B.050 – Building Construction (Island County, 2016a). Existing land uses and zoning are consistent with the Navy's recommendations for land uses within the APZs. The goals and policies in the county's comprehensive plan support the adoption of codes for compatible development within the APZs.

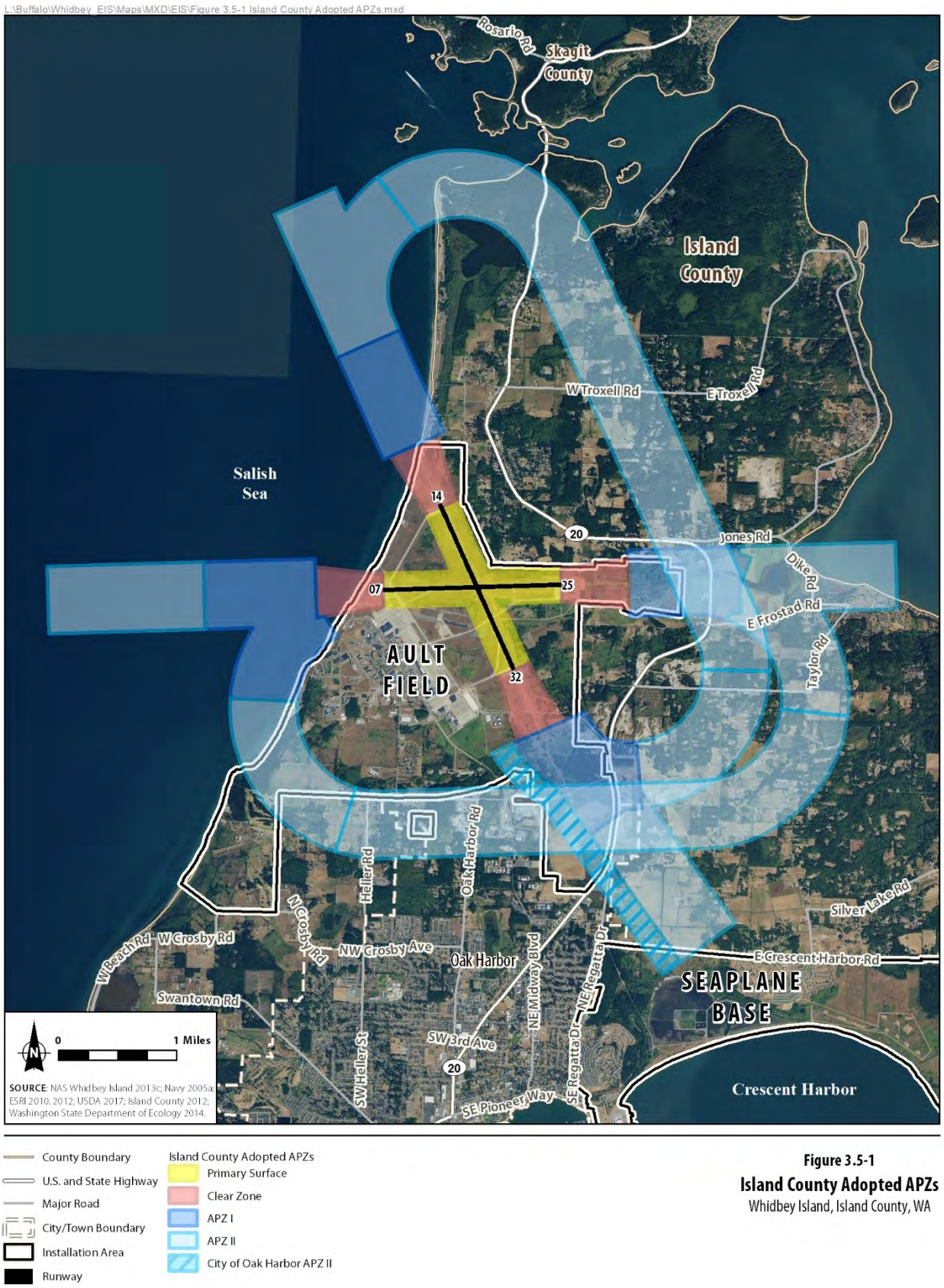


Figure 3.5-1
Island County Adopted APZs
Whidbey Island, Island County, WA

Island County adopted an Airport and Aircraft Operations Noise Disclosure Ordinance initially in the early 1990s and has adopted numerous updated ordinances, the most recent in 2015, for property sold, rented, or leased within the noise zones around the NAS Whidbey Island complex. The disclosure ordinance states "no person shall sell, lease, or offer sale or lease of any property within any airport environs mapped impacted areas unless the prospective buyer has been given notice substantially" (Island County, 2016a). Noise disclosure is the responsibility of property owners and their agents. Island County also enforces a separate Noise Level Reduction Ordinance, which sets minimum standards for building construction within the noise zones around Ault Field and OLF Coupeville.

Zoning is the primary land use control used by Island County to control development on non-federal land. The majority of parcels under county jurisdiction near Ault Field and OLF Coupeville and within the overlay district are zoned in the following categories:

- Rural, which permits one dwelling unit per 5 acres
- Rural Agriculture, which permits one dwelling unit per 10 acres
- Rural Forest, which permits one dwelling unit per 10 acres
- Urban Growth Area (south of Ault Field), where density is limited to three dwelling units per 5 acres; in addition, within the Urban Growth Area, the City of Oak Harbor has identified various future land uses, including industrial, planned industrial park, community commercial, open space, and planned business park
- Rural Residential areas west and southwest of OLF Coupeville where permitted density varies from one to three units per acre

Figures 3.5-2 and 3.5-3 show existing land uses in Island County with the No Action noise contours overlain.

3.5.2.2.4 City of Oak Harbor Comprehensive Plan (2010, 2016) and Zoning Ordinance (2016)

Maintaining land use compatibility with the NAS Whidbey Island complex is of paramount importance to the City of Oak Harbor (City of Oak Harbor, 2010). A stated goal/policy objective in the comprehensive plan is to prohibit residential development in any area within the 70 dB DNL or greater noise zone and to limit residential growth in the 60 to 70 dB DNL noise zone. Additionally, the plan promotes residential development to the southwest and away from Ault Field.

The City of Oak Harbor adopted the 1986 AICUZ noise contours to implement the Aviation Environs Overlay Zone through the city's zoning ordinance and other elements of the municipal code. Land within the Aviation Environs Overlay Zone is designated for low-density development. The overlay applies additional standards to properties located within underlying zoning districts. These standards include noise-level reduction requirements ranging between 25 dB and 30 dB, depending on structure type, location within DNL contours, and disclosure for real estate transactions. The City of Oak Harbor had also adopted a lighting and glare ordinance, helping to ensure the safety of aircraft operations by placing limitations on lighting that can impair a pilot's vision, especially at night.

Existing land use and zoning regulations in the Aviation Environs Overlay Zone are consistent with the Navy's recommendations for land use compatibility within the APZs. The goals and policies in the city's comprehensive plan support adoption of codes for compatible development within the APZs. Figures 3.5-2 and 3.5-3 show existing land uses in the City of Oak Harbor with the No Action noise contours overlain.

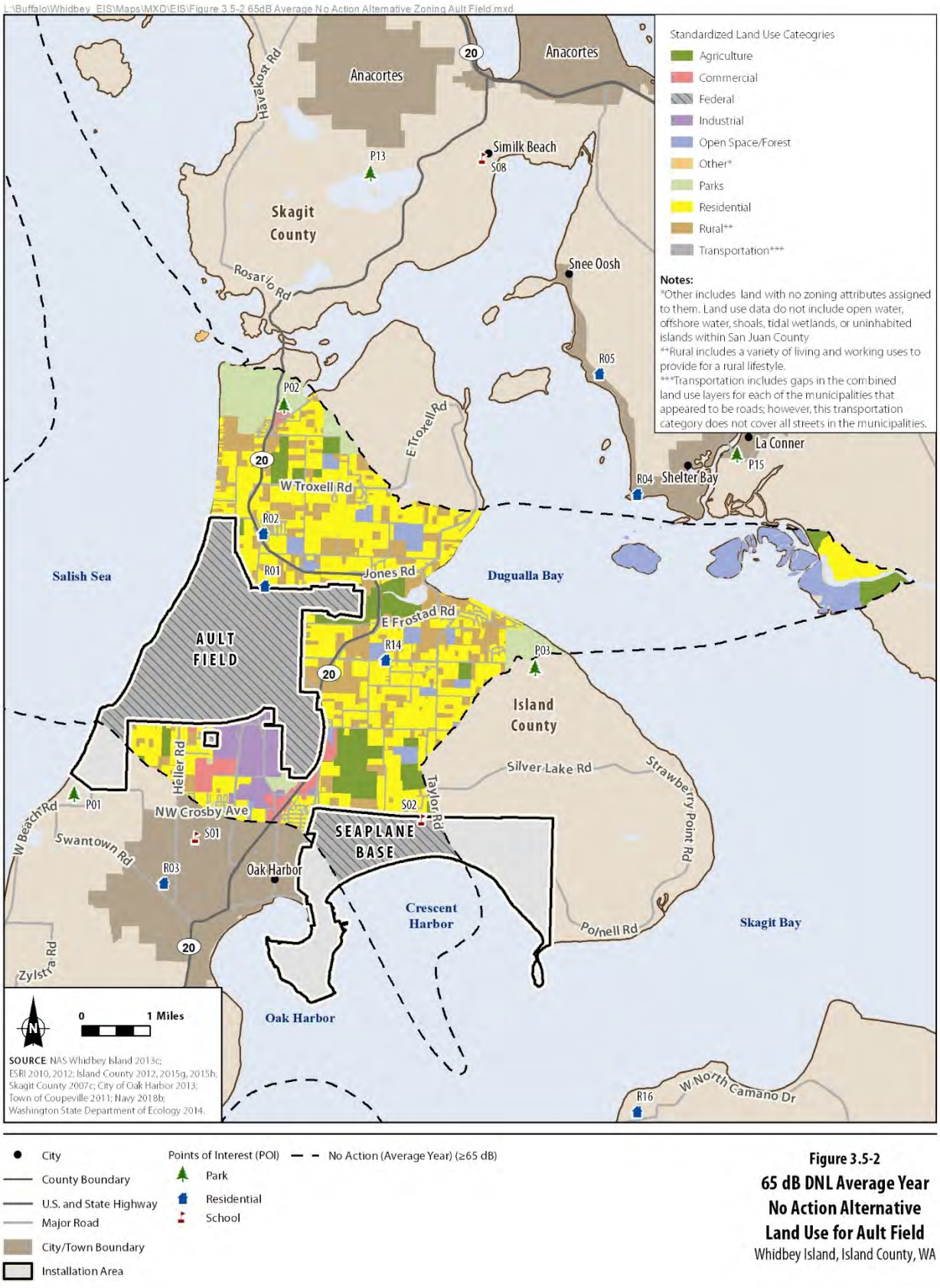


Figure 3.5-2
65 dB DNL Average Year No Action Alternative Land Use for Ault Field
Whidbey Island, Island County, WA

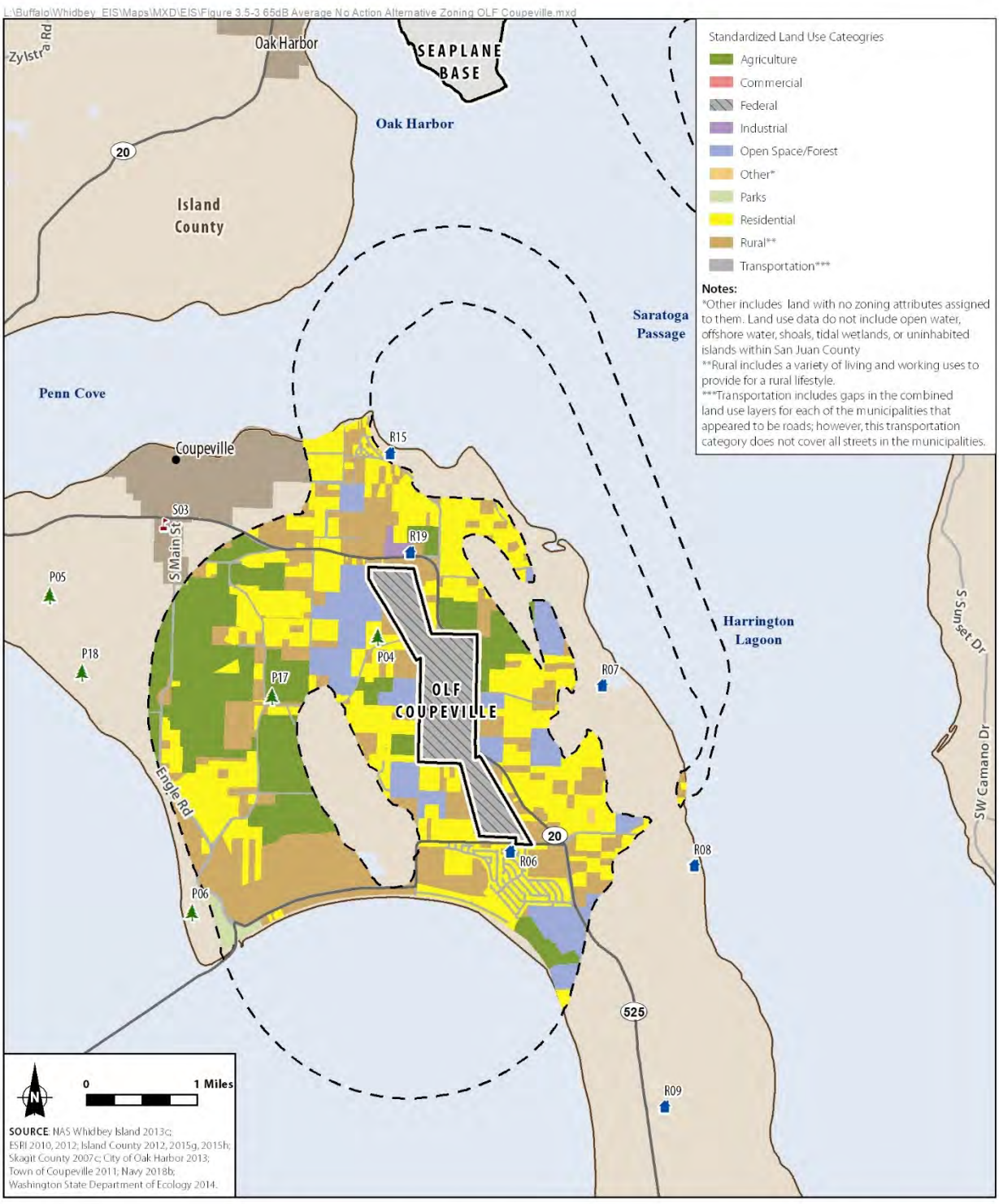


Figure 3.5-3
65 dB DNL Average Year No Action Alternative Land Use for OLF Coupeville
Whidbey Island, Island County, WA

The plan was revised and updated in June 2016 to comply with WGMA requirements. In addition, the noise zone construction standards defining minimum design requirements to safeguard life, health, property, and public welfare within noise-sensitive areas in the vicinity of Ault Field, ensure compatibility between Ault Field and surrounding land uses, and protect Ault Field from incompatible encroachment (Oak Harbor Municipal Code, 2015). Additionally, the City of Oak Harbor adopted a noise disclosure statement, which states "No person shall sell, lease, or offer the sale or lease of any property within the noise contours of 60 Ldn or above." Further, the city may impose a fine of up to $1,000 for violation of this requirement (Oak Harbor Municipal Code, 2015).

3.5.2.2.5 Town of Coupeville Comprehensive Plan (2003) and Zoning Ordinance (2016)

The Town of Coupeville adopted a comprehensive plan in October 1994. It has been updated several times, most recently in July 2003. The plan recognizes the economic relationship the town benefits from with Ault Field and OLF Coupeville. Figures 3.5-2 and 3.5-3 show existing land uses in Island County with the No Action noise contours overlain.

The Town of Coupeville does not have an established overlay district restricting development under the AICUZ noise contours or APZs and does not have a noise disclosure statement within its municipal code.

3.5.2.2.6 Additional Regional Land Use Controls

Additional land use requirements for compatibility may also result from state or local laws, or community-led joint land use study (JLUS) agreements. Whereas an AICUZ study represents the Navy's compatible land use recommendations to the community, a JLUS is a community document. The JLUS encourages collaborative planning and communication while encouraging compatible development near military facilities as those communities experience growth. The JLUS is produced in partnership with the DoD Office of Economic Adjustment. A JLUS has not yet been initiated at the NAS Whidbey Island complex, but it remains a tool for long-term consideration to address land use compatibility surrounding Ault Field and OLF Coupeville.

3.5.2.2.7 Readiness and Environmental Protection Integration Program, Conservation Easements, and Navigation Easements

The Navy has made positive changes to ensure conservation and minimize the potential for incompatibility. The DoD's Readiness and Environmental Protection Integration (REPI) program is a key tool for combating the airfield encroachment that can limit or restrict military training, testing, and operations. The REPI program protects these military missions by helping remove or avoid land use conflicts near installations and addressing regulatory restrictions that inhibit military activities. The REPI program is administered by the Office of the Secretary of Defense (OSD).

A key component of the REPI program is the use of buffer partnerships among the military services, private conservation groups, and state and local governments, authorized by 10 U.S.C., Section 2684a. These partnerships share the cost of acquisition of easements or other interests in land from willing sellers to preserve compatible land uses and natural habitats near military facilities that help sustain critical military mission capabilities that are at-risk from external encroachment pressures (DoD, 2017).

Through the REPI program, NAS Whidbey Island has been able to protect land uses under the primary flight corridors at both airfields within the NAS Whidbey Island complex. As of January 2018, the Navy has invested $13.8 million in direct payments to landowners willing to maintain compatible uses within the flight corridors. These easements protect local farms and endangered species, as well as prevent

incompatible uses within the most heavily used air space. Through this program, NAS Whidbey Island has protected 1,505 acres of open space and working farms (NAS Whidbey Island, 2018).

The Conservation Futures Funds program is operated by Island County to preserve and protect valuable and sensitive lands for future generations. Island County commissioners have the ability to establish specific goals for awarding these local grant contributions. In the most recent cycle, lands that also protected NAS Whidbey Island were awarded extra points as the local priority for grant awards. The Whidbey Camano Land Trust has been NAS Whidbey Island's most frequent partner in easement acquisitions around the NAS Whidbey Island complex, and the Conservation Futures Funds are often the source of local matching funds for the REPI easement acquisitions (NAS Whidbey Island, 2018).

The Navy has also purchased 18 navigation easements over 27 parcels scattered around OLF Coupeville. Navigation easements grant the Navy the right of passage in and through the airspace at various altitudes, depending upon the location of the parcel (Navy, 2005a).

3.5.2.3 Community Character

Municipalities define their community character through the comprehensive planning process. Comprehensive plans document existing community character, set out a vision for the future, and configure a road map for achieving that goal by guiding land use patterns and development. Ideally, comprehensive plan goals are implemented through land use regulations and other municipal actions.

Municipalities commonly define existing character through the connectivity of their natural and built environments. The natural environment may include such elements as a community's visual and scenic qualities, river corridors, open lands, farmlands, wetlands, woodlands, mountains, critical habitats, air quality, water quality, and noise levels. The built environment may include historic buildings, particular development patterns, and the visual character of the built landscape. Social and cultural environments and the economic environment are also part of the built environment. The social and cultural environment of a community includes such components as the crime rate, property maintenance, school quality, property values, and historic and cultural resources. The economic environment of a community includes types of jobs, their quantity and quality, commuting patterns, and the integrity of a downtown area.

Key characteristics can include the amount of noise in a community, traffic patterns/volume, and air quality. The following sections describe the community character of Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville.

3.5.2.3.1 Community Character, Island County

The 2016 update of the Island County comprehensive plan outlines the planning framework and goals of Island County through year 2036. The vision statement of the Island County comprehensive plan update is to "balance the goals of the Growth Management Act to ensure that Island County's rural character and natural beauty is protected, while meeting the housing and service needs of both existing and future County residents." Island County deeply values its rural character, stating it is essential to the quality of life within the county (Island County, 2016d). Forests, farmlands with crops and livestock, wildlife, flora, hiking and biking trails, beach access, and other open spaces for recreational use are highly valued assets in Island County, contributing to the rural character of the area. Generally, within Island County, Langley and Coupeville have remained more rural, while Oak Harbor has experienced more urban growth. As such, the county's comprehensive plan, through policy, zoning, and land use

decisions, aims to preserve open space, agriculture, and rural character while promoting urban growth in defined areas (Island County, 2016d).

3.5.2.3.2 Community Character, Skagit County

Skagit County values its rural community character and open space. The Skagit County 2016 comprehensive plan provides a sense of direction to where the county is going (trends and vision) and seeks to protect and retain the rural lifestyle in Skagit County. According to the Skagit County comprehensive plan, "Agriculture is the dominant factor in Skagit County's economy and community character." Farming, ranching, commercial forestry, and fishing have been a vital part of the county's culture since the early 1880s and continue to define the community today. Planning efforts for growth within the county reflect the desire to retain rural character while promoting an economy to compliment the county's agricultural and resource heritage (Skagit County, 2016).

3.5.2.3.3 Community Character, City of Oak Harbor

The City of Oak Harbor values its diverse community character and defines itself in two distinct areas: east and west of SR 20. The area west of SR 20 contains newer residential development, curvilinear streets, and cul-de-sacs. The area east of SR 20 contains a mix of predominantly post-war modern ranch homes within a gridded street pattern and a mix of commercial services.

Given the City of Oak Harbor's location within Whidbey Island, the connection between the urban environment and natural environment is highly valued. Through the City of Oak Harbor's comprehensive plan, the city seeks to preserve the native landscape and wildlife corridors, shorelines, waterfront trails and parks, and ease of access to outdoor recreation.

Additionally, the City of Oak Harbor contains areas of urban, commercial, rural residential, and agricultural development. Within downtown Oak Harbor and commercial areas, the city promotes pedestrian-friendly characteristics and cherishes its historic character. Urban growth areas have a rural residential character that the comprehensive plan seeks to preserve. In agricultural areas, the city preserves rural features, including farm buildings and structures of historic or architectural significance.

Of additional value to the city is maintaining its small-town character while respecting its "proud military heritage" (City of Oak Harbor, 2016).

3.5.2.3.4 Community Character, Town of Coupeville

The Town of Coupeville, through its comprehensive plan, aims to enhance its historic small-town community character, preserve its rural and agricultural heritage, and protect its significant natural landscape. Additionally, the Town of Coupeville contains 52 historic structures within its limits and identifies with a historical, unique seaside village character.

The historic Penn Cove shoreline area serves as the town's commercial core. Outside of this historic business district, the town's shoreline is primarily rural residential, with a few scattered farms. Due to undeveloped bluffs and the location of the town park and a boat launch, Coupeville has an open character shoreline. The town recognizes this as part of its environmental heritage that it seeks to preserve.

Open space characteristics provided by parks, vacant land, and the Penn Cove shoreline contribute to a low-density, small-town character for Coupeville.

3.5.2.4 Land Use Compatibility Assessment

The study area for the land use compatibility assessment is land within the projected DNL noise contours and existing APZs. This includes portions of Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville.

3.5.2.4.1 DNL Noise Contours

To assess the compatibility of surrounding land use with existing aircraft operations at the NAS Whidbey Island complex, maps of the affected environment DNL noise contours for the installation were overlaid on composite land use maps from Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville. Land use designations within each of these DNL noise contours were compared with the land use compatibility recommendations under the AICUZ program.

Portions of Island County, the City of Oak Harbor, and the Town of Coupeville are within the projected DNL noise contours for the NAS Whidbey Island complex. Table 3.5-2 provides the total area, by land use category, within the 65 to 69 dB DNL, 70 to 74 dB DNL, and the greater than or equal to 75 dB DNL noise contours around Ault Field and OLF Coupeville.

Residential land uses exist within each DNL noise contour around Ault Field and OLF Coupeville, and parks exist within the greater than or equal to 75 dB DNL noise contour around Ault Field. Per the AICUZ program, residential land use is not recommended within the 65 dB or greater noise contours (see Table 3.5-2). Additionally, parks are not recommended within the greater than or equal to 75 dB DNL noise contour. These land uses represent existing areas of potentially incompatible land use. As stated above in Section 3.5.2.2, land uses are regulated by the municipality and/or county.

Table 3.5-2 Existing Land Uses within Affected Environment[6] DNL Noise Contours Surrounding Ault Field and OLF Coupeville

Land Use	DNL Noise Contours (acres)			Total Acres (% of Total Land Use)[1]
	65 - <70 dB DNL	70 - <75 dB DNL	=75 dB DNL	
Ault Field				
Agriculture	315	310	506	1,131 (6%)
Commercial	78	170	90	338 (2%)
Federal[2]	1	0	12	13 (<1%)
Industrial	56	322	184	562 (3%)
Open Space/Forest	597	323	172	1,092 (6%)
Parks	471	185	245	901 (5%)
Residential	1,585	1,330	2,648	5,563 (28%)
Rural[3]	361	517	1,350	2,228 (11%)
Transportation[4]	121	112	342	575 (3%)
Other[5]	11	0	0	11 (<1%)
Subtotal	3,596	3,269	5,549	12,414 (63%)
OLF Coupeville				
Agriculture	837	705	30	1,572 (8%)
Commercial	1	0	0	1 (<1%)
Federal[2]	0	2	7	9 (<1%)
Industrial	0	15	12	27 (<1%)
Open Space/Forest	372	306	98	776 (4%)
Parks	47	7	0	54 (<1%)
Residential[3]	1,388	1,019	229	2,636 (13%)
Rural[4]	896	954	215	2,065 (10%)
Transportation[5]	135	80	47	262 (1%)
Other[6]	5	0	0	5 (<1%)
Subtotal	3,681	3,088	638	7,406 (36%)
TOTAL	**7,277**	**6,357**	**6,187**	**19,821**

Table 3.5-2 Existing Land Uses within Affected Environment[6] DNL Noise Contours Surrounding Ault Field and OLF Coupeville

Land Use	DNL Noise Contours (acres)			Total Acres (% of Total Land Use)[1]
	65 - <70 dB DNL	70 - <75 dB DNL	=75 dB DNL	

Notes:

1 Acreages have been rounded to ensure totals sum.

2 "Federal" land use includes federally zoned land. "Federal" does not include the Installation boundary.

3 "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

4 "Rural" is low density, which includes a variety of living and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

5 The "Transportation" class was created by taking any gaps in the combined land use layer that appeared to be roads and identifying them as Transportation. This Transportation land use category does not cover all streets in the region.

6 "Other" includes land with no zoning attributes assigned to it. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

7 "Affected Environment" refers to year 2021 because 2021 operations represent conditions and events at Ault Field for aircraft loading, facility and infrastructure assets, personnel levels, and number of aircraft expected to be fully implemented and complete. Affected environment is the same as the No Action Alternative.

Key:
dB = decibel
DNL = day-night average sound level
OLF = outlying landing field

3.5.2.4.2 Accident Potential Zones

To assess the compatibility of surrounding land use with existing aircraft operations at the NAS Whidbey Island complex, maps of the existing APZs for the installation were overlaid on composite land use maps from Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville. Land use designations within each APZ and Clear Zone were compared with land use compatibility recommendations under the AICUZ program.

Ault Field. Existing APZ-I and APZ-II at Ault Field cover approximately 1,700 and 3,400 acres, respectively. Land use within APZ-I and APZ-II is mostly agricultural, residential, and rural land. The Clear Zone covers approximately 500 acres, and land use within the zone is agricultural.

Per the AICUZ program, residential land uses are potentially incompatible within APZs (see Table 3.5-2). The residential land within the APZs therefore represents existing areas of potentially incompatible land use. As stated above in Section 3.5.2.2, land uses are regulated by the municipality and/or county.

OLF Coupeville. OLF Coupeville does not currently have formally defined APZs. The Clear Zone covers approximately 250 acres, and land use within the zone is designated as rural.

3.5.2.5 Recreation and Wilderness

This section discusses federal, state, and local parks and other recreational areas within the vicinity of the NAS Whidbey Island complex, including their facilities and features and relevant management measures. The study area for recreation and wilderness areas includes areas near the NAS Whidbey Island complex within the affected environment DNL noise contours out to the 65 dB DNL noise contour. Recommended land use compatibility guidelines developed under the AICUZ program state that outside of the greater than 65 dB DNL noise contours all land uses are generally considered compatible with military aircraft operations (see Table 3.5-1).

> "A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed to preserve its natural conditions and which…has outstanding opportunities for solitude or a primitive and unconfined type of recreation" (Public Law 88-577, section 2[c]).

3.5.2.5.1 Wilderness

The Wilderness Act of 1964 established the National Wilderness Preservation System, "composed of federally owned areas designated by the Congress as 'wilderness areas'." The act specifies that "these [areas] shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness" (Public Law 88-577). The definition of "wilderness" under the act is included in the text box on this page. Large complexes of wilderness are located in eastern Washington State and include:

- the Daniel J. Evans Wilderness in Olympic National Park and the Stephen Mather Wilderness in North Cascades National Park, both managed by the NPS
- the Mount Baker, Boulder River, Glacier Peak, Buckthorn, Brothers, and Mount Skokomish wilderness areas and others on the Olympic Peninsula and in the Cascades mountain range managed by the U.S. Forest Service (USFS)
- the San Juan Islands Wilderness and Washington Islands Wilderness, which encompass islands, rocks, and reefs offshore, managed by the USFWS. (Wilderness.net, 2017)

No Congressionally designated wilderness areas are located within the NAS Whidbey Island complex affected environment DNL noise contours. However, the Bureau of Land Management (BLM) has determined that BLM-owned and controlled lands in the San Juan Islands National Monument possess wilderness characteristics (i.e., "possess naturalness and outstanding opportunities for solitude or primitive and unconfined recreation") (BLM, n.d.[a]). The BLM currently is determining management measures for lands with wilderness characteristics in the national monument as part of its ongoing Resource Management Plan process; the San Juan Islands National Monument Resource Management Plan is expected to be complete in the spring of 2018 (BLM, n.d.[b]).

Williamson Rocks and Bird Rocks, which are exposed, uninhabited bedrock formations closed to the public that are included in the San Juan Islands Wilderness, part of the National Wilderness Preservation

System, also are located near the affected environment DNL noise contours (USFWS, 2010c). These rock formations are in proximity to a busy marina and Rosario Strait, which is a U.S. Coast Guard Regulated Navigation Area due to the amount of vessel traffic through this passage. In addition to noise from vessel traffic in the vicinity, these areas currently experience audible aircraft noise about 4 percent of the time based on the *NPS Acoustic Monitoring Report for Ebey's Landing National Historical Reserve* (NPS, 2016).

The San Juan Islands Wilderness, established in 1976, was designated "to secure for the American people of present and future generations the benefits of an enduring resource of wilderness" and encompasses approximately 355 acres of the Protection Island and San Juan Islands National Wildlife Refuge (NWRs), managed by the USFWS. The refuges include approximately 1,108 acres of rocks, reefs, and islands throughout the San Juan Archipelago in Island, San Juan, Skagit, and Whatcom Counties (USFWS, 2010c). The USFWS has prepared a Comprehensive Conservation Plan and Wilderness Stewardship Plan addressing the San Juan Islands Wilderness (USFWS, 2010c). The plan identifies planning issues, goals and objectives, and management strategies for the refuge and designated wilderness areas:

- The USFWS defines an issue as any matter that requires a management decision, including initiatives, opportunities, resource management problems, threats to resources of a refuge, conflicts in uses, public concerns, or presence of undesirable resource conditions. Issues identified in the plan that are pertinent to the Proposed Action include the potential for low-flying aircraft to disturb nesting colonies of seabirds and disturbance of wilderness character. The USFWS identifies the desired condition as "no aircraft, except by refuge authorization, within 1,000 feet of a nest during breeding season" (USFWS, 2010c).
- One goal identified in the plan is to promote the wilderness character and experience of the San Juan Islands Wilderness Area. Other goals noted in the plan relate to restoring, maintaining, and protecting the shorelines and ecosystems of islands included in the refuges and educating visitors and regional residents on the resources of Salish Sea ecosystems. An objective related to the goal of promoting wilderness character is to preserve visitors' experience of predominantly natural sights and sounds.
- Management strategies related to wilderness areas include actions meant to restore, maintain, and protect habitat as well as promotion of a 2,000-foot aircraft ceiling over wilderness islands (USFWS, 2010c).

Both Williamson Rocks and Bird Rocks are closed to public entry to protect sensitive wildlife species and habitat (USFWS, 2010c). Visitors are required to stay 600 feet (200 yards) or more offshore when observing wildlife, and recreational opportunities are limited to scenic and wildlife viewing from boats, other vessels, and aircraft offshore.

3.5.2.5.2 Parks and Recreation Areas

Land use analysis also considers the effects of noise on special management areas, such as national, state, and local parks and recreation areas. Federal and state special management areas in the vicinity of the NAS Whidbey Island complex are managed by different agencies, including the NPS, BLM, USFS, and Washington State Parks and Recreation Commission. Laws and regulations applicable to federal and state special management areas, discussed in the sections below, vary in scope and authority depending on the purposes for which these areas were designated.

Table 3.5-3 lists the federal, state, and local parks and public recreational areas that are located within or partially within the affected environment DNL noise contours associated with the NAS Whidbey Island complex and the agencies that own and/or manage these areas. Figure 3.5-4 shows parks within the study area (the area within the affected environment DNL noise contours out to the 65 dB DNL noise contour). The figure incorporates data from the Island County Parks Plan and U.S. Geological Survey Gap Analysis Program. Selected properties are described following the table and figure, and federal, state, and local policies related to parks and recreation areas that are relevant to the analysis in the EIS are described in the subsections following.

Table 3.5-3 Parks and Recreation Areas in the NAS Whidbey Island Complex Affected Environment DNL Noise Contours

Tier of Government	*Managing Agency*	*Parks and Recreation Areas*
Federal	U.S. Department of the Interior, Bureau of Land Management	San Juan Islands National Monument[1]
	U.S. Department of the Interior, National Park Service	Ebey's Landing National Historical Reserve
	U.S. Department of the Interior, Fish and Wildlife Service	San Juan Islands National Wildlife Refuge
	U.S. Department of Agriculture, Forest Service	Pacific Northwest National Scenic Trail (in partnership with the Pacific Northwest Trail Association)
State	Washington State Parks	Deception Pass and Dugualla State Parks, Fort Casey State Park, James Island Marine State Park (San Juan County)[3]
County	Island County	Parks and Trails: Clover Valley Ball Park and Off-leash Dog Park, Moran Beach, Rocky Point public beach access[3], Long Point public beach access, low-tide trails (between Ebey's Landing Road and Keystone Jetty), Driftwood Park, Crockett Blockhouse, Rhododendron Park, and Patmore Pit
	Skagit County	Ika Island (designated Open Space of Regional and Statewide Importance), and the Skagit Wildlife Area, including Goat Island and Skagit Bay Estuary
Municipal	City of Oak Harbor	Parks: Technical Drive Off-leash Dog Park, Ridgewood Park Public Schools: Hand-in-Hand Early Learning, Crescent Harbor Elementary School[3], Olympic View Elementary School[3]
	Coupeville	Parks and Trails: Parker Road Trail Public Schools: Coupeville Middle School[3], Coupeville High School[3]

Sources: BLM Spokane District Office, n.d.; NPS, n.d.[a], n.d.[b]; USDA Forest Service, n.d.[a]; Washington State Parks, n.d.[a]; Deception Pass Park Foundation, 2015; Island County, 2015d, 2015e, 2006; Skagit County, 2007b, 2015; WDFW, 2016; City of Oak Harbor, n.d., 2012; Town of Coupeville, 2013

Notes:

1 No portions of the designated monument lands fall within the 65 dB DNL noise contour. However, the San Juan Islands National Monument is considered for inclusion in this analysis under "*Parks and Recreation Areas in the NAS Whidbey Island Complex Affected Environment DNL Noise Contour Footprint*" because water areas within the Conservation Area Boundary associated with the national monument are within the greater than 65 dB DNL noise contour.

2 Dugualla State Park is managed as a satellite unit of Deception Pass State Park.

3 No portions of these recreational areas fall within the greater than 65 dB DNL noise contour. They are introduced here because they would fall within the DNL noise contours under some of the alternatives. Those conditions are described in Section 4.5.

Key:

dB = decibel

DNL = day-night average sound level

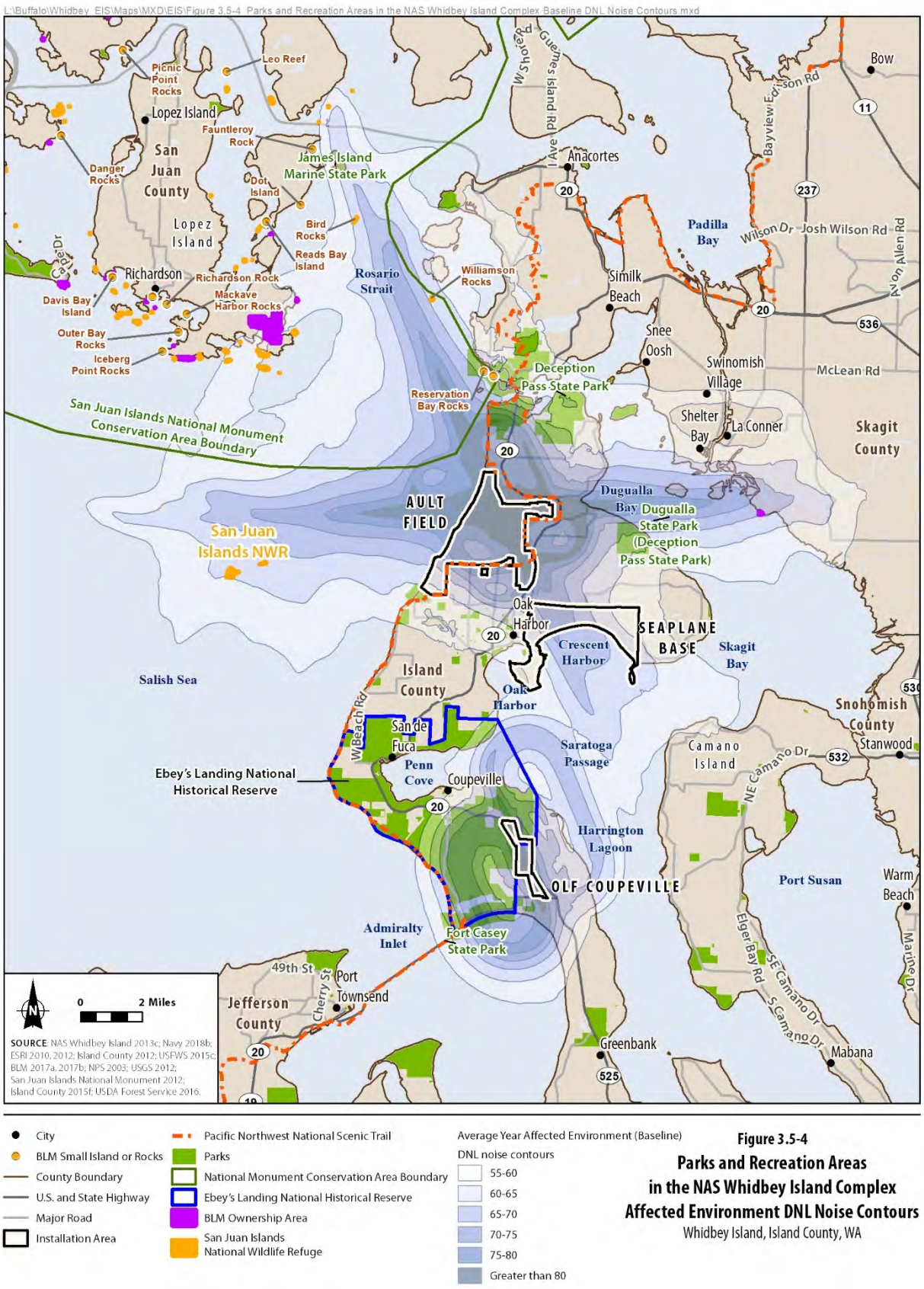


Figure 3.5-4
Parks and Recreation Areas in the NAS Whidbey Island Complex Affected Environment DNL Noise Contours
Whidbey Island, Island County, WA

3.5.2.5.2.1 San Juan Islands National Monument

BLM-owned lands in the San Juan Islands northwest of the NAS Whidbey Island complex have been designated the San Juan Islands National Monument by presidential proclamation (White House Office of the Press Secretary, 2013). Signed by President Barack Obama on March 25, 2013, the proclamation defines certain uses and activities that are allowed or restricted on lands included in the national monument; specifically, the proclamation states that safe and efficient aircraft operations by the Armed Forces are not restricted by the designation of the national monument (White House Office of the Press Secretary, 2013). National monuments are included in the National Landscape Conservation System established by the Omnibus Public Land Management Act of 2009 (Public Law 111-11), which directs the BLM to "conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values" (Section 2002).

The San Juan Islands National Monument includes BLM lands in the San Juan Islands archipelago, which includes over 450 islands, rocks, and pinnacles, the largest of which are San Juan Island, Orcas Island, and Lopez Island (White House Office of the Press Secretary, 2013). Recreational opportunities offered by the lands in the national monument and surrounding waters include wildlife viewing, fishing, kayaking, hiking, and camping (BLM Spokane District Office, n.d.). An estimated 500,000 people visit the San Juan Islands annually, but the number visiting the monument properties, specifically, is unknown (BLM, n.d.[d]). Visitation numbers are available for several Washington State Parks within the San Juan Islands. State parks within the vicinity of the 65 dB DNL noise contour include James Island, Spencer Spit on Lopez Island, and Turn Island. James Island Marine State Park is the only park in the San Juan Islands with territory inside the greater than 65 dB DNL noise contour. Visitation numbers from 1987 through 2016 for each of these parks are provided in Table 3.10-14 in Section 3.10.2.2, Economy, Employment, and Income, Affected Environment. Between 2011 and 2016, visitation numbers have ranged between 6,201 and 15,737 visitors at James Island Marine State Park; 50,430 and 90,156 visitors at Spencer Spit State Park; and 8,225 and 11,735 visitors at Turn Island State Park (Washington State Parks, n.d.[a]). Visitation numbers at each of these parks have varied during this short timeframe, with no clear trends of increases or decreases.

The proclamation establishing the national monument does not restrict "safe and efficient aircraft operations, including activities and exercises of the Armed Forces…in the vicinity of the monument" (White House Office of the Press Secretary, 2013). No BLM lands in the San Juan Islands National Monument are located within the greater than 65 dB DNL noise contours under affected environment conditions; however, portions of the waters around the monument are located within the greater than 65 dB DNL noise contours. The closest national monument lands to the NAS Whidbey Island complex are located a little over 3 miles north of NAS Whidbey Island. These are the Reservation Bay Rocks, located offshore of Deception Pass State Park (BLM Spokane District Office, n.d.). The rocks are located outside of the 65 dB DNL noise contour.

3.5.2.5.2.2 San Juan Islands National Wildlife Refuge

The San Juan Islands NWR consists mainly of rocks, reefs, and islands throughout the San Juan Archipelago that provide important breeding and haul-out habitats for waterfowl, seals, and sea lions. Two islands within the NWR, Smith and Minor, are located in the Strait of Juan de Fuca west of Whidbey Island. The NWR covers approximately 449 acres in Island, San Juan, Skagit, and Whatcom Counties. Islands and rocks within the NWR also provide important habitats for rare native plants. The USFWS provides opportunities for hiking, wildlife observing, and camping on two refuge islands. Many of the

rocks, reefs, and islands within the NWR are closed to public access to protect wildlife, habitat, and designated wilderness. Recreational opportunities around these areas are limited to viewing wildlife and scenery from ferries, commercial tour boats, private boats and kayaks, and aircraft (USFWS, 2010c).

Williamson and Bird Rocks, located near the affected environment DNL noise contours, are designated wilderness areas and subject to more restrictive management measures to preserve their wilderness resources and values, as described in the Wilderness Areas section above. These rock formations are closed to the public, and recreational opportunities associated with them are limited to wildlife and scenic viewing from boats, other vessels, and aircraft offshore.

3.5.2.5.2.3 Ebey's Landing National Historical Reserve

Under the National Park Service Organic Act of 1916 (Organic Act) (16 U.S.C. 1 *et seq.*), the NPS is responsible for managing national parks "by such means and measures as conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The Organic Act was reinforced by the Redwoods Act of 1978, which states that "the protection, management, and administration of [national parks] shall be conducted in light of the high value and integrity of the National Park System and shall not be exercised in [ways that harm] the values and purposes for which these various areas have been established, except as may have been or shall be directed and specifically provided by Congress."

The approximately 17,000-acre Ebey's Landing National Historical Reserve preserves the natural setting and cultural history of the Ebey's Landing area on Whidbey Island south of Penn Cove and southwest of the Town of Coupeville. Congress created Ebey's Landing National Historical Reserve in 1978 through passage of Public Law 95-625, Section 508, "in order to preserve and protect a rural community which provides an unbroken historical record from nineteenth century exploration and settlement in Puget Sound to the present time" (NPS, 2006a). The enabling legislation directs that "lands and interests [within the boundaries of the reserve acquired by the NPS] shall, so long as responsibility for management and administration remains with the United States, be administered [by the NPS in accordance with the Organic Act]" (NPS, 2006a). Ebey's Landing National Historical Reserve is unique in that it is managed by the Trust Board of Ebey's Landing National Historical Reserve, which includes representatives of the NPS, Washington State Parks, Island County, and the Town of Coupeville (NPS, n.d.[a]). The majority of the property within Ebey's Landing National Historical Reserve, including historic homes and farms, is privately owned and still occupied by farmers and other residents (NPS, n.d.[a], n.d.[b]).

OLF Coupeville, which began operating in 1943, is located partially within and along Ebey's Landing National Historical Reserve's southeastern boundary, southeast of Rhododendron Park and south of Smith Prairie, and partially within the reserve. As described in detail in Section 3.6.2.2, Architectural Resources, the Central Whidbey Island Historic District/Ebey's Landing National Historic Reserve were added to the National Register of Historic Places (NRHP) in 1973 for their importance to the 19th century for historic aboriginal, agricultural, architectural, commercial, and military qualities.

Estimating visitor trips to Ebey's Landing National Historical Reserve is difficult because of its varied attractions, numerous entrances and exits, and unique land management structure. According to the Trust Board of Ebey's Landing National Historical Reserve, there were more than 1 million visitors to the

reserve in 2016 (Bishop, 2017). This roughly reflects the visitors to the state parks within Ebey's Landing National Historical Reserve annually plus additional history-seeking visitors interested in the Town of Coupeville and surrounding historic cultural landscapes and others who travel to Ebey's Landing for summer camps and social events. Table 3.10-12 in Section 3.10.2.2, Economy, Employment, and Income, Affected Environment, provides visitation numbers for the state parks in Ebey's Landing National Historical Reserve from 1987 through 2016. The table shows that visitation numbers recorded for areas in Ebey's Landing National Historical Reserve between 2011 and 2016 have varied, with low visitation recorded in 2014 in particular, but have generally been within the range of visitation numbers recorded since 1987. Recreational opportunities in public and some private areas of Ebey's Landing National Historical Reserve include hiking, bicycling, boating, picnicking, camping, bird watching, historic tours, and other outdoor activities (NPS n.d.[b], n.d.[c]). Approximately 6,300 acres (or 37 percent) of Ebey's Landing National Historical Reserve is located within the affected environment DNL noise contours for the NAS Whidbey Island complex.

The NPS completed an acoustical monitoring study in the summer of 2015 to collect acoustic data on NPS property in Ebey's Landing National Historical Reserve in response to the Navy's proposal to continue and expand existing Growler operations at the NAS Whidbey Island complex. The study notes the importance of the acoustic environment to visitor experience and NPS management of Ebey's Landing National Historical Reserve:

> "Natural sounds are integral to ecosystem function and are one of the many resources and values that NPS managers are responsible for preserving and restoring. …The acoustic environment, like air, water or wildlife, is a valuable resource that can be substantially degraded by inappropriate sound levels and frequencies. Intrusive sounds (noise) are of concern to NPS managers because they can impede the ability to accomplish the NPS mission of resource protection and public enjoyment. …People visit national parks to see, hear and experience myriad phenomena associated with specific natural and cultural environments. Yet, in many cases, those environments are being increasingly impacted by anthropogenic noise altering their experience" (NPS, 2016).

The NPS installed two acoustic monitoring systems to record data for 31 days, between June 19, 2015, and July 21, 2015. Site 1 is located at the Reuble Farmstead (which includes offices, a conference room, transient quarters, and workshops) and is under low-elevation flight paths associated with OLF Coupeville. Site 2 is located adjacent to Ebey's Landing and Ebey's Prairie at the Ferry House and is situated closer to arrival and departure flight tracks associated with Ault Field. NPS recorded sound levels continuously throughout the 31-day monitoring period (over 730 hours of audio recording). The NPS's acoustic monitoring study documents SEL values for Sites 1 and 2 of 96 and 117 dB (C-weighted), respectively. The L_{max} values ranged from 85 to 113 dB. Over the duration of monitoring, audible aircraft noise occurred less than 4 percent of the time, and noise above 60 dB occurred only 1 percent of the time (NPS, 2016).

The acoustic monitoring study also calculated the DNL recorded over the 33-day monitoring period at each site. The calculated DNL at Site 1 was 73.6, and the calculated DNL at Site 2 was 54.7. Based on the modeled baseline (2021) noise contours considered in this EIS (see Figure 3.2-3), Site 1 is within the 65 to 70 dB DNL noise contours, and Site 2 is outside of the greater than 65 dB DNL contours, consistent with NPS's calculated DNL. Noise above 60 dBA occurred less than 1 percent of the total audio-collection

time (over 730 hours) at either recording location and measured an L_{max} of 113 dB at Site 1 and 85 dB at Site 2 (see Section 1.12 for additional discussion).

The NPS has established park management policies to conserve park resources and values, avoid or minimize impairment of these resources and values, and provide for public enjoyment. NPS has identified resources and values that national parks provide, which include natural soundscapes and appropriate opportunities for public enjoyment of parks. The NPS manages sound sources in national parks to the degree possible to preserve the natural soundscapes of parks. The process of managing unnatural sounds in parks requires identifying the types and levels of unnatural sounds that result in unacceptable impacts on natural soundscapes, monitoring sources of unnatural sounds, and creating and enforcing park policies and rules to address unacceptable noise impacts (NPS, 2006b). The NPS has stated that noise from existing overflights of military aircraft "significantly impacts the natural soundscape" at Ebey's Landing National Historical Reserve on a regular basis and presents "significant mitigation challenges" (O'Brien, 2017). However, the reserve was established after military aircraft operations began at OLF Coupeville and military aircraft noise was already part of the soundscape when the reserve was created. Section 3.6, Cultural Resources, provides more information on Ebey's Landing National Historical Reserve in the context of the region's military history.

3.5.2.5.2.4 Pacific Northwest National Scenic Trail

National scenic trails, such as the Pacific Northwest National Scenic Trail that crosses the northern part of Whidbey Island, are established under the National Trails System Act to "provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass" (16 U.S.C. 1242 §3(a)[2]). Managing agencies are directed to develop comprehensive plans for the acquisition, management, development, and use of designated trails. These plans address management issues specific to each trail but in general address occurrences of overuse of the trail or conflicting uses and identify areas where protection of the trail environment is needed (USDA Forest Service, Pacific Northwest Region, 1982). The USFS is currently developing a comprehensive plan for the Pacific Northwest National Scenic Trail (USDA Forest Service, n.d.[a]).

The Pacific Northwest National Scenic Trail extends approximately 1,200 miles from Glacier National Park to Cape Alava on the Olympic Peninsula. The trail was originally created by the Pacific Northwest Trail Association in 1977, and several portions of the trail received federal designation beginning in 2000. The Public Lands Omnibus Act of 2009 placed the trail under the management of the Department of Agriculture, with the USFS serving as the trail administrator. The USFS is in the process of preparing a comprehensive plan to guide management of the trail corridor; this plan in part will address measures the USFS should take to preserve natural resources in the corridor and the visitor experience (USDA Forest Service, n.d.[a]). A portion of the trail crosses Whidbey Island from Deception Pass State Park, along county roads and shoreline bluffs near Ebey's Landing National Historical Reserve and Fort Casey State Park to the Port Townsend Keystone Ferry landing (Island County, 2006; USDA Forest Service, n.d.[b]). An estimated 10.7-mile portion of the trail on Whidbey Island falls within the NAS Whidbey Island complex affected environment DNL noise contours. Visitor numbers for the portion of the trail on Whidbey Island are not publicly available.

3.5.2.5.2.5 State Parks and Recreation Areas

The Washington State Parks and Recreation Commission has the authority to adopt and enforce policies and rules related to the use and administration of state parks and use modern conservation practices to maintain and enhance park aesthetic, recreational, and ecological resources (Revised Code of Washington [RCW] 79A.05.030 and 79A.05.035). The commission recently completed the Centennial 2013 Plan, which outlines broad goals for state parks, including improving and upgrading existing state parks and creating new parks and trails (Washington State Parks and Recreation Commission, 2009).

State parks within the study area near the NAS Whidbey Island complex, including Deception Pass (established [est.] in 1923) and Dugualla (a satellite unit of Deception Pass State Park, est. 1992) State Parks, Fort Casey State Park (est. 1980), and James Island Marine State Park (est. 1974), offer a variety of recreational activities such as hiking, biking, horseback riding, picnicking, field games, boating, shellfish harvesting and fishing, beachcombing, kayaking, diving, wildlife watching, and other outdoor activities (Washington State Parks, n.d.[b], n.d.[c], n.d.[d], n.d.[e]; Deception Pass Park Foundation, 2015 and 2017). Fort Casey State Park provides sports fields that are used for field games such as soccer. Deception Pass and Fort Casey State Parks offer interpretive and educational programs from May through the beginning of September (Washington State Parks, n.d.[a], n.d.[b]). Deception Pass, Fort Casey, and James Island offer a variety of camping facilities, including tent sites, utility-served sites, cabins, and overnight mooring sites (Washington State Parks, n.d.[a], n.d.[b], n.d.[c]). Most of James Island Marine State Park is "designated a Natural Forest Area and is closed to public access except for designated recreational areas and trails" (Washington State Parks, n.d.[e]).

Two state parks in the study area, Deception Pass State Park and James Island Marine State Park, are also camping and day-use sites on the Cascadia Marine Trail, a designated National Recreation Trail managed by a partnership of agencies. The trail provides opportunities for water recreation between 66 campsites and 160 day-use sites in the Puget Sound region. No other camping or day-use sites along the trail are within the study area (Washington Water Trails Association, 2017; NPS, 2016).

Deception Pass State Park, located approximately 1.3 miles north of Ault Field, "is the busiest state park in Washington state," with an estimated 2 million visitors per year since 2011 (Beahm, 2014). In 2011, Washington State Parks established the Discover Pass system. Under this system, visitors to state parks must purchase a day pass or an annual Discover Pass. After 2011, recorded visitor numbers at many state parks decreased; however, visitors to Deception Pass State Park increased (Beahm, 2014). Table 3.5-4 provides visitation numbers at state parks within the study area, including numbers of overnight campers at Deception Pass, Fort Casey, and James Island Marine State Parks. Since 2011, total numbers of visitors and campers at Deception Pass State Park have generally increased. Visits to Fort Casey and James Island Marine State Parks have not followed a clear trend but have remained within the range of historical visit numbers since 1990, with the exception of a notable one-year increase in total visits to Fort Casey State Park in 2012.

Table 3.5-4 Estimated Total Visitors to State Parks in the Study Area, 1987-2011 (Every Third Year) and 2011-2016[1]

	Deception Pass		*Fort Casey*		*James Island*	
Year	*Total*	*Campers*	*Total*	*Campers*	*Total*	*Campers*
1987	2,909,187	101,051	475,722	18,582	16,040	360
1990	3,410,562	91,906	514,429	20,330	12,416	282
1993	4,286,155	87,634	597,886	20,285	13,738	237
1996	4,337,141	88,431	483,858	21,325	15,349	1,768
1999	2,200,477	97,701	785,857	17,770	15,247	1,049
2002	2,702,673	93,352	741,519	17,075	18,701	1,022
2005	2,535,061	99,654	693,104	16,970	8,583	2,152
2008	1,673,605	114,142	726,331	15,520	Not available	Not available
2011	1,436,938	95,291	667,789	11,607	6,201	3,885
2012	2,239,079	116,914	914,548	18,893	15,036	5,507
2013	2,447,072	119,639	725,119	18,569	15,737	5,899
2014	2,610,178	120,002	480,858	17,846	10,753	2,164
2015	2,633,240	119,915	609,849	17,901	10,825	2,174
2016	2,860,751	120,684	624,778	18,874	10,854	2,141

Source: Washington State Parks, n.d.[a]; Thrasher, 2017a

Note:
[1] Visitor numbers are not available for Dugualla State Park (Thrasher, 2017b).

3.5.2.5.2.6 County and Municipal Parks and Recreation Areas

County and municipally owned parks and recreational facilities, including public school facilities, are located within the affected environment DNL noise contours (Table 3.5-2). These parks and recreational facilities offer a variety of outdoor and indoor recreational activities to local residents and visitors.

Public school facilities in Oak Harbor and Coupeville within the study area are identified in Table 3.5-2. Recreational facilities at public schools include playgrounds, outdoor tracks and sports fields, and open space. School recreational facilities are used daily during the school year and are available for community use outside of school operating hours. Middle school and high school sports occur throughout the year, with outdoor sports seasons in the fall and spring. Fall sports include football, volleyball, cross country, swimming, tennis, soccer, and cheerleading (Oak Harbor Public Schools, 2017a). Spring sports include golf, soccer, baseball, softball, track and field, and tennis (Oak Harbor Public Schools, 2017b; Coupeville School District No. 204, 2017). Youth sporting events are also held at other community ball fields, such as those at Rhododendron Park, located less than 0.5 mile northwest of OLF Coupeville, and Clover Valley Ball Park, located approximately 1 mile south of Ault Field.

In addition to operating recreational facilities, Oak Harbor, Coupeville, other municipalities on Whidbey Island, and other community groups hold outdoor events and festivals during the spring, summer, and fall. A few of north Whidbey Island's major festivals include the following (WhidbeyIsland.us, 2017; Penncovewaterfestival.com, 2017):

- Penn Cove Mussel Festival (March, Coupeville)
- Whidbey Island Marathon (April, Oak Harbor/North Whidbey)
- Holland Happening (April/May, Oak Harbor)

- Penn Cove Water Festival (May, Coupeville)
- Oak Harbor 4th of July Fireworks, Fair, and Parade
- Whidbey Island Race Week (July; Oak Harbor, Penn Cove, and Saratoga Passage)
- Coupeville Arts and Crafts Festival (August)
- Jets over Whidbey (August, OLF Coupeville)
- Oak Harbor Music Festival (September)
- Tour de Whidbey (August, Whidbey Island)
- Whidbey Island Kite Festival (September, Fort Casey State Park)
- Autumn on Whidbey Wine, Spirits, and Art Tour (Fall, Whidbey Island)

One of the ways the Navy mitigates noise impacts on surrounding communities is to avoid scheduling training operations during major community events when possible. Current noise mitigation measures are discussed in Section F below, Section 3.2, and Appendix H.

Island and Skagit Counties and municipalities in these counties determine needs for parks and other recreational facilities based on public input and other measures of service. Island County determines unmet recreation needs in part based on a park or recreational facility's service area compared to areas and residential populations that are not served or are underserved (MIG, Inc., 2010, 2011). Skagit County and the Town of Coupeville use a level of service (LOS) standard based on park/facility acreage per 1,000 people compared to reference standards (Skagit County Parks and Recreation, 2013; Town of Coupeville, 2003). The City of Oak Harbor uses a combination of these two approaches (City of Oak Harbor, 2009). Unmet recreation needs identified in each locality are listed below:

- Island County: Additional nature and specialty (equestrian and mountain biking) trails, beach access points, boat launches, dog parks, campsites, and lands open to hunting (MIG, Inc., 2011)
- Skagit County: Additional trails, shoreline access points, regional park and picnic areas, indoor recreation facilities and pools, camping facilities, sports fields, natural areas/fishing ponds, and open space (Skagit County Parks and Recreation, 2013)
- Town of Coupeville: Additional open space and trails/walkways (Town of Coupeville, 2003)
- City of Oak Harbor: Winter recreation activities/indoor recreation facilities, community parks, additional trails, natural forest areas, tennis courts, softball/baseball fields (City of Oak Harbor, 2009)

3.5.2.5.2.7 Privately Owned and Other Recreation Areas

In addition to the public parks and recreation areas discussed above, many commercial or privately owned recreational facilities, such as golf courses, horse stables, fitness centers, private community centers, campgrounds and RV parks, and other facilities, are located in the communities surrounding the NAS Whidbey Island complex and may be within the affected environment DNL noise contours. Privately owned recreational facilities include community gathering places such as:

- The Whidbey Island Nordic Lodge Hall, located approximately 1 mile northwest of OLF Coupeville. The Nordic Lodge holds regular indoor and outdoor community events, including monthly meetings, celebrations of Nordic holidays, monthly crafters' days, game days, and trekking events (Whidbey Island Nordic Lodge, 2017).

- Camp Casey Conference Center, affiliated with Seattle Pacific University, located approximately 2.5 miles southwest of the OLF. The conference center offers retreats, lodging, and outdoor recreation and educational programs and activities, including an outdoor pool (Seattle Pacific University, 2017).
- The Island County Historical Society Museum, located on the Coupeville waterfront, approximately 3 miles northwest of the OLF and outside of the affected environment DNL noise contours. The Island County Historical Society Museum holds regular outdoor historical interpretive activities and walking tours in and around Coupeville that may occur in parts of the study area (Castellano, 2017).

Residents and visitors to Whidbey Island have opportunities to engage in a wide variety of recreational activities at and outside the parks and recreation areas noted in this section. Recreational activities may include walking and running, hiking, fishing, hunting, road- and off-road biking, kayaking, bird and wildlife watching, picnicking, beachcombing, gardening, and swimming, along with other outdoor leisure activities. In addition to the locations noted in this section, private property, bike paths and lanes, rural roads, and wildlife viewing and hunting areas are used for recreation. These recreational areas occur throughout the study area.

3.5.2.5.3 Noise Effects on Recreation

Military aircraft operations at the NAS Whidbey Island complex currently impact recreation in north and central Whidbey Island. The Navy received comments during public review of the Draft EIS noting that aircraft are visible and audible in parks and recreational areas in the study area, and the frequency of intrusive aircraft noise events has resulted in reported annoyance by residents, visitors to Whidbey Island parks, and park staff (see Appendix M). Users of parks and recreational areas in northern and central Whidbey Island have reported changes in their use of these areas, such as leaving or choosing not to go to parks when aircraft operations are occurring, spending more time indoors on private property, or wearing hearing protection while outdoors during sporting events or other activities. Park managers and event organizers have reported disruptions to interpretive programs or other social events as a result of intrusive noise levels from Growler operations. Intrusive noise caused by Growler operations is highly intermittent, occurring only when aircraft are operating in the vicinity of a park or other recreational area. The *NPS Acoustic Monitoring Report for Ebey's Landing National Historical Reserve* (2016) found that audible aircraft noise occurred less than 4 percent of the time during the more than 730 hours of monitoring, and noise above 60 dB occurred approximately 1 percent of the time. The annoyance of hearing aircraft either off in the distance or nearby is reportedly negatively affecting people's perception, use, and enjoyment of recreational areas within the study area.

Section 3.2, Noise, includes a discussion of general noise impacts and existing noise effects on recreation from aircraft operations at the NAS Whidbey Island complex. The analysis is based on the number of noise events at 11 regional parks or recreational areas per daytime hour that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). Table 3.2-9 presents the results of this analysis. Section 3.2 also discusses existing noise mitigation employed by aircrews flying out of NAS Whidbey Island. When flying in compliance with traffic or approach patterns or when directed by ATC, planes may fly below 3,000 feet AGL. Otherwise, aircrews are required, to the maximum extent possible, avoid flying over noise-sensitive areas, including the San Juan Islands National Monument, downtown Oak Harbor and Coupeville, and Fort Casey.

3.6 Cultural Resources

This discussion of cultural resources includes prehistoric and historic archaeological sites; historic buildings, structures, objects, sites, and districts; and physical entities and human-made or natural features and viewsheds important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources can be divided into four major categories:

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.
- Cemeteries include formal burial grounds, as well as known sites of burials of human remains.
- Traditional cultural properties (TCPs) may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that American Indian tribes and nations (herein after referred to as "tribes") or other groups consider essential for the preservation of traditional culture.

3.6.1 Cultural Resources, Regulatory Setting

Federal laws that regulate cultural resources include the following:

- **National Historic Preservation Act of 1966, as amended**
  This act established a program for the preservation of historic properties and created the NRHP, State Historic Preservation Offices (SHPOs), the Section 106 Review Process, and the Section 110 programs for identification, evaluation, and protection of historic properties.
- **Archeological and Historic Preservation Act of 1974**
  This act was established to provide for the protection of historic American sites, buildings, objects, and antiquities of national significance that might otherwise be lost as a result of any federal construction project or federally licensed activity or program.
- **American Indian Religious Freedom Act of 1978**
  This act provides for protection and preservation for American Indian access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.
- **Archaeological Resources Protection Act of 1979**
  This act requires federal permits for the excavation or removal of archaeological sites on federal lands and sets penalties for violators.
- **Native American Graves Protection and Repatriation Act of 1990**
  This act gives ownership and control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on federal land to federally recognized tribes or Native Hawaiian organizations.

In addition to these, EO 13007, Indian Sacred Sites, also provides for the protection of access to and ceremonial use of Indian sacred sites by Indian practitioners, as well as calling upon federal agencies to avoid adversely affecting the physical integrity of those sacred sites.

Cultural resources also may be covered by state, local, and territorial laws. These types of cultural resources are considered as part of a NEPA assessment. Pertinent to the Proposed Action, the State of Washington cultural resource laws are as follows:

- **Indian Graves and Records (RCW 27.44)**
  This act provides protection to graves and records of Native Americans. It largely pertains to cairns and graves, as well as glyptic or painted records of Native American tribes or peoples.
- **Archaeological Sites and Resources (RCW 27.53)**
  This regulation pertains to archaeological resources that are located in, on, or under the surface of any lands or waters owned by or under the possession, custody, or control of the State of Washington or any county, city, or political subdivision of the state.
- **Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60)**
  This regulation sets forth the requirements for the preservation and protection of cemeteries and historic graves.
- **Archaeological Site Public Disclosure Exemption (RCW 42.56.300)**
  This allows for the protection of archaeological site information in order to avoid looting or depredation of a site.
- **Discovery of Human Remains (RCW 27.44)**
  This regulation establishes procedures to ensure the protection of human remains, especially for those of Native American descent.

3.6.1.1 Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) and as implemented by 36 CFR Part 800, requires federal agencies to consider the effects of their actions on historic properties before undertaking a project that uses federal funds or is located on federal lands. Cultural resources that are listed in the NRHP or eligible for listing in the NRHP are "historic properties" as defined by the NHPA. The NRHP was established under the NHPA and is administered by the NPS on behalf of the Secretary of the Interior. The NRHP includes properties on public and private land, as well as National Historic Landmarks. Properties can be determined eligible for listing in the NRHP by the Secretary of the Interior or by a federal agency official with concurrence from the applicable SHPO. An NRHP-eligible property has the same protections as a property listed in the NRHP.

A historic property is defined as "…any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria" (36 CFR Section 800.16). To qualify for listing on the NRHP, a cultural resource must meet, at minimum, one of the following four criteria:

- **Criterion A**
  properties that are associated with the events that have made a significant contribution to the broad patterns of American history; or
- **Criterion B**
  properties that are associated with the lives of persons significant in our past; or

- **Criterion C**
  properties that embody the distinctive characteristic of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant or distinguishable entity whose components may lack individual distinction; or
- **Criterion D**
  properties that have yielded or may likely yield information important in prehistory or history. (Andrus, 2002).

For cultural resources qualifying as historic properties, consideration for potential effects is afforded under the NHPA.

If a cultural resource can be demonstrated to meet the criteria for listing on the NRHP and retains its integrity (i.e., location, design, setting, materials, workmanship, feeling, and association), it qualifies as a historic property, and adverse effects, either direct or indirect, to that historic property must be avoided, minimized, or mitigated appropriately. Direct effects physically alter the historic property in some way; indirect effects diminish some significant aspect of the historic property but do not physically alter it.

Historic properties can include archaeological sites. Archaeological sites are defined as the location in which evidence of a past activity is preserved, sometimes below the ground surface. Historic properties also can include elements of the built environment. Buildings, structures, objects, sites, or districts can be considered historic properties. These resources typically are over 50 years in age. While archaeological sites often are recommended as eligible under Criterion D, built structures can be considered eligible for the NRHP based upon any of the four criteria.

Types of Effects

Direct Effects: physically alter the historic property in some way.

Indirect Effects: diminish some significant aspect of the historic property but do not physically alter it.

Another type of cultural resource that, if present, also warrants consideration as a historic property is a TCP. A TCP must consist of a tangible property, such as a district, site, building, structure, or object, and must meet the criteria listed above to be considered a historic property under the NHPA. For natural resources to qualify for protection under the NHPA, they would have to constitute a definable TCP—that is, a specific site or district associated with traditional events, activities, or observances of a significance warranting inclusion on the NRHP (Parker and King, 1998).

Federal agencies are required to consult with the SHPO, Indian tribes, representatives of local governments, and the public in a manner appropriate to the agency planning process for the planned actions (undertakings), and to the nature of the undertaking, and to its potential to cause effects on historic properties. The methodology for identifying, evaluating, and mitigating impacts to cultural resources has been established through federal laws and regulations including the NHPA, Archaeological Resources Protection Act of 1979, Native American Graves Protection and Repatriation Act of 1990, and American Indian Religious Freedom Act of 1978.

As part of its responsibilities under Section 106, the Navy is consulting with the Advisory Council on Historic Preservation (ACHP); the Washington SHPO; tribes; federal, state, and local

agencies/representatives; and individual organizations. Further, the Navy is continuing consultation on the development of a Memorandum of Agreement (MoA) (see Section 3.6.2.6).

The four steps of the Section 106 consultation conducted by the Navy for this effort were outlined in a letter dated August 31, 2016. These steps included the following: determining the undertaking, defining the area of potential effects (APE), identifying and evaluating historic properties within the APE, and determining effect (i.e., no effect, no adverse effect, or adverse effect). A copy of the Section 106 implementing regulations (36 CFR Part 800) was included as an attachment to the August 31 letter for reference to the procedures used to comply with this federal law (Appendix C, Section 106 Documentation).

3.6.1.2 Area of Potential Effects

The affected environment for cultural resources is also referred to as the APE. An APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist (36 CFR 800.16[d]).

In accordance with Section 106, the Navy has determined that the APE includes the area encompassed by the 65 dB DNL noise contour that would exist in 2021 as represented by an aggregate noise contour and those lands that are a part of Ebey's Landing National Historical Reserve. The aggregate noise contour combines the land encompassed by the 65 dB DNL contour extending the largest distance from NAS Whidbey Island and OLF Coupeville for each alternative. This thereby incorporates the largest overall area within the 65 dB DNL noise contours that is also inclusive of Ebey's Landing National Historical Reserve for use as the APE (see Figure 3.6-1).

The APE is comprised of the following four components:

- On-installation Direct Effect Areas: Areas on the installation where historic properties could be directly affected (i.e., by ground disturbance, demolition, or alteration) (see Figure 3.6-2).
- On-installation Indirect Effect Areas: Areas within the installation bounded by the 65 dB DNL noise contours where historic properties could remain physically undisturbed but potentially subject to effects from the introduction of visual, atmospheric, or audible elements that occur when aircraft are seen or heard flying in the vicinity.
- Off-installation Indirect Effect Areas: Areas off the installation within operational areas bounded by the 65 dB DNL noise contours and potentially subject to effects from the introduction of visual, atmospheric, or audible elements to the setting that occur when aircraft are seen or heard flying in the vicinity.
- Ebey's Landing National Historical Reserve.

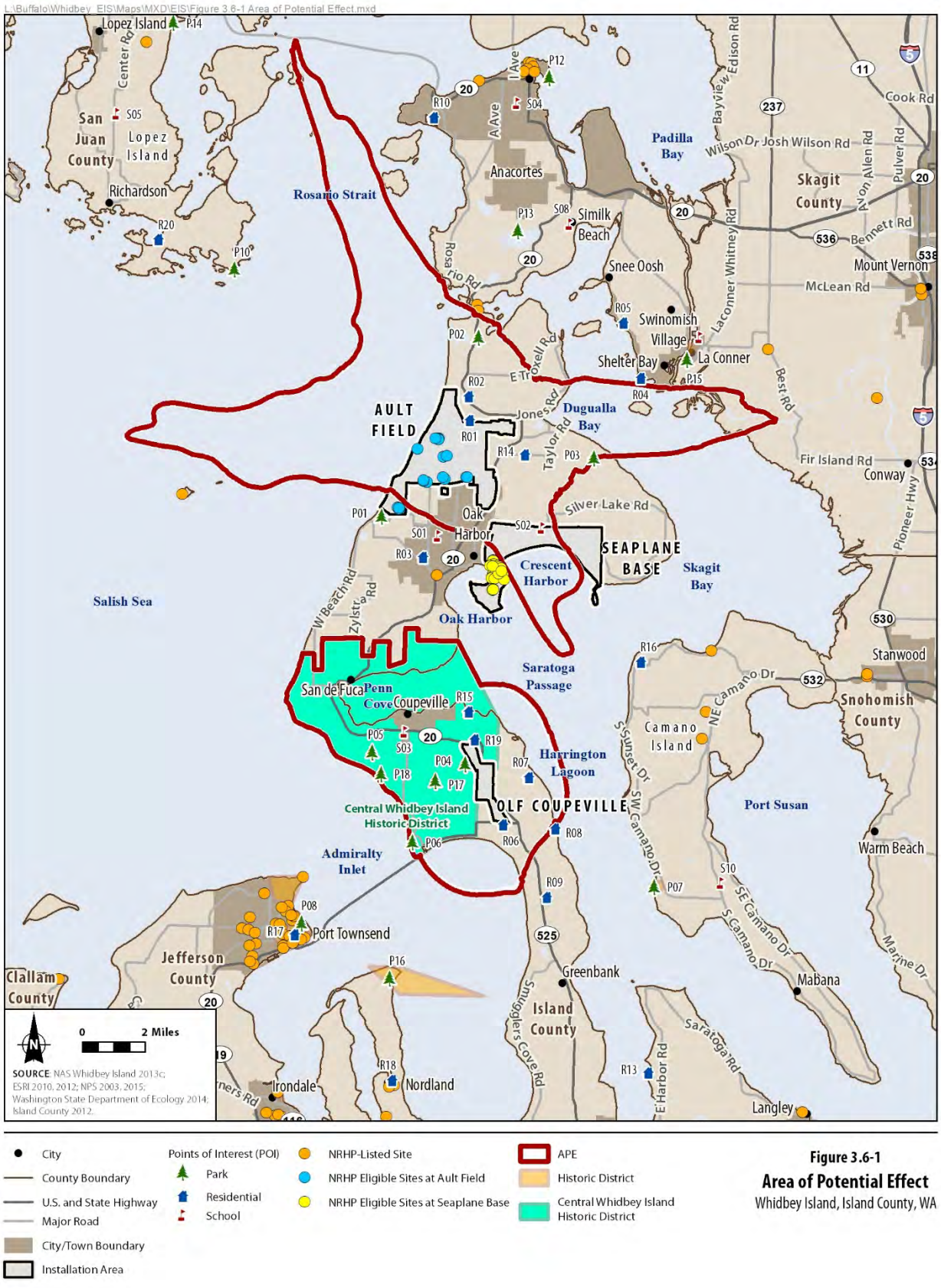


Figure 3.6-1
Area of Potential Effect
Whidbey Island, Island County, WA

Figure 3.6-2
On Installation Direct Effect Areas
Whidbey Island, Island County, WA

65 dB DNL is generally accepted for the evaluation of historic properties near airports and is consistent with environmental documentation previously completed for Navy operations at NAS Whidbey Island.[16] The APE has been refined through consultation with the SHPO, consulting parties, tribes, and other interested parties to include all of Ebey's Landing National Historical Reserve (see Section 3.6.2.6). Consistent with the implementing regulations and in consideration of comments received, the Navy has determined that the APE is appropriate for the scope and scale of the undertaking. Additional information regarding the development of the APE is provided in the correspondence to consulting parties dated May 1, 2017; July 14 and 19, 2017; October 2, 2017; and June 25, 2018 (see Appendix C).

Existing conditions related to cultural resources were identified based on the results of earlier cultural resources investigations and the results of the Navy's consultation for the Proposed Action in accordance with Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800. For the purposes of assessing the existing environment for cultural resources, the Navy considered the cultural resources and historic properties identified within the APE for the Proposed Action. Cultural resources, including those that are historic properties, located outside of the APE are not considered in this evaluation.

3.6.2 Cultural Resources, Affected Environment

3.6.2.1 Background

Whidbey Island is located within the ethnographic territory of the Southern Coast Salish, a large native group consisting of speakers of two distinct Coast Salish languages: Twana or Lushootseed. Twana was spoken by the people of Hood Canal and its drainage. Lushootseed territory extended from Samish Bay in the north and south to the head of Puget Sound; it was further divided into the Northern Lushootseed and Southern Lushootseed by differences in dialect. Before the treaties of 1854-1855, as many as 50 named groups were known to have lived in the Southern Coast Salish traditional cultural area (Suttles and Lane, 1990). Whidbey Island is located in the southwestern part of Northern Lushootseed territory and was home to several Southern Coast Salish tribes for numerous generations (Navy, 2016c).

The northern portion of the island is within the ethnographic territory of the Lower Skagit, speakers of a northern Lushootseed dialect. The Kikiallus and Squiuamish, divisions of the Swinomish, also occupied the northern portion of Whidbey Island, including the area of Deception Pass (Snyder, 1974). Additionally, the K'lallam reportedly utilized natural resources along the west coast of Whidbey Island in the early historic period (Gibbs, 1855).

The waters of northern Puget Sound were used by the Coastal Salish people, and their subsistence practices centered on the exploitation of marine resources, although terrestrial resources were also heavily used. The most important food of the Southern Coast Salish was salmon; however, a number of shellfish species including clams, cockles, oysters, saltwater snails, barnacles, crab, chitons, and mussels also were gathered and eaten. Important terrestrial resources included blacktail deer and elk. Important plant resources collected during ethnographic times included camas, bracken, wapato, salmonberry,

[16] The use of 65 dB DNL is consistent with existing federal regulations, including the FAA's Airport Noise Compatibility Planning (14 CFR Part 150), which indicates that, in general, all land uses are considered to be compatible with noise levels less than 65 dB DNL. Areas of significant noise exposure are those in which noise levels are 65 dB DNL or higher (FICUN, 1980). The use of this residential noise standard has been extrapolated for use in evaluating noise impacts to historic resources.

thimbleberry, trailing blackberry, blackcap, serviceberry, salal berry, red huckleberry, blueberry, and red and blue elderberry (Navy, 2016c; Suttles and Lane, 1990).

Forest resources also were used for wooden canoes, boxes, bowls, and spoons. Wood fibers were used to make basketry, cordage, mats, nets, blankets, and garments. Cattail and tule mats were made, along with robes of a variety of materials including woven mountain goat wool, deer hides, bear skins, and duck skins (Navy, 2016c). In the vicinity of Crescent Harbor and Oak Harbor, the Lower Skagit primarily fished for flounder and salmon and harvested a variety of shellfish (Snyder, 1974). In general, resources on the island were exploited in the spring, summer, and fall when groups would travel to various sites on the island where resources could be easily obtained as they became seasonally available.

By the 1790s, the first non-native groups entered Puget Sound. Captain George Vancouver of the Royal British Navy was one of the first to arrive, in 1792 (Suttles and Lane, 1990). At first, the settlers made little contact with the Southern Coast Salish due to the needs of the fur trade, which was their initial interest. However, by 1818, the U.S. and Great Britain opened up the territory, including lands within Puget Sound. Thirty years later, a treaty was signed between the U.S. and Great Britain to divide the territory, with the lands south of the boundary at the Strait of Juan de Fuca going to the U.S. (Navy, 2016c).

During the mid-1800s, the number of Euro-American settlements increased in the Washington Territory, which caused some conflict with the local tribes. As a result, Isaac Stevens, the first governor and superintendent of Indian Affairs of the Washington Territory, was authorized by the U.S. to negotiate with Washington tribes for the settlement of their traditional lands. Stevens negotiated eight treaties. As part of these treaties, the tribes reserved their rights to continue traditional activities on these lands. Reservations also were established from the lands retained, after tribal lands were ceded to the U.S. Treaty rights, however, were reserved on lands beyond the reservations.

Industries, such as timber and commercial fishing, developed during the second half of the 19th century, as tribal members slowly moved onto reservations, and white settlement grew. In 1850, the Donation Land Law was passed to give legal status to claims already made to promote settlement. Isaac N. Ebey was the first permanent white settler to file a claim as a result of this act. Settlement in the areas of Oak Harbor and Crescent Harbor also occurred at this time, with brothers Samuel and Thomas Maylor arriving in 1852, followed soon after by Edward Barrington (although none filed claims until the 1860s) (NPS, 1980).

In 1883, the Town of Coupeville was platted on Captain Thomas Coupe's 320-acre claim. One year later, the town had stores, hotels, a school, a church, and numerous dwellings. Today's Front Street is representative of this early 19th century development. Due to the time of its founding, Coupeville is the second oldest city within the State of Washington (NPS, 2006a).

In addition to the Town of Coupeville, continued growth allowed for the construction of Fort Casey in the late 1890s; it served as part of a defense system to guard Puget Sound (NPS, 1980). Much of the infrastructure associated with Fort Casey has been in place since 1906 (NPS, 2006a). Starting in 1895, Dutch homesteaders began to arrive and settle in the Oak Harbor area. By 1897, more than 200 Dutch had settled in north Whidbey, particularly in the area of Clover Valley, which is today Ault Field (Neil, 1989). This community of Dutch settlers began potato and dairy farms on Whidbey Island (Navy, 2016c). By the turn of the 19th century, the Puget Sound basin was established as the urban center of the northwest, and Whidbey Island became a vacation spot for the mainlanders (Navy, 2016c).

3.6.2.1.1 NAS Whidbey Island

Naval buildup in the U.S. during the late 1930s required expansion of existing facilities and construction of new facilities on the West Coast. After the adoption of the Two Ocean Navy Bill, in January of 1941, the Chief of Naval Operations requested a list of potential locations for a new Pacific Coast base that could accommodate seaplanes, allow for expansion into land-based planes, and provide the necessary support services for ammunitions, fuel, and personnel. Clover Valley and Crescent Harbor were selected due in large part to the weather, described as a "sunshine oasis in the fog belt of Puget Sound" (Command History, 1945). An appropriation of $3.79 million was made for the construction of NAS Whidbey Island in August of 1941, and construction began following the events at Pearl Harbor. The mission of the two new bases on Whidbey Island was to provide facilities to operate and maintain two off-shore patrol squadrons, one inshore patrol squadron, and facilities for operating four additional squadrons. NAS Whidbey Island was formally commissioned on September 21, 1942 (Navy, 2016c).

Prior to the Navy's acquisition of land for the Seaplane Base and Ault Field (originally Clover Valley Field) in 1942, and for OLF Coupeville in 1944, the lands on Whidbey Island were rural, with open pasture land, dirt roads, and second-growth forested areas. Farms and their accompanying structures dominated the landscape, as the community of Oak Harbor had a population of fewer than 400 people. Before the early 1940s, these rural areas were subdivided into numerous lots ranging in size from 10 to nearly 180 acres. Ault Field contained approximately 120 such lots as of 1941, and roughly 85 rural or farm lots were located at the Seaplane Base (Hampton and Burkett, 2010; Navy, 2016c).

The outbreak of World War II brought more activity to Whidbey Island. Patrol planes based on NAS Whidbey Island flew long-range navigation training missions over the north Pacific. Buildings continued to be added to the original complex throughout World War II (Hampton and Burkett, 2010).

In 1949, NAS Whidbey Island became a major Fleet support station and the only major station north of San Francisco and west of Chicago. This decision and the rising tensions of the Cold War, in connection with the outbreak of the Korean War, resulted in the development of additional facilities and rehabilitation of existing structures in the early 1950s (Dames and Moore, 1994). This development centered on Ault Field, with the Seaplane Base taking a supporting role.

The 1950s also were characterized by the first operations of modern jet aircraft. In 1951, NAS Whidbey Island was designated a Master Jet Station. In order to provide long-range, nuclear-capable, strategic bombers from forward-based Pacific Fleet aircraft carriers, the Navy assigned heavy attack squadrons to NAS Whidbey Island beginning in 1956. In the latter half of the 1950s, NAS Whidbey Island also became the center of anti-submarine warfare in the Pacific Northwest (Navy, 2016c).

Between 1965 and 1969, NAS Whidbey Island received the A-6 Intruder squadrons, which transformed it into the sole training and operation center for these squadrons for use in the Pacific. The A-6A Intruder training program included celestial and other navigational training, radar navigation, special weapons employment, bombing, and day/night carrier qualifications. This action increased air operations at Ault Field.

By 1971, NAS Whidbey Island became the home base of tactical electronic warfare squadrons for naval aviation forces, a role that continues today (Navy, 2016c). Two years later, in 1973, NAS Whidbey Island was formally established as a Functional Specialty Center responsible for the training and operations of all medium attack squadrons of the Pacific Fleet and all of the Navy's tactical electronic warfare squadrons.

By 1980, aviation units based at NAS Whidbey Island included six medium attack squadrons, nine tactical electronic warfare squadrons, and three Naval Air Reserve squadrons (Navy, 2016c). During the 1980s, NAS Whidbey Island squadrons provided electronic warfare support to U.S. naval forces operating around the world. NAS Whidbey Island was considered by the Base Realignment and Closure Commission for closure in the early 1990s, but it ultimately remained open due to its strategic importance in the Pacific Northwest.

During the 1990s and 2000s, NAS Whidbey Island functioned as the main home base for the Pacific Fleet of Prowler squadrons, which began the transition to Growler aircraft in 2008.

3.6.2.1.1.1 Ault Field

Construction of Ault Field began in 1942, when the field was referred to as Clover Valley Field. On August 28, 1942, the first military plane landed at Clover Valley. Once the field was fully operational, the first air squadrons, consisting of Grumman F4F Wildcats, the primary Navy and Marine fighter planes during World War II, arrived. During the construction of Ault Field in 1942, much of the land consisted of peat bogs and marshes, which required stabilization. As a result, the peat was removed to a depth of approximately 5 feet below grade and then replaced with gravel (Navy, 2016c). Clover Valley Field was renamed Ault Field on September 25, 1943, in memory of Commander William B. Ault (Navy, 2016c).

In the post-World War II era, NAS Whidbey Island naval operations began to expand, especially at Ault Field. In the mid-1950s, for example, the Navy acquired 973 acres of land adjacent to Ault Field to grade and construct overruns for its two runways. World War II dormitories, administrative buildings, and hangars continued to be used at Ault Field in the 1950s. Air operations at Ault Field increased 31 percent from 1966 to 1967 (Navy, 2016c).

In the 1970s, excess land was disposed of at Ault Field. Operations continued through the 1980s and 1990s. However, Ault Field has not experienced large amounts of construction since the end of the Cold War.

Today, approximately 23 percent of Ault Field is developed (Navy, 2013). In addition to housing, Ault Field includes two runways and associated apron and taxiways plus hangars, administrative and support buildings, and roads for the installation. The undeveloped area of the installation contains open grassland, forest, and agricultural land (EDAW, 1997; Stell, 2013).

3.6.2.1.1.2 OLF Coupeville

OLF Coupeville is located on a relatively wide area of the central portion of Whidbey Island on the south side of Penn Cove, 3 miles south of Coupeville, Washington. It is located approximately 10 miles south of Ault Field and is used primarily for FCLP. In addition to its 5,400-foot-long landing strip, small operations tower, taxiways, and a few access roads, most of the installation is grass-covered and still maintains the character of its original agricultural usage (Stell, 2013).

In 1937, OLF Coupeville was split between 16 landowners before its acquisition by the Navy in 1943 (Navy, 2016c). For instance, the Kineth and Smith families had obtained large homestead tracts through the Homestead Act in the 1850s. The homesteads around OLF Coupeville contained fertile prairie lands, and farmers like the Kineth and Smith families prospered growing some of the best wheat crops on the island (Navy, 2017a).

Construction for the Navy use at OLF Coupeville was completed in 1944. The field was originally used for emergency and practice landings until 1946. Navy use of the OLF continued through 1963, when the Navy had made plans to sell the facility. However, in 1967, the Navy reactivated the OLF to accommodate training and operational demands for the Vietnam War (124 F. 3d 1277) (Navy, 2016c).

Since 1967, the Navy has continuously used OLF Coupeville for FCLP, with a peak of use between 1967 and 1971 and another peak in the late 1980s and early 1990s (*Argent* v. *United States*, 124 F.3d 1277) (see Section 1.4 for additional information). Operations at OLF Coupeville, like those at Ault Field, have continued since that time, with periods of high and low activity dependent upon Navy mission requirements related to global events and national defense requirements.

Today, northern portions of OLF Coupeville are located within Ebey's Landing National Historical Reserve. Due to the previous agricultural occupation in OLF Coupeville, the most common resources found from previous occupations included concrete foundations, gravel pads, and footings associated with outbuildings (Navy, 2016c).

3.6.2.1.1.3 Seaplane Base

The survey for construction of the Seaplane Base began in August of 1941. At the time, approximately 85 rural or farm lots were located there, totaling nearly 2,670 acres. The Navy expanded its holdings by filling nearly 120 acres of tidal flats, bringing the total to 2,791 acres. The first seaplane landed in December 1942 (Navy, 2016c).

During the early 1960s, the Seaplane Base operated as an active facility, but it was placed on standby status by 1966. In 1970, the Seaplane Base patrol operations were ended.

The Seaplane Base consists of a former seaplane base that is now a mixture of ordnance, retail, and public works facilities, as well as Navy family housing. A fuel pier and the Survival Training Area also are present. As part of the 2010 Phase 1 architectural survey of the Seaplane Base, 96 architectural resources were documented, along with two historic districts: the Seaplane Plane Base Historic District (SPBHD) and the Victory Homes Historic District.

The SPBHD is eligible for listing in the NRHP. The boundaries of the SPBHD include a collection of contributing and individually eligible buildings, structures, and landscape features that are related to the Seaplane Base's historic military mission and operations (WDAHP [Washington Department of Archaeology and Historic Preservation], 2010; Navy, 2016b).

At the national level, the SPBHD is significant for its role in U.S. naval aviation history and the rapid development of defense installations prior to and during World War II. During this period, the Seaplane Base played an important role in the Navy's war effort by providing both training and armaments for military missions in the Pacific. At the state level, the Seaplane Base has made a significant contribution to the Navy's expanding role in the Puget Sound region. At the local level, the Seaplane Base played a key role in the establishment of NAS Whidbey Island and has had a significant impact in the socioeconomic development of Oak Harbor and Whidbey Island (EDAW, 1997; Hampton and Burkett, 2010).

The Victory Homes were constructed in 1942 by the Austin Company during the original development of the Seaplane Base. The Victory Homes Historic District contains only two representative structures (Buildings 613 and 614) because the remainder of the district was demolished in the 1990s. These structures were retained in compliance with the Memorandum of Agreement Regarding the Victory Homes Replacement Project with the Washington SHPO (Hampton and Burkett, 2010; Navy, 2016c).

Today, the Seaplane Base has continued as a support facility to Ault Field. It is currently home to ordnance operations, the Navy Exchange, public works shops and storage facilities, and some housing facilities (Navy, 2016c).

3.6.2.1.2 Island County

Island County, the eighth-oldest county in Washington, was created on January 6, 1853. At that time, it included what is today Whatcom, Snohomish, Skagit, and San Juan Counties. The first five claims in the newly created Island County were filed that same year. The first three were in the vicinity of present day Bellingham; Ebey's claim, which later surveyed out to be 641 acres, was the fourth; and Richard H. Lansdale's claim of 320 acres to the north, at the west end of Penn Cove, was the fifth claim. Island County became known as “a place of old settlers and longtime residents” (Cook, 1972).

In the early years of Island County, farming was one of the primary activities. Beginning in the 1890s, farmers in Island County began planting orchards to supplement potato and grain crops. Island County's population doubled between 1900 and 1910, and continued to increase during the 1920s; the number of farms in the county tripled between 1900 and 1920 (Cook, 1972). While the county remained essentially rural, it became more accessible via roads and water. Today, the county hosts a number of residents within cities and towns, but a majority live in unincorporated areas.

The county seat of Island County is the Town of Coupeville, which is one of Washington’s oldest towns. Coupeville is located within a NRHP-listed historic district called the Central Whidbey Island Historic District (Section 3.6.2.1.3). It is a 19th century seaport town, established in 1853, set on the southern edge of Penn Cove. The town was founded by Captain Thomas Coupe. The original plat of the town, recorded in 1883, includes most of the central part of the town east of North Main Street. Today, Coupeville hosts the greatest concentration of historic buildings in Washington (NPS, 2010; Town of Coupeville, 2003).

3.6.2.1.3 Central Whidbey Island Historic District and the Ebey’s Landing National Historical Reserve

The Central Whidbey Island Historic District (NRHP #73001869) was listed on the NRHP on December 12, 1973. The original nomination form noted its state significance, a period of significance for the 19th century, and areas of significance including aboriginal (historic), agriculture, architecture, commerce, and military. According to the 2006 *Ebey’s Landing National Historical Reserve, the Final General Management Plan and Environmental Impact Statement*, the district has the same boundaries as the Ebey’s Landing National Historical Reserve (NRHP #01000229), which also is listed in the NRHP. In this manner, the boundaries of Ebey’s Landing National Historical Reserve coincide with those established in the original nomination of the Central Whidbey Island Historic District.

Ebey’s Landing National Historical Reserve was established under Section 508 of the Parks and Recreation Act of 1978.

Its purpose is “to preserve and protect the cultural landscape and to commemorate the history of a rural community, which provides a continuous record of exploration and American settlement in Puget Sound

from the nineteenth century to the present" (NPS, 2010). The events associated with its establishment as a reserve include the exploration of Puget Sound, the settlement by Colonel Ebey, the settlement of the Donation Land Law beginning in 1850, and the growth of the Town of Coupeville in the 19th century (NPS, 2006a). Part of the cultural landscape of Ebey's Landing National Historical Reserve also was influenced by the military history of Fort Casey and Fort Ebey, which protected the mouth of Puget Sound (NPS, 2010).

Ebey's Landing National Historical Reserve is unique because it is the first "historical reserve" in the National Park System (NPS, 2006a). As stated in its general management plan, one of the reasons for establishing Ebey's Landing National Historical Reserve was to preserve open space and at the same time allow for federal assistance (NPS, 2006a). Ebey's Landing National Historical Reserve represents a broad spectrum of Northwest history (NPS, 2006a). As a historic district, it "possess[es] a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (Andrus, 2002).

As indicated in the NRHP nomination form for the Central Whidbey Island Historic District, the Island County Commissioners established the district on October 16, 1972, for its importance to the 19th century. The original district contained approximately 8,000 acres surrounding Penn Cove and included original Donation Land Claims, 18 places listed in the Historic American Building Survey (15 of which were still standing), Fort Casey, and numerous structures portraying a cross section of domestic architecture (Cook, 1972). Portions of the district were documented in a 1935 Historic American Building Survey. Coupeville was noted as the civic and social center district due to its mixture of old and new (Cook, 1972).

Per updates to the nomination form, the Central Whidbey Island Historic District/Historical Reserve now is listed as nationally significant under three criteria (A, B, and C) (Gilbert and Luxenberg, 1997). The use of Criterion A is due to the association with its areas of significance, which include the following: Agriculture; Architecture; Commerce; Recreation/Tourism; Ethnic Heritage; Exploration/Settlement; Education; Religion; Military; and Politics and Government. Persons associated with the property include Captain George Vancouver, Master Joseph Whidbey, the Ebey family, Captain Coupe, and Judge Still; for these connections, the property is listed under Criterion B. The property also is listed under Criterion C because it includes structures and objects that are associated with distinctive types, styles, and periods of construction dating from the mid-19th century to the present and that represent the areas of significance. It also is culturally affiliated with the Salish tribe and has its period of significance between 1300 and 1945 (Gilbert and Luxenberg, 1997). The original NRHP nomination for the Central Whidbey Island Historic District (Cook, 1972) focused primarily on the area's mid- to late-19th century development, while the later nomination "amends and supplements the existing nomination to fully reflect the range of landscape and architectural features that contribute to the special character of the Reserve, which Congress has sought to preserve" (Gilbert and Luxenberg, 1997).

In partnership with the Town of Coupeville, Island County, and Washington State Parks, the NPS manages Ebey's Landing National Historical Reserve, which comprises an area of approximately 17,572 acres: 13,617 acres of land and 3,955 surface-acres of water (Penn Cove). Approximately 2,023 acres are protected with NPS-held conservation easements, and 684 acres are NPS owned in fee. Most of the land (approximately 85 percent) is privately owned, with the rest under a combination of local, state, and federal ownership (NPS, 2006a).

The base of the NPS operation is located at the Reuble Farmstead, which is located to the west of OLF Coupeville. This site was used as a noise monitoring location in the 2016 NPS acoustical monitoring activities, along with the Ferry House, a focal point within Ebey's Landing National Historical Reserve. The Reuble Farmstead is located under the low-elevation flight path for operations at OLF Coupeville, while the Ferry House is exposed to aircraft operations from both Ault Field and OLF Coupeville (Pipkin, 2016).

3.6.2.2 Archaeological Resources

Prehistoric archaeological sites within the Puget Sound region have largely been recognized in two settings: shell middens along the Strait of Juan de Fuca and terrestrial sites located near rivers. Whidbey Island is located at the north end of Puget Sound. Shell midden sites are the most abundant site type in Island County and are usually highly linear shoreline sites. Shell middens typically contain abundant faunal remains and, very infrequently, tools. Few shell middens contain features or obvious internal structures (Wessen, 1988).

Historic archaeological sites within the region largely consist of structure foundations and debris scatters (Navy, 2016c). In Washington State, historic archaeological remains are associated with fur trade camps, military forts, logging and mining camps, railroads, and religious centers. Many of the early towns grew up around military or fur trade forts (Stilson, Meatte, and Whitlam, 2003). The presence of the military was in part a reason for the settlements within the area surrounding NAS Whidbey Island.

Within the APE, 151 archaeological sites are present. Among these, seven archaeological sites have been determined eligible for the NRHP, two have been determined not eligible for the NRHP, and 142 either have no determination or are potentially eligible for the NRHP. None of the known archaeological sites are located within the on-installation direct effect areas.

In addition, an archaeological district, the Sqwikwikwab (Fish Town), is present outside of NAS Whidbey Island. This district includes four archaeological sites and a nearby burial site. As noted within the Washington Department of Archaeology and Historic Preservation (DAHP) records, the Sqwikwikwab is an eligible historic and archaeological district. It is listed on the Washington Heritage Register. The district is located off station near the mouth of the north fork of the Skagit River.

3.6.2.3 Architectural Resources

The Navy defines buildings and structures according to the definitions provided in National Register Bulletin 16A: How to Complete the National Register Registration Form. A building is a construction "...created principally to shelter any form of human activity." "Structures are...those functional constructions made usually for purposes other than creating human shelter" (NPS, 1997).

Approximately 2,308 architectural resources are present within the APE (Table 3.6-1). The number of resources is based on records gathered by the Navy from the Washington DAHP geographic information systems (GIS) data set, the NRHP, NAS Whidbey Island records, and the 2016 Ebey's Landing National Historical Reserve Historic Building Inventory Update.[17]

[17] The 2016 Ebey's Landing National Historical Reserve Historic Building Inventory Update includes only those resources that are within the boundary of the reserve and that have been formally evaluated to determine whether they contribute to the historic significance of the reserve.

Table 3.6-1 Architectural Resources within the APE

Resource Type	*Eligible/Listed for the NRHP*	*Not Eligible for the NRHP*	*Status Not Determined for the NRHP*	*Total Number*
Buildings and Structures (50 years and older)	28	182	1,779	1,989
Washington Heritage Barn Register Listed	23	Not applicable	Not applicable	23
Historic Districts	2	0	0	2
Washington Heritage Register Listed	4	Not applicable	Not applicable	4
NRHP	2	Not applicable	Not applicable	2
ELNHR 2016 Inventory	203	85	Not applicable	288
TOTAL:	262	267	1,779	2,308[1]

Source: Appendix C – June 25, 2018, consultation letter attachment.

Notes:
[1] The total number of resources may not represent the actual number of resources due to double-counting; some resources are included in multiple registers and inventories.

Key:
ELNHR = Ebey's Landing National Historical Reserve
NRHP = National Register of Historic Places

A full listing of the resources within the APE is provided in Appendix C as an attachment to the June 25, 2018, letter to consulting parties.

3.6.2.3.1 On-installation Direct Effect Areas

The on-installation direct effect areas of the APE consist of the portions of Ault Field that would be directly impacted by construction and demolition activities. This area of the APE includes over 160 historic buildings and structures, although no historic districts are present. Among the 160 resources, only four are considered to be eligible for listing on the NRHP. They include the following:

- **Building 112 (Hangar 1)**
  Hangar 1 is the only remaining hangar of four structures of its type constructed at the beginning of World War II. This hangar was instrumental to aerial patrols and crew training during the war. Hangar 1 has undergone minor alterations but has retained its integrity. This structure is eligible for NRHP listing under Criterion A, based on its association with naval aviation during World War II, and under Criterion C as a distinctive example of a military structure quickly erected to fulfill war needs (Hampton and Burkett, 2010). According to the Installation Cultural Resources Management Plan (ICRMP) and a 2010 Environmental Assessment, this building is planned for demolition. The Navy has consulted with the SHPO and has completed stipulations from the MoA, signed May 24, 2010, by the Commander, Navy Region Northwest and the SHPO on June 2, 2010 (Navy, 2010a; Navy, 2016c). Building 112 will be demolished as part of the military construction for the P-8A operations prior to the initiation of the Proposed Action.
- **Building 386 (Hangar 5)**
  This structure dates to the early Cold War (between 1953 and 1957). Hangar 5 is recommended as eligible under Criterion C. It is an example of a Miramar type of hangar and of a reinforced

concrete frame hangar construction. The SHPO concurred with the Navy's finding of eligibility (Hampton and Burkett, 2010). This hangar has undergone renovations per stipulations within a MoA with the Washington SHPO.

- **Buildings 457 and 458 (Ready Lockers)**
  These structures have been used for storage of munitions. Due to their association with Hangar 1, Buildings 457 and 458 are eligible for NRHP listing under Criterion A, based on their association with naval aviation during World War II, and under Criterion C as a distinctive example of a military structure quickly erected to fulfill war needs (Hampton and Burkett, 2010). These structures are considered outbuildings to Hangar 1 and are part of the determined-eligible property (Navy, 2016c). They are planned for demolition per the 2010 Environmental Assessment and are noted in the MoA, signed May 24, 2010, by the Commander, Navy Region Northwest and the SHPO on June 2, 2010 (Navy, 2010a).

In addition to the resources that are eligible for the NRHP, other facilities are located within areas that would be subject to activities associated with the three action alternatives. Among the other resources within this portion of the APE, Building 115 (Armament Storage), Building 2737 (Hangar 12), and Taxiway Juliet are present. These resources have been determined not eligible for the NRHP, and the SHPO has concurred with that determination. Building 115 is located on Midway Street. It was built in 1942 as an ordnance shop and continues today as an aviation armament shop. Building 2737 was built in 1989 as a maintenance hangar; it is located proximate to Building 386 (Hangar 5), Building 112 (Hangar 1), and Buildings 457 and 458 (Ready Lockers), near North Charles Porter Avenue. Taxiway Juliet was constructed in the early 1950s as part of the conversion from World War II activities to the Master Jet Station. Five of these taxiways, most of which are about 100 feet wide, were added to the Ault Field runway complex in 1952 and 1958 (Navy, 2016c).

3.6.2.3.2 On-installation Indirect Effect Areas

According to the ICRMP, a total of 1,859 buildings and structures are present at NAS Whidbey Island. Among these, 1,830 buildings and structures are located within Ault Field and the Seaplane Base, while a total of 29 buildings and structures are located within OLF Coupeville (Navy, 2016c). Several architectural surveys have been conducted at NAS Whidbey Island, resulting in the identification of over 30 buildings that have been determined eligible for listing in the NRHP (Navy, 2016b). Table 3.6-2 provides a listing of the NRHP-eligible resources located within the on-installation indirect effect areas of the APE at Ault Field. No NRHP-eligible resources are located at OLF Coupeville, and while NRHP-eligible resources are located at the Seaplane Base, none of them are located within the APE.

Table 3.6-2 NRHP-Eligible Buildings at Ault Field

Building Number	Name/Function	Date built
112[1]	Hangar 12	1942
118	Skywarrior Theater	1942
386	Hangar 5	1953-1957
410	Hangar 6	1957
457[2]	Ready Locker	1943
458[2]	Ready Locker	1943
920[3]	Quarters O/920 West First Street	1900
1140[3]	Quarters P/1140 W. Clover Valley	1900
2700	Naval Ocean Processing Facility	1986
3220[3]	Quarters R/3220 N. Saratoga Street	1930
3230[3]	Quarters G/3230 N. Saratoga Street	1935
3295[3]	Quarters E/3295 N. Goldie Road	1935
3305[3]	Quarters F/3305 N. Goldie Road	1935

Sources: Navy, 2016c

Notes:

[1] The Navy has consulted with the SHPO and has completed stipulations from a MoA, signed May 24, 2010, by the Commander, Navy Region Northwest and the SHPO on June 2, 2010 (Navy, 2010a; Navy, 2016c). Building 112 will be demolished as part of the military construction for the P-8A operations prior to the initiation of the Proposed Action.

[2] These resources are planned for demolition per a 2010 Environmental Assessment and are noted in a MoA, signed May 24, 2010, by the Commander, Navy Region Northwest and the SHPO on June 2, 2010.

[3] These resources are anticipated to be demolished because they were not divested in accordance with Stipulation I.C. of a MoA that was signed on October 6, 2017; the Navy consulted with the Washington SHPO on the MoA. Stipulation I.C. of the MoA describes the farmhouses' disposition. It states that prior to demolition, the PNC, LLC would offer the buildings as-is to the public. The stipulation sets forth the need to develop an advertising/marketing strategy to notify individuals/groups of the farmhouses. Three months' time for the notice of availability was to be made to allow for three sets of applicants: Group A – descendant family members; Group B – historical societies; and Group C – the general public. The stipulation provides for the procedures for reserving a farmhouse and then the procedures for acquiring the farmhouse. Demolition was to occur if the farmhouses were not divested (Stipulation I.D.).

Key:

MoA = Memorandum of Agreement
NRHP = National Register of Historic Places
SHPO = State Historic Preservation Office

3.6.2.3.3 Off-Installation Indirect Effect Areas

As shown in Figure 3.6-1, the off-installation indirect effect areas includes geographic areas surrounding Ault Field and OLF Coupeville. The APE includes areas that are located within Island and Skagit Counties, including those portions within Ebey's Landing National Historical Reserve.

3.6.2.3.3.1 Off-Installation Non-Ebey's Landing National Historical Reserve

As shown in Table 3.6-1, 2,308 resources are located within the APE. These include a number of resources located outside of the installation (i.e., Ault Field, the Seaplane Base, and OLF Coupeville) and Ebey's Landing National Historical Reserve. These resources include houses, barns, outbuildings, and structures. Within the Washington DAHP records, these include those resources recorded as part of real estate tax assessor's records, through surveys, and via official listings, such as the Washington Heritage Barn Register or the Washington Heritage Register. A full listing of these resources is included in Appendix C as part of the attachment to the June 25, 2018, letter to consulting parties. Figures 8 and 9 of this document show the location of these resources and the NRHP status associated with them.

3.6.2.3.3.2 Central Whidbey Island Historic District and the Ebey's Landing National Historical Reserve

The entire Ebey's Landing National Historical Reserve, and thereby the Central Whidbey Island Historic District, is included in the APE. The Ebey's Landing National Historical Reserve inventory was updated in 2016. The updated inventory includes 288 total recorded buildings and structures. Among these are 85 non-contributing buildings and structures and 203 contributing buildings and structures. The contributing resources include 21 roads, 10 landscape areas, and 15 views, amongst the other types of resources.

Ten landscape character areas (referred to as "landscape areas" within the Section 106 documentation in Appendix C) were included as part of the 1998 amendment in order to represent four primary landforms and the Town of Coupeville. These landscape character areas are depicted in Figure 3.6-3 and include the Ebey's Prairie, Crockett Prairie, Smith Prairie, San de Fuca Uplands, Fort Casey Uplands, East Woodlands, West Woodlands, Penn Cove, Coastal Strip, and Coupeville. These landscape character areas contain elements of the past related to the following:

- patterns of spatial organization
- response to the natural environment
- land use categories and activities
- vegetation related to land use
- circulation
- structures
- cluster arrangement
- archaeological resources
- views and other perceptual qualities

Historical land use patterns within Ebey's Landing National Historical Reserve retain a high degree of integrity and represent the dominant values of agricultural lands, recreation and natural resource values of the shorelines, and community stability for the Town of Coupeville.

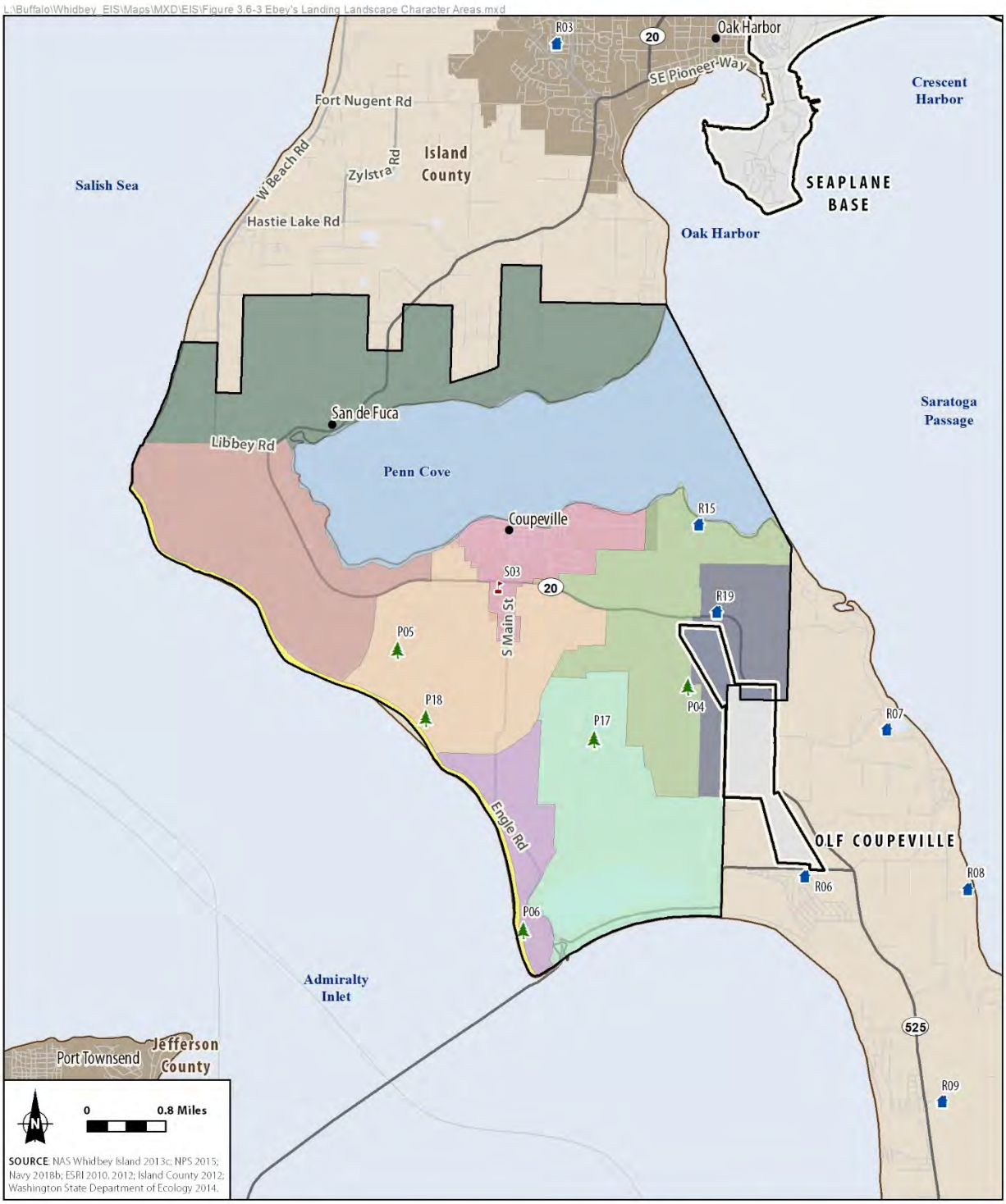


Figure 3.6-3
Ebey's Landing National Historical Reserve, Landscape Character Areas
Whidbey Island, Island County, WA

In addition, 15 character views (referred to as "landscape areas/landscape locations" within the Section 106 documentation in Appendix C) are noted within the 1998 nomination form; "these views are treated as tangible resources and are identified using the historical record and are based on character defining features of the cultural landscape" (Gilbert and Luxenberg, 1997). These views include the following:

1. Ebey's Prairie from the cemetery, and from Engle Road
2. Entry to Coupeville (from Ebey's Prairie into Prairie Center, and along Main Street) and Front Street in Coupeville
3. View from Front Street and the Wharf, across Penn Cove
4. View to Crockett Prairie and Camp Casey from Wanamaker Road
5. View to Crockett Prairie and uplands from the top of Patmore Road
6. View to Crockett Prairie and uplands from Keystone Spit I
7. View to Grasser's Lagoon from Highway 20
8. Views to and across Penn Cove along Madrona Way
9. Views from the bluff trail to Ebey's Prairie and Coastal Strip
10. View of Smith Prairie from Highway 20, entering the reserve
11. Views from Monroe's Landing across the cove to Coupeville
12. Views from Fort Casey across Keystone Spit and Crockett Lake
13. View from Highway 20 across Ebey's Prairie
14. Engle Road to Uplands and west coast
15. Views to Grasser's Hill from Madrona Way. (Gilbert and Luxenberg, 1997).

While these locations are noted as "views," they serve as representative locations within each of the landscape character areas because they convey the characteristics of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve that contribute to the listing on the NRHP.

3.6.2.4 Cemeteries

Twenty-seven cemeteries are located within the APE. Among these are five historic-era cemeteries or monuments and 22 prehistoric archaeological sites that contained multiple burials. No known cemeteries or human burial grounds are located within Ault Field (the on-installation direct effect areas).

One of the monuments identified in this count is noted in the NPS management plan as culturally important to tribes and tribal members with traditional associations to Ebey's Landing National Historical Reserve (NPS, 2006a). This is noted as the Snaklin Monument, a 5-foot-tall stone obelisk, located within a small chainlink-fenced enclosure on private land near Parker Road in the northeast section of Ebey's Landing National Historical Reserve[18] (NPS, 2006a).

[18] An area shown on a plat map as a "USA Indian Cemetery" was identified within the NPS Management Plan (2006a). The noted location is on a wooded hillside approximately 0.25 mile northwest of the Snaklin Monument (NPS, 2006a). The inclusion of this cemetery within the Washington DAHP records is unclear, and, therefore, it is not necessarily included among the 27 cemeteries presented as being within the APE.

3.6.2.5 Traditional Cultural Properties

TCPs are places of traditional religious and cultural importance. They often are associated with tribes, but they can be attributed to other cultural groups. A TCP is eligible for or listed on the NRHP.

To date, no studies of TCPs (or Properties of Traditional Religious and Cultural Importance) have been completed within NAS Whidbey Island, although a 2000 study of the Victory Homes area did include a portion devoted to TCPs (Navy, 2016c). Consultation with the tribes, the SHPO, and consulting parties has resulted in no new TCPs identified within the APE (see Appendix C). Therefore, no known TCPs have been identified in the APE.

3.6.2.6 Section 106 Consultation

The Navy initiated Section 106 consultation in October 2014 with the Washington SHPO regarding the Proposed Action and its effects on historic properties at NAS Whidbey Island. The SHPO acknowledged the invitation on October 23, 2014.

In 2014, additional consultation was initiated with the following communities and organizations:

- Advisory Council on Historic Preservation: A letter was sent to the ACHP requesting its participation within the Section 106 process. The ACHP verbally agreed to serve as a consulting party for the Section 106 discussions.
- Town of Coupeville: On October 23, 2014, the mayor responded to the request sent on October 20, 2014, to serve as a consulting party for the Section 106 process.
- Citizens of Ebey's Reserve (COER): The COER requested consulting party status from the Navy on February 22, 2014. The Navy responded to this initial request on May 20, 2014, and indicated that it would contact the COER when Section 106 initiation would begin. Various members of COER responded to the Navy's invitation with letters on October 23, 28, and 30, 2014, and November 8 and 30, 2014, to indicate their acceptance of participating as a consulting party in the Section 106 review.
- Trust Board of Ebey's Landing National Historical Reserve: A response was received on November 4, 2014, to accept the invitation to serve as a consulting party within the Section 106 review.
- Island County Commissioners: A response was received on November 4 and 5, 2014, from two of the commissioners, from Districts 1 and 2, to serve as a consulting party for the Section 106 review.
- Island County Historical Society: No response has been received to date.
- National Park Service: The NPS responded on November 3, 2014, to accept the invitation to serve as a consulting party in the Section 106 review.
- City of Oak Harbor: No response has been received to date.
- PBY Naval Air Museum: No response has been received to date.
- Seattle Pacific University (Camp Casey): Seattle Pacific University responded on November 25, 2014, that it was accepting the invitation to serve as a consulting party within the Section 106 review.
- Washington State Parks Northwest Region Office: No response has been received to date.

The Navy sent a second letter to the SHPO and consulting parties on June 30, 2016. The letter provided information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours. The SHPO acknowledged receipt of this second letter in a response dated July 6, 2016 (please note in Appendix C, the letter shows a date of July 7, 2016. The letter, however, was transmitted to the Navy via email on July 6, 2016).

Letters also were sent to the Mayor of Port Townsend, the Island County Commissioner for District 3, and the Jefferson County Historical Society on July 12, 2016. These parties are additions to the original mailing list for which letters were sent in October 2014. The letters requested comments on the proposed definition of the APE and included information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours.

In response to the request for comments on the proposed definition of the APE, letters and emails were received from the following parties:

- ACHP – The ACHP responded on August 10, 2016, indicating its comments regarding the proposed definition of the APE and its recommendations to provide information on the APE to consulting parties for review.
- City of Port Townsend – Between July 5, 2016 and August 6, 2016, the City of Port Townsend provided correspondence via email regarding the proposed definition of the APE and the noise study. The City of Port Townsend also provided a letter to the Navy on August 16, 2016, indicating its comments on the proposed definition of the APE and the use of the noise data.
- Citizens of Ebey's Reserve – In a letter dated July 22, 2016, the COER requested information regarding the comment deadline, an explanation of expanded operations at Ault Field and OLF Coupeville, and additional input on the noise modeling study and files from the 2005 environmental assessment.
- Town of Coupeville – In a letter dated August 25, 2016, the Town of Coupeville provided comments on the use of particular noise data and the potential to impact historic resources, agriculture, and businesses.

The Navy sent a third letter to the consulting parties on August 31, 2016. This letter provided clarification of the Section 106 process. It included three enclosures, consisting of information on the process and strategy for the Section 106 process for the continuation and increase of Growler operations, a flow chart, and a copy of the implementing regulations for Section 106 codified at 36 CFR Part 800.

Responses were received on September 1, 2016, from the COER concerning the noise data and the initial findings; on September 28, 2016, from the Trust Board of Ebey's Landing National Historical Reserve, indicating its comments on the proposed definition of the APE and the use of noise data; and on September 30, 2016, from the Washington SHPO regarding the Section 106 process, the proposed definition of the APE, the development of a public involvement plan, tribal consultation, the distinction between NEPA and the NHPA, the determination of effect, and the potential for drafting resolution documentation.

A fourth letter was sent by the Navy on November 10, 2016, indicating the use of the Draft EIS public meetings to fulfill the Section 106 requirements for public notification and consultation. The letter

provided information on the dates and times of the meetings. The NPS responded to this letter on January 3, 2017, noting its concern for the use of the 65 dB DNL contour to delineate the APE, as well as its concern for evaluating impacts to the cultural landscape. The SHPO responded to information presented in the Draft EIS on January 25, 2017. The SHPO noted its concern with the APE and the potential for adverse effects, especially as it pertains to long-term and cumulative effects of increased flight operations on the character and qualities of historic places and communities.

The Navy sent a fifth letter to the consulting parties on May 1, 2017. This letter provided information regarding the Navy's rationale for the use of the 65 dB DNL noise contour for the APE. The Navy also provided background information on historic flight operations. The letter contained five enclosures, including the location of NAS Whidbey Island and OLF Coupeville, a map of flight tracks to depict airfield operations, a depiction of the aggregate noise contour, a map showing the portions of the APE evaluated for potential direct effects, and a map showing the portions of the APE evaluated for potential indirect effects.

The Navy and the SHPO continued discussions regarding the APE. The Navy met with the SHPO on May 10, 2017, and received a letter of the same date. The letter notes the SHPO's disagreement with the definition of the APE and provides recommendations for the submittal of forms for when a survey is completed. The Navy provided a response on July 14, 2017, showing additional information on the use of the 65 dB DNL contour and its intention to incorporate the whole of Ebey's Landing National Historical Reserve. The SHPO response on July 14, 2017, provides concurrence with the methodology for identifying historic properties and offers recommendations to completing the task.

An additional letter was sent by the Navy to all consulting parties on July 19, 2017. It provided an update on the Navy's effort to identify historic properties and to offer another opportunity to provide comments. Five enclosures were provided. The first four included information noting known historic properties within the 65 dB DNL contour line, the historic buildings identified in the Ebey's Landing National Historical Reserve 2016 Inventory Update, known historic properties within the 2016 Inventory Update, and all listed historic properties in the NRHP. A bibliography also was included to help provide information on the historic context.

The Navy notified the ACHP, SHPO, and consulting parties on October 2, 2017, that the Navy was updating the noise analysis to incorporate changes to the Navy's training requirements and would consult on changes to the APE and inventory once the update was complete. The letter notified the various parties of the change in the scale and scope of the undertaking due to the inclusion of two new scenarios (Scenarios D and E), a decrease in the number of pilots required in each squadron, and the updated noise analysis.

A letter continuing the Section 106 consultation was provided to the ACHP, SHPO, and consulting parties on June 25, 2018. The letter noted the Navy's adverse effect finding for the Central Whidbey Island Historic District as a result of more frequent aircraft operations affecting certain landscape components of the district. Specifically, the Navy found that the increased frequentness of noise exposure would have an adverse indirect effect on five representative locations within the district. The Navy further requested comments on this finding. An attachment documenting the finding of effects determination was included as part of the correspondence.

The SHPO responded to the Navy's letter on June 27, 2018. The SHPO acknowledged the receipt of the materials and concurred with the Navy's determination of adverse effect. The SHPO noted its

anticipation of further consultation and the development of a MoA to address the adverse effect. The SHPO also requested correspondence or comments received from concerned tribes or other consulting parties.

The Navy is consulting with the Washington SHPO, the ACHP, tribes, and consulting parties regarding the MoA to mitigate adverse effects as part of its NHPA Section 106 consultation. Documentation of the correspondence with the SHPO and other consulting parties is provided in Appendix C.

The Navy began Section 106 consultation with the eight federally recognized tribes regarding the Proposed Action and its effects on historic properties at NAS Whidbey Island on October 10, 2014, with the Navy's invitation for government-to-government consultation (see Section 3.7.1.3).

The following tribes were contacted:

- Jamestown S'Klallam Tribe
- Lummi Tribe of the Lummi Reservation
- Samish Indian Nation
- Stillaguamish Tribe of Indians of Washington
- Suquamish Indian Tribe of the Port Madison Reservation
- Swinomish Indian Tribal Community
- Tulalip Tribes of Washington
- Upper Skagit Indian Tribe

The Samish Indian Nation responded on October 28, 2014, indicating that the Samish Indian Nation was not interested in consulting for cultural resources at this time.

The Navy sent a second letter to the tribes on June 30, 2016. The letter provided information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours.

The Jamestown S'Klallam Tribe responded on August 1, 2016, indicating that with respect to cultural resources, the tribe has no comments regarding the EA-18G flight operations. The tribe requested future consultation on projects regarding renovation, demolition, and construction of facilities at NAS Whidbey Island.

The Navy sent a third letter to the tribes on August 31, 2016. This letter was intended to provide clarification of the Section 106 process. It included three enclosures, consisting of information on the process and strategy for the Section 106 process for the continuation and increase of Growler operations, a flow chart, and a copy of the implementing regulations for Section 106 codified at 36 CFR Part 800.

A fourth letter was sent by the Navy on November 10, 2016, indicating the use of the Draft EIS public meetings to fulfill the Section 106 requirements for public notification and consultation. The letter provided information on the dates and times of the meetings.

The Navy sent a fifth letter to the tribes on May 1, 2017. This letter provided information regarding the Navy's rationale for the use of the 65 dB DNL noise contour for the APE. The Navy also provided background information on historical flight operations. The letter contained five enclosures, including the location of NAS Whidbey Island and OLF Coupeville, a map of flight tracks to depict airfield

operations, a depiction of the aggregate noise contour, a map showing the portions of the APE evaluated for potential direct effects, and a map showing the portions of the APE evaluated for potential indirect effects.

An additional letter was sent by the Navy to all tribes on July 19, 2017. It provided an update on the Navy's effort to identify historic properties and to offer another opportunity to provide comments. Five enclosures were provided. The first four included information noting known historic properties within the 65 dB DNL contour line, the historic buildings identified in the Ebey's Landing National Historical Reserve 2016 Inventory Update, known historic properties within the 2016 Inventory Update, and all listed historic properties in the NRHP. A bibliography also was included to help provide information on the historic context.

The Navy notified the tribes on October 2, 2017, that it was updating the noise analysis to incorporate changes to the Navy's training requirements and would consult on changes to the APE and inventory once the update was complete. The letter notified the tribes of the change in the scale and scope of the undertaking due to the inclusion of two new scenarios (Scenarios D and E), a decrease in the number of pilots required in each squadron, and the updated noise analysis.

A letter continuing the Section 106 consultation was provided to the tribes on June 25, 2018. The letter noted the Navy's adverse effect finding for the Central Whidbey Island Historic District as a result of more frequent aircraft operations affecting certain landscape components of the district. Specifically, the Navy found that the increased frequentness of noise exposure would have an adverse indirect effect on five representative locations within the district. The Navy further indicated its assurance of confidentiality for any sensitive information and requested comments on this finding. An attachment documenting the finding of effects determination was included as part of the correspondence.

No other responses have been received to date from the tribes.

Documentation of the correspondence with the tribes is provided in Appendix C.

3.7 American Indian Traditional Resources

Protected tribal resources, as defined in DoDI 4710.02, DoD Interactions with Federally Recognized Tribes (DoD, 2006), are "those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by or reserved by or for Indian tribes through treaties, statutes, judicial decisions, or EOs, including tribal trust resources." Tribal trust resources are defined as "Indian lands or treaty rights to certain resources." These resources include plants, animals, and locations associated with hunting, fishing, and gathering activities for subsistence or ceremonial use. For the purposes of the analysis in this section, the term "traditional resources" will be used to encompass protected tribal resources.

The Navy has determined that the study area for American Indian traditional resources includes the area encompassed by: (1) the construction locations at Ault Field (see Figure 2.3-1), and (2) the 65 dB DNL noise contour areas for 2021 conditions (see Figure 3.2-3). Noise levels below 65 dB DNL are considered to be equivalent to background noise or conversational speech.[19] Within this study area, several types of

[19] The use of the 65 dB DNL is consistent with federal governance, including Airport Noise Compatibility Planning (14 CFR Part 150), which indicates that, in general, all land uses are considered to be compatible with noise levels less than 65 dB DNL.

traditional resources are present: within the 65 dB DNL noise contour areas, there are federally secured off-reservation fishing, usual and accustomed (U&A) grounds and stations for eight federally recognized tribes. There are no known traditional resources at the proposed construction areas at Ault Field as these sites are located on previously disturbed areas and on manmade structures.

American Indian properties of traditional cultural and religious importance, including TCPs (i.e., a specific site or district associated with traditional events, activities, or observances) are discussed in Section 3.6 (Cultural Resources).

3.7.1 Policy and Regulatory Setting

The Navy consults with federally recognized tribes on actions with the potential to significantly affect protected tribal resources, tribal rights, or American Indian lands. Seven tribes have federally secured off-reservation treaty fishing rights in the study area: the Jamestown S'Klallam Tribe, the Lummi Tribe of the Lummi Reservation, the Stillaguamish Tribe of Indians of Washington, the Suquamish Indian Tribe of the Port Madison Reservation, the Swinomish Indian Tribal Community, the Tulalip Tribes of Washington, and the Upper Skagit Indian Tribe. Additionally, while the Samish Indian Nation is a federally recognized tribe, it currently does not have adjudicated federally secured off-reservation treaty fishing rights in the study area.

3.7.1.1 DoD and Navy Policies Regarding Consultation

In October 1998, the DoD promulgated its American Indian and Alaska Native Policy, emphasizing the importance of respecting and consulting with tribal governments on a government-to-government basis (explanatory text was added on November 21, 1999). The policy requires an assessment, through consultation, of the effects of proposed DoD actions that may have the potential to significantly affect traditional resources (including traditional subsistence resources such as shellfish), tribal rights (such as access to adjudicated treaty fishing areas), and Indian lands before decisions are made by the agencies.

In 2005, the Navy updated its policy for consultation with federally recognized tribes. The Secretary of the Navy Instruction 11010.14A, *Department of the Navy Policy for Consultation with Federally Recognized Indian Tribes* (October 11, 2005), implements DoD policy within the Navy and encourages ongoing consultation and communications.

Commander, Navy Region Northwest Instruction 11010.14, *Policy for Consultation with Federally-Recognized American Indian and Alaska Native Tribes* (November 10, 2009), sets forth policy, procedures, and responsibilities for consultations with federally recognized tribes and Alaska Native tribes. The goal of the policy is to establish permanent government-to-government working relationships built upon respect, trust, and openness with tribal governments.

Under these policies, the Navy is required to consider tribal comments and concerns prior to making a final Navy decision on a proposed action. However, reaching formal agreement with a tribe or obtaining tribal approval prior to a Navy final decision is not required.

3.7.1.2 Laws, Executive Orders, and Memoranda Mandating Consultation

EOs and memoranda requiring consultation with tribes include the following:

- EO 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000). This EO requires that federal agencies consider tribal rights in the development of their regulatory policies and that they establish accountable processes for consultation. Policies that

have tribal implications are defined as those regulations, legislative comments, or proposed legislation and other policy statements or actions that have substantial direct effects on one or more tribes (EO 13175, 2000). President Clinton's statement on signing the EO (also dated November 6, 2006) indicates that the intent of the EO was to ensure not only that all federal agencies consult with tribes but that they also respect tribal sovereignty (Clinton, 2000).

- Presidential Memorandum dated November 5, 2009. This memorandum emphasizes federal agencies' need to comply with EO 13175 by requiring the submittal of plans for how consultation will be conducted.
- Presidential Memorandum dated April 29, 1994, Government-to-Government Relations with Native American Governments. This memorandum establishes that federal agencies should undertake activities affecting tribal rights or trust resources in a manner that is knowledgeable, sensitive, and respectful of tribal sovereignty. In this manner, it requests that federal agencies ensure a government-to-government relationship with federally recognized tribal governments (Clinton, 1994).

Other laws and EOs requiring consultation with tribes include the NHPA, as amended in 2006; the American Indian Religious Freedom Act of 1978; the Archaeological Resources Protection Act of 1979; the Native American Graves Protection and Repatriation Act of 1990; and EO 13007, Indian Sacred Sites, all of which are discussed in Section 3.6 (Cultural Resources).

3.7.1.3 Government-to-Government Consultation

In accordance with DoD policies and Navy instructions, the Navy invites government-to-government consultation with federally recognized tribes when proposed actions may have the potential to significantly affect protected tribal resources, tribal rights, or Indian lands.

In October 2014, the Commanding Officer of NAS Whidbey Island invited the following eight federally recognized tribes with traditional resources in the study area to evaluate the Navy's Proposed Action and to consider whether there may be a potential for significant impacts to tribal rights and protected tribal resources:

- Jamestown S'Klallam Tribe
- Lummi Tribe of the Lummi Reservation
- Samish Indian Nation
- Stillaguamish Tribe of Indians of Washington
- Suquamish Indian Tribe of the Port Madison Reservation
- Swinomish Indian Tribal Community
- Tulalip Tribes of Washington
- Upper Skagit Indian Tribe

The Navy sent a second letter to the eight federally recognized tribes on November 30, 2016.

Government-to-government consultation on this Proposed Action was requested by the Swinomish Indian Tribal Community on December 13, 2016. The Navy responded to the Swinomish Indian Tribal Community via email on December 20, 2016, and via letter on December 21, 2016. Additional correspondence occurred in June of 2017. The Swinomish Indian Tribal Community subsequently withdrew its request on September 27, 2017. Appendix C includes a record of this correspondence. No

other tribes have requested or initiated government-to-government consultation. The Navy will consult with all tribes regarding their concerns for tribal resources related to the Proposed Action.

For informational purposes, the Navy also sent a letter on November 30, 2016, to the following tribes (noted in alphabetical order):

- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Chehalis Reservation
- Confederated Tribes of the Colville Reservation
- Cowlitz Indian Tribe
- Hoh Indian Tribe
- Kalispel Tribe
- Lower Elwha Klallam Tribe
- Makah Tribe
- Muckleshoot Indian Tribe
- Nisqually Indian Tribe
- Nooksack Indian Tribe
- Port Gamble S'Klallam Tribe
- Puyallup Tribe
- Quileute Nation
- Quinault Nation
- Sauk-Suiattle Indian Tribe
- Shoalwater Bay Tribe
- Skokomish Indian Tribe
- Snoqualmie Tribe
- Spokane Tribe of Indians
- Squaxin Island Tribe

This letter provided information regarding the release of the Draft EIS. It included a short description of the Proposed Action and noted where additional information could be found. Appendix C includes a record of this correspondence.

3.7.2 Affected Environment

The history of Native Americans in Puget Sound and their use of the vicinity of the NAS Whidbey Island complex are presented in Section 3.6 (Cultural Resources).

3.7.3 Tribal Treaty Rights and Federal Trust Responsibilities; Reservation of Rights by American Indians

Treaties with tribes are considered government-to-government agreements and preempt state laws. Tribal treaty rights are not affected by later federal laws (unless Congress clearly abrogates treaty rights). Treaty language securing fishing and hunting rights is not a "grant of rights (from the federal government to the Indians), but a grant of rights from them—a reservation of those not granted"

(*United States v. Winans,* 25 S. Ct. 662, 1905). This means that the tribes retain rights not specifically surrendered to the U.S.

Furthermore, the U.S. has a trust or special relationship with tribes. This trust relationship provides the basis for legislation, treaties, and EOs that clarify the unique rights or privileges of American Indians. The trust responsibility has been interpreted to require federal agencies to carry out their activities in a manner that is protective of tribal treaty rights. EO 13175, Consultation and Coordination with Indian Tribal Governments, affirms the trust responsibility of the U.S. and directs agencies to consult with tribes and respect tribal sovereignty when taking actions affecting such rights. The Navy complies with this trust responsibility by complying with laws and regulations, such as NEPA and the NHPA.

3.7.3.1 Treaties of Point No Point and Point Elliot

In 1855, Territorial Governor and Superintendent of Indian Affairs Isaac I. Stevens negotiated treaties (commonly referred to as the "Stevens Treaties") with 24 of the 29 modern-day federally recognized tribes located in Washington State. The treaties included language pronouncing that:

> "[T] he right of taking fish at usual and accustomed (U&A) grounds and stations is further secured to said Indians in common with all citizens of the Territory . . . together with the privilege of hunting and gathering roots and berries on open and unclaimed lands."

The Point Elliot Treaty was signed on January 22, 1855. The present-day tribes who are signatory to this treaty include, among other tribes, the Lummi Tribe of the Lummi Reservation, the Samish Indian Nation, the Stillaguamish Tribe of Indians of Washington, the Swinomish Indian Tribal Community, the Suquamish Indian Tribe of the Port Madison Reservation, the Tulalip Tribes of Washington, and the Upper Skagit Indian Tribe.

The Point No Point Treaty was signed on January 26, 1855. This treaty provided for the establishment of the villages of S'Klallams, including the present day Jamestown S'Klallam Tribe. The terms of this treaty were similar to those in the Point Elliot Treaty and other Stevens Treaties and secured off-reservation fishing rights.

United States v. Washington State

Known as the "Boldt Decision," after the presiding U.S. District Court Judge George Boldt, *United States v. Washington* (384 F. Supp. 312 [W.D. Wash. 1974], aff'd, 520 F.2d 676 [9th Cir. 1975]) affirmed the rights of federally recognized Washington tribes (i.e., those that were party to the various treaties) to harvest fish in their U&A places, identified the U&A locations of various tribes, and also allocated 50 percent of the salmon and steelhead fishery to treaty tribes.

The decision and subsequent court decisions established that the following tribes have U&A fishing grounds and stations located in the vicinity of the study area.

Vicinity of Ault Field (waters and shoreline northwest of Ault Field):

- Jamestown S'Klallam Tribe
- Lummi Tribe of the Lummi Reservation
- Samish Indian Nation
- Suquamish Indian Tribe of the Port Madison Reservation

- Swinomish Indian Tribal Community
- Tulalip Tribes of Washington

Vicinity of the 65 dB DNL noise contour areas:

- The six tribes listed above for the vicinity of Ault Field
- Stillaguamish Tribe of Indians of Washington
- Upper Skagit Indian Tribe

3.7.3.2 American Indian Access and Use at NAS Whidbey Island

Within the study area, there is no tribal access to Navy controlled property to exercise off-reservation reserved rights for hunting. Ault Field, the Seaplane Base, and OLF Coupeville are military installations and are not open and unclaimed land.[20]

At the proposed construction sites at Ault Field (See Figure 2.3-1), there are no known traditional resources because these sites are located on previously disturbed areas and on manmade structures. Tribes do not currently access or use the vicinity of the construction sites.

Within the 65 dB DNL noise contour areas, Navy-managed land and waters exist (see Figures 3.2-3 to 3.2-5) at Ault Field, the Seaplane Base, and OLF Coupeville.

In the co-use waters west and north of Ault Field, five tribes exercise treaty fishing activities waters: the Jamestown S'Klallam Tribe, the Lummi Tribe of the Lummi Reservation, the Suquamish Indian Tribe of the Port Madison Reservation, the Swinomish Indian Tribal Community, and the Tulalip Tribes of Washington. Of these tribes, the Suquamish Tribe has a 2013 Memorandum of Agreement with the Navy that provides safe and coordinated access to waters located within the designated Surface Danger Zone (established and described in 33 CFR Part 334) that extends from the NAS Whidbey Island Small Arms Range. Tribes do not currently have access to the shorelines west of Ault Field for treaty fishing due to safety and security requirements associated with Navy flight operations. These same five tribes have treaty fishing rights in the co-use waters east of Ault field in Dugualla Bay.

Tribes do not currently have access to the shorelines at the Seaplane Base due to safety and security requirements associated with Navy operations. In the co-use waters of Crescent Harbor, four tribes exercise treaty fishing (including shellfishing) activities: the Stillaguamish Tribe of Indians of Washington, Swinomish Indian Tribal Community, Tulalip Tribes of Washington, and the Upper Skagit Indian Tribe.

Tribes do not currently have access to or use of Navy land at OLF Coupeville due to safety and security requirements associated with Navy flight operations.

[20] The 1855 Treaty of Point No Point preserves the "privilege of hunting and gathering roots and berries on open and unclaimed lands" (Navy 2010c). At the time of the treaty, the term "open and unclaimed lands" applied to public domain lands held by the United States that had not been fenced or claimed through a land settlement act. Today, "open and unclaimed lands" applies to lands remaining in the public domain (for the purposes of hunting, gathering foods, and grazing livestock or trapping). Public land used in a manner inconsistent with hunting, however, may not be "open and unclaimed" (WDFW, n.d.).

3.8 Biological Resources

Biological resources include living, native, or naturalized animal species and the habitats within which they occur. Animal species are referred to generally as wildlife. Habitat can be defined as the resources and conditions present in an area that result in occupancy by organisms (Hall, Krausman, and Morrison, 1997). Although the existence and preservation of biological resources are intrinsically valuable, these resources also provide aesthetic, recreational, and socioeconomic values to society. This analysis focuses on species or vegetation types that are important to the function of the ecosystem, of special societal importance, or protected under federal or state law or statute.

Biological resources are divided into two major categories in this EIS: terrestrial wildlife and marine wildlife. Special status species are those listed by and protected under the federal, state, and county regulations discussed below in Section 3.8.1, Biological Resources, Regulatory Setting.

3.8.1 Biological Resources, Regulatory Setting

This section summarizes the federal and state regulations applicable to the wildlife species that could be affected by the Proposed Action. Analyses, conclusions, and consultations (as applicable) pursuant to each of the federal regulations are provided in Section 4.8.

3.8.1.1 Federal Regulations

3.8.1.1.1 Endangered Species Act

The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.), provides a program for the conservation of threatened and endangered species of animals and plants and the habitats in which they are found. Under the ESA, species may be listed as either endangered or threatened based upon the species' biological status and threats to their existence (USFWS, 2013a). Once listed under the ESA, threatened and endangered species and designated critical habitat are protected because the ESA prohibits the take of any listed species except under federal permit. As defined in the ESA, "take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."

Section 7 of the ESA directs federal action proponents to consult with the USFWS and/or the National Marine Fisheries Service (NMFS) when their activities "may affect" a species listed pursuant to the ESA or its designated or proposed critical habitat. Critical habitat is not designated on any areas owned, controlled, or designated for use by the DoD where an approved INRMP, as determined by the Department of Interior or Department of Commerce Secretary, provides a benefit to the species subject to critical habitat designation. NAS Whidbey Island has an approved INRMP (NAS Whidbey Island, 2013a), and, pursuant to the Sikes Act (16 U.S.C. 670a-670o), no critical habitat has been designated on the installation. However, critical habitat has been designated within the region (i.e., the study area) and is described in subsequent sections.

3.8.1.1.2 Migratory Bird Treaty Act and Executive Order 13186

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations (USFWS, 2015a). Per the MBTA, "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10.12). Migratory birds, as defined by the MBTA, include nearly all species (1,026 in total) that may occur in the U.S., with the exceptions of some upland game birds (e.g., California quail [*Callipepla*

californica]) and non-native species (e.g., European starling [*Sturnus vulgaris*]) that occur in the U.S. by way of human introduction (USFWS, 2013b). The MBTA does not explicitly include provisions for permits to authorize the incidental take of migratory birds that results from an otherwise legal activity but is not the purpose of the activity. Instead, the USFWS encourages individuals, companies, industries, and agencies to use best practices established to help reduce and avoid the unpermitted take of MBTA-protected species.

EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (January 10, 2001), requires that all federal agencies undertaking activities that may negatively impact migratory birds take a prescribed set of actions to further implement the MBTA. EO 13186 directs federal agencies to develop a Memorandum of Understanding with the USFWS that promotes the conservation of migratory birds. On September 5, 2014, the DoD signed a 5-year Memorandum of Understanding with the USFWS. In accordance with the Memorandum of Understanding, and to the extent possible as per law and budgetary considerations, EO 13186 encourages agencies to implement a series of conservation measures aimed at reinforcing and strengthening the MBTA.

Section 315 of the 2003 National Defense Authorization Act and the Military Readiness Rule (50 CFR Part 21) gave the Secretary of the Interior authority to prescribe regulations to exempt the armed forces from the incidental taking of migratory birds during authorized military readiness activities. Congress defined military readiness activities as all training and operations of the U.S. armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. The Final Rule authorizing the DoD incidental take of migratory birds during authorized military readiness activities requires that the armed forces confer with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate adverse effects of the Proposed Action if the action will have a significant negative effect on the sustainability of a population of a migratory bird species. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem.

3.8.1.1.3 Bald and Golden Eagle Protection Act

Bald eagles and golden eagles (*Aquila chrysaetos*) are protected by the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c). The BGEPA prohibits anyone without a federal permit to “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle . . . [or any golden eagle], alive or dead, or any part, nest, or egg thereof.” “Take” is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." “Disturb” is further defined as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle, a decrease in productivity by substantially interfering with the eagle’s normal breeding, feeding or sheltering behavior, or nest abandonment by substantially interfering with the eagle’s normal breeding, feeding or sheltering behavior.” In addition to immediate impacts, this definition also covers “impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle’s return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.” Under the BGEPA, a federal permit may be issued to authorize specific activities including the take, possession, and transportation of specimens for scientific or

exhibition purposes, for the religious purposes of Indian tribes, or when a take is necessary to protect wildlife or agriculture in a particular area (USFWS, 2012).

3.8.1.1.4 Marine Mammal Protection Act

All marine mammals are protected under the provisions of the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C Chapter 31). Marine mammals include cetaceans (whales, dolphins, and porpoises), pinnipeds (seals, sea lions, and walruses [*Odobenus rosmarus*]), manatees (*Trichechus* spp.), dugongs (*Dugong dugon*), marine otters (*Lutra felina*) and sea otters (*Enhydra lutris*), and polar bears (*Ursus maritimus*). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. “Take” is defined as “to hunt, harass, capture, or kill” any marine mammal or attempt to do so. The NMFS administers the MMPA in protecting whales, dolphins, porpoises, seals, and sea lions, while the USFWS protects walruses, manatees, dugongs, otters, and polar bears (NMFS, 2014a).

The National Defense Authorization Act of 2004 amended definitions in the MMPA related to “military readiness activity.” This is defined as “all training and operations of the Armed Forces that relate to combat” and “the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use.” For military readiness activities, the relevant definition of harassment is any act that:

- injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (“Level A harassment”), or
- disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered (“Level B harassment”)

3.8.1.2 State Regulations

3.8.1.2.1 Species of Concern

The Washington Department of Fish and Wildlife (WDFW) administers the protection of wildlife species listed by the State of Washington as endangered, threatened, and sensitive. Refer to Special Status Terrestrial Wildlife below for a discussion of species protected by state regulations. Washington’s listing procedures are defined in WAC 232-12-297, endangered species are designated under WAC 232-12-014, and threatened and sensitive species are designated under WAC 232-12-011 (WDFW, 2013). State-listed species’ statuses are defined as follows:

- **Endangered**
  species native to the State of Washington that are seriously threatened with extinction throughout all or a significant portion of their range within the state

- **Threatened**
  species native to the State of Washington that are likely to become an endangered species within the foreseeable future throughout a significant portion of their range within the state without cooperative management or removal of threats
- **Sensitive**
  species native to the State of Washington that are vulnerable or declining and are likely to become endangered or threatened in a significant portion of their range within the state without cooperative management or removal of threats (WDFW, 2013)

3.8.1.3 Local Regulations

3.8.1.3.1 Island County Critical Areas Ordinance

The Island County Critical Areas Ordinance (17.02) provides for the protection of habitat for deserving flora and fauna, as recognized by Island County. Protected species include those listed by the federal government or the State of Washington as endangered, threatened, or sensitive. Protected species also include species of local importance, which are not listed by federal or state regulation, but are designated by Island County for their uniqueness in the county and worthiness of protection.

3.8.1.3.2 Skagit County Critical Areas Ordinance

The Skagit County Critical Areas Ordinance (14.24) provides for the protection of habitat considered to be critical areas, including Fish and Wildlife Habitat Conservation Areas (FWHCAs) (SCC 14.24.500). The purpose of FWHCAs is to protect fish and wildlife populations and their associated habitats and provide special consideration on conservation or protection measures necessary to preserve or enhance anadromous species. The Skagit Wildlife Area was also designated under this ordinance.

3.8.1.3.3 San Juan County Critical Areas Ordinance

The San Juan County Critical Areas Ordinance (18.35) provides for protection of function and values of habitat, including FWHCAs (Ordinance 1-2015 Section 1). FWHCAs in San Juan County are described in Ordinance 18.35.119, with map information provided in Ordinance 18.35.120. Critical areas include but are not limited to areas in which federal and state-listed species and species of local importance have primary association; shellfish areas; kelp and eelgrass beds; herring, smelt, sand lance, and other forage-fish spawning areas; and habitats of local importance. The study area overlap with San Juan County is limited to offshore waters of Puget Sound, with the exception of the 113-acre James Island Marine State Park and other small, rocky islands.

3.8.2 Biological Resources, Affected Environment

The following discussions provide a description of the existing conditions for terrestrial wildlife and marine wildlife in the Proposed Action's biological resources study area.

The study area for the affected environment and the analyses of effects on biological resources associated with the action alternatives are presented in Figure 3.8-1. The study area includes all areas where biological resources may be affected directly or indirectly by the Proposed Action, including those that may occur beyond the immediate area involved in the Proposed Action (see Chapter 4). There are two types of activities under the Proposed Action that would affect biological resources: construction at Ault Field and air operations at the NAS Whidbey Island complex. Under the Proposed Action, the greatest potential for impacts on biological resources would occur during aircraft operations, when noise and collision impacts could occur. Research shows that some animals begin to respond to aircraft noise at as little as 60 dB (Black et al., 1984). Dolbeer et al. (2014) found that most wildlife-aircraft collisions (hereafter referred to as "strikes") occur below an altitude of 3,500 feet. Based on these findings, the Navy defined the study area as all areas where modeled average noise levels under the Proposed Action would be equal to or greater than 60 dB at ground/surface level and all areas where aircraft operations would occur at or below an altitude of 3,500 feet (Figure 3.8-1).

Figure 3.8-1
Biological Resource Study Area
Whidbey Island, Island County, WA

3.8.2.1 Terrestrial Wildlife and Vegetation

Terrestrial wildlife includes all vegetation, invertebrates, reptiles, amphibians, birds, and mammals that are associated primarily with terrestrial habitats. Anadromous and marine fish species are included in the marine section of this chapter. This section summarizes the terrestrial wildlife communities that inhabit the study area, with a more detailed discussion of the special status species and habitats.

3.8.2.1.1 Vegetation

Non-native grassland and landscaped vegetation occupy the proposed construction areas at Ault Field. This vegetation is regularly maintained as part of the airfield management program. No unique or regionally significant vegetation communities occur in these areas, and all areas are previously disturbed.

3.8.2.1.2 Reptiles and Amphibians

Within the study area, there are six reptile and nine amphibian species that potentially occur (Table 3.8-1) (NAVFAC, 2015). The American bullfrog (*Lithobates catesbeianus*) is a non-native species (Washington Herp Atlas, 2005, 2013; NatureServe, 2015). The NAS Whidbey Island complex provides potentially suitable habitat for all reptiles and amphibians found in the study area (Table 3.8-1) (NAS Whidbey Island, 2013a). Refer to Special Status Terrestrial Wildlife below for a discussion of reptile and amphibian species protected by state and federal regulations.

Table 3.8-1 Reptiles and Amphibians Potentially Occurring within the Study Area

Common Name	*Scientific Name*
Reptiles	
Common garter snake	*Thamnophis sirtalis*
Northern alligator lizard	*Elgaria coerulea*
Northwestern garter snake	*Thamnophis ordinoides*
Terrestrial garter snake	*Thamnophis elegans*
Western fence lizard	*Sceloporus occidentalis*
Western pond turtle	*Clemmys (Actinemys) marmorata*
Amphibians	
American bullfrog	*Lithobates catesbeianus*
Ensatina	*Ensatina eschscholtzii*
Long-toed salamander	*Ambystoma macrodactylum*
Northern Pacific chorus frog	*Pseudacris regilla*
Northern red-legged frog	*Rana aurora*
Northwestern salamander	*Ambystoma gracile*
Rough-skinned newt	*Taricha granulosa*
Western redback salamander	*Plethodon vehiculum*
Western toad	*Anaxyrus boreas*

Source: NAVFAC, 2015

3.8.2.1.3 Birds

Most bird species that occur in the study area are protected under the MBTA and are discussed in Section 3.8.2.2., Special Status Terrestrial Wildlife, below. However, six common, year-round resident species are not protected by the MBTA and may occur in the study area. Five of the six species are not native to the U.S., including the ring-necked pheasant (*Phasianus colchicus*), rock pigeon (*Columba livia*),

Eurasian collared-dove (*Streptopelia decaocto*), European starling, and house sparrow (*Passer domesticus*) (NAS Whidbey Island, 2013a; eBird, 2015a). The California quail, a game species, is the only species native to the U.S. that occurs in the study area and that is not protected under the MBTA.

3.8.2.1.4 Mammals

Within the study area, 36 species of terrestrial mammals potentially occur (NAS Whidbey Island, 2013a; Burke Museum of Natural History and Culture, 2013). Terrestrial mammal species include six non-native species. Large mammals that regularly occur are the Columbian black-tailed deer (*Odocoileus hemionus columbianus*) and the coyote (*Canis latrans*), which occur in the mixed forest, alder forest, and freshwater marsh habitat types, as well as in grasslands. The eastern cottontail (*Sylvilagus floridanus*), European rabbit (*Oryctolagus cuniculus*), river otter (*Lontra canadensis*), mink (*Mustella vison*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), Douglas squirrel (*Tamiasciurus douglasii*), Townsend's vole (*Microtus townsendii*), masked shrew (*Sorex cinereus*), and deer mouse (*Peromyscus maniculatus*) also are among the most commonly occurring mammals within the study area. Twenty-five percent of the mammal species (nine species) that occur within the study area are bats. Refer to Section 3.8.2.2., Special Status Terrestrial Species, below for a discussion of species protected by state and federal regulations.

3.8.2.2 Special Status Terrestrial Species

3.8.2.2.1 Federal Threatened and Endangered Terrestrial Species

The USFWS Information for Planning and Conservation (IPaC) tool was used to identify all terrestrial species protected under the ESA that could potentially occur in the study area (USFWS, 2017). Nine terrestrial wildlife species were identified by IPaC (Table 3.8-2) and are discussed individually below.

Table 3.8-2 Federally Listed[21] Terrestrial Species and Critical Habitats Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Federal Status*	*Critical Habitat Present?*	*Occurrence*
Plants				
Golden paintbrush	*Castilleja levisecta*	Threatened	No	Highly Unlikely: species occurs within study area, but no suitable habitat exists within the proposed construction areas, and there would be no impact to species.
Invertebrates				
Island marble butterfly	*Euchloe ausonides insulanus*	Candidate	No	Highly Unlikely: species is currently only known from one population on San Juan Island, outside of the study area.

[21] Federally listed species are those designated as threatened, endangered, or candidate species by the ESA. These species were determined based on the USFWS IPaC tool (USFWS, 2017).

Table 3.8-2 Federally Listed[21] Terrestrial Species and Critical Habitats Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Federal Status*	*Critical Habitat Present?*	*Occurrence*
Taylor's checkerspot butterfly	*Euphydryas editha taylori*	Endangered	Yes	Highly Unlikely: species believed to be extirpated from Island County (WDFW, 2013); however, unoccupied critical habitat has been designated on Whidbey Island.
Reptiles and Amphibians				
Oregon spotted frog	*Rana pretiosa*	Threatened	No	Highly Unlikely: no known occurrences within study area. Closest extant population and critical habitat are more than 10 miles to the northwest, on mainland Washington outside the study area.
Birds				
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	No	Confirmed: known to occur year-round in the marine waters within the study area.
Northern spotted owl	*Strix occidentalis caurina*	Threatened	No	Highly Unlikely: range not known within the study area.
Streaked horned lark	*Eremophila alpestris strigata*	Threatened	No	Highly Unlikely: not known within the study area.
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	No	Highly Unlikely: No longer breeds in Washington. Only four individuals have been recorded in western Washington since 1950.
Mammals				
North American wolverine	*Gulo gulo luscus*	Proposed Threatened	No	Highly Unlikely: there are no records of this species' occurring within the study area, and no suitable habitat is present.

Sources: USFWS, 2017; WDFW, 2015; Hallock, 2013

3.8.2.2.1.1 Golden Paintbrush

The golden paintbrush (*Castilleja levisecta*) was listed as threatened under the ESA in 1997. The species inhabits generally flat, upland prairies on soils derived from glacial origins. Low, deciduous shrubs are commonly present as small to large thickets (USFWS, 2015b).

Historically, golden paintbrush was reported in more than 30 sites in the Puget Trough of British Columbia and Washington and the Willamette Valley in Oregon. Eleven known populations remain, including two in British Columbia and nine in Washington. Five populations of golden paintbrush occur on the northern half of Whidbey Island (USFWS, 2007). One known population of golden paintbrush occurs on NAS Whidbey Island at Forbes Point on the Seaplane Base, approximately 4 miles southeast of Ault Field (NAS Whidbey Island, 2013a). The species has not been documented at Ault Field or OLF Coupeville. There is no designated critical habitat for this species.

Furthermore, no suitable habitat to support this species occurs within the proposed construction areas. Therefore, there would be no measurable impacts to vegetation or the golden paintbrush specifically, and they will not be discussed in Chapter 4.

3.8.2.2.1.2 Taylor's Checkerspot Butterfly

The Taylor's checkerspot butterfly (*Euphydryas editha taylori*), a subspecies of Edith's checkerspot butterfly (*Euphydryas editha*), was listed as endangered under the ESA in 2013 (USFWS, 2013c). This subspecies historically occurred in grasslands throughout the San Juan Islands and Puget Trough, but only eight populations were reported in Washington in 2016 (USFWS, 2013c; WDFW, 2013; Potter, 2016). The species is believed extirpated from the study area; no Taylor's checkerspot butterflies have been found within counties inside the study area since 2009 (WDFW, 2013; Potter, 2016). Critical habitat has been designated within the study area, including on Whidbey Island; however, it is unoccupied (Figure 3.8-2; USFWS, 2013c; USFWS, 2017). There is no designated critical habitat within the NAS Whidbey Island complex; the nearest critical habitat to the proposed construction site at Ault Field is situated approximately 1.5 miles north of Ault Field (USFWS, 2017). Critical habitat also occurs in two additional locations within the study area, one about 0.25 mile northeast of OLF Coupeville and another along the coast, due west of OLF Coupeville. For the Taylor's checkerspot butterfly, critical habitat (USFWS final rule 78 FR 61505) was not designated on the NAS Whidbey Island complex because the primary constituent elements were not present there. Given that the species is believed to be extirpated from the study area, critical habitat within the study area is unoccupied, and designated critical habitat does not occur on the NAS Whidbey Island complex near the proposed construction, the Proposed Action would have no effect on this subspecies and would otherwise not affect critical habitat. Therefore, the Taylor's checkerspot butterfly will not be discussed in Chapter 4.

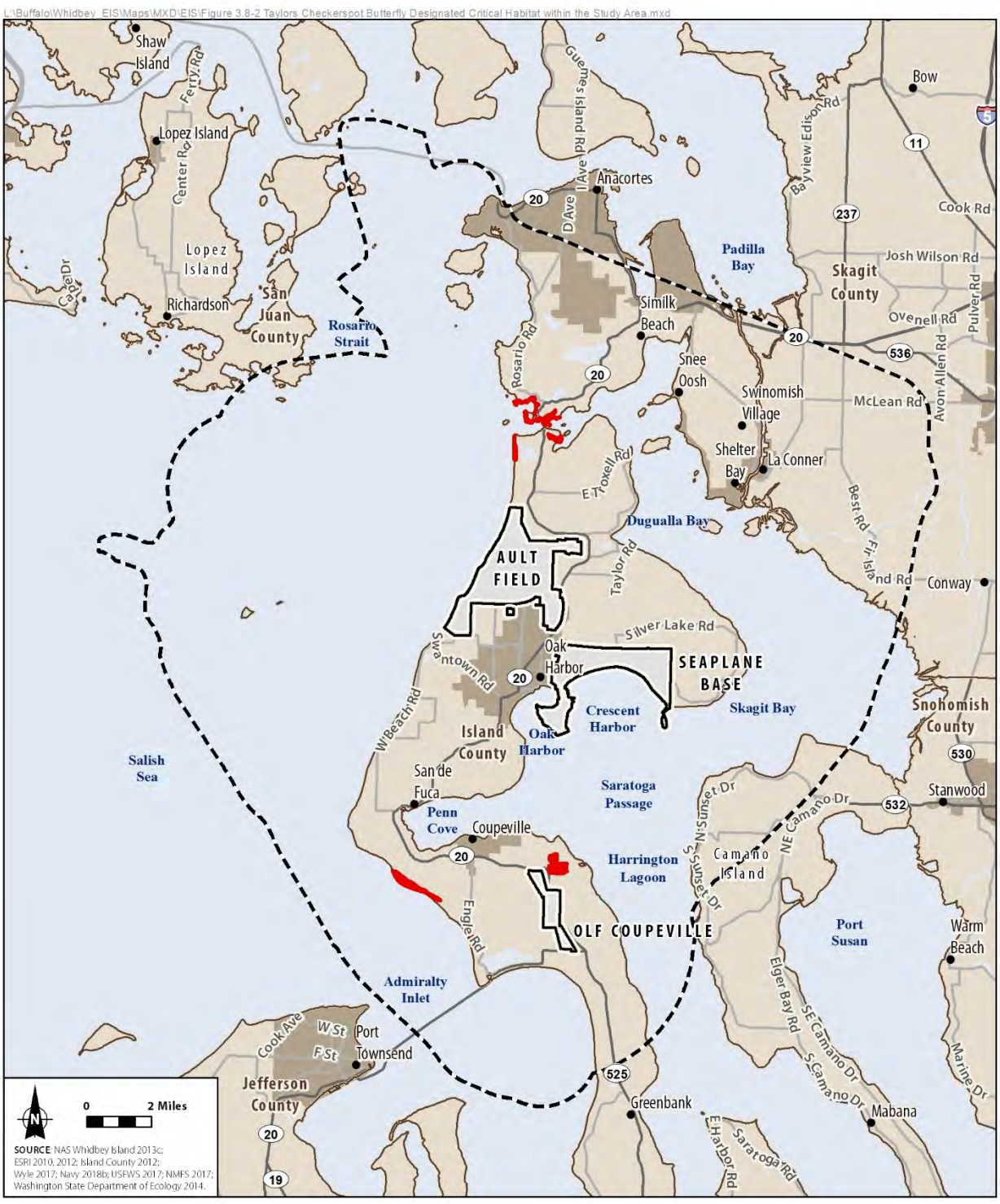


Figure 3.8-2
Taylor's Checkerspot Butterfly Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

3.8.2.2.1.3 Marbled Murrelet

The USFWS listed the Washington, Oregon, and California population of the marbled murrelet (*Brachyramphus marmoratus*) as threatened in 1992 (USFWS, 1992). There are currently about 3.7 million acres of designated critical habitat for the Washington, Oregon, and California population of the marbled murrelet (USFWS, 2016b). The nearest marbled murrelet designated critical habitat occurs approximately 15 miles to the southwest of the furthest extent of the study area (USFWS, 2016b).

Marbled murrelets breed from Alaska south along the Pacific Coast to central California (Santa Cruz County) (Nelson, 1997; WDFW, 2013). Their winter range largely overlaps their summer range, as marbled murrelets exhibit limited seasonal movement, but they may inhabit nearshore waters as far south as northern Baja, Mexico, in winter (Nelson, 1997; eBird, 2015b). Marbled murrelets are seabirds that nest on large branches or other suitable, large platforms in mature or old growth conifers (Hamer and Nelson, 1995a; Hamer, 1995; WDFW, 2013). Key nesting habitat components in Washington include the number of potential nest platforms, percent moss on dominant trees (i.e., those greater than or equal to 32 inches in diameter), percent slope, density of dominant trees, and mean diameter of western hemlock (Hamer, 1995; Nelson, 1997). Marbled murrelet nests have been found primarily in mature and old-growth habitat and, in a few cases in Oregon, in younger (60- to 80-year-old) forests that have trees with dwarf mistletoe or other deformations or structures that provide a nest platform (Nelson, 1997; Nelson and Wilson, 2002). Hamer (1995) also found that the presence of marbled murrelets decreased with increasing stand elevation, distance inland, lichen cover, and canopy cover (Hamer, 1995). The species shows high fidelity to nesting areas and is faithful to nest trees (Nelson, 1997).

Marbled murrelets do not build nests but rather lay one egg on moss or duff on branches or platforms (Nelson, 1997). Hamer and Nelson (1995b) estimated that egg laying and incubation occur from late April to late July in Washington (Hamer and Nelson, 1995b). Both adults share responsibility for incubation, which lasts 28 to 30 days, with one adult remaining at the nest while the other flies to marine areas to forage (Nelson, 1997; WDFW, 2013). The adults typically exchange incubation/foraging duties every 24 hours, usually prior to official sunrise, but timing varies due to weather and latitude (Nelson, 1997).

During the breeding season (April 1 to September 23), marbled murrelets prey on small schooling fish underwater in nearshore and protected coastal waters (Nelson, 1997; Livezey and Flotlin, 2012; WDFW, 2013). They pursue prey underwater, and that prey more commonly includes the Pacific sand lance (*Ammodytes hexapterus*), northern anchovy (*Engraulis mordax*), Pacific herring (*Clupea pallasii*), and capelin (*Mallotus villosus*). Marbled murrelets often forage within 3 miles of shore, usually closer on exposed outer coasts, and generally prefer shallow waters less than 200 feet deep (Nelson, 1997). The availability of prey contributes to the locations of at-sea foraging hotspots, but hotspots are primarily associated with proximity to suitable inland nesting habitat (Raphael et al., 2015). They return to known feeding sites and move into and out of them primarily between dawn and mid-morning. Nest sites may be quite distant from marine foraging areas, with nesting behavior having been recorded as far as 55 miles inland in Washington (WDFW, 2013).

Adults brood their chick for only 1 to 2 days after hatching, but both adults feed their chick until it fledges (i.e., leaves the nest) (Nelson and Hamer, 1995; Nelson, 1997). Chicks are fed one to eight times daily, typically around sunrise, midday, and sunset. Chicks fledge between 27 and 40 days after hatching, departing at dusk and presumably flying directly to the ocean. Parents do not continue to care for young after their departure from the nest (Nelson, 1997).

During non-breeding periods, marbled murrelets are typically found in stratified, nearshore waters similar to their summer foraging areas (Nelson, 1997). Seasonal migrations are generally limited to small-scale movements from outer coastal areas to protected waters or south from breeding areas. Movements may follow prey availability throughout the winter. Marine environments change seasonally, and marbled murrelets are opportunistic foragers, so their diets differ between non-breeding periods and the breeding season (Burkett, 1995). Small schooling fish are still a key part of their diet, but they also consume marine invertebrates like krill, mysids, and amphipods (Burkett, 1995; Nelson, 1997). Marbled murrelets spend most of their time at sea foraging or loafing (e.g., resting and preening) (Nelson, 1997).

Some marbled murrelets, presumably local breeders, also use forested habitats during the winter (Naslund, 1993; Nelson, 1997). They may be making trips to find nesting sites or to maintain sites, territories, or pair bonds. Forest site attendance during the winter is variable but is less than during the breeding season (Nelson, 1997). Sanzenbacher et al. (2014) found that passage rates between marine areas and forested nesting areas were 11 percent to 47 percent lower in winter than in summer at three sites in northern California. Flights below the tree canopy are rare during winter visits (Nelson, 1997).

Marbled murrelets fly at speeds of 25 to 100 miles per hour (mph) at altitudes that may exceed 3,000 feet (Nelson, 1997). Stumpf et al. (2011) reported the mean flight height of marbled murrelets on the Olympic Peninsula in Washington to be approximately 800 feet AGL, while ranging from 200 to more than 2,000 feet AGL. In the study, 50 percent of marbled murrelets flew between 643 and 938 feet AGL over inland habitats. Sanzenbacher et al. (2014) found that flight heights vary greatly between coastal areas and inland areas. Mean flight heights were nearly three times higher inland. Their flight paths from marine foraging sites to nest sites consistently follow ridges and river corridors (Nelson, 1997).

The Washington, Oregon, and California marbled murrelet population is split into six monitoring areas, or conservation zones, from the Canadian border to approximately San Francisco Bay. Two of these zones are in Washington: Conservation Zone 1, which includes the Strait of Juan de Fuca, Hood Canal, and the San Juan Islands; and Conservation Zone 2, which includes the outer Washington coast (Lance and Pearson, 2015). The Washington, Oregon, and California breeding season population was most recently estimated at 24,100 individuals in 2015[22]. The population trended downward between 2001 and 2015 by 0.13 percent annually. In Washington, the estimated 2015 breeding season population was 7,494 individuals. The annual rate of decline in Washington between 2001 and 2015 was -4.40 percent. The study area lies within Conservation Zone 1, which had an estimated 2016 population of 4,614 individuals. The annual rate of decline in Conservation Zone 1 between 2001 and 2016 was -4.90 percent (Lynch et al., 2017).

[22] The Northwest Forest Plan Effectiveness Monitoring Program is now only collecting a complete sampling data set every other year, so rangewide population and trend information will no longer be available on an annual basis as in prior years.

The WDFW began surveying at-sea marbled murrelets in the state outside of the breeding season (September to April) in 2012. The most recently reported study results (September 2014 to April 2015) estimated 1,384 (95-percent confidence interval (CI) = 904 – 2,117) marbled murrelets in their Puget Sound study strata. The most populated survey stratum included the nearshore waters west of Whidbey Island, with an estimated 990 birds (95-percent CI = 566 – 1,733) in 2014/2015. The second-most-populated survey stratum included the nearshore waters east of Whidbey Island, with an estimated 263 birds (95-percent CI = 165 – 421) in 2014/2015 (Pearson and Lance, 2014).

Around Ault Field and OLF Coupeville, population density from 2001 through 2012 was estimated to be from less than 2.6 to 2.6–7.8 birds per square mile (Falxa et al., 2013). Marbled murrelets are found in the highest densities in the nearshore waters of the San Juan Islands and Rosario Strait, both located to the northwest and outside of the action area; the Strait of Juan de Fuca, west of the action area; Admiralty Inlet, bordering Whidbey Island to the southwest; and Hood Canal, located to the southwest of Admiralty Inlet and outside of the study area (USFWS, 2016c).

Marbled murrelet nesting has not been documented in Island County (Opperman et al., 2006; WDFW, 2013), and the study area and NAS Whidbey Island complex offer only a few scattered old growth trees in forested areas that are dominated by second-growth mixed conifer forest (NAS Whidbey Island, 2013a). In the 1990s, it was the general conclusion that small amounts of suitable habitat occur on Whidbey Island within Deception Pass State Park; however, the winds in the area largely prevent the moss-covered defective limbs that create platforms for nesting murrelets (Milner, 2016). No habitat or nesting surveys have been conducted on Whidbey Island in recent years. During consultations for the 2012 *Environmental Assessment for the Transition of Expeditionary EA-6B Prowler Squadrons to EA-18G Growler Aircraft at Naval Air Station Whidbey Island, Oak Harbor, Washington*, the USFWS confirmed the project was more than 0.25 mile from suitable marbled murrelet nesting habitat (Navy, 2012). More recently, the Navy contacted the WDFW to ensure it had obtained the most up-to-date information on marbled murrelet nesting occurrence in the study area. The WDFW responded that patches in the study area could be considered suitable nesting habitat, but none of these areas have been identified as supporting marbled murrelet nesting, and no nesting birds have been found on Whidbey Island (Milner, 2016).

Marbled murrelets are present in the marine waters surrounding Whidbey Island year-round (Seattle Audubon Society, 2015). According to the WDFW Wildlife Science Division, observations of marbled murrelets were reported to be relatively consistent throughout the year (Pearson and Lance, 2017).

WDFW, along with researchers from Pacific Northwest and Pacific Southwest Research Stations of the USFS, USFWS, and Crescent Coastal Research, have been estimating marbled murrelet population size and trends using at-sea line transects within 8 kilometers of the Washington, Oregon, and northern California coastline from year 2000 to 2016. The population estimate for Puget Sound and the Strait of Juan de Fuca in 2016 was 4,600 birds, with a 4.9-percent average annual rate of decline for the 2001 to 2016 period, assuming a constant rate of decline (Lynch et al., 2017; Pearson and Lance, 2017). The at-sea murrelet density estimates for areas sampled in 2016 were 1.32 birds per km^2 in Puget Sound and the Strait of Juan de Fuca (Lynch et al., 2017).

Marbled murrelet populations have suffered significant declines in the Pacific Northwest, caused primarily by the removal of essential habitat by logging and coastal development (USFWS, 1997). Other threats contributing to the decline in marbled murrelets include chemical/oil spills and bioaccumulation, fishing bycatch, collisions with man-made objects, anthropogenic disturbances, and changes in prey

availability due to climate and overfishing (Nelson, 1997; USFWS, 1997, 2009; Bellefleur, Lee, and Ronconi, 2009; WDFW, 2013).

The potential effects of the Proposed Action on marbled murrelets are discussed in Chapter 4.

3.8.2.2.1.4 Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*), a subspecies of the spotted owl (*Strix occidentalis*), was listed as threatened under the ESA in 1990 (WDFW, 2013). The species is associated with structurally complex, typically old growth, forests. The northern spotted owl's occurrence within the study area is unlikely, and no critical habitat has been designated with the study area; therefore, the Proposed Action would have no effect on the subspecies (eBird, 2015a, 2015b; Seattle Audubon Society, 2015; WDFW, 2013). This subspecies will not be discussed in Chapter 4.

3.8.2.2.1.5 Streaked Horned Lark

The streaked horned lark (*Eremophila alpestris strigata*), a subspecies of the horned lark (*Eremophila alpestris*), was listed as threatened under the ESA in 2013 (USFWS, 2013c). Streaked horned larks nest on grasslands and sparsely vegetated areas at airports, sandy islands, and coastal spits in Washington (WDFW, 2013). Their winter habitats are similar to their nesting habitats (USFWS, 2013c). The subspecies was historically abundant on Puget Sound prairies, but it is now extirpated at northern Puget Trough breeding sites due to habitat loss (WDFW, 2013). Likewise, more than 90 percent of grasslands in the southern Puget Sound region have been lost. Streaked horned lark nesting sites are now restricted to 13 locations in Washington. The nearest known occurrences to the study area are over 40 miles to the south (Anderson and Pearson, 2015).

There are no current or historical nesting records in the study area and Island County (WDFW, 2013). Records of horned larks sighted on Whidbey Island are limited to nine observations of 23 individuals during spring and fall migration periods from 1993 to 2015 (eBird, 2015a). These observations were not identified to the subspecies level (i.e., streaked horned lark), so it is possible that some or all of these observations were of migrants of the listed subspecies. However, based on recent occurrence records for the streaked horned lark, it is not likely these observations were the listed subspecies (WDFW, 2013; Anderson and Pearson, 2015). Additionally, no critical habitat is designated within the study area. The Proposed Action would have no effect on this subspecies because it is not known to occur in the study area, and no critical habitat is present; therefore, the streaked horned lark will not be discussed in Chapter 4.

3.8.2.2.1.6 Yellow-billed Cuckoo

The western U.S. Distinct Population Segment (DPS) of the yellow-billed cuckoo (*Coccyzus americanus*) was listed as threatened under the ESA in 2014 (USFWS, 2015d). The western DPS prefers large, continuous tracts of riparian woodlands with cottonwoods (*Populus* spp.) and willows (*Salix* spp.) (WDFW, 2013). Yellow-billed cuckoos no longer breed in Washington, and only four individuals have been recorded in western Washington since 1950. Because they are highly unlikely to occur in Washington, the Proposed Action would have no effect on the western U.S. DPS of the yellow-billed cuckoo; therefore, it will not be discussed in Chapter 4.

3.8.2.2.1.7 North American Wolverine

As of 2016, the North American wolverine (*Gulo gulo luscus*) is proposed for listing as threatened. North American wolverines rely on remote, high-elevation montane habitat with heavy snowfall (Copeland et al., 2010). In Washington, North American wolverines are rare and primarily found in the northern Cascade mountains (WDFW, 2012a). The study area does not contain any occurrences of the North American wolverine, and there is no suitable habitat for the species. The Proposed Action would have no effect on the North American wolverine; therefore, it will not be discussed in Chapter 4.

3.8.2.2.2 Migratory Birds

The term "migratory birds" hereafter refers to species that are protected under the MBTA, which includes both migrating and non-migrating species. About 230 migratory bird species occur annually within the study area (NAS Whidbey Island, 2013a; eBird, 2015a; Seattle Audubon Society, 2015). Although all of these species occur annually, their relative abundances may vary widely. Likewise, some species are year-round residents, while others may only occur seasonally during spring and/or fall migrations, the breeding season, and/or winter. All major taxonomic groups are represented on this list.

In the breeding season, successful reproduction is the primary focus of adult birds. During this period, birds will be engaged in courtship, nest-building, parental care, foraging, and nest/territory defense to increase the chances of survival for themselves and their young. About 120 migratory bird species breed annually on Whidbey Island (Opperman et al., 2006; eBird, 2015a). These species represent many major bird taxa, including, but not limited to, raptors, waterbirds[23], woodpeckers, and passerines (i.e., songbirds). Breeding migratory birds within the study area and at the NAS Whidbey Island complex are composed of year-round residents and summer-only breeding residents. Some common year-round residents include mallards (*Anas platyrhynchos*), great blue herons (*Ardea herodias*), bald eagles, northern flickers (*Colaptes auratus*), and song sparrows (*Melospiza melodia*) (NAS Whidbey Island, 2013a; eBird, 2015a). Rufous hummingbirds (*Selasphorus rufus*), barn swallows (*Hirundo rustica*), Swainson's thrushes (*Catharus ustulatus*), and black-headed grosbeaks (*Pheucticus melanocephalus*) are among the more common summer-only breeding residents.

During the winter, birds are primarily focused on finding food and shelter. More than 120 migratory bird species overwinter within the study area and on Whidbey Island (NAS Whidbey Island, 2013a; eBird, 2015a; Seattle Audubon Society, 2015). Some more common winter-only residents include buffleheads (*Bucephala albeola*), horned grebes (*Podiceps auritus*), ruby-crowned kinglets (*Regulus calendula*), and golden-crowned sparrows (*Zonotrichia atricapilla*) (eBird, 2015a). Mallards, bald eagles, glaucous-winged gulls (*Larus glaucescens*), Pacific wrens (*Troglodytes pacificus*), and dark-eyed juncos (*Junco hyemalis*) are among the year-round residents most common during the winter.

[23] Waterbirds includes a variety of taxa that are largely dependent on aquatic environments, including but not limited to waterfowl, loons, herons, rails, shorebirds, gulls, terns, and alcids.

During spring and fall migrations, birds travel from areas of low or decreasing resources (i.e., nesting sites and/or food) to areas of high or increasing resources (Cornell Lab of Ornithology, 2007). Migrating birds, especially long-distance migrants, may stop over at various locations en route to their breeding or wintering grounds to forage and rest. More than 200 migratory bird species regularly occur on Whidbey Island during the spring and/or fall migration periods (NAS Whidbey Island, 2013a; eBird, 2015a; Seattle Audubon Society, 2015). Migrating birds may be arriving to breed (spring) or to overwinter (fall), or they may be passing through on their way to other breeding or wintering grounds. Some species will be departing for breeding grounds further north or at higher elevations in the spring, or to wintering grounds further south or at lower elevations in the fall. Year-round residents also will be present during spring and fall migrations. Pectoral sandpipers (*Calidris melanotos*), short-billed dowitchers (*Limnodromus griseus*), Heermann's gulls (*Larus heermanni*), and American pipits (*Anthus rubescens*) are among the species that typically only occur within the study area and on Whidbey Island during spring and/or fall migrations (eBird, 2015a).

MBTA-protected species that are listed as Birds of Conservation Concern (BCC) and habitat areas that are important to MBTA-protected species are further detailed in the sections below.

3.8.2.2.2.1 Birds of Conservation Concern

BCCs are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. BCCs have been identified at three geographic scales: National, USFWS Regions, and Bird Conservation Regions (BCRs). BCRs are the smallest geographic scale at which BCCs have been identified, and the lists of BCC species at this scale are expected to be the most useful for governmental agencies to consider in complying with the MBTA and EO 13186 (USFWS, 2008). The Proposed Action would be located in BCR 5 (Northern Pacific Forest). Twenty-one BCCs for BCR 5 occur annually within the study area (Table 3.8-3) (USFWS, 2008; NAS Whidbey Island, 2013a; eBird, 2015a; Seattle Audubon Society, 2015).

Table 3.8-3 Birds of Conservation Concern Occurring Annually within the Study Area

Common Name	*Scientific Name*	*Seasonal Occurrence*	*Habitat*
Arctic tern[1]	*Sterna paradisaea*	Breeder	From 1977 to 1995, nested on gravel islands and parking lots of Everett, WA (Snohomish County). Breeding probably no longer occurs in WA.
Bald eagle	*Haliaeetus leucocephalus*	Year-round	Forested areas adjacent to large bodies of water
Black oystercatcher	*Haematopus bachmani*	Year-round	Rocky shorelines
Black swift	*Cypseloides niger*	Migrant	Coastal lowlands
Caspian tern	*Hydroprogne caspia*	Breeder and migrant	Coastal estuaries, salt marshes, and barrier islands
Lesser yellowlegs[2]	*Tringa flavipes*	Migrant	Wide range of wetland habitats
Marbled godwit[1,2]	*Limosa fedoa*	Winter resident and migrant	Coastal habitats
Marbled murrelet	*Brachyramphus marmoratus*	Year-round	Calm, shallow, coastal waters and bays
Northern goshawk[1]	*Accipiter gentilis*	Year-round	Mature coniferous forests
Olive-sided flycatcher	*Contopus cooperi*	Breeder and migrant	Coniferous forest
Pelagic cormorant	*Phalacrocorax pelagicus*	Year-round	Exclusively marine; found in bays and sounds and along the coast, close to shore
Peregrine falcon	*Falco peregrinus*	Year-round	Broad range of natural and artificial habitats
Purple finch	*Haemorhous purpureus*	Year-round	Breeds in coniferous and mixed forests; winters in a wider variety of habitats
Red knot (*roselaari* subspecies)[1,2]	*Calidris canutus roselaari*	Migrant	Sandy coastal habitats
Rufous hummingbird	*Selasphorus rufus*	Breeder and migrant	Broad range of habitats, including secondary succession communities and openings, mature forests, parks, and residential areas
Short-billed dowitcher[2]	*Limnodromus griseus*	Migrant	Tidal flats, beaches, salt marshes, sewage ponds, and flooded agricultural fields
Solitary sandpiper	*Tringa solitaria*	Migrant	Banks of wooded streams, narrow marsh channels, and edges of mudflats
Western grebe[2]	*Aechmophorus occidentalis*	Year-round	Large, open waterbodies; marshes with open water
Whimbrel[2]	*Numenius phaeopus*	Migrant	Wide range of open terrestrial and coastal habitats
Willow flycatcher	*Empidonax traillii*	Breeder and migrant	Moist, shrubby areas
Yellow-billed loon[2]	*Gavia adamsii*	Winter resident and migrant	Nearshore marine waters

Sources: USFWS, 2008; eBird, 2015a; Seattle Audubon Society, 2015; Rodewald, 2015

Notes:
1 Indicates species that is very rare in the study area.
2 Indicates species is non-breeding in Bird Conservation Region 5.

3.8.2.2.2.2 Important Bird Areas

The Important Bird Area (IBA) program is a global bird conservation initiative of BirdLife International and is implemented in the U.S. by the National Audubon Society and its local partners. Its purpose is to identify and conserve sites that provide essential habitats for breeding, wintering, and/or migrating birds, particularly species that are MBTA protected. IBAs vary in size and may occur on public or private lands. Sites designated as IBAs must support one or more of the following: 1) special-status species, 2) restricted-range species, 3) species that are vulnerable because their populations are concentrated in one general habitat type or biome, and/or 4) species, or groups of similar species that are vulnerable because they congregate at high densities. While all IBAs are recognized for their importance to birds, some are of greater significance than others. IBAs may be prioritized hierarchically as Global, Continental, or State, based on their significance (National Audubon Society, 2010).

Audubon Washington has been identifying IBAs with the assistance of the WDFW since 1998 and to date has designated 74 IBAs in the state (National Audubon Society, 2015a). Five recognized IBAs are entirely or significantly contained within the study area, including one Global IBA and four State IBAs (discussed individually below) (Figure 3.8-3[24]). A number of other IBAs are outside of the study area but within 10 miles of Whidbey Island, including Samish/Padilla Bays (Global)[25], Protection Island (Global), Point No Point (Global), Indian-Marrowstone Island/Oak Bay (State), Deer Lagoon (State), and Port Susan Bay (State) (National Audubon Society, 2015b).

The Skagit Bay IBA (Global) is nearly 70,000 acres and includes the bay for which it is named along the northeastern side of Whidbey Island as well as adjacent lands along the bay to the east of Oak Harbor and the Seaplane Base. Ault Field is approximately 4 miles west of this IBA. This site provides important wintering grounds for dunlins (*Calidris alpina*) and waterfowl, particularly tundra swans (*Cygnus columbianus*), trumpeter swans (*Cygnus buccinator*), and snow geese (*Chen caerulescens*). It is an important migration stopover site for shorebirds, songbirds, and raptors. The Skagit Bay IBA is also a key breeding area for many species of birds, including bald eagles, great blue herons (*Ardea herodias*), and purple martins (*Progne subis*). This IBA contains at least 28 bald eagle territories and provides foraging areas for two great blue heron nesting colonies totaling about 1,000 breeding pairs. The site is also an important recreational area for hunters and birdwatchers (National Audubon Society, 2013a). A total of 281 bird species have been documented at Skagit Bay (eBird, 2015c).

The Deception Pass IBA (State) is 741 acres of marine waters, small islands, and rocky shorelines off the northern end of Whidbey Island, approximately 2 miles north of Ault Field. This site is an important wintering area (November to April) for large numbers of diving birds, such as loons, cormorants, grebes, mergansers, and alcids. The rocky outcrops and cliffs in the IBA provide nesting areas for black oystercatchers (*Haematopus bachmani*) and pigeon guillemots (*Cepphus columba*) (National Audubon Society, 2013b). A total of 173 bird species have been documented at Deception Pass (eBird, 2015d).

[24] The upland boundary of the Crescent Harbor Marshes IBA is not accurately depicted in Figure 3.8-3 and is based on best available information from the National Audubon Society.

[25] A very small portion of Samish/Padilla Bays IBA lies within the study area.

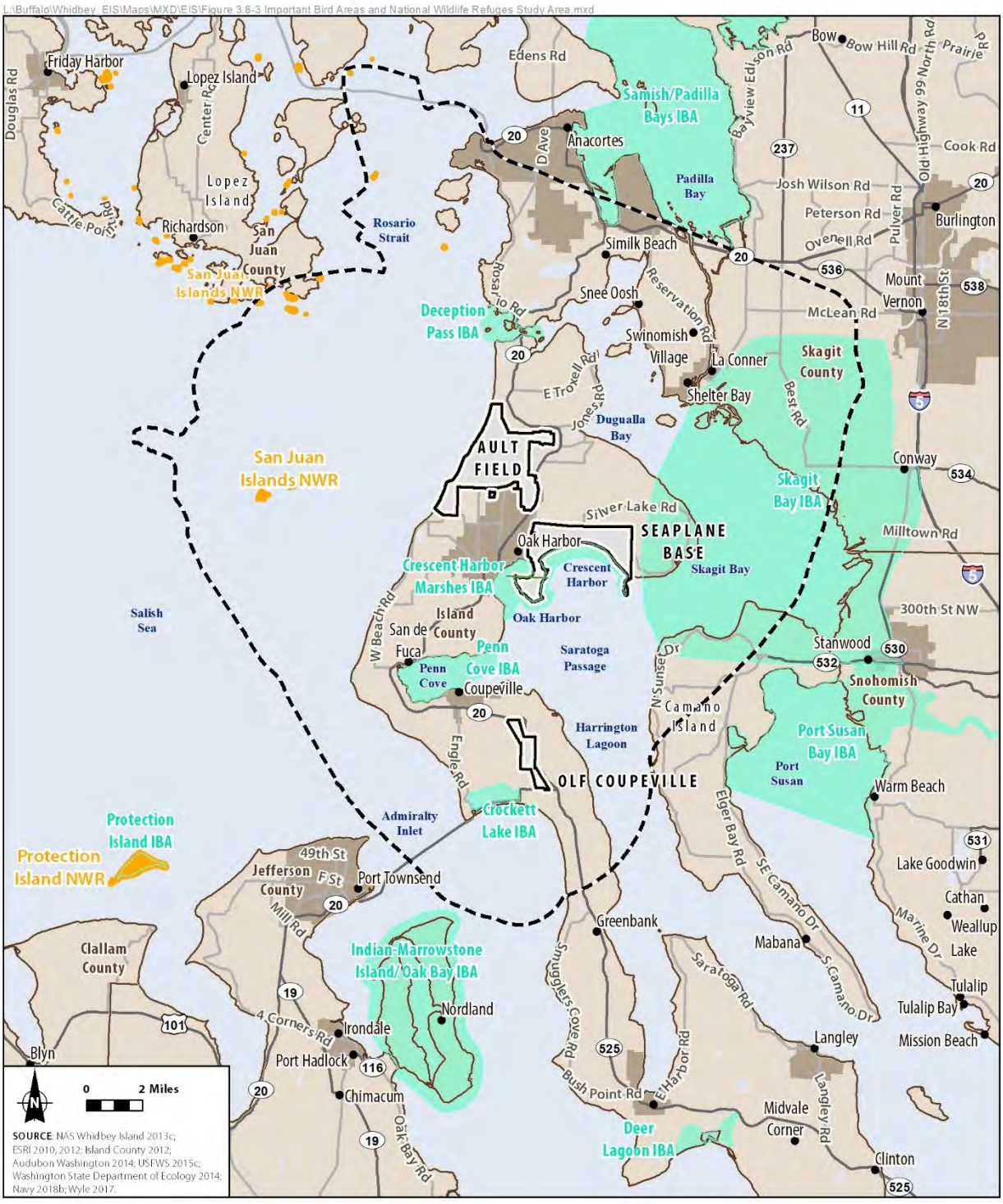


Figure 3.8-3
Important Bird Areas and National Wildlife Refuges in the Study Area
Whidbey Island, Island County, WA

The Crescent Harbor Marshes IBA (State) lies east of Oak Harbor and includes 2,768 acres of shoreline, nearshore marine waters, and uplands on the Seaplane Base. The site is about 2 miles south of Ault Field and about 4 miles north of OLF Coupeville. The upland habitats support the highest nesting densities of northern harriers in Washington. The marshes, shorelines, and marine waters support moderately sized concentrations of wintering waterfowl. The shorelines provide habitat for high concentrations of black oystercatchers, surfbirds (*Calidris virgata*), and black turnstones (*Arenaria melanocephala*). A total of 105 species have been recorded at this site (National Audubon Society, 2013c; Bayard, 2016).

The Penn Cove IBA (State) is 3,361 acres of marine waters and shoreline habitats immediately north of the Town of Coupeville. It lies approximately 2 miles north of OLF Coupeville and 6 miles south of Ault Field. Penn Cove's primary importance is as a wintering foraging area for aquatic birds, including 26 species of ducks, loons, and grebes; black turnstones; surfbirds; peregrine falcons; and merlins (*Falco columbarius*). It also supports nesting bald eagles and great blue herons (National Audubon Society, 2013d). A total of 140 bird species have been documented at Penn Cove (eBird, 2015e).

The Crockett Lake IBA (State) is a 655-acre site consisting of the lake, surrounding wetlands, and adjacent upland habitats (National Audubon Society, 2013e; Whidbey Camano Land Trust, 2015). The upland habitats include remnant prairie, coastal bluffs, and old growth forest (Whidbey Camano Land Trust, 2015). This IBA is about 0.5 mile west of the southern end of OLF Coupeville. According to eBird, 191 bird species have been documented at Crockett Lake (eBird, 2015f).

Each of the previously mentioned IBAs supports different bird species during some part of their life cycle. To summarize the birds supported by a particular IBA, bird species were categorized into groups such as waterfowl, wading birds, seabirds, shorebirds, raptors, and passerines. Each category is defined below, and Table 3.8-4 lists the presence of each category at a given IBA.

Waterfowl comprise geese, swans, and ducks (family Anatidae) and are mostly gregarious birds that spend much of their time swimming (Kaufman, 2001). Despite their shared traits, waterfowl species can exhibit great variability in size, appearance, habitat use, and behavior. For the purposes of this EIS, wading birds are those that wade in shallow waters when hunting for food; they include species such as egrets, herons, cranes, ibises, and rails. Seabirds are a diverse group of birds that are adapted to marine environments and, for the purposes of this EIS, constitute loons, grebes, cormorants, pelicans, jaegers, alcids, gulls, and terns. In general, shorebirds have relatively long legs and thin bills, and most forage for invertebrates in open, shoreline habitats (USFWS, n.d.). Shorebirds comprise four families of the order Charadriiformes in the United States: Recurvirostridae (stilts and avocets), Haematopodidae (oystercatchers), Charadriidae (plovers), and Scolopacidae (sandpipers and allies). Raptors are birds of prey represented by vultures (family Cathartidae); ospreys (family Pandionidae); hawks, eagles, and allies (family Accipitridae); Owls (families Tytonidae and Stigidae); and falcons (family Falconidae). Passerines (and songbirds) are perching birds. Roughly 60 percent of all bird species are passerines (Ehrlich et al., 1988). For the purposes of this EIS, other bird orders include quails and turkeys (Galliformes); pigeons and doves (Columbiformes); nightjars, swifts, and hummingbirds (Caprimulgiformes); kingfishers (Coraciiformes); and woodpeckers (Piciformes).

Table 3.8-4 Categories of Birds in Important Bird Areas[1]

Important Bird Area	Bird Category[1]					
	Waterfowl	Wading Birds	Seabirds	Shorebirds	Raptors	Passerines and Other Bird Orders
Skagit Bay IBA (Global)	X	X		X	X	X
Deception Pass IBA (State)	X		X	X		
Crescent Harbor IBA (State)	X	X	X	X	X	
Penn Cove IBA (State)	X	X	X	X	X	
Crocket Lake IBA (State)	X					X

Source: eBird, 2015a-f.

[1] The bird category for which each IBA is known to be important in supporting some portion of its species' life cycle.

3.8.2.2.2.3 eBird Hotspots

eBird is the world's largest repository for bird observation data, currently housing more than 260 million bird observations, with millions more arriving each month (eBird, 2015g). eBird has designated many birding areas as hotspots and summarizes data for these locations. These hotspots represent locations that are important to birds, particularly MBTA-protected species. There are more than 75 eBird hotspots designated within the study area. Over 20 eBird hotspots have at least 100 documented species, and five hotspots have at least 150 documented species. Skagit Flats and Crockett Lake hotspots have the most documented species, with 191 species each. No eBird hotspots are on Ault Field; however, hotspots are in proximity to Ault Field. Ault Field abuts Joseph Whidbey State Park (119 species) at its southeast border. eBird hotspots also include some of the IBAs discussed above (e.g., Crockett Lake), as well as county, state, and federal natural or recreation areas.

3.8.2.2.2.4 National Wildlife Refuges

NWRs in the study area provide important habitat to wildlife, particularly MBTA-protected species. The USFWS-managed San Juan Islands NWR contains multiple islands within the study area, including Bird Rocks, Williamson Rocks, Smith Island, and Minor Island. The San Juan Islands NWR is composed of a number of small rocks, reefs, and islands in northern Puget Sound. San Juan Islands NWR was established to protect colonies of nesting seabirds, including black oystercatchers, pigeon guillemots, Brandt's cormorants (*Phalacrocorax penicillatus*), and rhinoceros auklets (*Cerorhinca monocerata*) (USFWS, 2014a). San Juan Islands NWR also provides habitat for other wildlife, perhaps most notably harbor seals and elephant seals, both of which have been documented giving birth at the properties (Jeffries et al., 2000; USFWS, 2014a, 2014b). The nearest portion of San Juan Islands NWR to Ault Field is approximately 6 miles to the west.

3.8.2.2.3 Bald and Golden Eagles

Bald eagles occur year-round within the study area and on Whidbey Island, including permanent breeding residents and winter-only residents (NAS Whidbey Island, 2013a; eBird, 2015a; NAVFAC

Northwest, 2014). Bald eagles are one of the most commonly reported bird species on eBird for Island County (eBird, 2015a). Bald eagles prefer forested areas in proximity to large bodies of water, and, in Washington, their nests are most abundant near marine shorelines (WDFW, 2013; Rodewald, 2015). Proximity to water is important, as their primary food source is fish, although they also commonly prey on birds, such as waterfowl, gulls, and seabirds (WDFW, 2013). Bald eagles breed at Ault Field and use many habitats on the property for foraging, roosting, and perching (NAS Whidbey Island, 2013a; NAVFAC Northwest, 2014). The nearest known bald eagle nest at Ault Field is approximately 0.75 mile from the proposed construction area. There are no known nests or potential nesting habitats on OLF Coupeville, and bald eagle use of the property is limited to intermittent foraging and flyovers.

Golden eagles are rare, transient visitors to the study area and Whidbey Island during migration (NAS Whidbey Island, 2013a; eBird, 2015a). During migration, golden eagles hunt over wetlands, agricultural areas, and grasslands for small to medium-sized reptiles, mammals, and birds (Kochert et al., 2002; WDFW, 2013). Within the study area, suitable migration foraging habitats are plentiful (NAS Whidbey Island, 2013a); however, observations are limited. There are seven eBird records of golden eagles within the study area, all of which are on mainland portions of Skagit County (eBird, 2015h).

3.8.2.2.4 State Threatened and Endangered Species

Ten species of birds, one amphibian, and two butterfly species with the potential to occur within the study area are listed as endangered, threatened, candidate, or sensitive by the State of Washington (Table 3.8-5). Five of these species are also federally listed under the ESA and are discussed above under "Federal Threatened and Endangered Species." Bald eagles are discussed above under "Bald and Golden Eagles." The preferred habitats and likelihood of occurrence within the study area for the remaining five species are presented in Table 3.8-5.

Three state-listed plant species were identified as potentially occurring within the study area (Table 3.8-5). No state-listed plant populations or individual occurrences of those species have been previously identified at Ault Field. Furthermore, no suitable habitat to support these species occurs within Ault Field. Therefore, there would be no measurable impacts to vegetation or special status plant species.

Table 3.8-5 State-listed[1] Terrestrial Wildlife Species, Their Preferred Habitats, and Their Likelihood of Occurrence within the Study Area

Common Name	*Scientific Name*	*State Listing Status*	*Preferred Habitat*	*Likelihood of Occurrence*
Plants				
Golden paintbrush	*Castilleja levisecta*	Endangered	See text under "Federal Threatened and Endangered Species"	
White meconella	*Meconella oregana*	Endangered	Open grasslands	Rare
White-top aster	*Sericocarpus rigidus*	Sensitive	Open areas with gravelly, glacial soils	Rare
Invertebrates				
Island marble butterfly	*Euchloe ausonides insulanus*	Candidate	See text under "Federal Threatened and Endangered Species" in Table 3.8-2	
Taylor's checkerspot butterfly	*Euphydryas editha taylori*	Endangered	See text under "Federal Threatened and Endangered Species"	
Amphibians				
Oregon spotted frog	*Rana pretiosa*	Endangered	See text under "Federal Threatened and Endangered Species" in Table 3.8-2	
Birds				
American white pelican	*Pelecanus erythrorhynchos*	Endangered	Open water, shores	Rare year-round
Bald eagle	*Haliaeetus leucocephalus*	Sensitive	See text in "Bald and Golden Eagles"	
Brown pelican	*Pelecanus occidentalis*	Endangered	Open water, shores	Rare in fall/early winter
Common loon	*Gavia immer*	Sensitive	Open water	Common year-round
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	See text under "Federal Threatened and Endangered Species"	
Northern spotted owl	*Strix occidentalis caurina*	Endangered	See text under "Federal Threatened and Endangered Species"	
Peregrine falcon	*Falco peregrinus*	Sensitive	Nests in urban areas, forages in open areas	Uncommon year-round
Sandhill crane	*Grus canadensis*	Endangered	Meadows, wetlands, open grasslands, agricultural fields	Uncommon in fall
Streaked horned lark	*Eremophila alpestris strigata*	Endangered	See text under "Federal Threatened and Endangered Species"	
Tufted puffin	*Fratercula cirrhata*	Endangered	Offshore islands, open marine water	Uncommon in summer

Sources: WDFW, 2013, 2015a; eBird, 2015a; Seattle Audubon Society, 2015; Naval Facilities Engineering Command Northwest, 2014

Note:
[1] Excludes species also listed under Endangered Species Act or Bald and Golden Eagle Protection Act

3.8.2.2.5 Species of Local Importance

3.8.2.2.5.1 Island County Species of Local Importance

In addition to species listed by federal or state regulation as endangered, threatened, or sensitive (see Tables 3.8-2 and 3.8-5), the Island County Critical Areas Ordinance's (17.02) Protected Species list also includes four birds designated as Species of Local Importance. These species include the great blue heron, osprey (*Pandion haliaetus*), pileated woodpecker (*Dryocopus pileatus*), and trumpeter swan. The nesting sites of the great blue heron, osprey, and pileated woodpecker are protected under the ordinance, while the trumpeter swan's foraging habitats are protected.

3.8.2.2.5.2 Skagit County Species of Local Importance

In addition to species listed by federal or state regulation as endangered, threatened, or sensitive (see Tables 3.8-2 and 3.8-5), the Skagit County's Critical Areas Ordinance (14.24) Habitats and Species of Importance includes breeding and/or roosting sites for the great blue heron, Vaux's swift (*Chaetura vauxi*), pileated woodpecker, osprey, Townsend's big-eared bat (*Corynorhinus townsendii*), cavity-nesting ducks, and harlequin duck (*Histrionicus histrionicus*). Trumpeter swan and waterfowl concentrations are also Species of Importance.

The study area overlaps with portions of the county's Skagit Wildlife Area in the following areas: Telegraph Slough, Goat Island, and Skagit Bay Estuary.

3.8.2.2.5.3 San Juan County Species of Local Importance

In addition to species listed by federal or state regulation as endangered, threatened, or sensitive (see Tables 3.8-2 and 3.8-5), San Juan County's Critical Areas Ordinance (18.35) Species of Importance that have the potential to occur within the study area include the black oystercatcher, great blue heron, pigeon guillemot, Townsend's big-eared bat, northern flying squirrel (*Glaucomys sabrinus*), and western toad (*Anaxyrus boreas*). Species of Importance that have the potential to occur within the study area also include bat roosting concentrations and nest sites for the northern harrier, merlin (*Falco columbarius*), Wilson's snipe (*Gallinago delicate*), short-eared owl (*Asio flammeus*), long-eared owl (*Asio otus*), northern pygmy owl (*Glaucidium gnoma*), sooty grouse (*Dendragapus fuliginosus*), common nighthawk (*Chordeiles minor*), American dipper (*Cinclus mexicanus*), western bluebird (*Sialia mexicana*), chipping sparrow (*Spizella passerine*), vesper sparrow (*Pooecetes gramineus*), horned lark, western meadowlark (*Sturnella neglecta*), western screech owl (*Megascops kennicottii*), lazuli bunting (*Passerina amoena*), and American kestrel (*Falco sparverius*).

James Island Marine State Park is a Fish and Wildlife Habitat Conservation Area, pursuant to the county's Critical Areas Ordinance.

3.8.2.2.5.4 Jefferson County Species of Local Importance

The overlap of the study area and Jefferson County is limited to offshore waters in Puget Sound; therefore, there are no additional terrestrial Species of Local Importance.

3.8.2.2.5.5 Snohomish County Species of Local Importance

Due to the small portion of offshore waters in Snohomish County that overlap with the study area, there are no additional terrestrial Species of Local Importance.

3.8.2.3 Marine Species

Marine species include fish and marine mammals. A brief description of their potential occurrence in the study area is provided below.

3.8.2.3.1 Marine Fish

The Salish Sea is home to over 250 marine fish species (Pietsch and Orr, 2015). In the study area, marine fish may occupy a variety of near and offshore habitats and at different sea depths. A summary of fish that may occur in the study area, by group, is provided in Table 3.8-6. Federally listed marine fish are discussed separately in Section 3.8.2.4, below.

Table 3.8-6 Marine Fishes by Taxonomic Group that Have the Potential to Occur in the Study Area

Taxonomic Group[1]	*Description and Example Species*	*Marine Inland Waters Habitat*
Hagfish (order Myxiniformes)	Primitive and jawless with an eel-like body shape that primarily feed on dead fishes. • Pacific hagfish (*Eptatretus stoutii*)	Occupy seafloor and muddy substrates in deep waters.
Lamprey (order Petromyzontiformes)	Primitive, jawless, and eel-like. Anadromous; breed in freshwater streams and mature in ocean. • Pacific lamprey (*Entosphenus tridentatus*)	Found in marine deep waters and freshwater streams. Data suggests use bottom habitats in both ocean and streams.
Sharks, Rays, and Chimaeras (class Chondrichthyes)	Cartilaginous (non-bony) fishes, some of which are open-ocean predators. • Spotted ratfish (*Hydrolagus colliei*), • Big skate (*Beringraja binoculata*) • Bluntnose sixgill shark (*Hexanchus griseus*)	This class uses a variety of surface, water column, and seafloor marine habitats, both near and offshore.
Eels and Spiny Eels (orders Anguilliformes and Elopiformes)	Undergo a unique larval stage with a small head and elongated body; different from other fishes. • Snipe eel (*Nemichthys scolopaceus*)	Surface, water column, seafloor. Most commonly deepwater habitats, but juvenile fish are found in more shallow waters.
Sturgeons (order Acipenseriformes)	Anadromous and long lived. • White sturgeon (*Acipenser transmontanus*) • Green sturgeon (*Acipenser medirostris*)	Marine water column and seafloors; freshwater rivers and streams.
Herring, Eulachon, and Salmonids (orders Clupeiformes, Osmeriformes, Esociformes, and Salmoniformes)	Most are anadromous species and are important to commercial and recreational fisheries. • Pacific herring (*Clupea pallasii*), • Longfin smelt (*Spirinchus thaleichthys*), • Pink salmon (*Oncorhynchus gorbuscha*)	This class uses a variety of surface and water column marine habitats, both near and offshore. Spawn in estuarine and freshwaters.

Table 3.8-6 Marine Fishes by Taxonomic Group that Have the Potential to Occur in the Study Area

Taxonomic Group[1]	*Description and Example Species*	*Marine Inland Waters Habitat*
Lizardfishes and Lancetfishes (order Aulopiformes)	Primarily found in warmer ocean waters to the south. • California lizardfish (*Synodus lucioceps*), • Longnose lancetfish (*Alepisaurus ferox*)	Lizardfishes may be found on seafloors in shallow to deep waters. Lancetfishes are primarily deepwater fishes that use seafloors.
Cods, Hakes, and Brotulas (orders Gadiformes and Ophidiiformes)	Important commercial fishery resources. • Pacific cod (*Gadus macrocephalus*), • Pacific hake (*Merluccius productus*)	Primarily seafloor and water bottom marine habitats, but known to occur at or near water surface.
Toadfishes (order Batrachoidiformes)	A lie-in-wait predator, common in the Salish Sea. • Plainfin midshipman (*Porichthys notatus*)	Common on sandy and muddy seafloors, both nearshore and offshore.
Sauries and Silversides (orders Atheriniformes and Beloniformes)	Small-sized nearshore/coastal fishes, primarily feed in large schools on organic debris. • Pacific saury (*Cololabis saira*)	Primarily found on surface and within water column.
Opahs and Ribbonfishes (order Lampridiformes)	Rare in the Salish Sea, but known to occur. • Opah (*Lampris guttatus*), • King-of-the-salmon (*Trachipterus altivelis*)	Primarily open ocean (pelagic) or deepwater fishes but can be found in surface waters.
Pipefish (order Gasterosteiformes)	Small mouth with tubular snout and armor like scales. • Threespine stickleback (*Gasterosteus aculeatus*), • Tubesnout (*Aulorhynchus flavidus*), • Bay pipefish (*Syngnathus leptorhynchus*)	Surface and shallow waters near shore, often in eelgrass and protected bays.
Rockfishes (order Scorpaeniformes)	Bottom dwelling with modified pectoral fins to rest on the bottom. • Brown rockfish (*Sebastes auriculatus*)	Typically deep waters with rocky seafloors, both nearshore and offshore.
Gobies (order Perciformes; family Gobiidae)	Large and diverse family of marine fishes. • Bay goby (*Lepidogobius lepidus*)	Primarily surface and shallow waters near shore.
Jacks, Tunas, and Mackerals, (order Perciformes; families Carangidae and Scombridae)	Highly migratory predators; they make up a major component of commercial fisheries. • Shiner perch (*Cymatogaster aggregata*), • Striped seaperch (*Embiotoca lateralis*)	Surface, column, and seafloors near shore and intertidal zones.

Table 3.8-6 Marine Fishes by Taxonomic Group that Have the Potential to Occur in the Study Area

Taxonomic Group[1]	*Description and Example Species*	*Marine Inland Waters Habitat*
Flounders (order Pleuronectiformes)	"Flatfishes" that are generally highly camouflaged. Important commercial fisheries. • Pacific sanddab (*Citharichthys sordidus*), • Flathead sole (*Hippoglossoides elassodon*), • Pacific halibut (*Hippoglossus stenolepis*)	Generally deep seafloors, often with sandy or silty bottoms, both near and off shore.
Ocean Sunfish (molas) (order Tetraodontiformes)	Unique body shape and characteristics, rare in Salish Sea. • Ocean sunfish (*Mola mola*)	Primarily a pelagic, offshore species. Located at surface and in water column.

Note:
[1] Taxonomic groups are based on the following commonly accepted references: Hart, 1973; Helfman, Collette, and Facey, 1997; Moyle and Cech, 1996; Nelson, 2006. Species information gathered from Pietsch and Orr, 2015.

3.8.2.3.2 Marine Mammals

Twelve species of marine mammals potentially occur within the study area (Table 3.8-7) (NAS Whidbey Island, 2013a; Burke Museum of Natural History and Culture, 2013; WDFW, 2013; Carretta et al., 2016).

Table 3.8-7 MMPA-protected Marine Mammals Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Occurrence*
Pinnipeds (sea lions, seals)		
Steller sea lion	*Eumetopias jubatus*	Seasonal (unlikely June to September)
California sea lion	*Zalophus californianus*	Seasonal (unlikely in July)
Northern elephant seal	*Mirounga angustirostris*	Likely in the Strait of Juan de Fuca; infrequent in Puget Sound
Harbor seal	*Phoca vitulina*	Likely
Cetaceans (whales, dolphins, porpoises)		
Minke whale	*Balaenoptera acutorostrata*	Seasonal, more likely spring to fall, rare in Puget Sound
Humpback whale	*Megaptera novaengliae*	Seasonal to rare in some areas with highest likelihood spring to fall
Gray whale	*Eschrictius robustus*	Seasonal to rare, more likely winter to spring
Pacific white-sided dolphin	*Lagenorynchus obliquidens*	Rare but more likely summer and fall, extralimital in Puget Sound
Bottlenose dolphin	*Tursiops truncatus*	Extralimital
Killer whale (resident and transient populations)	*Orcinus orca*	Residents and transient stocks likely to rare, depending on waterbody
Harbor porpoise	*Phocoena phocoena*	Likely to rare
Dall's porpoise	*Phocoenoides dalli*	Likely to rare

Sources: NAS Whidbey Island, 2013a; Burke Museum of Natural History and Culture, 2013; WDFW, 2013; Carretta et al., 2016

3.8.2.3.2.1 Pinnipeds

Pinnipeds are carnivorous, fin-footed, semiaquatic marine mammals. Two families of pinniped occur in the study area: Otariidae (eared seals, i.e., sea lions and fur seals) and Phocidae (earless, or true seals). Four species of pinniped may occur in the study area: the California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), harbor seal (*Phoca vitulina*), and northern elephant seal (*Mirounga angustirostris*). All four species are protected under the MMPA but are not listed under the ESA.

Of these, the most abundant and widely distributed species is the harbor seal, which is present year-round in the study area. Harbor seals use a variety of habitats for haul-out sites, including intertidal and subtidal rock outcrops, sandbars, sandy beaches, peat banks in salt marshes, and manmade structures such as log booms, docks, and recreational floats (Wilson, 1978; Prescott, 1982; Schneider and Payne, 1983; Gilbert and Guldager, 1998; Jeffries et al., 2000; Lambourn, Jeffries, and Huber, 2010; London et al., 2012). Harbor seals are the only marine mammal known to use beaches and rocks on the NAS Whidbey Island complex as haul-out sites (Jeffries et al., 2000). Harbor seals are the only known marine mammal to breed in Washington waters, and pupping does occur in the study area, typically between June through August (Jeffries et al., 2000). There are no known harbor seal pupping sites at the NAS Whidbey Island complex; however, harbor seal pups have been documented on NAS Whidbey Island complex beaches during the pupping season (June through August).

Northern elephant seals are also present in the study area year-round, primarily in the Strait of Juan de Fuca waters including the waters west of Whidbey Island. Smith and Minor Islands are within the study area, and both are documented haul-out sites for the Northern elephant seal (Jeffries et al., 2000). Pups have been born at both sites (Jeffries et al., 2000). Northern elephant seals have also been documented south of the study area on sandy beaches in Puget Sound during molting season.

Steller sea lions and California sea lions are seasonally present in the study area. They are typically absent during the summer months (mid-June through August) when they are at their Oregon and California breeding rookeries, respectively. During the late summer and early fall, both species return to the study area and may opportunistically haul out near shore on navigation buoys, piers, and jetties (Navy, 2015d). They move throughout the study area in response to foraging opportunities of various fish species. There are no rookeries in the study area for either the California sea lion or the Steller sea lion because such pups would not be present in the study area.

3.8.2.3.2.2 Cetaceans

Cetaceans are finned marine mammals including whales, dolphins, and porpoises. Eight species of cetaceans may occur in the study area; all eight are protected under the MMPA, and two, the humpback whale and Southern Resident killer whale, are listed under the ESA. Transient killer whales, minke whales, gray whales, Pacific white-sided dolphins, bottlenose dolphins, harbor porpoises, and Dall's porpoises are discussed below; humpback whales and Southern Resident killer whales are discussed under Section 3.8.2.4.

Killer whales in the Pacific Northwest are divided into three eco-types and corresponding DPSs: Southern Resident killer whales, transients, and offshore. These populations are noticeably different from one another in their morphology, ecology, behavior, and genetics. Both the Southern Resident killer whale and transient killer whales are present in the study area, with their occurrence and distribution varying seasonally. Offshore killer whales have been documented entering the far western

waters of the Strait of Juan de Fuca, which is outside the study area. As such, offshore killer whales are not expected to be present in the study area at any time.

West Coast Transient killer whales may be present in the study area. Transient killer whales in the Pacific Northwest spend most of their time along the outer coast of British Columbia and Washington but visit inland waters in search of harbor seals, sea lions, and other prey. According to the Orca Network, a citizen science organization, transients may occur in inland waters in any month (Orca Network, 2017), but several studies have shown peaks in occurrences: Morton (1990) found bimodal peaks in spring (March) and fall (September–November) for transients on the northeastern coast of British Columbia. Baird and Dill (1995) found some transient groups frequenting the vicinity of harbor seal haul-out sites around southern Vancouver Island during August and September, which is the peak period for pupping through post-weaning of harbor seal pups. However, not all transient groups were seasonal in these studies, and their movements appear to be unpredictable. Transient killer whale occurrences inside marine waters have increased between 1987 and 2010, possibly because the abundance of some prey species (e.g., seals, sea lions, and porpoises) has increased (Houghton et al., 2015). While transient killer whales are frequently sighted in the main basin of Puget Sound, their presence near Navy installations varies from not present at all to infrequent sightings, depending on the season (Orca Network, 2017; Whale Museum, 2012). Transients have been observed in Saratoga Passage near NAS Whidbey Island.

Minke whales appear to have established home ranges in the inland waters of Washington, including areas within the study area (Dorsey, 1983; Dorsey et al., 1990). Minke whales are reported in the inland waters year-round, although the majority of records are from March through November (Calambokidis and Baird, 1994). The species is primarily sighted in the San Juan Islands and Strait of Juan de Fuca (Stern, 2005; Orca Network, 2017). Three feeding grounds have been identified in the Strait of Juan de Fuca and San Juan Islands area. There is year-to-year variation in the use of these feeding areas, and other feeding areas probably exist (Osborne et al., 1988; Hoelzel et al., 1989; Dorsey et al., 1990; Stern, 2005). There were 74 sightings of the Minke whale in Admiralty Inlet and six sightings within the Saratoga Passage area between January 2005 and July 2017 (Orca Network, 2017).

Gray whales have the potential to occur within the study area. As this species migrates between feeding and breeding grounds, a few enter the Strait of Juan de Fuca to feed in inland waters. Gray whales are observed in Washington inland waters during all months of the year (Calambokidis et al., 2010; WDFW, 2012b), with peak abundance from March through June (Calambokidis et al., 2010). NMFS has identified a Gray whale “Potential Presence” area extending into and including all U.S. waters from the entrance of the Strait of Juan de Fuca landward (Calambokidis et al., 2015). This portion of the Potential Presence area therefore overlaps all of the study area. This Potential Presence area is identified as seasonally important from January through July, and October through December--approximately 10 months of the year. Observed feeding areas are located in Saratoga Passage between Whidbey and Camano Islands, including Crescent Harbor.

Pacific white-sided dolphins are known to enter the inshore pass of British Columbia and Washington, and they have been documented in the Strait of Juan de Fuca and the Strait of Georgia (Stacey and Baird, 1991; Norman et al., 2004). Small groups have also been seen in Haro Strait off San Juan Island. This species is extremely rare in Puget Sound, with only one stranding in southern Puget Sound recorded in the 1980s (Osborne et al., 1988). Though sightings have increased slightly in recent years, Pacific white-sided dolphin occurrence in the Inland Waters, including the study area, is considered extremely

rare with the exception of southern Puget Sound, where occurrence is considered extralimital (Orca Network, 2017).

Bottlenose dolphins are considered extralimital in Washington inland waters; only three sightings and one stranding of bottlenose dolphins have been documented in Puget Sound since 2004 (Cascadia Research, 2011). Orca Network recorded a sighting of a bottlenose dolphin in Puget Sound in 2011 and multiple sightings in Puget Sound in 2017 (Orca Network, 2017). The anecdotal data from Orca Network are not consistently validated, and they vary in level of credibility. It is highly unlikely that any individual bottlenose dolphins will occur within the study area.

Harbor porpoise are known to occur in the Strait of Juan de Fuca and the San Juan Island area year-round (Calambokidis and Baird, 1994; Osmek et al., 1995; Carretta et al., 2014). Harbor porpoises were historically one of the most commonly observed marine mammals in Puget Sound (Scheffer and Slipp, 1948); however, there was a significant decline in sighting beginning in the 1940s (Everitt et al., 1979; Calambokidis et al., 1992), but recent increased sightings may indicate their return to the area. From 2003 to 2013, the Northwest Marine Mammal Stranding network documented 255 harbor porpoise strandings in Washington Inland Waters (Barre, 2014). There were no sightings in Saratoga Passage near NAS Whidbey Island, but the potential does exist for this species to occur within the study area.

The Dall's porpoise occurs in the inland waters year-round, but abundance and distribution varies between summer and winter (Calambokidis, 2006). They are most frequently observed in the Strait of Juan de Fuca and Haro Strait between San Juan Island and Vancouver Island (Nysewander et al., 2005). Dall's porpoises have been documented in Saratoga Passage, with all but one sighting occurring in the winter (WDFW, 2008; Nysewander et al., 2005).

3.8.2.4 Special Status Marine Wildlife

3.8.2.4.1 Federal Threatened and Endangered Marine Species

Federally endangered and threatened marine species are managed by the NMFS and USFWS. Eight marine fishes and two marine mammal species (the humpback whale and Southern Resident killer whale) were identified as potentially occurring within the study area and are discussed further below (NMFS, 2016d) (Table 3.8-8).

Table 3.8-8 NMFS/USFWS-managed Federally Endangered and Threatened Species and Critical Habitats Identified by IPaC as Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Federal Status*	*Critical Habitat Present?*	*Occurrence*
Fish				
Green sturgeon (Southern DPS)	*Acipenser medirostris*	Threatened	Yes	Confirmed: Primarily expected to be found on seafloor habitats, but individual fish may occur at the surface on rare occasion.
Eulachon (Southern DPS)	*Thaleichthys pacificus*	Threatened	No	Confirmed: Non-breeding eulachon may be present in Puget Sound.

Table 3.8-8 NMFS/USFWS-managed Federally Endangered and Threatened Species and Critical Habitats Identified by IPaC as Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Federal Status*	*Critical Habitat Present?*	*Occurrence*
Bull trout	*Salvelinus confluentus*	Threatened	Yes	Confirmed: Study area does not overlap with suitable spawning streams, but the species is found along the marine shoreline.
Dolly Varden	*Salvelinus malma*	Proposed Similarity of Appearance (Threatened)	No	Under the "Similarity in Appearance" provision of the ESA, the occurrence is the same as bull trout
Chinook salmon (Puget Sound Evolutionarily Significant Unit [ESU])	*Oncorhynchus tshawytscha*	Threatened	Yes	Confirmed: May occur in the marine waters and freshwater streams and rivers around Whidbey Island and within the study area.
Hood Canal summer-run chum	*Oncorhynchus keta*	Threatened	Yes	Confirmed: May occur in the marine waters around Whidbey Island and within the study area.
Steelhead (Puget Sound DPS)	*Oncorhynchus mykiss*	Threatened	Yes	Confirmed: May occur in the marine waters and freshwater streams and rivers around Whidbey Island and the within study area.
Bocaccio rockfish (Puget Sound/Georgia Basin DPS)	*Sebastes paucispinis*	Endangered	Yes	Confirmed: Expected to use deepwater habitats and may use nearshore habitats.
Yelloweye rockfish (Puget Sound/Georgia Basin DPS)	*Sebastes ruberrimus*	Threatened	Yes	Confirmed: Expected to use deepwater habitats and may use nearshore habitats.
Mammals				
Humpback whale (Mexico DPS)	*Megaptera novaengliae*	Threatened	No	Seasonal to rare in some areas, with highest likelihood spring to fall
Humpback whale (Central America DPS)	*Megaptera novaengliae*	Endangered	No	Seasonal to rare in some areas, with highest likelihood spring to fall
Killer Whale (Southern Resident)	*Orcinus orca*	Endangered	Yes	Confirmed: May occur in Puget Sound. Likely to rare, depending on water body

Sources: USFWS, 2017; NMFS, 2017; Carretta et al., 2016.

3.8.2.4.1.1 Green Sturgeon

The green sturgeon is an anadromous fish that is widely distributed from coastal Mexico to the Bering Sea, Alaska. Green sturgeon are comprised of two distinct populations: the Northern DPS and Southern DPS (Adams et al., 2002). Fish originating south of (and not including) the Eel River of northern California and to the south belong to the Southern DPS, and fish originating from the Eel River and to the north belong to the Northern DPS. The Southern DPS was listed as threatened under the ESA in 2006, and a Northern DPS listing was "not warranted" under the ESA but as a Species of Concern. Critical habitat for the green sturgeon Southern DPS was designed in 2009 (74 FR 52300) and includes waters off the western shore of the NAS Whidbey Island complex. During the designation of the critical habitat, the physical and biological features that were determined essential for the conservation of the Green Sturgeon Southern DPS in freshwater riverine systems included:

- abundant food resources important for larval, juvenile, subadult, and adult life stages
- substrates suitable for egg deposition and development, larval development, and subadults and adults (e.g., substrates for holding and spawning)
- water flow regime necessary for normal behavior, growth, and survival of all life stages
- water quality, including temperature, salinity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages
- a migratory pathway necessary for the safe and timely passage of Southern DPS fish within riverine habitats and between riverine and estuarine habitats (e.g., an unobstructed river or dammed river that still allows for safe and timely passage)
- water depth of deep (more than 16 feet) holding pools for both upstream and downstream holding of adult or subadult fish, with adequate water quality and flow and with high associated turbulence and upwelling that are critical for adult green sturgeon spawning
- sediment quality necessary for normal behavior, growth, and viability of all life stages

During the designation of the critical habitat, the physical and biological features that were determined essential for the conservation of the Southern DPS in estuarine areas included:

- specific benthic species critical for the rearing, foraging, growth, and development of juvenile, subadult, and adult green sturgeon within bays and estuaries
- sufficient water flow into the bay estuary to allow adults to successfully orient to the incoming flow and migrate upstream to spawning grounds
- water quality, including temperature, salinity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages (same as Green Sturgeon Southern DPS in freshwater riverine systems)
- a migratory pathway necessary for the safe and timely passage of Southern DPS fish within estuarine habitats and estuarine and marine habitats
- a diversity of water depths necessary for shelter, foraging, and migration of juvenile, subadult, and adult life stages. Subadult and adult green sturgeon occupy a variety of depths with bays and estuaries for feeding and migration.
- sediment quality necessary for normal behavior, growth, and viability of all life stages (same as Green Sturgeon Southern DPS in freshwater riverine systems)

During the designation of the critical habitat, the physical and biological features that were determined essential for the conservation of the Southern DPS in coastal marine areas include:

- abundant food resources for subadults and adults, which may include benthic invertebrates and fish
- coastal marine waters with adequate dissolved oxygen levels and acceptably low levels of contaminants (e.g., pesticides, polyaromatic hydrocarbons, and heavy metals that may disrupt the normal behavior, growth, and viability of subadult and adult green sturgeon)
- a migratory pathway necessary for the safe and timely passage of Southern DPS fish within marine habitats and marine and estuarine habitats

Green sturgeon spawn in freshwater, inland rivers. Reproductive males and females range from 15 to 28 years old and 19 to 34 years old, respectively (Van Eenennaam et al., 2006). Green sturgeon are believed to spawn every 3 to 5 years from March through July (Moyle, Foley, and Yoshiyama, 1992). Within the study area and region of Whidbey Island, there are no known spawning sites. The only known active spawning sites for Southern DPS green sturgeon in the U.S. are from the Sacramento River in California (Moyle, Foley, and Yoshiyama, 1992; NMFS, 2005a). Northern DPS green sturgeon are known from the Klamath Rivers of California and Rouge River of Oregon (Moyle, Foley, and Yoshiyama, 1992; Erickson et al., 2002; Rien et al., 2001).

Juvenile green sturgeon spend 1 to 3 years in their natal river and then return to the ocean as adults, where they widely disperse, generally to northern regions (Nakamoto, Kisanuki, and Goldsmith, 1995; Moyle, Foley, and Yoshiyama, 1992; Erickson et al., 2002). The feeding and behavior of adults is not well studied, but adults from the Sacramento River feed along the ocean bottom on crustaceans, mollusks, and fish (Moyle, Foley, and Yoshiyama, 1992; Houston, 1988). In a study of green sturgeon originating from the Rouge River, Oregon, fish were found at depths up to 490 feet and spent most of their time at depths of 131 to 328 feet (Erickson and Hightower, 2007). However, rapid ascents to the ocean surface were noted several times per month in individual fish.

The Northern and Southern DPSs are distinct in their natal rivers, but as the fish enter their ocean habitat as adults, green sturgeon from both DPSs may co-occur and be of “mixed stock” (Israel and May, 2007; Lindley et al., 2011). There have not been any studies on the population structure of green sturgeon in Puget Sound, but fish in other portions of Washington (i.e., Willapa Bay, Grays Harbor, and the Columbia River) were comprised of both Southern and Northern DPSs (Lindley et al., 2011).

While there are no spawning rivers near to Puget Sound, green sturgeon are known to occur in Puget Sound, and critical habitat has been designated near the study area and Whidbey Island (Figure 3.8-4). Green sturgeon are primarily expected to be found on ocean-bottom habitats, but individual fish may occur at the surface on rare occasion.

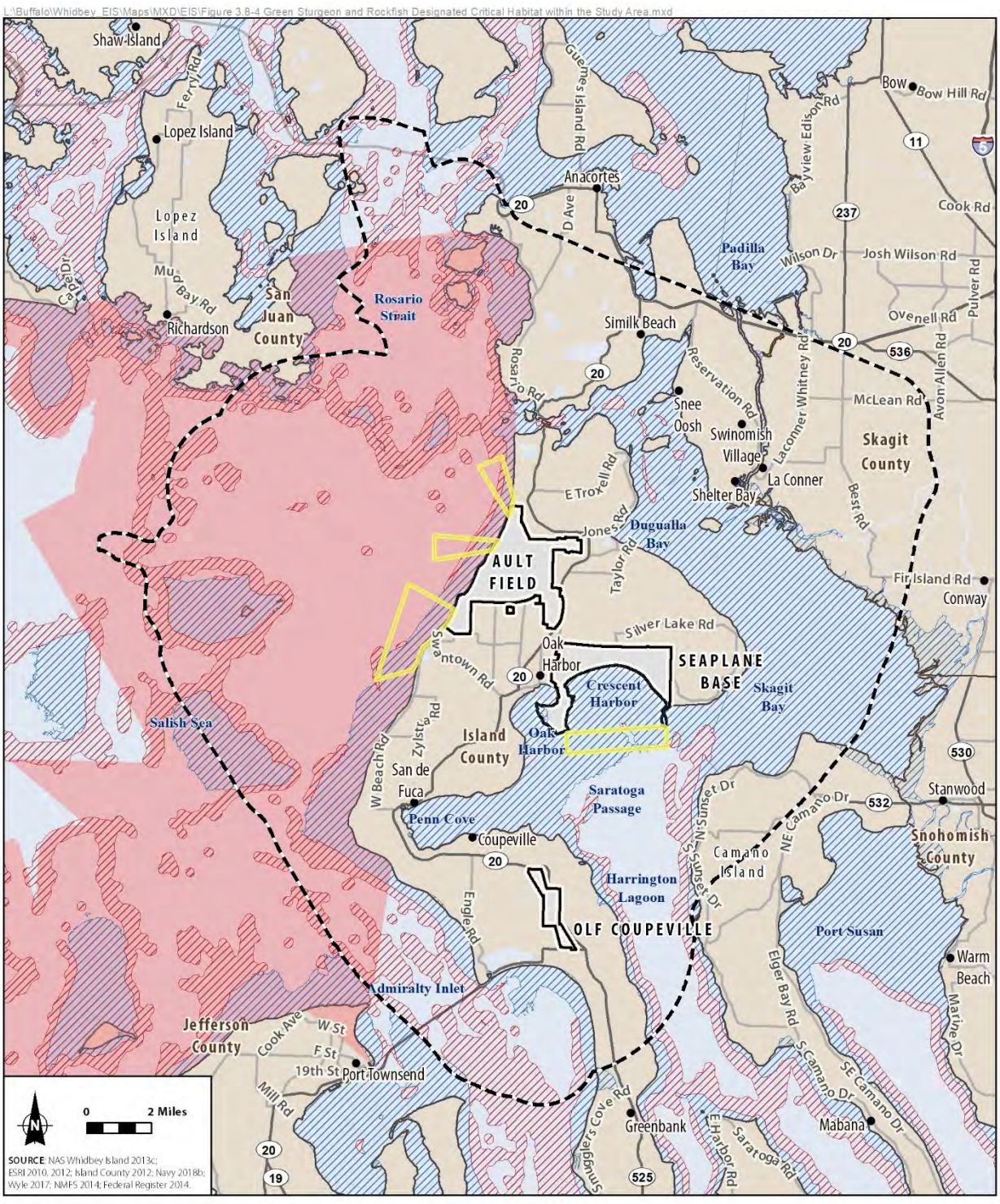


Figure 3.8-4
Green Sturgeon and Rockfish Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

3.8.2.4.1.2 Eulachon

The eulachon is an anadromous species of smelt that is distributed from northern California to the Bering Sea (NMFS, 2008). On March 18, 2010, NMFS listed the southern DPS of eulachon as threatened under the ESA, and critical habitat was listed on October 20, 2011. The Southern DPS of eulachon includes fish from the Mad River in northern California to the Skeena River in British Columbia (NMFS, 2016a).

Eulachon spawn in the lower reaches of mainland Pacific rivers. The eulachon spawning season is generally in early spring and varies widely across the species' range (NMFS, 2008). Eulachon reproduce at 2 or 3 years of age (Willson et al., 2006). Eulachon return to marine habitats as immatures and adults, but little is known about their distribution during non-natal periods. Most data gathered are as bycatch from commercial fisheries, particularly shrimp trawlers. Eulachon appear to prefer ocean bottom habitats at moderate depths, from 65 to 660 feet (Hay and McCarter, 2000), but occur at depths up to 2,000 feet (Allen and Smith, 1988). Both juvenile and adult eulachon feed on plankton such as copepods and euphausiids (NMFS, 2008, 2016a; Willson et al., 2006). Eulachon are preyed on by many species of marine mammals, fish, and birds.

In the study area and on Whidbey Island, there are no known spawning rivers. In Washington, eulachon spawn in the Nooksack River to the north of Whidbey Island, and the Elwha, Bogahchiel, Queets, Quinault, Moclips, Cupalis, Grays Harbor, Willapa Bay, and Columbia Rivers to the south (Willson et al., 2006). The nearest critical habitat to the study area is the Elwha River, west of Port Angeles (Shaffer et al., 2007; NMFS, 2016a). Spawning eulachon are known to be common in some of the Washington estuaries such as Grays Harbor, Willapa Bay, and the Columbia River, but historical records suggest eulachon spawning in Puget Sound was always rare or uncommon (NMFS, 2008; Monaco et al., 1990; Emmett et al., 1991).

While there is no spawning habitat or critical habitat within the study area, non-breeding eulachon may be present in waters within Puget Sound.

3.8.2.4.1.3 Salmonids

Seven species of Pacific salmonids (or salmon) occur in the Puget Sound, and four federally listed salmon species have the potential or are known to occur within the waters in the study area: Chinook salmon, Hood Canal summer-run chum, steelhead, and bull trout. Chinook salmon, Hood Canal summer-run chum, and steelhead are discussed collectively in this section, while the bull trout is discussed separately in the section below. The Chinook salmon Puget Sound Evolutionarily Significant Unit (ESU) was listed as threatened in 1998, the Hood Canal summer-run chum was listed as threatened in 2005, and the steelhead Puget Sound DPS was listed as threatened in 2007 (Ford et al., 2010).

All four salmon species of the study area are anadromous and may migrate 100 miles or more up freshwater rivers and streams to spawn. Chinook salmon Puget Sound ESU and steelhead Puget Sound DPS spawn in freshwater rivers; Hood Canal summer-run chum depend more so on estuarine rivers (Healey, 1982). Salmon eggs and fry mature at their natal sites for varying amounts of time, depending on the species, and then juveniles migrate back to marine waters. In Puget Sound, juvenile Chinook and Hood Canal summer-run chum will often stay in estuarine waters, feeding close to the shoreline and water surface (Fresh, 2006; Toft et al., 2007).

As salmon mature, they expand into deeper waters and more varied habitat (Fresh, 2006). Adult salmon occupy a variety of marine habitats; Chinook Puget Sound ESU predominately use coastal waters versus open ocean habitats (Healey, 1983), Hood Canal summer-run chum use open waters in the northeast Pacific Ocean (Neave, Yonemori, and Bakkala, 1976; Myers, 1993), and steelhead Puget Sound DPS tend to remain in offshore waters (Quinn and Myers, 2004; Myers et al., 1996).

Once reproductively mature, adult salmon migrate back to their natal rivers and complete their lifecycle. Chinook salmon Puget Sound ESU mature at ages 3 to 4 years (Myers et al., 1998), Hood Canal summer-run chum mature at ages 2 to 4 years (Ames, Graves, and Weller, 2000), and steelhead Puget Sound DPS mature at ages 2 to 3, although they may not spawn for another 1 to 3 years (NMFS, 2005b).

The Chinook salmon Puget Sound ESU is comprised of spawned fish from rivers that flow into the Puget Sound rivers from the Elwha River east to the Strait of Georgia at the U.S.-Canada border (NMFS, 1998). This population also includes hatchery-spawned fish at a number of facilities around the Puget Sound. Critical habitat for Chinook salmon Puget Sound ESU was designated in 2005 (70 FR 52630) and includes all of Whidbey Island and the surrounding marine areas (Figure 3.8-5). Nearby spawning critical habitat includes Quilceda Creek, the Stillaguamish River, Snohomish River, and Skykomish River. Critical habitat designation is exempted for lands on the NAS Whidbey Island complex owned and controlled, as well as management lands and tide lands (down to the extreme low tide line, -4.5 feet mean lower low water), based on implementation of an existing INRMP. Furthermore, critical habitat designation is also excluded from water-restricted areas off of Ault Field and Crescent Harbor off the Seaplane Base, based on probable national security impacts (NAS Whidbey Island, 2013a). Chinook salmon may occur in the offshore waters around Whidbey Island, especially juvenile fish that tend to prefer nearshore waters. There are no spawning sites within the study area and the NAS Whidbey Island complex.

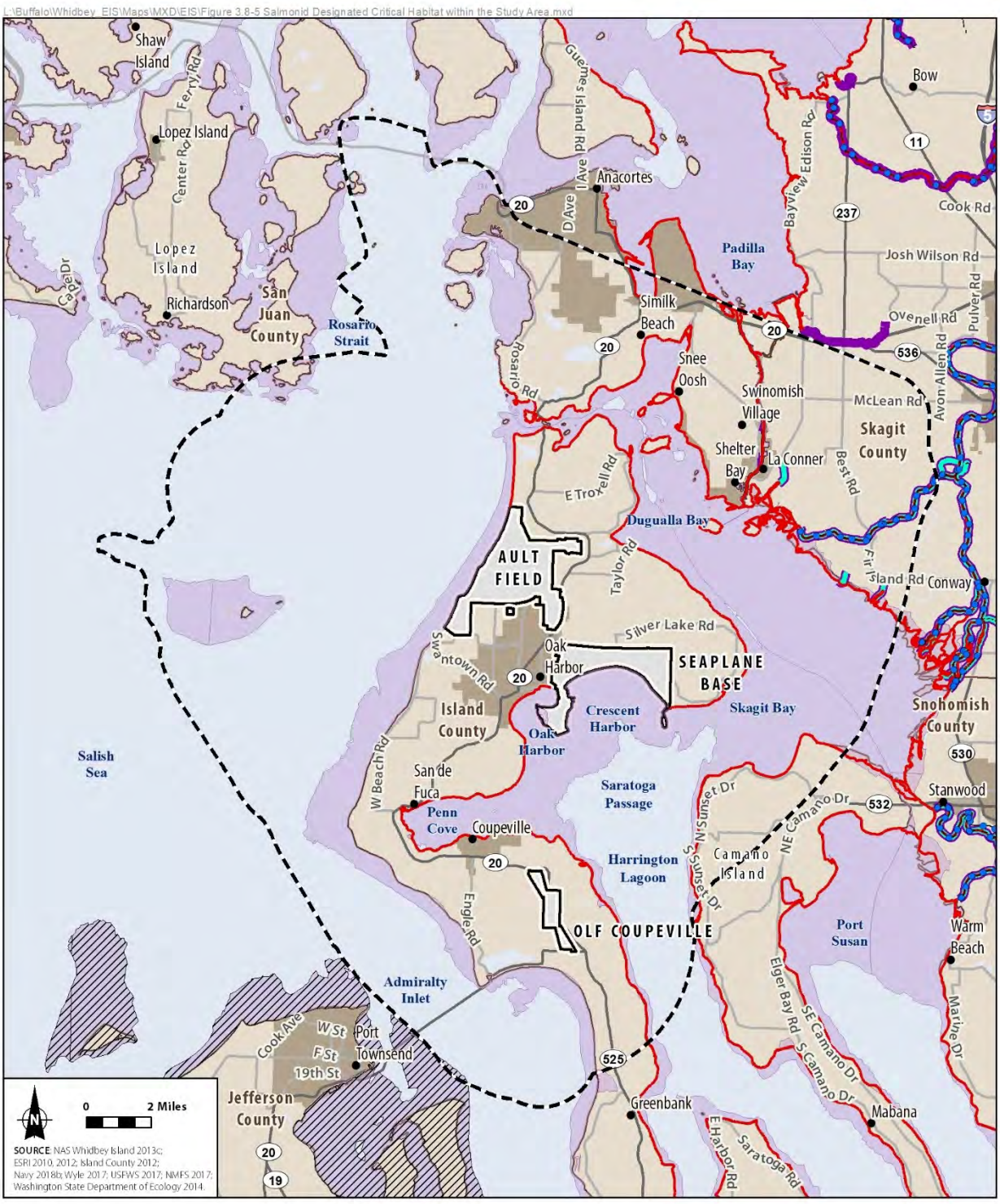


Figure 3.8-5
Salmonid Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

During the designation of the critical habitat, the specific primary constituent elements that were determined essential for the conservation of the Chinook salmon Puget Sound ESU, Hood Canal summer-run chum, and steelhead Puget Sound DPS included:

- freshwater spawning sites with water quantity and quality conditions and substrate to support spawning, incubation, and larval development
- freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks
- freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival
- estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation
- nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood , aquatic vegetation, large rocks and boulders, and side channels
- offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation

The Hood Canal summer-run chum population is comprised of fish spawned from the Hood Canal and its tributaries, and rivers in the Olympic Peninsula from the Hood Canal and Dungeness Bay. The ESU also includes hatchery-spawned fish from four programs. Critical habitat was designated in 2005 (70 FR 52630) and includes both rivers and nearshore waters in the Hood Canal and along the southern Puget Sound coastline to Dungeness Bay (Figure 3.8-5). The study area overlaps with critical habitat along its southwestern boundary. Waters adjacent to the NAS Whidbey Island complex are not included as critical habitat. The primary constituent elements essential for the conservation of the Hood Canal summer-run chum are the same primary constituent elements listed above for the Chinook salmon Puget Sound ESU. Hood Canal summer-run chum may occur in the offshore waters around Whidbey Island, especially juvenile fish that tend to prefer nearshore waters. There are no spawning sites within the study area and the NAS Whidbey Island complex.

The steelhead Puget Sound DPS is comprised of spawned fish from rivers that flow into the Puget Sound and includes the Elwha River, Hood Canal, South Sound, North Sound, and the Strait of Georgia, plus hatchery-spawned fish from six programs. Critical habitat was designed in February 2016 (70 FR 52630) and includes many river tributaries of Puget Sound from the Elwha River to the Canadian border (Figure 3.8-5). There is one river designated as critical habitat within the study area: the North Fork Skagit River. The primary constituent elements essential for the conservation of the steelhead Puget Sound DPS are the same primary constituent elements listed above for the Chinook salmon Puget Sound ESU and Hood

Canal summer-run chum. Steelhead may occur in the offshore waters around Whidbey Island; however, there are no suitable spawning streams on the island.

3.8.2.4.1.4 Bull Trout

The bull trout is a *Salmonidae* (salmon) and a native to western waters in North America. Populations of bull trout have four different life-history forms: fish that complete their lifecycle within one tributary (resident), fish that spawn in streams and mature in lakes (adfluvial), fish that spawn in streams and mature in rivers (fluvial), and fish that spawn in streams and mature in marine habitats (anadromous) (USFWS, 2014c). In November 1999, all populations of bull trout were listed as threatened under the ESA, including the Coastal-Puget Sound population of bull trout. The Coastal Puget Sound DPS of bull trout uniquely contains the anadromous life history.

The bull trout inhabits pristine, cold-water streams and lakes, and it requires connectivity between headwater streams and its river, lake, and/or ocean habitats for annual spawning and feeding migrations (USFWS, 2014c). In the study area, bull trout likely originate from the Skagit, Stillaguamish, and Snohomish Rivers. Anadromous bull trout tagged from the Skagit River entered marine waters of Skagit Bay from April to July and were located in the waters off the western coast of Whidbey Island (Hayes et al., 2011). Study fish used shallow nearshore habitats and did not travel far (less than 7.5 miles) from the mouth of their natal river.

The USFWS designated critical habitat for bull trout in 2005 and revised it in 2010 (75 FR 63898) (USFWS, 2010a). The current critical habitat designations include 754 miles of marine shoreline in Washington (Figure 3.8-5). The inshore extent of critical habitat is the mean higher high-water line, including the uppermost reach of the saltwater wedge within tidally influenced, freshwater heads of estuaries. Critical habitat extends offshore to the depth of 33 feet relative to the mean low low-water line. Within the study area, designated critical habitat occurs along most of the Skagit Bay shoreline; however, the NAS Whidbey Island complex shoreline was not included in the designation. During the designation of the critical habitat, the specific primary constituent elements that were determined essential for the conservation of the bull trout included:

- springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia
- migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers
- an abundant food base, including terrestrial organisms or riparian origin, aquatic macroinvertebrates, and forage fish
- complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that established and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks, and unembedded substrates to provide a variety of depths, gradients, velocities, and structure
- water temperatures ranging from 36 to 59 °F, with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

- in spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand and embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.
- a natural hydrograph, including peak, high, low, and base flows within historical and seasonal ranges, or, if flows are controlled, minimal flow departure from a natural hydrograph
- sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited
- sufficiently low levels of occurrence of nonnative predatory species (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding species (e.g., brook trout); or competing species (e.g., brown trout) that, if present, are adequately temporally and spatially isolated from bull trout

Within the study area, all coastal and marine waters are included within the Coastal Recovery Unit (USFWS, 2015d). The study area contains one "core area" of bull trout habitat (the Lower Skagit River) and includes the southern and eastern shorelines of Fidalgo Island and mainland shorelines. Bull trout are expected along all shorelines throughout the study area (Hayes et al., 2011), and they would potentially occur in the marine waters adjacent to Ault Field (NAS Whidbey Island, 2013a).

3.8.2.4.1.5 Dolly Varden

Dolly Varden are listed as a threatened species under the "Similarity of Appearance" provision. Dolly Varden closely resemble bull trout, and the two species cannot be easily distinguished from each other. As a result, please refer to the bull trout section, above. This species will not be discussed separately in subsequent sections of this document.

3.8.2.4.1.6 Rockfish

There are two federally listed rockfish species that have the potential or are known to occur within the study area: the bocaccio rockfish and yelloweye rockfish (NMFS, 2016b). Bocaccio rockfish are common in Oregon and California and are distributed from the Alaska Peninsula to central Baja California, Mexico (Drake et al., 2010). Yelloweye rockfish range from the Aleutian Islands to northern Baja, California (Love, Yoklavich, and Thorsteinson, 2002). On April 28, 2010, the bocaccio rockfish Puget Sound/Georgia Basin DPS was listed as endangered, and the yelloweye rockfish Puget Sound/Georgia Basin DPS was listed as threatened.

Bocaccio and yelloweye rockfish larvae and juveniles are pelagic and often found at or near (within 260 feet of) the water surface, drifting with nearshore and offshore kelp mats (Love, Yoklavich, and Thorsteinson, 2002; Busby, Matarese, and Mier, 2000). Compared to Pacific coastal waters, water exchange in the Puget Sound is low and results in more retention of these rockfish species, resulting in their distinct populations (Buonaccorsi et al., 2002; Drake et al., 2010). In Puget Sound, records of juvenile bocaccio and yelloweye rockfish are rare. This may be in part because these species may inhabit more offshore waters or because of the lack of studies and ability to identify juvenile fish to their species (Love, Yoklavich, and Thorsteinson, 2002; NMFS, 2014b).

As bocaccio and yelloweye rockfish age, they move to deeper waters within Puget Sound and surrounding waters. Adult bocaccio rockfish are generally found at depths between approximately 150

and 800 feet. Adult yelloweye rockfish are generally found at depths between approximately 150 and 1,300 feet and tend to have high site fidelity (DeMott, 1983; Love, Yoklavich, and Thorsteinson, 2002; Orr, Brown, and Baker, 2000). NMFS (2014b) summarized that together, adult yelloweye and bocaccio rockfish generally occupied habitats from approximately 90 to 1,400 feet.

Adult bocaccio rockfish first reach reproductive maturity after age 4 years (Drake et al., 2010), while yelloweye rockfish reach maturity at 15 years or older (Yamanaka and Kronlund, 1997). Rockfishes are long-lived fish, with lifespans exceeding 50 years. Yelloweye rockfish have been documented up to 118 years old.

In November 2014, the NMFS designated critical habitat (79 FR 68042) for the two rockfish species together: 590 square miles of nearshore habitat was designated for bocaccio rockfish, and 414 square miles of deepwater habitat was designated for yelloweye rockfish and bocaccio rockfish (Figure 3.8-4). The NAS Whidbey Island complex is bounded by nearshore critical habitat for the bocaccio rockfish. There are deepwater critical habitats for the bocaccio and yelloweye rockfish species within the study area. Adult rockfish are expected to use deepwater habitats away from the Whidbey Island shore. Juvenile rockfish, especially bocaccio rockfish, may occur nearshore to Whidbey Island and within the study area.

During the designation of the critical habitat, the physical and biological features that were determined essential for the conservation of the adult bocaccio and adult and juvenile yelloweye rockfish included:

- Benthic habitats or sites deeper than 98 feet (30 m) that possess or are adjacent to areas of complex bathymetry consisting of rock or highly rugose habitat, which are essential because these features support growth, survival, reproduction, and feeding opportunities by providing the structure for rockfishes to avoid predation, seek food, and persist for decades. Several attributes of these sites determine the quality of the habitat and are useful in considering the conservation value of the associated feature; these attributes include:
    - quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities
    - water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities
    - the type and amount of structure and rugosity that support feeding opportunities and predator avoidance

The physical and biological features that were determined essential for the conservation of the juvenile bocaccio include:

- Juvenile settlement habitats located in the nearshore with substrates such as sand, rock, and/or cobble compositions that also support kelp are essential for conservation because these features enable forage opportunities, refuge from predators, and behavioral and physiological changes needed for juveniles to occupy deeper, adult habitats. Several attributes of these sites determine the quality of the habitat and are useful in considering the conservation value of the associated feature; these attributes include:
    - quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities

- water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities

3.8.2.4.1.7 Humpback Whale

The humpback whale was listed as endangered under the ESA in 1970 (WDFW, 2013). On September 8, 2016, NMFS revised the ESA listing for humpback whales, separating the population into 14 DPSs. Two DPSs occur in the study area: the Mexico DPS and Central America DPS. Based on evidence of population recovery, the Central America DPS occurring in the study area remained listed as endangered, and the Mexico DPS was down-listed (to threatened) from the U.S. Endangered Species List (NMFS, 2016c). NMFS has not designated a critical habitat for the humpback whale. Humpback whales inhabit all of the world's major oceans, with the California/Oregon/Washington breeding stock occurring in waters off Washington (NMFS, 2015a). Humpback whales spend the summer months in feeding grounds at higher latitudes, and most individuals occur off Washington from July to September (WDFW, 2013; NMFS, 2015a). Their preferred feeding grounds are shallow, cold coastal waters (NMFS, 2015a). The California/Oregon/Washington stock migrates to its calving grounds off the coast of Mexico and Central America for the winter (WDFW, 2013; NMFS, 2015a). This stock was estimated at more than 2,000 individuals in 2007-2008 (WDFW, 2013). While they are most commonly observed off the coast of northern Washington, humpback whales are rare visitors to Puget Sound (Burke Museum of Natural History and Culture, 2013; WDFW, 2013).

3.8.2.4.1.8 Killer Whale (Southern Resident)

The Southern Resident population consists of about 75 individuals across three social groups identified as the J, K, and L pods, and this population was listed as endangered under the ESA in 2005 (WDFW, 2013; NMFS, 2015b).

Southern resident killer whales occur primarily in U.S. and Canadian waters in and around the San Juan Islands from late spring to fall (WDFW, 2013; NMFS, 2015b). During the remainder of the year, they move to the outer coast and travel to sites as far north as southeastern Alaska and as far south as central California. Their primary food source is salmonids, particularly Chinook salmon (*Oncorhynchus tshawytscha*).

The NMFS designated critical habitat for the Southern Resident killer whale in the waters around the San Juan Islands, Puget Sound, and the Strait of San Juan de Fuca in 2006 (71 FR 69062) (Figure 3.8-6; NMFS, 2006). The critical habitat designation excluded the waters within the boundaries of 18 military sites in the area, including within the study area and the NAS Whidbey Island complex. The critical habitat does not include waters shallower than 20 feet (6.1 m), based on extreme high water. The physical and biological features that were determined essential for the conservation of the killer whale (Southern Resident) include:

- water quality to support growth and development
- prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth
- passage conditions to allow for migration, resting, and foraging

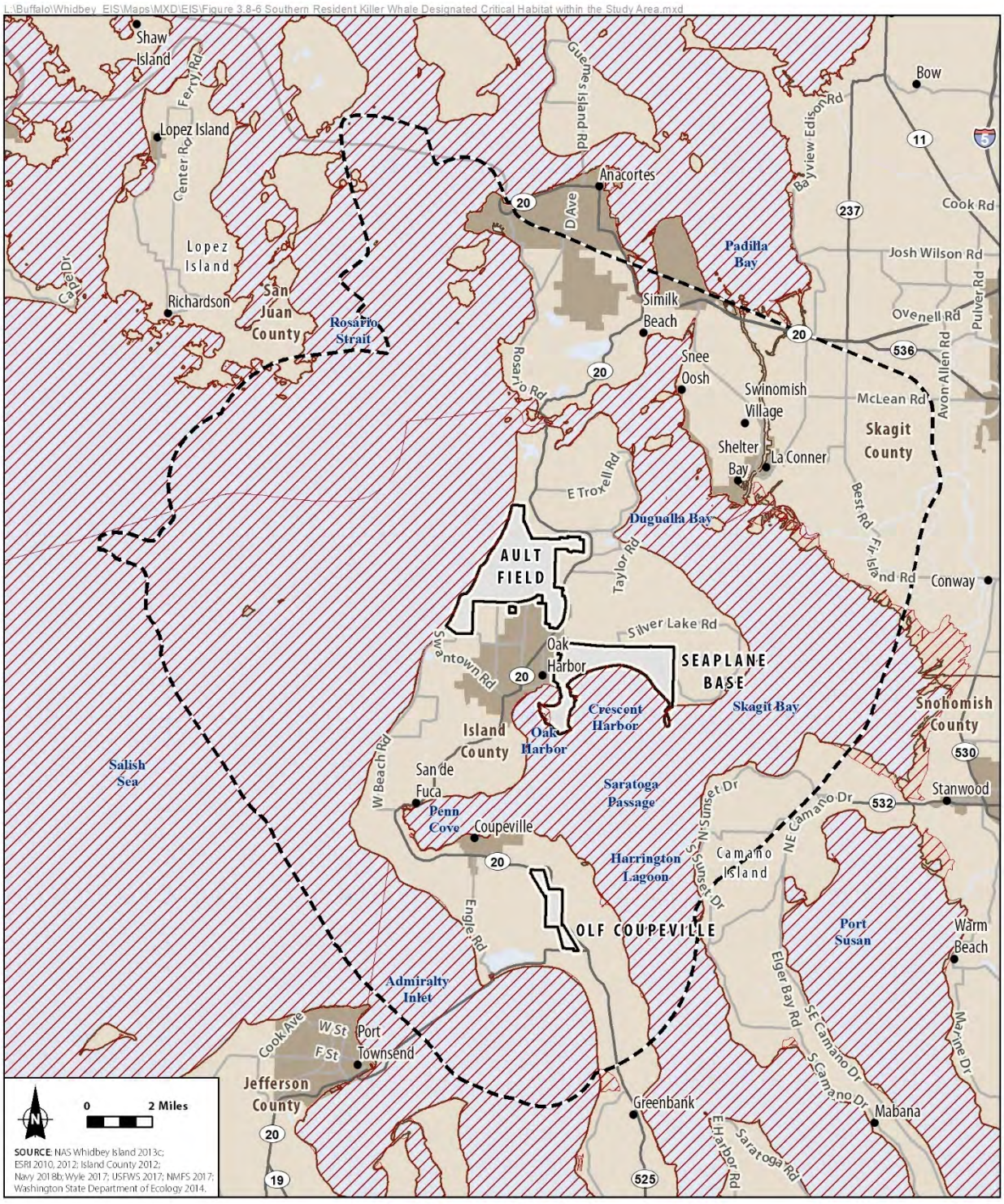


Figure 3.8-6
Southern Resident Killer Whale Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

3.8.2.4.2 State Threatened and Endangered Marine Species

Three species of marine mammals that potentially occur in the waters of the study area are listed by the State of Washington. Two of these species, the humpback whale and Southern Resident killer whale, are also federally listed under the ESA. The gray whale is listed as sensitive by the state, but it is not protected under the ESA. Approximately six to 10 gray whales visit the marine waters near Whidbey Island each year, arriving beginning in January and staying until summer (WDFW, 2013).

3.9 Water Resources

This discussion of water resources includes groundwater, surface water, marine waters, marine sediments, wetlands, and floodplains. This section discusses the physical characteristics of these water resources; wildlife and vegetation are addressed in Section 3.8, Biological Resources. Water quality refers to the suitability of water for a particular use (i.e., potable water, irrigation) based on selected physical, chemical, and biological characteristics.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A Total Maximum Daily Load is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards occur.

Wetlands are transitional zones between the terrestrial and aquatic environments, and they include jurisdictional and non-jurisdictional wetlands. Jurisdictional wetlands are those that meet the three criteria (hydrology, hydric soils, and hydrophytic vegetation [i.e., plants occurring in saturated soils]) defined in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation manual. Wetlands are jointly defined by the USEPA and USACE as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands are generally associated with drainages, stream channels, and water discharge areas (both natural and man-made) and include “swamps, marshes, bogs and similar areas” (40 CFR section 230.3[t] and 33 CFR section 328.3[b]).

Groundwater is water that flows or seeps downward and saturates soil or rock, supplying springs and wells. Groundwater is typically found in aquifers with high-porosity soil where water can be stored between soil particles and within soil pore spaces. Groundwater is used for water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition.

Floodplains are areas of low-level ground present along rivers, stream channels, large wetlands, or coastal waters. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplain boundaries are most often defined in terms of frequency of inundation—that is, the 100-year and 500-year flood. The area subject to a 1-percent chance of flooding is referred to as the 100-year floodplain, while the area subject to a 0.2-percent chance of flooding is referred to as the 500-year floodplain. Floodplain

delineation maps are produced by the Federal Emergency Management Agency (FEMA) and provide a basis for comparing the locale of the Proposed Action to the floodplains.

Sediments are the solid fragments of organic and inorganic matter created from weathering rock transported by water, wind, and ice (glaciers) and deposited at the bottom of bodies of water. Components of sediment range in size from boulders, cobble, and gravel to sand (particles 0.05 to 2.0 millimeters [mm] in diameter), silt (0.002 to 0.05 mm in diameter), and clay (less than or equal to 0.002 mm in diameter). Sediment deposited on the Continental Shelf is delivered mostly by rivers but also by local and regional currents and wind. Most sediment in nearshore areas and on the Continental Shelf is aluminum silicate derived from rocks on land that is deposited at rates of greater than 10 centimeters per 1,000 years. Sediment may also be produced locally as nonliving particulate organic material ("detritus") that travels to the bottom (Hollister, 1973; Milliman et al., 1972). Some areas of the deep ocean contain an accumulation of the shells of marine microbes, composed of silicon and calcium carbonate, termed biogenic ooze (Chester, 2003). Through the downward movement of organic and inorganic particles in the water column, substances that are otherwise scarce in the water column (e.g., metals) are concentrated in bottom sediment (Chapman et al., 2003; Kszos et al., 2003).

3.9.1 Water Resources, Regulatory Setting

3.9.1.1 Federal Regulations

Waters of the U.S. are defined as 1) traditional navigable waters, 2) wetlands adjacent to navigable waters, 3) non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow perennially or have continuous flow at least seasonally (e.g., typically 3 months), and 4) wetlands that directly abut such tributaries.

The full regulatory definition of Waters of the United States is provided in the USEPA regulations found in 40 CFR Part 122. The term "Waters of the United States" has a broad meaning under the Clean Water Act (CWA) and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Jurisdictional Waters of the United States regulated under the CWA include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, and "other" waters that, if degraded or destroyed, could affect interstate commerce. Wetlands are currently regulated by the USACE under Section 404 of the CWA as a subset of all Waters of the United States. EO 11990, Protection of Wetlands, requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

The CWA requires that the State of Washington establish a Section 303(d) list to identify impaired waters and establish Total Maximum Daily Loads for the sources causing the impairment. While Section 303(d) of the CWA requires a report on impaired waters, Section 305(b) requires states to provide a description of water quality of all waters of the state, including rivers/streams, lakes, estuaries/oceans, and wetlands (Washington State Department of Ecology, 2015b). Per USEPA guidance, the Washington State Department of Ecology submits a combined report to the USEPA to fulfill the state's obligation under CWA sections 303(d) and 305(b).

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge material or fill into wetlands and other Waters of the United States. Any discharge of dredge material or fill into Waters of the United States requires a permit from

the USACE. The CWA also establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES) program, on the amounts of specific pollutants that can be discharged into surface waters to restore and maintain the chemical, physical, and biological integrity of the water. The NPDES program regulates the discharge of point (i.e., end of pipe) sources of water pollution.

Section 438 of the Energy Independence and Security Act (42 U.S.C. section 17094) establishes stormwater design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 square feet must "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow."

The principal federal regulation concerning the protection of groundwater is the Safe Drinking Water Act of 1974. This act was set forth to protect the nation's public water supplies, including groundwater, in areas where it is the main potable water source.

EO 11988, Floodplain Management, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development unless it is the only practicable alternative. Flood potential of a site is usually determined by the 100-year floodplain, which is defined as the area that has a 1-percent chance of inundation by a flood event in a given year. No construction would occur within FEMA-mapped floodplains under any of the proposed alternatives. Therefore, there would be no impacts on floodplains because all three alternatives would be fully consistent with EO 11988.

Section 10 of the Rivers and Harbors Act provides for USACE permit requirements for any in-water construction. The USACE and some states require a permit for any in-water construction. Permits are required for construction of piers, wharfs, bulkheads, pilings, marinas, docks, ramps, floats, moorings, and like structures; construction of wires and cables over the water, and pipes, cables, or tunnels under the water; dredging and excavation; any obstruction or alteration of navigable waters; depositing fill and dredged material; filling of wetlands adjacent or contiguous to Waters of the United States; construction of riprap, revetments, groins, breakwaters, and levees; and transportation of dredged material for dumping into ocean waters. No new in-water construction would occur under any of the proposed alternatives; therefore, this regulation is not addressed further in this EIS.

The National Wild and Scenic Rivers System was created by Congress in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The National Wild and Scenic Rivers Act (16 U.S.C. 1271 et seq.) is notable for safeguarding the special character of these rivers while also recognizing the potential for their appropriate use and development. The act encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection. There are no designated wild and scenic rivers on Whidbey Island; therefore, wild and scenic rivers will not be discussed further.

The Navy supports the development and implementation of state coastal non-point pollution control programs on Navy lands consistent with applicable laws and regulations. These could include identifying non-point sources, specifying corrective measures, and coordinating non-point source compliance efforts with state programs. The Navy also identifies areas of sensitive natural resources of the coastal zone, minimizes the loss or degradation of coastal wetlands, enhances the natural value of wetlands, and protects water quality. The Navy encourages research and development efforts to address non-

point sources of pollution to identify and understand Navy impacts on the coastal and marine environment.

3.9.1.2 State and Local Regulations

In the State of Washington, water resource regulations are contained in a series of chapters of the RCW known as the Water Resources Act of 1971 (Chapter 90.54 RCW) (Washington State Department of Ecology, n.d.[a]). The Washington State Department of Ecology, Water Resources Program, ensures voluntary compliance with these laws and will take enforcement actions when voluntary compliance is not provided.

The Washington State Wetland Rating System categorizes wetlands based on specific attributes such as rarity, sensitivity to disturbance, and functions (Hruby, 2004). This rating system was designed to differentiate between wetlands based on their sensitivity to disturbance, their significance, their rarity, the ability to replace them, and the functions they provide. The rating system, however, does not replace a full assessment of wetland functions that may be necessary to plan and monitor a project of compensatory mitigation. The "rating" categories are intended to be used as the basis for developing standards for protecting and managing the wetlands to reduce further loss of their value as a resource (Hruby, 2004). The rating system is primarily intended for use with vegetated, freshwater wetlands as identified using the State of Washington wetland delineation method (WAC, 1997; Hruby 2004).

Water quality standards for the surface waters of the State of Washington regulate point source pollution through permitting of both stormwater discharge and wastewater discharge (Washington State Department of Ecology, n.d.[b]). These permits stipulate specific limits and conditions of allowable discharge. The USEPA approved the marine Water Quality Assessment 305(B) reports and the 303(d) list of impaired waterbodies for Washington on December 21, 2012 (Washington State Department of Ecology, n.d.[c]). The 2014 report was submitted to the USEPA on September 28, 2015; however, because this report has not been approved by the USEPA, the 2012 report is considered the most current for this EIS (Washington State Department of Ecology, n.d.[d]).

Water quality standards for the groundwaters of the State of Washington include regulations regarding the Underground Injection Control (UIC) Program and water consumption. The UIC Program regulates discharges to UIC wells, which are man-made structures used to discharge fluid into the subsurface, including drywells, infiltration trenches, perforated pop, or any structure deeper than the widest surface dimension (Washington State Department of Ecology, n.d.[e]). They are generally used to discharge stormwater and sanitary waste. Water use is regulated through a state permit and certificate system that relies on a "first in time, first in right" policy, meaning applicants who apply first are given priority (Washington State Department of Ecology, n.d.[a]). The Water Code, enacted in 1917 (90.03 RCW), requires a permit or certificate for all uses of surface water. Exemptions include water for livestock, non-commercial lawns less than 0.5 acre, single homes, and industrial purposes (no acreage limit). These laws make it illegal to divert or withdraw water.

The Washington NPDES stormwater program requires that construction site operators obtain a construction Stormwater General Permit for any activates that will include clearing, grading, and excavating that could disturb 1 or more acres and discharge stormwater to surface waters. Operators must 1) develop stormwater pollution prevention plans, 2) implement sediment, erosion, and pollution prevention control measures, and 3) obtain coverage under the permit (Washington State Department of Ecology, n.d.[f]). Construction or demolition that necessitates an individual permit also requires

preparation of a Notice of Intent to discharge stormwater and a stormwater pollution prevention plan that is implemented during construction. As part of the 2010 Final Rule for the CWA, titled *Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category*, activities covered by this permit must implement non-numeric erosion and sediment controls and pollution prevention measures.

Authorized under the Water Pollution Control Act, Model Toxic Control Act, and Puget Sound Water Quality Authority Act, the Sediment Management Standards established standards for the quality of surface sediments (WAC, 1995). The purpose of the standards is to reduce and eliminate adverse effects on biological resources and health threats to humans from surface sediment contamination. The standards designate the maximum level of sediment contamination allowed and outline cleanup actions and standards.

Floodplain management guidelines establish statewide authority for floodplain management through regulatory programs that are compliant with the minimum standards of the National Flood Insurance Program (WAC, 2002). Regulatory areas include areas within the FEMA-designated 100-year flood plain.

Chapter 15.01 of Island County municipal code established the stormwater management program, which was created as a way to fund stormwater control facilities in the Marshall Drainage Basin in Island County. Owners of properties that have been determined to contribute to stormwater runoff and that would benefit from control facilities are required to pay fees to fund the program.

Chapter 15.03 of Island County municipal code established the clean water utility to allow for the management of surface water drainage to protect surface and groundwater quality in unincorporated areas of Island County that are located outside the Marshal Drainage Basin. Properties owned by the federal government are excluded from the utility.

3.9.2 Water Resources, Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under water quality resources at the NAS Whidbey Island complex.

3.9.2.1 Groundwater

Groundwater beneath the NAS Whidbey Island complex is present in three main aquifer systems: the shallow, intermediate, and deep aquifers. The aquifers are composed of sand or sand and gravel with confining layers of till, clay, and silt. The shallow aquifer is a major water-bearing zone on Whidbey Island and generally ranges in depth from 20 to 145 feet below ground surface; the intermediate aquifer extends throughout the northern portion of Whidbey Island, and its water levels are generally 5 to 20 feet beneath the shallow aquifer; and the deep aquifer (or sea-level aquifer) is a continuous water-bearing zone on Whidbey Island, with water levels ranging from 11 to 17 feet above sea level (Simonds, 2002).

The USEPA has designated the Whidbey Island aquifer system as a sole-source aquifer: it is the only supply of potable water for at least half of the island's residents. There is no viable alternative source of drinking water for those using groundwater, and the aquifer boundaries have been defined (URS, 1995).

Water-level data from environmental investigations at the NAS Whidbey Island complex and regional studies indicate that groundwater flow at Ault Field generally follows surface topography. Most of the groundwater underlying Ault Field converges in the central runway areas and likely discharges eastward

to Dugualla Bay. Groundwater along the western side of Ault Field appears to discharge westward to the Strait of Juan de Fuca (EA EST, 1996).

NAS Whidbey Island does not use groundwater as a source of drinking water. Rather, treated surface water is piped to the installation from the Skagit River. The City of Oak Harbor uses the Skagit River for 75 percent of its drinking water, with the remaining 25 percent supplied by three municipal wells. Island County residents near Ault Field who are not located in the Oak Harbor water district use private wells for drinking water.

In the mid-1990s, contaminated groundwater was found to be migrating westward off site toward private water supply wells in Oak Harbor (ATSDR, 2010). The source of this groundwater contamination was a former landfill located in the southeastern portion of the installation. In response, the Navy designed an extraction and treatment system to treat and control the migration of contaminated groundwater. All private wells in the vicinity of the contaminant plume were closed, and the residences were connected to public water supplies (ATSDR, 1993).

3.9.2.1.1 Per- and Polyfluoroalkyl Substances

The Defense Environmental Restoration Program (DERP) is addressing past releases of per- and polyfluoroalkyl substances, commonly known as PFAS. PFAS have been used in a variety of industrial and military applications, including as a component in aqueous film-forming foam (AFFF), which is routinely used to extinguish fuel fires. PFAS may be present in the soil and/or groundwater at Navy sites as a result of historical fire-fighting activities using this foam. In May 2016, the USEPA issued drinking water health advisories for two PFAS, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), in accordance with the Safe Drinking Water Act (*Federal Register*, 2016; USEPA, 2016i, 2016j, 2016k). PFAS are a type of "emerging contaminant," which is a chemical or material characterized by a perceived, potential, or real threat to human health or the environment or by a lack of published health standards (DoD, 2009b).

An emerging contaminant is a constituent:

- of relatively recent environmental concern that has a reasonably possible pathway to enter the environment
- that presents a potential unacceptable human health or environmental risk, and
- that does not have regulatory standards based on peer-reviewed science, or the regulatory standards are evolving due to new science, detection capabilities, or pathways (DoD, 2009b).

The Navy is committed to ensuring all individuals who live or work on or in the vicinity of Navy installations and facilities receive safe drinking water. Installation-wide assessments are being conducted to identify potential PFOA and PFOS release sites and prioritize future site investigations and remediation based on potential risk to drinking water sources. Locations where PFOA and/or PFOS may have migrated to off-installation drinking water sources are being proactively identified. Where USEPA lifetime health advisory levels have been exceeded, the Navy has provided alternative drinking water.

Based on historical use of AFFF, there are three areas of PFAS investigation identified at the NAS Whidbey Island complex: Ault Field, the Area 6 Former Landfill, and OLF Coupeville. Drinking water wells within 1 mile downgradient of known or suspected release sites at Ault Field and OLF Coupeville were tested to determine whether they were impacted from past releases of AFFF. Drinking water wells

within 0.5 mile downgradient to the east and south of the Area 6 Former Landfill were tested to determine whether they were impacted from past releases of AFFF.

As of June 29, 2018, the Navy had sampled 233 drinking water wells in the areas surrounding Ault Field, the Area 6 Former Landfill, and OLF Coupeville properties. Of the total 233 wells sampled, 15 wells are above the USEPA's lifetime health advisory level established for PFOS and/or PFOA. Where USEPA lifetime health advisory levels have been exceeded, the Navy has provided alternative drinking water until a long-term solution can be established.

The Navy implemented a robust public outreach initiative for Island County that included outreach meetings at multiple locations across the county, including eight public meetings from November 21, 2016, to June 18, 2018. Three public meetings were held in Coupeville and five in Oak Harbor. Public outreach efforts included the following: press releases issued to inform the public of meeting times, locations, and other pertinent information; mailing over 3,000 letters to property owners and Public Water Supply Districts whose drinking water wells are within the Navy's areas of investigation; postcards sent to property owners in advance of public meetings; emails sent to interested members of the public since December 2016; website updates with the latest information on the Navy's drinking water PFAS investigation; and phone calls to each property owner who had his or her drinking water sampled by the Navy, notifying them within 24 hours of receipt of analytical results. Partner agencies that participated in all public meetings include the USEPA Region 10, Agency for Toxic Substances and Disease Registry Region 10, Washington State Department of Health, and Island County Public Health. The Navy's DERP investigation is ongoing, and additional updates will be provided to the public as information becomes available. The DERP investigation is not part of the Proposed Action for this EIS.

3.9.2.2 Surface Water

NAS Whidbey Island currently holds a USEPA-issued NPDES permit for stormwater discharges associated with industrial activity. This permit requires stormwater monitoring, inspections, training/awareness, documentation, reporting, and implementation of control measures, including Best Management Practices (BMPs) to reduce and/or eliminate stormwater pollutant discharge.

The installation's Spill Prevention Control and Countermeasures Plan provides guidance that would be used in a spill response, such as response procedures, a notification and communication plan, roles and responsibilities, and response equipment inventories. In the event of an accidental spill, response measures would be implemented immediately to minimize potential impacts to the surrounding environment.

Surface water on Whidbey Island generally occurs on soils with low infiltration rates or in streams or constructed ditches due to runoff from precipitation or flowing springs. Low infiltration rates usually occur on clay soils, soils with a high water table, or shallow soils over impervious materials. A minor amount of surface water results from discharge from shallow aquifers.

No significant rivers or streams occur on Whidbey Island. The island's streams tend to be short coastal tributaries draining into cleared lands or, in some instances, lands with residual forest stands. Most of the streams on the island have densely vegetated riparian zones dominated by deciduous trees and shrubs. The streams tend to be shallow, and most of them carry a reduced water volume during the summer months, with the flow becoming subsurface in some stream reaches.

The freshwater streams occurring on the NAS Whidbey Island complex fall within two categories: 1) coastal streams draining small watersheds or water bodies, and 2) complexes of drainage channels manipulated for specific land-management purposes. The latter were originally shallow, meandering watercourses that were channelized and straightened, and the attendant riparian vegetation was removed.

Several created ponds occur at Ault Field on the golf course and at the Seaplane Base (Penfold Pond). Extensive marsh areas are found at the Seaplane Base. The Lake Hancock site includes a coastal lagoon and a saltwater slough draining the lagoon. Stormwater on Ault Field and the Seaplane Base is collected via storm drains, underground pipes, and open ditches and is discharged into the Strait of Juan de Fuca, Dugualla Bay, Crescent Harbor, and Oak Harbor.

Water quality in the ditched channels at Ault Field is considered poor. These ditches accumulate significant amounts of sediments that are contaminated with aromatic hydrocarbons and heavy metals, primarily from discharge from the flight line and hangar complex (NAS Whidbey Island, 2013a). The ditches are regularly dredged to maintain stormwater conveyance. Silt fences are erected during dredging operations to minimize downstream impacts.

To control non-point source pollution, the exposure of stormwater runoff to contaminants must be controlled. Developing stormwater and erosion-control measures, implementing standard stormwater BMPs, and educating station personnel are proactive measures to limit the exposure of stormwater to contaminants.

Examples of BMPs for controlling non-point source pollution include, but are not limited to:

- Activities in uncovered areas such as vehicle maintenance, chemical or waste oil storage, or transferring potential contaminants will be conducted in covered areas so stormwater will not wash contaminants into storm drains or surface waters.
- Areas that cannot be covered should have their stormwater runoff retained and diverted to the sanitary sewer system.
- The storm drain system should not to be used to dump or discharge any materials or chemicals. All departments should notify the Environmental Division before conducting any operations that may discharge materials or washes into the system. This includes water from vehicle washing. All storm drains should be labeled with no dumping signs.

3.9.2.3 Wetlands

Wetlands at the NAS Whidbey Island complex occur on soils with low infiltration rates, in streams, or in constructed ditches. Wetlands that are not within stream channels or ditches occupy about 1,147 acres of land within the NAS Whidbey Island complex. Wetlands in streams and ditches are not defined in the installation's INRMP by area but by linear mile, and they total 24.5 miles (NAS Whidbey Island, 2013a). The primary functions of the wetlands at the NAS Whidbey Island complex are to provide fish and wildlife habitat, flood attenuation, and water quality enhancement (Navy, 1996). A freshwater pond is present to the north of Ault Field. No wetlands are located in or adjacent to proposed construction areas. The closest wetland is approximately 0.8 mile away.

3.9.2.4 Floodplains

No areas at Ault Field are located in FEMA flood zones. FEMA defines the project area as Zone X (Griffin, 2012). Zone X areas are outside of both the 1-percent (100-year) and 0.2-percent (500-year) floodplains. The 100-year floodplain is a term used to describe an area that statistically has a 1-percent chance of flooding in any given year, while a 500-year floodplain is a term used to describe an area that statistically has a 0.2-percent chance of flooding in any given year. Storm-related tidal flooding occasionally occurs east of the runways, next to the eastern boundary of the installation, during winter storms when high winds combine with extreme high tides on Dugualla Bay to bring the tidal surge farther inland than normal (EA EST, 1996). The runway ditch network handles stormwater drainage for Ault Field and the surrounding area.

3.9.2.5 Marine Waters and Sediments

Water circulation, temperatures, and quality are complicated by the geography of the Puget Sound region. The Strait of Juan de Fuca is a weakly stratified estuary with strong tidal currents. The western end of the strait is strongly influenced by ocean processes, whereas the eastern end is influenced by intense tidal action occurring through and near the entrances to numerous narrow passages. Seasonal variability in temperature and salinity is small because the waters are vertically well mixed. In the eastern portion of northern Puget Sound, temperature and salinity vary from north to south, with the waters in the Strait of Georgia being slightly warmer than the waters near Admiralty Inlet. Waters near Admiralty Inlet also tend to have higher salinity than waters to the north. Dissolved oxygen levels vary seasonally, with lowest levels of about 4 milligrams per liter at depth during the summer months and highest levels of about 8 milligrams per liter near the surface (Gustafson et al., 2000). Major sources of freshwater are the Skagit and Snohomish Rivers located in the Whidbey Basin; however, the annual amount of freshwater entering Puget Sound is only 10 percent to 20 percent of the amount entering from the Strait of Georgia, primarily through the Fraser River (Gustafson et al., 2000).

Sediment characteristics around Whidbey Island include mixed fine-grained materials, including fine-grained sands, silts, and clays in bays and estuaries, and sands and gravels in deeper waters that grade out to finer sands toward the western end of the Strait of Juan de Fuca (Gustafson et al., 2000).

Longshore drift moves sediment in a northerly direction along the west side of Whidbey Island. Bluff erosion is evident near Rocky Point, along approximately one mile of shoreline, and along a stretch extending from the Recreational Vehicle Park northward for 0.4 mile (SCS, 1991). Long-term bluff erosion has been measured near the west end of Eighth Street at about 5.5 inches per year (SCS, 1991). Sediment samples from the Proposed Action area were found to be below the Washington State Sediment Quality Standards and Cleanup Screening Levels (SEE, 2011a, 2011b). Site SC13 located just south of the existing finger pier was the exception, with several polyaromatic hydrocarbon compounds detected at levels that exceeded the SQS or CSL. Sediments from the proposed dredging area were found to be suitable for in-water disposal at the Port Gardner non-dispersive disposal site (Dredged Material Management Program, 2011).

3.10 Socioeconomics

This section discusses population demographics, employment characteristics, schools, and housing occupancy status data and provides key insights into socioeconomic conditions that might be affected by the Proposed Action.

Socioeconomics is defined as the social, demographic, and economic characteristics of a demographic area such as a town, city, county, or state. Included in this resource analysis is a description and an assessment of the potential impacts to population and demographics; economy, employment, and income; housing stock; local government revenue and expenditures; and community services and facilities. The affected area for socioeconomic analysis is defined as the area where the principal effects from operating Growler aircraft at the NAS Whidbey Island complex are expected to occur.

3.10.1 Socioeconomics, Regulatory Setting

Socioeconomic data shown in this section are presented at the U.S. Census Bureau tract, city/town, county, and state levels to characterize baseline socioeconomic conditions in the context of regional and statewide trends. Data have been collected from previously published documents issued by federal, state, and local agencies and from state and national databases (e.g., the U.S. Bureau of the Census, the U.S. Bureau of Economic Analysis, and the U.S. Bureau of Labor Statistics).

3.10.2 Socioeconomics, Affected Environment

For the purposes of this EIS, the socioeconomic analysis concentrates on the communities most likely affected by actions at the NAS Whidbey Island complex, namely the Town of Coupeville; the Cities of Oak Harbor, Anacortes, and Mount Vernon; and Island and Skagit Counties, Washington. These communities were selected for several reasons. Historically, the vast majority (95.1 percent) of Navy personnel assigned to the NAS Whidbey Island complex have chosen to live within these communities. (See Table 3.10-2 for the exact breakdown by community). Therefore, it is expected that personnel associated with the Proposed Action would likely also reside in these communities. Areas that experience the most population growth would also likely experience the most significant impacts to housing, community services, local government spending, and economic activity. Therefore, these communities are included in the economic study area. Additionally, for each alternative and scenario, the greater than 65 dB DNL noise contours fall within the communities listed above. Finally, given the geographic nature of the area, the region of economic influence of Island County is somewhat restricted. Island County only has direct ground transportation links to Skagit County; ferry services must be used to access other nearby counties. This lack of easy access limits cross-county spending and, therefore, limits the impact economic activity in Island County would have on surrounding communities. As a result, this socioeconomic analysis focuses primarily on Island and Skagit Counties.

The analysis of potential impacts to the tourism industry is the one exception. Due to the economic importance of the tourism industry to San Juan County and the location of some of the greater than 65 dB DNL contours associated with the Proposed Action, the study area for the analysis of the tourism industry includes Island, Skagit, and San Juan Counties.

Because most economic statistics are collected and published on a county-wide basis, the socioeconomic analysis in the following sections is presented at this level. However, the analysis of community services and facilities, where impacts are more localized and where more local data are available, was completed on a municipal level.

3.10.2.1 Population, Affected Environment

3.10.2.1.1 NAS Whidbey Island Complex

In FY 2021, a total of 9,908 military, civilian, contractor, and non-appropriated fund civilian personnel are expected to be stationed at or employed by the NAS Whidbey Island complex. In addition, an estimated 5,627 military dependents are expected to be connected to the NAS Whidbey Island complex in 2021. Table 3.10-1 provides a summary of expected future base loading at the NAS Whidbey Island complex by personnel type.

Table 3.10-1 Military and Civilian Personnel Expected to be Assigned to the NAS Whidbey Island Complex in 2021

	Total Personnel FY 21
Military Personnel	8,129
Civilian	721
Contractor	521
Non-appropriated Fund Civilian[1]	537
Total Personnel	**9,908**

Source: Delaney, 2016

Note:
[1] A non-appropriated fund civilian personnel position is a job funded from non-appropriated fund sources and is not dependent on the DoD appropriations budget.

Key:
DoD = U.S. Department of Defense
FY 21 = Fiscal Year 2021

Table 3.10-2 shows a categorization of where personnel stationed at or employed by the NAS Whidbey Island complex chose to reside. As shown on the table, the majority of these personnel live within Island County (approximately 85 percent), with the remaining personnel living in Skagit County or in other communities outside the immediate region. These figures include both those personnel living in military housing (41.6 percent) as well as those renting or owning homes in the neighborhoods surrounding the station. The City of Oak Harbor was home to nearly 42 percent of those individuals stationed or employed by the NAS Whidbey Island complex (see Table 3.10-2).

Table 3.10-2 Personnel Stationed and Employed at the NAS Whidbey Island Complex by Place of Residence

County/Municipality	*% of Personnel*
Island County	
NAS Whidbey Island complex	41.6
City of Oak Harbor	40.8
Town of Coupeville	2.7
Subtotal	85.1
Skagit County	
Anacortes	7.1
Mount Vernon	2.9
Subtotal	10.0
Other (municipalities in various counties each with <2%)	4.9
Total	**100**

Source: Coury, 2018.

3.10.2.1.2 Island and Skagit Counties

Many of the communities surrounding the NAS Whidbey Island complex have experienced substantial population growth since 2000. Table 3.10-3 presents actual, estimated, and projected population totals for Island and Skagit Counties and for the Cities or Towns of Oak Harbor, Coupeville, Anacortes, and Mount Vernon from 2000 to 2030. Between 2000 and 2016, total population in Island County increased by approximately 12.0 percent, while population in the City of Oak Harbor increased by 13.9 percent and population in the Town of Coupeville increased 22.1 percent during the same time period. Skagit County experienced a slightly greater rate of population increase. Between 2000 and 2016, total population in Skagit County increased by 17.0 percent. During the same time period, the total population in the City of Anacortes increased by 11.5 percent, and the total population in the City of Mount Vernon increased by 27.3 percent. The State of Washington as a whole experienced a population increase of approximately 20.0 percent from 2000 through 2016 (see Table 3.10-3).

Table 3.10-3 Total Population Counts, Estimates, and Projections for Communities in the Study Area Surrounding the NAS Whidbey Island Complex

Geographic Area	Total Population				
	2000 (actual)	2010 (actual)	2016 (estimated)	2020 (projected)	2030 (projected)
Washington State	5,894,121	6,724,540	7,073,146	7,638,415	8,503,178
Island County	**71,558**	**78,506**	**80,113**	**84,044**	**89,848**
Coupeville	1,723	1,831	2,104	N/A	N/A
Oak Harbor	19,795	22,075	22,544	N/A	N/A
Skagit County	**102,979**	**116,901**	**120,475**	**130,705**	**146,880**
Anacortes	14,557	15,778	16,229	N/A	N/A
Mount Vernon	26,232	31,743	33,388	N/A	N/A

Sources: USCB, 2002, 2012a, 2012b, n.d.[a]; Washington State Office of Financial Management, 2017

Note: The Washington Office of Financial Management does not provide population projections for towns or cities.

Key:
N/A = Not Available

Total population in the region is expected to continue to grow, albeit at a slower pace than seen over the past decade. By 2030, total population in Island County is expected to reach 89,848 residents, and total population in Skagit County is expected to reach 146,880 residents (see Table 3.10-3). Population projections are not available at the city or town level in Washington State (Washington State Office of Financial Management, 2017).

3.10.2.2 Economy, Employment, and Income, Affected Environment

3.10.2.2.1 NAS Whidbey Island Complex

The NAS Whidbey Island complex has a large influence on the local and regional economy. According to a 2010 report that analyzed the economic impact of DoD expenditures in the State of Washington, Navy Region Northwest (which includes Naval Base Kitsap and Naval Station Everett in addition to the NAS Whidbey Island complex) employed just over 39,000 persons, had a payroll of approximately $2.08 billion, and was responsible for approximately $52 million in other expenditures in FY 09 (Berk and Associates, 2010).

The report noted that the State of Washington's defense installations were responsible for $7.9 billion in expenditures in FY 09 and that companies in the state received $5.2 billion in DoD contracts in that year. In particular, companies in Island County received almost $136 million in DoD contracts (Berk and Associates, 2010).

After deducting that part of the defense installations' expenditures and DoD contracts spent in other states, the State of Washington's defense installations contributed almost $8.7 billion in expenditures directly into the state's economy in FY 09. These expenditures generated an additional indirect or multiplier impact on the state's economy. In FY 09, the defense installations and the DoD contracts resulted in a total (direct and indirect) economic impact of almost $12.2 billion in the State of Washington, an amount equivalent to almost 4 percent of the state's gross state product (i.e., the final value of all goods and services produced in the state) in that year (Berk and Associates, 2010).

Another study conducted by the Island County Economic Development Council specifically to determine the economic benefits that the NAS Whidbey Island complex has on Island and Skagit Counties found that the Navy annually injects approximately $726 million into Island County's economy via salary and payroll expenditures, $44 million through retirement and disability payments, and $18 million via health care expenditures. In addition, the study found that the Navy annually injects approximately $15 million via salary and payroll expenditures in Skagit County, $28 million through retirement and disability payments, and $14 million via health care expenditures (Island County EDC, 2013).

3.10.2.2.2 Island and Skagit Counties

The economic characteristics of the two counties in the study area differ. Island County's economy revolves around the military, health and educational facilities, retail trade, and manufacturing. The NAS Whidbey Island complex was the largest single employer in the county (Island County EDC, 2013). The largest civilian (non-military) employment sector in 2016 in Island County was the "educational services, and health care and social services" sector, which provided jobs to approximately 20.9 percent of the employed civilian work force. Other large industrial sectors in the county during the same time period included manufacturing; public administration; retail trade; and the professional, scientific, and management, and administrative and waste management services sector (see Table 3.10-4).

In contrast, Skagit County has a fairly well-rounded economy. While best known regionally for its agriculture, Skagit County receives more than a third of its gross domestic product from manufacturing. Oil refining in Anacortes, marine and aerospace industries, food manufacturers, and other specialty/niche manufacturing industries all contribute to the county's economic health. Health care and education services are also important for the regional economy (Washington Employment Security Department, 2015). The largest employment sectors in 2016 in Skagit County were the educational services, and health care and social services sector; the retail trade sector; the manufacturing sector; and the arts, entertainment, and recreation and accommodation and food services sector (see Table 3.10-4).

Table 3.10-4 Civilian Employment[1] by Industrial Sector for Communities within the Study Area Surrounding the NAS Whidbey Island Complex in 2016

	Washington State	*Island County*	*Coupeville*	*Oak Harbor*	*Skagit County*	*Anacortes*	*Mount Vernon*
Agriculture, forestry, fishing and hunting, and mining	2.70%	1.40%	2.70%	1.90%	4.30%	1.60%	6.80%
Construction	6.10%	7.40%	3.50%	3.60%	8.10%	5.80%	8.10%
Manufacturing	10.50%	12.40%	3.40%	10.30%	12.20%	11.40%	11.90%
Wholesale Trade	2.90%	2.20%	1.30%	1.40%	2.60%	1.50%	1.60%
Retail Trade	11.80%	10.20%	7.10%	9.10%	12.40%	12.70%	14.90%
Transportation and warehousing, and utilities	5.20%	5.10%	8.60%	5.20%	4.20%	5.30%	3.40%
Information	2.30%	1.90%	3.80%	0.90%	1.10%	1.20%	0.70%
Finance and insurance, and real estate and rental and leasing	5.40%	4.60%	1.60%	4.70%	4.20%	4.40%	2.70%
Professional, scientific, and management, and administrative and waste management services	12.50%	9.60%	13.70%	7.60%	8.70%	9.20%	8.30%
Educational services, and health care and social assistance	21.40%	20.90%	34.20%	22.20%	22.00%	23.40%	20.30%
Arts, entertainment, and recreation and accommodation and food services	9.20%	9.20%	4.40%	12.00%	10.80%	13.20%	13.20%
Other services, except public administration	4.70%	4.80%	6.70%	4.30%	5.10%	5.10%	4.80%
Public Administration	5.30%	10.30%	9.10%	17.00%	4.10%	5.20%	3.30%

Sources: USCB, n.d.[b]

Note: Due to rounding, totals may not sum.

[1] Table includes information for the civilian employed population 16 years of age and older. Persons in the Armed Forces, unemployed, and not in the labor force are not included in these percentages.

The two counties in the study area also vary greatly in terms of income and unemployment levels. In 2016, Island County had income levels that were comparable to those in the State of Washington as a whole. In 2016, the county had a per capita income of $32,503 and a median household income of $60,261. During the same time period, the State of Washington had an overall per capita income of $32,999 and an overall median household income of $62,848. However, the City of Oak Harbor and the Town of Coupeville had per capita and median household incomes that were below these levels (see Table 3.10-5) (USCB, n.d.[b]).

Table 3.10-5 Selected Economic Characteristics for the Communities in the Study Area Surrounding the NAS Whidbey Island Complex

Geographic Area	*Annual Average Unemployment Rate (2016)*	*Per Capita Income (2016)*	*Median Household Income (2016)*	*Percent of Population with Incomes below the Poverty Level (2016)*
Washington State	5.4%	$32,999	$62,848	12.7%
Island County	6.0%	$32,503	$60,261	9.5%
Coupeville	N/A	$31,729	$46,657	14.5%
Oak Harbor	N/A	$23,946	$46,959	14.0%
Skagit County	6.8%	$28,586	$56,433	15.0%
Anacortes	N/A	$35,156	$61,922	10.0%
Mount Vernon	6.9%	$22,195	$49,307	19.6%

Sources: USCB, n.d.[b]; USBLS, 2018

Note: The U.S. Bureau of Labor Statistics does not collect labor statistics for cities with fewer than 25,000 residents.

Key:
N/A = Not Available

In contrast, both per capita and median household income levels in Skagit County were significantly less than comparable statewide levels. In 2016, Skagit County had a per capita income level of $28,586 and a median household income level of $56,433 (see Table 3.10-5).

The percentage of persons living below the poverty line also varies throughout the study area. Island County had the smallest percentage of persons with incomes below the poverty level, with 9.5 percent of its population, while Skagit County had the higher percentage of low-income residents out of the two counties. The Town of Coupeville and the City of Mount Vernon had approximately 14.5 and 19.6 percent of their populations, respectively, living below the poverty level, while the City of Anacortes had 10.0 percent of its population with incomes below this level (see Table 3.10-5).

Unemployment rates were equally variable throughout the study area. As shown on Table 3.10-5, Island County had an average annual unemployment rate in 2016 of 6.0 percent, while Skagit County had a higher 2016 average annual unemployment rate of 6.8 percent. In comparison, the State of Washington had an average annual unemployment rate of 5.4 percent during the same time period (see Table 3.10-5).

3.10.2.2.2.1 Agriculture

While agriculture is not a large employment sector, it is still an important industry to the economies of Island and Skagit Counties. According to data provided by the USDA's 2012 Census of Agriculture and the U.S. Census Bureau's 2010 Census of Population and Housing, approximately 11.4 percent of the total land area in Island County and 9.6 percent of the total land area in Skagit County is farmland (USDA, National Agricultural Statistics Service, 2014; USCB [U.S. Census Bureau], 2012e).

In 2012, a total of 377 farms were operating on Island County and reported a total market value of sales as $11.5 million. Main agricultural products in the county included cattle and calves; vegetables, melons, potatoes, and sweet potatoes; and grains, oilseeds, dry beans, and dry peas (USDA, National Agricultural Statistics Service, 2014).

During the same time period, a total of 1,074 farms were operating in Skagit County, and their total market value of sales was $272.3 million. The primary agricultural products in Skagit County included nursery crops, greenhouse crops, floriculture and sod, vegetables, melons, potatoes, sweet potatoes, and milk from cows (USDA, National Agricultural Statistics Service, 2014).

A total of 426 workers were employed on Island County farms in 2012, of which 315 were considered seasonal and worked fewer than 150 days per year. An additional 111 agricultural workers were employed for more than 150 days per year. Likewise, a total of 6,881 workers were employed on Skagit County farms in 2012, of which 5,027 were considered seasonal workers and worked fewer than 150 days per year. An additional 1,854 workers were employed for more than 150 days per year.

According to the 2012 Census of Agriculture, only seven migrant workers, employed on a total of three farms, were reported in Island County in 2012. In addition, migrant workers were only reported on two farms in Skagit County during the same time period. The actual number of migrant workers was withheld to avoid disclosing data for individual farms (USDA, National Agricultural Statistics Service, 2014).

3.10.2.2.2.2 Tourism

Tourism, particularly ecotourism, is also a very important economic driver in the region around the NAS Whidbey Island complex. The following section provides a brief overview of the tourism industry in the region. Due to the importance of this sector to the communities in San Juan County and San Juan County's proximity to the NAS Whidbey Island complex, the economic study area for this resource has been expanded to include Island, Skagit, and San Juan Counties.

According to a report completed by Dean Runyan Associates (2015), the travel and tourism industry employs a significant number of workers in Island, San Juan, and Skagit Counties and generates a substantial amount of income for the regional economy. Data on annual travel expenditures, as well as earnings and employment statistics for the three counties from 1991 to 2014, are provided on Table 3.10-6. As shown in the table, travel expenditures supported approximately 2,000 jobs in Island County; 2,600 jobs in San Juan County; and 3,800 jobs in Skagit County in 2014. In addition, the industry generated an estimated $54.6 million in earnings in Island County, $59.3 million in earnings in San Juan County, and $87.9 million in earnings in Skagit County (see Table 3.10-6).

Table 3.10-6 Annual Travel Expenditures, Earnings, and Employment in Island, San Juan, and Skagit Counties (1991-2014)

	Island County			*San Juan County*			*Skagit County*		
Year	*Total Travel Spending (in $ millions)*	*Total Earnings, Travel and Tourism Sector (in $ millions)*	*Total Employment, Travel and Tourism Sector*	*Total Travel Spending (in $ millions)*	*Total Earnings, Travel and Tourism Sector (in $ millions)*	*Total Employment, Travel and Tourism Sector*	*Total Travel Spending (in $ millions)*	*Total Earnings, Travel and Tourism Sector (in $ millions)*	*Total Employment, Travel and Tourism Sector*
1991	$87.7	$26.6	2,930	$59.2	$18.7	1,340	$137.8	$38.7	3,400
1992	$93.3	$28.3	2,990	$68.9	$21.8	1,500	$144.7	$40.4	3,410
1993	$95.7	$29.2	3,030	$74.3	$23.6	1,590	$138.6	$38.7	3,210
1994	$96.1	$29.2	2,940	$78.0	$24.7	1,610	$148.6	$41.7	3,350
1995	$97.2	$29.5	2,850	$91.5	$29.1	1,840	$151.7	$42.5	3,280
1996	$100.0	$30.3	2,710	$98.8	$31.5	1,870	$154.4	$43.1	3,110
1997	$102.9	$30.9	2,690	$93.5	$29.5	1,700	$164.7	$45.6	3,200
1998	$102.3	$31.1	2,590	$105.8	$33.9	1,780	$168.6	$47.5	3,130
1999	$109.1	$33.8	2,670	$106.7	$34.9	1,990	$183.3	$53.3	3,420
2000	$115.8	$36.4	2,730	$118.2	$39.3	2,210	$190.9	$56.1	3,460
2001	$117.6	$37.2	2,580	$124.1	$41.7	2,120	$188.0	$55.8	3,420
2002	$117.9	$37.7	2,500	$123.7	$41.9	2,150	$186.7	$56.1	3,310
2003	$118.0	$37.7	2,400	$118.2	$40.4	1,970	$195.5	$58.7	3,330
2004	$129.3	$40.0	2,470	$129.4	$43.1	2,040	$208.9	$61.0	3,320
2005	$134.4	$41.1	2,430	$132.5	$44.2	2,000	$220.4	$63.7	3,360
2006	$144.7	$43.5	2,480	$135.6	$44.5	1,950	$241.6	$68.9	3,580
2007	$144.2	$42.8	2,310	$137.0	$44.7	1,870	$252.4	$72.1	3,630
2008	$152.5	$44.4	2,400	$139.9	$45.0	1,820	$260.7	$73.0	3,690
2009	$148.1	$45.2	2,400	$127.6	$42.1	1,670	$242.4	$71.1	3,440
2010	$150.8	$43.0	2,240	$135.0	$42.1	1,640	$262.4	$73.6	3,470
2011	$167.6	$46.1	2,360	$146.4	$45.8	1,760	$271.0	$75.9	3,480
2012	$170.8	$48.6	2,430	$161.5	$49.7	1,810	$288.6	$80.5	3,610
2013	$172.1	$51.8	2,560	$172.4	$56.5	1,960	$292.2	$84.5	3,700
2014	$179.8	$54.6	2,620	$193.2	$59.3	2,000	$306.3	$87.9	3,760

Source: Dean Runyan Associates, 2015.

Table 3.10-7 further divides the travel and tourism sector earnings and employment into industrial subsectors for 2014. As shown in the table, the accommodation and food service sector accounts for approximately 56.6 percent to 65.3 percent of all earning in the industry and approximately 46.2 percent to 64.0 percent of the total employment of the industry (see Table 3.10-7).

Table 3.10-7 Industry Earnings Directly Generated by Travel Spending by Subsector in Island, San Juan, and Skagit Counties: 2014 ($ millions)[1]

	Island County		*San Juan County*		*Skagit County*	
Industrial Subsector	*Earnings*	*Employment*	*Earnings*	*Employment*	*Earnings*	*Employment*
Accommodation and Food Service	$30.9	1,210	$38.7	1,280	$55.1	1,930
Arts, Entertainment, and Recreation	$12.7	990	$11.3	410	$15.6	1,200
Retail[2]	$8.4	330	$7.0	240	$12.9	480
Ground Transportation	$2.1	70	$1.4	40	$3.7	120
Other Travel[3]	$0.4	10	$0.9	30	$0.6	30
Total Direct Earnings	**$54.6**	**2,620**	**$59.3**	**2,000**	**$87.9**	**3,760**

Source: Dean Runyan Associates, 2015.

Note:
1 Due to rounding, totals may not sum.
2 Retail includes gasoline sales.
3 Other Travel includes air travel and ground transportation impacts for travel to other Washington visitor destinations, travel arrangement and reservation services, and convention and trade show organizers.

Finally, Table 3.10-8 provides estimates of the local and state government revenue that was generated by travel and tourism expenditures in Island, San Juan, and Skagit Counties in 2014. As shown on the table, travel and tourism spending generated approximately $5.4 million of local tax receipts in Island County; $5.7 million of local tax receipts in San Juan County; and $8.0 million of local tax receipts in Skagit County. In addition, travel and tourism spending in the three counties is estimated to have generated $43.9 million in tax revenues for the State of Washington (see Table 3.10-8).

Table 3.10-8 Government Revenue Directly Generated by Travel Spending by Sector in Island, San Juan, and Skagit Counties: 2014 ($ millions)

Government Level	*Island County*	*San Juan County*	*Skagit County*
Local Tax Receipts	$5.4	$5.7	$8.0
State Tax Receipts	$11.5	$12.6	$19.8
Total Local and State Tax Receipts	**$16.9**	**$18.3**	**$27.7**

Source: Dean Runyan Associates, 2015.

Note: Due to rounding, totals may not sum.

Table 3.10-9 indicates the volume of overnight visitors to each county in terms of person-nights and person-trips. The number of single-day trips is not estimated at the county level because of data limitations (Dean Runyan Associates, 2015). As shown on the table, in 2014 Island County visitor volume reached approximately 2.1 million person-nights, which included more than 1 million trips. Visitor

volume in San Juan County in 2014 was approximately 1.4 million person-nights, which included nearly 770,000 person-trips. Finally, visitor volume in Skagit County was estimated to be 1.6 million person-nights, which included more than 640,000 person-trips (see Table 3.10-9).

Table 3.10-9 Overnight Visitor Volume in Island and San Juan Counties: 2012-2014

	Person-Nights			*Person-Trips*[1]		
Accommodation Type	***2012***	***2013***	***2014***	***2012***	***2013***	***2014***
Island County						
Hotel/Motel	386,000	389,000	411,000	246,000	248,000	262,000
Private Home	1,289,000	1,286,000	1,319,000	597,000	596,000	611,000
Other Overnight[2]	402,000	401,000	405,000	147,000	147,000	148,000
Total Overnight Visitors/Trips	**2,078,000**	**2,076,000**	**2,135,000**	**991,000**	**990,000**	**1,021,000**
San Juan County						
Hotel/Motel	685,000	731,000	827,000	437,000	466,000	527,000
Private Home	262,000	263,000	269,000	121,000	122,000	124,000
Other Overnight[2]	313,000	314,000	317,000	116,000	116,000	117,000
Total Overnight Visitors/Trips	**1,260,000**	**1,308,000**	**1,413,000**	**674,000**	**704,000**	**769,000**
Skagit County						
Hotel/Motel	439,000	449,000	479,000	175,000	179,000	191,000
Private Home	907,000	903,000	924,000	372,000	370,000	379,000
Other Overnight[2]	206,000	206,000	208,000	74,000	74,000	75,000
Total Overnight Visitors/Trips	**1,551,000**	**1,557,000**	**1,610,000**	**621,000**	**623,000**	**644,000**

Source: Dean Runyan Associates, 2015.

Note: Due to rounding, totals may not sum.

1 Each overnight visitor's trip counted as "one" regardless of the number of nights stayed.

2 The category "other overnight" includes campgrounds and vacation homes. Visitation rates for these categories are not available individually.

Important outdoor attractions in the vicinity of the NAS Whidbey Island complex include Deception Pass State Park, Ebey's Landing National Historical Reserve, and the San Juan Islands National Monument.

Deception Pass State Park, which straddles Whidbey and Fidalgo Islands, is the most frequently visited state park in the State of Washington (Thrasher, 2017a; 2017b). The 4,134-acre park has over 100,000 feet of saltwater and freshwater shoreline and almost 50 miles of hiking, biking, and horse trails (Washington State Parks, n.d.[a]). Table 3.10-10 presents attendance figures for the park. According to statistics collected by the Washington State Parks Department, in 2016 nearly 2.9 million people visited Deception Pass State Park. The vast majority of these visitors were "day use" visitors. An estimated 121,000 visitors utilized the overnight moorage or camping facilities in 2016 (see Table 3.10-10). Visits to Deception Pass State Park generate an estimated $50 million in consumer expenditures annually (Earth Economics, 2015a).

Table 3.10-10 Estimated Visitors to Deception Pass State Park, 1987-2008 (every third year) and 2011-2016

Year	*Overnight Moorage*	*Camping*[1]	*Day Use*	*Total*
1987	6,460	101,051	2,801,676	**2,909,187**
1990	5,164	91,906	3,313,492	**3,410,562**
1993	4,954	87,634	4,193,567	**4,286,155**
1996	2,635	88,431	4,246,075	**4,337,141**
1999	1,565	97,701	2,101,211	**2,200,477**
2002	4,494	93,352	2,604,827	**2,702,673**
2005	4,704	99,654	2,430,703	**2,535,061**
2008	4,543	114,142	1,554,920	**1,673,605**
2011[2]	5,766	89,525	1,341,647	**1,436,938**
2012	6,940	109,974	2,122,165	**2,239,079**
2013	6,881	112,758	2,327,433	**2,447,072**
2014	120,002[3]		2,490,176	**2,610,178**
2015	119,915[3]		2,513,325	**2,633,240**
2016	120,684[3]		2,740,067	**2,860,751**

Source: Thrasher, 2017a; 2017b

Notes:
1 Includes both tent-camping sites and improved sites with utility hookups or cabins.
2 Methods utilized to collect visitor attendance data at Deception Pass State Park changed in 2011.
3 Breakout of overnight moorage and camping not available.

Ebey's Landing National Historical Reserve in central Whidbey Island consists of 17,572 acres and encompasses three state parks, three county parks, the Town of Coupeville, and an abundance of privately held rural land (NPS, n.d.[d]). An estimated 85 percent of land within Ebey's Landing National Historical Reserve is privately owned, and several landowners of farms and important open spaces have sold restricted development easements to the NPS to ensure the character is maintained (NPS, 2006a). In 1978, Ebey's Landing National Historical Reserve was formed as a "partnership" park to be managed by the NPS, Washington State Parks, Island County, and the Town of Coupeville, charged with "preserv[ing] a rural community which provides an unbroken historic record from…19th century exploration and settlement in Puget Sound to the present time" (Public Law 95-625 and U.S.C. Sec. 461, Section 508 of the Parks and Recreation Act of 1978). Today, Ebey's Landing National Historical Reserve attracts visitors interested in the history of the region and the Town of Coupeville as well as outdoor recreationists seeking scenic vistas; hiking, biking, and horse trails; beaches; birding; and water-based activities (Bishop, 2017; NPS, n.d.[d]). Estimating visitor trips to Ebey's Landing National Historical Reserve is difficult because of its varied attractions, numerous entrances and exits, and unique land management structure (Bishop, 2017). Recent grant applications submitted by the Trust Board of the Ebey's Landing National Historical Reserve have cited more than 1 million visitors annually as a rough estimate (Bishop, 2017). This roughly reflects the visitors to the state parks within Ebey's Landing National Historical Reserve annually plus additional history-seeking visitors interested in the Town of Coupeville and the historic landscape, and still others who travel to Ebey's Landing for summer camps, reunions, and weddings (Bishop, 2017). Table 3.10-11 provides estimated attendance figures for the state parks within Ebey's Landing National Historical Reserve in 2016 by overnight and day use. Table

3.10-12 provides historical attendance figures for the state parks within Ebey's Landing National Historical Reserve from 1987 to 2016.

Table 3.10-11 2016 Estimated Visitors to State Parks within Ebey's Landing National Historical Reserve

State Parks within Ebey's Landing NHR	*Overnight Camping[1]*	*Day Use*	*Total*
Fort Casey	18,874	605,904	624,778
Fort Ebey	24,020	184,862	208,882
Ebey's Landing	-	141,181	141,181

Source: Thrasher, 2017b

Note:
[1] Includes both tent-camping sites and improved sites with utility hookups or cabins. No camping sites are available in Ebey's Landing State Park.

Table 3.10-12 Estimated Total Visitors to State Parks within Ebey's Landing National Historical Reserve for Selected Years 1987-2016

	Fort Casey	*Fort Ebey*	*Ebey's Landing*	*Total*
1987	475,722	213,580	66,567	**755,869**
1990	514,429	255,593	45,559	**815,581**
1993	597,886	430,682	34,819	**1,063,387**
1996	483,858	384,376	34,271	**902,505**
1999	785,857	387,004	17,312	**1,190,173**
2002	741,519	305,734	88,847	**1,136,100**
2005	693,104	326,337	72,109	**1,091,550**
2008	726,331	166,140	120,093	**1,012,564**
2011	667,789	251,187	67,758	**986,734**
2012	914,548	281,135	86,256	**1,281,939**
2013	725,119	232,510	150,715	**1,108,344**
2014	480,858	80,615	141,480	**702,953**
2015	609,849	209,100	121,482	**940,431**
2016	624,778	208,882	141,181	**974,841**

Source: Thrasher, 2017a; 2017b

Based on a visitor study in summer 2007, the average total expenditure per person inside Ebey's Landing National Historical Reserve and on the surrounding area in Whidbey Island was $95 (University of Idaho, 2008). When expenditures were restricted to just those spent within Ebey's Landing National Historical Reserve, the average expenditure per person was $22. Approximately 44 percent of visitor groups spent no money inside Ebey's Landing National Historical Reserve, and 46 percent spent $100 or less inside and outside of the reserve during their visit. The San Juan Islands are more than 450 islands, rocks, and pinnacles located west of Whidbey Island in northern Puget Sound and a well-recognized tourist destination. The four ferry-served islands within the archipelago, San Juan, Orcas, Lopez, and Shaw islands, are the most populous and provide the most dining and lodging options and tourism activities. Of these, Lopez Island is the closest to the NAS Whidbey Island complex and hosts varied outdoor

activities including kayaking, hiking, fishing, whale watching, beach-going, and bicycling (visitsanjuanislands.com, 2017).

The San Juan Islands National Monument, established in 2013, consists of BLM-managed land within the archipelago totaling approximately 1,000 acres (BLM, n.d.[d]). Dozens of small islands and rocks are included in the monument, as are several small land tracts near the outer edges of the San Juan Islands. The nearest monument land tracts to the NAS Whidbey Island complex are Cape St. Mary, Chadwick Hill, Watmough Bay, Point Colville, and Iceberg Point. Lands within the monument contain contrasting landscapes, cultural resources, and diverse habitats for mammals, birds, and insects (BLM, n.d.[e]). A cited estimate is over 500,000 visitors to the San Juan Islands annually, but the number visiting the monument properties, specifically, is unknown (BLM, n.d.[c]). The monument lands are undeveloped and attract hikers, kayakers, photographers, campers, and nature enthusiasts.

Several Washington State Parks are within the San Juan Islands; those within the vicinity of the greater than 65 dB DNL noise contour include James Island, Spencer Spit on Lopez Island, and Turn Island. James Island Marine State Park is the only park in the San Juan Islands with territory inside the greater than 65 dB DNL noise contour. Recent and historical visitor numbers to these state parks are provided in Tables 3.10-13 and 3.10-14.

Table 3.10-13 2016 Estimated Visitors to State Parks in San Juan Islands near the NAS Whidbey Island Complex

WA State Park	*Overnight Camping or Moorage*[1]	*Day Use*	*Total*
James Island	2,141	8,713	10,854
Spencer Spit	18,285	32,145	50,430
Turn Island	1,105	8,335	9,440

Source: Thrasher, 2017b

Note:
[1] All onshore camping sites are tent sites; no sites with utility hookups or cabins are available. Moorage is also available for boaters staying overnight.

Table 3.10-14 Estimated Total Visitors to State Parks in San Juan Islands near the NAS Whidbey Island Complex for Selected Years 1987-2016

	James Island	*Spencer Spit*	*Turn Island*
1987	16,040	40,764	7,173
1990	12,416	97,226	5,779
1993	13,738	144,458	4,532
1996	15,349	84,528	6,430
1999	15,247	83,412	10,708
2002	18,701	94,205	20,190
2005	8,583	80,383	20,454
2008	n/a	68,154	n/a
2011	6,201	88,919	9,105
2012	15,036	74,443	11,314
2013	15,737	90,156	11,735
2014	10,753	75,558	8,225
2015	10,825	58,001	11,294
2016	10,854	50,430	9,440

Source: Thrasher, 2017a; 2017b

Key:
n/a = Not available

According to a study completed by Earth Economics for the State of Washington, visitors to Washington State Parks spend an average of $21 per person per day. Similarly, visitors to national parks and national recreation areas located in Washington State spend an average of $53 per visitor per day. As explained in the report, visits to federal lands typically generate high daily expenditures because frequently these areas are well-recognized destinations that attract visitors from greater distances who therefore visit for a longer duration. State lands attract high numbers of visitors; however, their trips tend be shorter and the total expenditure associated with them is lower (Earth Economics, 2015b).

3.10.2.3 Housing, Affected Environment

3.10.2.3.1 NAS Whidbey Island Complex

Military personnel stationed at the NAS Whidbey Island complex reside either in military-controlled bachelor or family housing or in private housing off station, with the vast majority of military personnel living in private sector housing in the local economy. The Navy provides housing to eligible military personnel stationed at the NAS Whidbey Island complex in either unaccompanied housing units (i.e., bachelor enlisted quarters) or in family housing units.

In May 2016, the NAS Whidbey Island complex had the capacity to house a maximum of 1,625 unaccompanied personnel in its bachelor enlisted quarters. These unaccompanied housing units consisted of 11 buildings with a combined total of 1,137 rooms and 1,625 beds. Personnel ranked E4 and above are entitled to single-occupancy rooms. No additional unaccompanied housing units are planned to be constructed between now and 2021. As of May 2016, there were 1,465 personnel residing in the unaccompanied housing units, equating to a 90.2-percent occupancy rate (Switalski, 2016).

As shown on Table 3.10-15, according to the Navy's preliminary *Housing Requirements and Market Analysis 2017-2022* study, a total of 3,409 unaccompanied personnel assigned to the NAS Whidbey Island complex are expected to require either military-controlled or private housing in the region. In 2017, an estimated 1,637 military-controlled housing units were available for unaccompanied personnel. An additional 1,339 adequate private housing units were available in the region. Several factors are utilized when determining whether a housing unit in the local community is considered acceptable, including, among other factors, commute time to the station, rental costs, number of bedrooms, and overall size of the housing unit. Consequently, in 2017, there was an estimated deficit of 433 unaccompanied personnel housing units (see Table 3.10-15).

Table 3.10-15 Total Unaccompanied Personnel Housing Needs and Military Family Housing Needs and Available Assets at the NAS Whidbey Island Complex in 2017 and 2022

NAS Whidbey Island Complex	*2017*	*2022*
Unaccompanied Personnel		
Unaccompanied Personnel Requiring Housing	3,409	3,905
Military-controlled Units	1,637	1,602
Adequate Private Housing	1,339	1,389
Surplus/(Deficit) of Unaccompanied Personnel Housing Assets	(433)	(914)
Military Families		
Military Families Requiring Housing	3,769	4,358
Military-controlled Units	1,509	1,510
Adequate Private Housing Units	2,084	2,902
Surplus/(Deficit) of Military Family Housing Assets	(176)	54

Source: Leidos, Inc., 2017.

By 2022, this deficit is anticipated to grow. According to the report, by 2022 there will be an estimated 3,905 unaccompanied personnel requiring housing at the NAS Whidbey Island complex. During the same time, the total number of military-controlled units will decline to 1,602, but the number of adequate private housing units available to these personnel is expected to grow to 1,389. Consequently, a deficit of 914 suitable housing units is projected for unaccompanied personnel by 2022 (see Table 3.10-15).

According to the study, 3,769 military families at the NAS Whidbey Island complex required housing units in 2017. In this time, a total of 3,593 adequate family housing units were estimated to be available to military families in the area, including 1,509 family housing units under military control and 2,084 acceptable private housing units in the community. Consequently, there was an effective housing deficit of 176 units for military families in 2017 (see Table 3.10-15).

However, by 2022, this deficit is expected to change into a slight surplus of 54 units. By 2022, an estimated 4,358 military families are projected to need housing at the NAS Whidbey Island complex. During the same time, a total of 4,412 adequate family housing units are projected to be available to military families residing in the area. The number of military-controlled family housing units is not expected to change substantially; however, an additional 818 adequate family housing units are projected to be constructed in the region by 2022 (see Table 3.10-15).

In 2017, a total of 1,509 military-controlled public-private venture family housing units were available at the NAS Whidbey Island complex, including 246 enlisted two-bedroom units; 702 enlisted three-

bedroom units; 347 enlisted four-bedroom units; two E7 to O6 two-bedroom units; 145 E7 to O5 three-bedroom units; and 67 E7 to O6 four-bedroom or greater units (Leidos, Inc., 2017). As of May 2016, the total combined occupancy rate for these units was 98.1 percent, with the average waiting time for the units between 2 and 4 months for the smaller renovated units and 5 to 7 months for the larger, newer style units. No additional military-controlled family housing units are planned to be constructed between now and 2022 (Switalski, 2016). The Navy periodically assesses on- and off-base housing demand and availability to determine whether additional Navy-controlled housing is required for service members and their dependents.

3.10.2.3.2 Island and Skagit Counties

Table 3.10-16 provides information on the regional housing market surrounding the NAS Whidbey Island complex in 2016. These data are the most current data available at the time of publication. As shown on the table, the two-county region had a total of 92,769 housing units in that year. The majority of these units were owner-occupied. However, reflecting the transient nature of military personnel assigned to the NAS Whidbey Island complex, communities located in close commuting distance to the station, such as the City of Oak Harbor and the Town of Coupeville, had higher percentages of renter-occupied units compared with the county. In fact, the City of Oak Harbor had more renter-occupied units than owner-occupied units. In 2016, homeowner vacancy rates ranged from 0.0 percent in the Town of Coupeville to 3.7 percent in the City of Mount Vernon. Likewise, rental vacancy rates ranged from a low of 0.0 percent in the Town of Coupeville to a high of 8.1 percent in the City of Mount Vernon (see Table 3.10-16).

Table 3.10-16 Selected Housing Characteristics for the Communities in the Study Area Surrounding the NAS Whidbey Island Complex in 2016

Geographic Area	*Total Number of Housing Units*[1]	*Owner Occupied*	*Renter Occupied*	*Homeowner Vacancy Rate*	*Rental Vacancy Rate*	*Median Value of Owner-occupied Units*	*Median Gross Rent*
Washington State	2,966,814	1,683,381	1,013,225	1.6%	4.1%	$269,300	$1,056
Island County	40,711	22,416	10,972	2.1%	3.4%	$295,800	$1,085
Coupeville	1,002	524	425	0.0%	0.0%	$291,100	$796
Oak Harbor	9,956	3,540	5,782	1.5%	2.6%	$226,100	$1,091
Skagit County	52,058	31,134	14,974	2.1%	4.4%	$255,100	$970
Anacortes	7,661	4,620	2,404	1.3%	1.9%	$327,300	$1,059
Mount Vernon	12,429	6,835	4,677	3.7%	8.1%	$206,500	$885

Sources: USCB, n.d.[c]

Note:
[1] Total number of housing units equals the total owner-occupied units, total renter-occupied units, and total vacant units.

Property values in the three-county region varied greatly, with the median value of owner-occupied housing units ranging from a low of $206,500 in the City of Mount Vernon to a high of $327,300 in the City of Anacortes. Rental prices also vary throughout the region. In 2016, the median gross rent ranged from $796 per month in the Town of Coupeville to $1,091 in the City of Oak Harbor (see Table 3.10-16).

Since 2016, property values have risen in Island and Skagit Counties, and fewer homes have been listed for sale. In the third quarter of 2016, the median sale prices of housing units were $325,800 and $289,600 in Island and Skagit Counties, respectively. By 2017, these prices had increased to $349,700 in Island County and $322,900 in Skagit County (University of Washington, 2017).

In the last decade, the number of houses listed for sale has decreased steadily in both Island and Skagit Counties, with fewer listings every year compared to the previous one (University of Washington, 2017). From the third quarter of 2010 to the third quarter of 2017, listings declined from 1,017 to 416 in Island County and from 1,133 listings to 468 in Skagit County. In comparison, 486 units had been listed for sale at the end of the third quarter of 2016 in Island County and 509 units in Skagit County. Similarly, the length of time that a housing unit remained unsold on the market declined between 2016 and 2017 In the third quarter of 2016, there was a 3.5-month supply of housing units available in Island County; by the third quarter of 2017, this number had declined to a 3.0-month supply of housing units. In Skagit County, the length of time that an existing housing unit remained on the market increased slightly from 2016 to 2017; in 2016 the county had a 2.6-month supply of housing units, and in 2017, it had a 2.7-month supply (University of Washington, 2017).

Information from the Northwest Multiple Listings Service (MLS) database provides further evidence for these trends. In March 2016, 342 single-family homes and 20 condominiums in Island County were listed for sale with the Northwest MLS, representing a decline of 24.6 percent over March 2015 levels. A total of 124 single-family home and condominium sales closed during March 2016 in Island County. The average sale price of these units was $322,364, and the median sale price of these units was $300,000 (Northwest MLS, 2016a, 2016b).

Similarly, in March 2016, 414 single-family homes and 15 condominiums were listed for sale in Skagit County, representing a decline of 12.6 percent from March 2015 levels. A total of 162 single-family home and condominium sales closed in Skagit County during March 2016; the average sale price of these units was $308,224, and the median sale price was $276,750 (Northwest MLS, 2016a).

According to data collected from the U.S. Census Bureau's *2012-2016 American Community Survey (5-Year Estimates)*, the homeowner vacancy rate was 2.1 percent for both Island County and Skagit County during 2016. During the same time, the U.S. Census Bureau estimated that the rental vacancy rate was 3.4 percent in Island County and 4.4 percent in Skagit County (see Table 3.10-16).

According to data collected by the NAS Whidbey Island Housing Department, in May 2016, 107 housing units were available for rent in the Military Housing Area surrounding the NAS Whidbey Island complex. At that time, rent for apartments ranged between $750 and $1,070; rent for condominiums ranged between $1,100 and $1,190; rent for townhouses/duplexes ranged between $685 and $1,850; rent for houses ranged between $1,300 and $1953; and rent for studio/loft apartments ranged between $550 and $869 (Switalski, 2016).

As part of the preliminary *Housing Requirements and Market Analysis 2017-2022* study, in 2017, the Navy conducted an inventory of rental housing in the housing market area (defined as all of Island County and most of Skagit County). This study found that 19,114 suitable rental housing units were located within an hour commute of the NAS Whidbey Island complex. A suitable rental housing unit is defined as a unit that meets Navy requirements for physical condition and health and safety. In 2017, approximately 9.3 percent (1,954 units) of all rental housing units in the market study area were considered unsuitable for Navy personnel. Table 3.10-17 categorizes the suitable units by monthly rent

and bedroom size. Many of these units do not meet the Navy's size and/or affordability requirements. The Navy does not consider studio apartments or efficiency apartments adequate for either unaccompanied personnel or Navy families. In addition, the Navy does not consider units suitable if they exceed the Navy's highest Maximum Allowable Housing Cost for the installation or if they fall below the Navy's cost of a minimal acceptable housing unit (Leidos, Inc., 2017).

Table 3.10-17 Suitable Rental Housing Located in the NAS Whidbey Island Housing Market Area: 2017

	Number of Bedrooms					
Monthly Rental Price	***None***	***One***	***Two***	***Three***	***Four+***	***Total***
$2,800 +	73	110	227	1,087	340	1,837
$2,600 - $2,799	29	42	88	399	122	680
$2,400 - $2,599	29	41	88	399	122	679
$2,200 - $2,499	8	26	191	252	80	557
$2,000 - $2,199	5	24	205	232	75	541
$1,800 - $1,999	5	24	205	232	75	541
$1,600 - $1,799	11	50	390	450	130	1,031
$1,400 - $1,599	16	71	562	630	187	1,466
$1,200 - $1,399	21	96	768	844	258	1,987
$1,000 - $1,199	86	502	1,020	196	114	1,918
$800 - $999	110	599	1,517	247	125	2,598
Below $800	345	2,380	1,803	545	206	5,579
Total	**738**	**3,965**	**7,064**	**5,513**	**1,834**	**19,114**

Source: Leidos, Inc., 2017.

In 2017, an estimated 357 of these units were vacant and available for rent. Total rental vacancy rate in the housing market area was estimated to be approximately 1.8 percent (Leidos, Inc., 2017). See Table 3.10-18 for detailed information on these vacant housing units by price and size.

Table 3.10-18 Vacant Suitable Rental Housing Located in the NAS Whidbey Island Housing Market Area: 2017

	Number of Bedrooms					
Monthly Rental Price	***None***	***One***	***Two***	***Three***	***Four+***	***Total***
$2,800 +	1	2	4	19	6	32
$2,600 - $2,799	1	1	2	7	3	14
$2,400 - $2,599	1	1	2	7	3	14
$2,200 - $2,499	-	-	3	5	1	9
$2,000 - $2,199	-	-	4	4	1	9
$1,800 - $1,999	-	-	4	4	1	9
$1,600 - $1,799	-	1	7	8	3	19
$1,400 - $1,599	-	2	10	12	4	28
$1,200 - $1,399	1	2	14	16	4	37
$1,000 - $1,199	2	10	19	4	2	37
$800 - $999	2	12	29	5	2	50
Below - $800	6	45	34	11	3	99
Total	**14**	**76**	**132**	**102**	**33**	**357**

Source: Leidos, Inc., 2017.

According to the study, the supply of rental housing is expected to grow 0.1 percent per year between 2017 and 2022. By 2022, the number of unsuitable rental housing units is projected to remain constant at 1,954 units. Therefore, the study forecasts that 19,221 suitable housing units will be available in the housing market area by 2022. Rental vacancy rates are forecast to remain constant at 1.8 percent throughout the next 5 years. A total of 359 suitable housing units are forecast to be vacant and available for rent by 2022 (Leidos, Inc., 2017).

3.10.2.3.3 Housing Affordability

As property values and rental prices have increased in the region, housing affordability has increasingly become an issue in Island and Skagit Counties. Affordable housing, as defined by the U.S. Department of Housing and Urban Development (HUD), is housing costs--which include rent or mortgage payments plus interest, utility costs, and insurance payments--that account for less than 30 percent of a household's income. Households that pay more than 30 percent of their income for housing costs are considered "cost burdened," while households that pay more than 50 percent of their income for housing costs are considered "severely cost burdened" (ECONorthwest, 2017).

According to a study completed by ECONorthwest for the Island County Housing and Housing Affordability Task Force, approximately 36 percent of all of Island County's households were cost burdened and spent more than 30 percent of their income on housing costs between 2011 and 2015. Renters were particularly impacted. Fifty percent of all households renting housing in Island County were considered cost burdened during this time, while only 29 percent of households that owned their homes were cost burdened (ECONorthwest, 2017).

Lower income households were the most affected by the high housing prices. Between 2011 and 2015, approximately 26 percent of Island County households had annual incomes of less than $35,000 and could only afford housing units with rents of less than $875 per month or valued at less that $87,500. More than 70 percent of these households did not have affordable housing (ECONorthwest, 2017).

The study also found that households in the northern portion of Island County were the most cost burdened in the county. Approximately 38 percent of all households in the northern portion of Island County had housing costs greater than 30 percent of their income. Oak Harbor and Coupeville had an estimated 43 percent and 35 percent, respectively, of their households that were cost burdened (ECONorthwest, 2017).

Housing affordability can also be measured using HUD's Fair Market Rent (FMR) and HUD's Affordable Housing Wage. The FMR is set at the 40th percentile among a distribution of rental units in a given area. In Island County, the 2017 HUD FMR varied by size of apartment, with the FMR ranging from $711 for a studio apartment to $1,569 for a four-bedroom apartment. Table 3.10-19 provides other FMRs by unit type. Similarly, HUD's Affordable Housing Wage estimates the hourly earnings that would be required in order to afford a two-bedroom apartment at HUD's FMR without the household becoming cost burdened. In 2017, a household in Island County had to earn at least $18.92 per hour, or $35,424 annually, to afford a two-bedroom apartment without exceeding 30 percent of its income (ECONorthwest, 2017).

Table 3.10-19 HUD Fair Market Rent by Unit Type, Island County, 2017

Rental Unit Type	*Studio*	*1-Bedroom*	*2-Bedroom*	*3-Bedroom*	*4-Bedroom*
Fair Market Rent	$711	$805	$984	$1,432	$1,568

Source: ECONorthwest, 2017.

Currently, there is a deficit of affordable housing in Island County, particularly for households that earn less than $50,000, or approximately 80 percent of the county's median family income. Table 3.10-20 show the deficit or surplus of affordable housing units in the county by income level. As shown on the table, there currently is a total deficit of an estimated 3,792 affordable units in the private sector for families with income of less than $50,000 (see Table 3.10-20). If other lower-cost housing options, such as government-subsidized housing, are unavailable, these households would be forced to spend an unaffordable portion of their income on housing (ECONorthwest, 2017).

Table 3.10-20 Available Affordable Housing Units in Island County by Income Level

	Annual Family Income								
	Less than $10,000	*$10,000-$14,999*	*$15,000-$24,999*	*$25,000-$34,999*	*$35,000-$49,999*	*50,000-$74,999**	*$75,000-$99,999*	*$100,000-$149,999*	*$150,000 or more*
Available Affordable Units	(88)	(701)	(1,975)	(433)	(595)	1,895	942	(390)	1,345

Source: ECONorthwest, 2017.

Key: *80% to 100% of the Median Family Income for a family of four in Island County, as determined by HUD.

Similar to Island County, Skagit County has experienced some issues with affordable housing. According to an affordable housing strategy report commissioned by the Skagit County Board of Commissioners, as of 2010-2014, an estimated 39 percent, or 17,534, of households in the county were cost burdened (Schissler, 2016).

The gap between what the average renter household earns and rental costs in Skagit County illustrates the affordable housing problem further. The Affordable Housing Wage, the hourly wage that would allow a household to rent a two-bedroom unit at the HUD-estimated FMR ($962 per month), is $18.50 per hour for a two-bedroom rental in Skagit County. The average wage rate for renters in Skagit County is approximately $11.82, meaning that these households could only afford a rental unit priced at $615 per month or less to maintain housing costs at or below 30 percent of income. Thus, the gap between the Affordable Housing Wage for a two-bedroom rental and the average renter wage is $6.68 per hour, or $13,894 per year (Schissler, 2016).

Given that at least 17,535 households in Skagit County are currently cost burdened, the same number of more affordably priced housing units are needed to alleviate their hardship. Moreover, some percentage of future households will require affordably priced housing if they are to keep their housing expenditures below 30 percent of income. Based on population projections through 2036 and the assumption that 39 percent of future households will be low income, there will be a demand for 5,404

new housing units priced for low-income households. Combining the current deficit and the future demand for affordable housing, Skagit County requires 22,939 new affordably priced homes to eliminate the housing cost burden by 2036 (Schissler, 2016).

3.10.2.4 Local Government Revenues, Affected Environment

In calendar year 2014, the Island County government collected approximately $64.5 million in revenues, with approximately 26 percent of this revenue coming from property taxes. Other large revenue sources for the county included intergovernmental revenues, which accounted for 27 percent of total revenues; licenses, permits, charges for services, fines, and forfeits, which also accounted for 27 percent of total revenues; and retail sales and use taxes, which accounted for 14 percent of total revenues (see Table 3.10-21).

Table 3.10-21 Total County Government Revenues by Source for Calendar Year 2014 in the Area Surrounding the NAS Whidbey Island Complex

	Island County	*Skagit County*
Property Taxes	$16,633,696	$45,027,529
Retail Sales and Use Taxes	$9,121,313	$21,287,528
All Other Taxes	$2,360,801	$2,352,921
Intergovernmental Revenues	$17,326,852	$15,664,879
Licenses, Permits, Charges for Services, Fines and Forfeits	$17,189,997	$23,336,896
All Other Revenue	$1,909,168	$5,344,767
Total Revenues	**$64,541,827**	**$113,014,520**

Source: Washington State Office of Financial Management, 2015
Note: Due to rounding, totals may not sum

During the same time period, the Skagit County government raised $113.0 million in total revenues. Similar to Island County, the major revenue sources in the county were property taxes; licenses, permits, charges for services, and fines and forfeits; retail sales and use taxes; and intergovernmental revenue. Property taxes provided 40 percent of total revenues in Skagit County during calendar year 2014 (see Table 3.10-21).

During calendar year 2014, total county government expenditures were $63.7 million in Island County and $120.8 million in Skagit County. Large expense categories included general government, security of persons and property, and transportation (see Table 3.10-22). See Table 3.10-22 for a breakdown of expenditures by category by county.

Table 3.10-22 Total County Government Expenditures by Category for Calendar Year 2014 in the Area Surrounding the NAS Whidbey Island Complex

	Island County	*Skagit County*
General Government	$13,316,636	$32,957,808
Security of Persons and Property	$11,605,650	$28,054,616
Physical Environment	$7,519,094	$9,728,181
Transportation	$8,649,198	$17,205,131
Mental and Physical Environment	$6,650,043	$12,488,410
All Other Expenditures (including debt service)	$15,942,364	$20,351,625
Total Expenditures	**$63,682,985**	**$120,785,772**

Source: Washington State Office of Financial Management, 2015
Note: Due to rounding, totals may not sum

3.10.3 Community Services, Affected Environment

The following section describes community services and facilities that could be affected by the Proposed Action. Due to the nature of these resources, the affected areas vary by the type of community service being assessed and do not correspond exactly to the study area utilized for the broader socioeconomic analysis. For purposes of this analysis, the impacts to educational services and facilities have been limited to the Oak Harbor, Coupeville, and Anacortes school districts. Combined, these three districts provide approximately 92 percent of all NAS Whidbey Island complex military dependents with educational services. The discussion of medical services covers a slightly broader area and includes facilities located in Island County as well as those located in the Cities of Anacortes and Mount Vernon because residents are typically willing to travel greater distances to receive specialty medical care. In contrast, the study area for fire and police services is focused on the City of Oak Harbor and the Town of Coupeville. This area has been selected as the likely area for impact because a large proportion of the influx of military personnel and their families is expected to live in these communities, and any emergency situation that may occur at Ault Field or at OLF Coupeville could require additional assistance from first responders in these communities.

Many of the community services discussed below are supported by NAS Whidbey Island personnel and their families. NAS Whidbey Island personnel volunteer thousands of hours of service each year and participate in trash cleanups at parks throughout the region; volunteer at local schools, clubs, and sports programs; provide classes to home-schooled students; and lead local Boy and Girl Scout troops. In addition, the Navy search and rescue (SAR) service at NAS Whidbey Island is tied to the installation's aircraft missions, including the Growler mission. The Navy's SAR teams typically maintain a 24-hour support posture to provide medical care and transport as well as SAR operations over water, land, and mountainous terrain. Over the past 10 years, the SAR service has completed 354 missions that have saved more than 400 lives of local residents and visitors to the area. Often, these SAR operations require highly specialized skills such as helicopter rappelling, hoisting, and mountain landings under all weather conditions.

3.10.3.1 Education, Affected Environment

The majority of students affiliated with the NAS Whidbey Island complex attend schools in the Oak Harbor, Coupeville, or Anacortes school districts, with the vast majority of these students attending the Oak Harbor School District. The Oak Harbor School District serves all of North Whidbey Island, including the City of Oak Harbor, the NAS Whidbey Island complex, and the surrounding area (Oak Harbor School

District, 2015). In 2016, eight public schools, including five elementary (grades Kindergarten through 5), two middle (grades 6 through 8), and one high school (grades 9 through 12), are in the district. In addition, the district runs a program for alternative learners and a cooperative service for home-schooled students (Oak Harbor School District, 2015).

In May 2016, the Oak Harbor School District had a total enrollment of approximately 5,500 full-time equivalent students and employed 710 staff members, in addition to an estimated 300 substitute teachers. Total enrollment in the district is forecast to increase to at least 6,000 students by 2021. Excluding portable classrooms, the Oak Harbor School District had the capacity to accommodate approximately 2,300 students in its elementary schools; 1,500 students in its middle schools; and 1,650 students in its high school (Gibbon, 2016).

In May 2016, the district's elementary schools were all operating above their designed capacity by an excess of 20 classrooms, or by approximately 500 students, districtwide. Due to state-mandated classroom-size reductions, which must be fully implemented in 2018, the elementary buildings exceeded their designed capacity during the 2016-2017 school year by 28 classrooms, or by approximately 675 students. These students were housed in 28 portable classrooms (Gibbon, 2016).

Conversely, in May 2016, there was an excess of 12 classrooms with a capacity to house approximately 325 students available in the middle school buildings. In addition, there was enough capacity in the high school to handle an additional 150 students (Gibbon, 2016).

In the fall of 2017, the district reconfigured its schools into five elementary schools (grades Kindergarten through 4), one intermediate school (grades 5 and 6), one middle school (grades 7 and 8), one high school (grades 9 through 12), and one combined early-learning center/district preschool and Kindergarten through grade 12 parent partnership school to eliminate some of the overcrowding in the elementary schools. Following the reconfiguration in 2017, elementary school enrollment is expected to exceed the designed capacity by 300 to 400 students during the 2017-2018 school year. Between 2018 and 2021, enrollment is expected to continue to grow, making elementary enrollment further exceed the designed capacity. By 2021, it is estimated that enrollment of the elementary schools will again exceed the designed capacity by approximately 600 students (Gibbon, 2016).

Once reconfiguration was complete, the middle schools switched from having surplus capacity to exceeding their designed capacity. Based on data received in 2016, during the 2017-2018 school year, the middle schools are expected to be overcrowded and exceed designed capacity by approximately 150 students. Eleven portable classrooms will be utilized in the middle schools to house these additional students. By 2021, the middle schools are expected to exceed designed capacity by approximately 275 students. The high school is expected to reach capacity by 2021 (Gibbon, 2016).

Approximately 50 percent of students in the district are federally connected students (i.e., have at least one parent in the military or who works on federal property and/or lives in federally controlled housing) (Gibbon, 2016). In 2012, 911 school-aged children who attended public schools in the district lived in Navy family housing in the NAS Whidbey Island complex. An additional 20 students lived on station but attended private schools in the area (Kovach, 2013).

During the 2012-2013 school year, the Oak Harbor School District received approximately $4.6 million in federal impact aid to offset the costs associated with educating these federally connected students. Oak Harbor School District's annual expenditures for the 2012-2013 school year totaled $46.3 million, or an average of $8,737 per student (Oak Harbor School District, 2014). The total amount of funding for

federal impact aid available to the U.S. Department of Education has been declining over the past decade. As a result, the amount of aid allocated to the Oak Harbor School District has also been declining. Between 2008 and 2016, the amount of impact aid received by the district has declined by 60 percent, or $2 million, despite the fact that fewer federally connected students attended the district in 2008 than currently do (Gibbon, 2016).

Since 2014, the district has spent $2.5 million from its general fund to purchase additional classrooms and related curricula and equipment. Next year, the district has budgeted an additional $750,000 to further expand classroom space. By 2021, it is anticipated that the Oak Harbor School District will require 39 portable classrooms to accommodate all students in the district (Gibbon, 2016).

The Coupeville School District serves central Whidbey Island and includes the Town of Coupeville, Greenbank, and the surrounding area. It shares a northern border with Oak Harbor School District and a southern border with the South Whidbey School District, just north of Bush Point. The Coupeville School District includes three public schools: one elementary, one middle, and one high school. During the 2012-2013 school year, the Coupeville School District employed 53 classroom teachers. As of October 2012, the district had a total enrollment of 973 students in grades kindergarten through 12 (Washington State Office of the Superintendent of Public Instruction, n.d.[a]). Approximately 9.7 percent of these students, or 94 pupils, were military dependents (Island County EDC, 2013).

Total enrollment in the Coupeville School District has declined since the 2012-2013 school year. In June 2016, approximately 920 full-time equivalent students were attending schools in the district, including approximately 400 students in the elementary school, approximately 220 students in the middle school, and approximately 300 students in the high school (Shank, 2016).

The district currently has some excess capacity in its facilities. By repurposing rooms currently utilized for other purposes such as music and technology, the district anticipates that an additional 75 to 100 students could be accommodated in the existing elementary school, an additional 100 students could be accommodated in the middle school, and an additional 100 students could be accommodated in the high school. If certain operational changes were made, further classroom space could be made available in the middle and high schools if necessary (Shank, 2016).

During the 2012-2013 school year, the district received $41,000 in federal impact aid to offset the costs associated with education for these federally connected students (Island County EDC, 2013). Coupeville School District's total annual expenditures during the 2012-2013 school year were approximately $9.2 million. Average per-pupil expenditure was $9,796 (Washington State Office of the Superintendent of Public Instruction, n.d.[b]). Similar to what other school districts have experienced, federal impact aid to the district has declined over recent years, despite the fact that the number of federally connected students attending the Coupeville School District has increased (Shank, 2016). In addition, state education aid is anticipated to remain relatively constant through 2021 (Shank, 2016).

The Anacortes School District serves the City of Anacortes and the northern portion of Fidalgo Island in Skagit County. The district consists of eight schools, including one early childhood education center, three elementary schools, a middle school, two high schools, and one career and technical academy (Anacortes School District, n.d.). All of the elementary schools are currently operating near capacity. The Anacortes Middle School and the Anacortes High School have excess capacity and could accommodate an additional 200 and 180 students, respectively. The Cap Sante High School is currently operating at capacity (Wenzel, 2016).

By 2021, total enrollment is expected to increase by 100 to 150 students districtwide. It is anticipated that there will be no extra capacity in the district and that all classrooms will be filled in all schools. An additional high school (grades 9 through 12) is expected to open in 2018 (Wenzel, 2016).

In October 2012, a total of 2,709 students were enrolled in the Anacortes School District, and 140 classroom teachers were employed by the district (Washington State Office of the Superintendent of Public Instruction, n.d.[c]). Approximately 4.8 percent of the students, or 142 pupils, enrolled in the district were military dependents (Island County EDC, 2013).

The Anacortes School District did not receive any impact aid during the 2012-2013 school year to support these federally connected students (Island County EDC, 2013). During that year, the total expenditures for the district were approximately $26.0 million, which equated to approximately $10,024 per student (Washington State Office of the Superintendent of Public Instruction, n.d.[d])

3.10.3.2 Medical Services, Affected Environment

Naval Hospital Oak Harbor, located at Ault Field, provides medical, surgical, and ambulatory health care services to active-duty personnel and their dependents, eligible retired military personnel, and North Atlantic Treaty Organization personnel (Canadian forces) and their dependents (Rose, 2018). The facility totals more than 108,000 square feet of inpatient and outpatient space (Naval Hospital Oak Harbor, 2015b). Hospital services available include surgical facilities, a dental clinic, an adult medical homeport, a laboratory, a pharmacy, radiology, mental health OB/GYN, occupational health, aviation medicine, a deployment health care center, an optometry clinic, an orthopedic clinic, a pediatric homeport, physical therapy, preventative medicine, a substance abuse and rehabilitation program, and a five-bed inpatient birthing center (Rose, 2018).

As of 2016, approximately 27,000 beneficiaries fell within the Naval Hospital Oak Harbor area of operation; approximately 20,300 of those beneficiaries enrolled in Naval Hospital Oak Harbor as their primary medical provider. By 2021, the expected number of beneficiaries enrolled at Naval Hospital Oak Harbor is expected to climb to approximately 21,470 (Rose, 2018).

Because no emergency services or in-patient treatment besides the birthing center are available at Naval Hospital Oak Harbor, emergency cases are sent to nearby civilian hospitals, typically WhidbeyHealth Medical Center in Coupeville or Island Hospital in Anacortes. Those requiring specialized treatments also may be referred to one of the three local civilian hospitals, such as WhidbeyHealth Medical Center in Coupeville, Island Hospital in Anacortes, or Skagit Valley Hospital in Mount Vernon (Naval Hospital Oak Harbor, 2015a).

WhidbeyHealth Medical Center is located 13 miles south of the NAS Whidbey Island complex in the Town of Coupeville. Established in 1970, the hospital has since expanded to include the main campus in Coupeville, three EMS stations, and eight outpatient locations. The system employs more than 70 physicians and more than 700 staff members. The main campus has a recently constructed 39-bed inpatient wing (WhidbeyHealth, 2018).

Island Hospital is located approximately 18 miles north of the NAS Whidbey Island complex in the City of Anacortes. It serves west Skagit County, north Whidbey Island, and the San Juan Islands. The 43-bed hospital provides Level III Trauma Care/Level II Stroke Emergency Services and employs more than 190 physicians and healthcare providers (Island Hospital, 2016). In 2011, Island Hospital had an occupancy

rate of 61 percent (Island Hospital, 2013). Island Hospital also operates seven family-care clinics: five in Anacortes and two in San Juan County (Island Hospital, 2016).

Skagit Valley Hospital is located 30 miles northeast of the NAS Whidbey Island complex in the City of Mount Vernon. The 137-bed hospital has a Level III Trauma Emergency Department and more than 400 health care professionals on the medical staff. The Skagit Valley Hospital received 33,246 visits to its emergency department in 2015. The hospital also operates 11 clinics, with locations in Mount Vernon, Anacortes, Camano Island, Oak Harbor, Sedro-Woolley, Smokey Point, and Stanwood (Skagit County Regional Health, 2016).

3.10.3.3 Fire and Emergency Services, Affected Environment

Fire and emergency services at the NAS Whidbey Island complex are currently provided by the NRNW F&ES. NRNW F&ES is a regionalized fire and emergency service organization that provides services to nine separate Navy installations in the Puget Sound region. In total, NRNW F&ES has 193 personnel, and they serve approximately 67,000 naval personnel, civilian employees, and contractors throughout the region. The organization has one continuously manned fire station located in Oak Harbor and also captures run data and provides personnel and apparatus at OLF Coupeville when flight operations are active. The fire department serves Ault Field, Navy housing, the Seaplane Base, OLF Coupeville, and off-base Navy-affiliated Child Development Centers. The primary responsibilities of NRNW F&ES are structural fire suppression, aircraft rescue and firefighting, emergency dewatering of vessels, hazardous materials technician response, technical and confined space rescue, and Emergency Medical Services Transport services at the Basic Life Support level (Merrill, 2016).

In a typical year, NRNW F&ES responds to approximately 1,110 calls for service at the NAS Whidbey Island complex. Currently, the department meets DoDI 6055.6, with an aggregate response time of less than 7 minutes for structural or emergency medical services calls; under 5 minutes for unannounced airfield emergencies; and under 1 minute for announced airfield emergencies. The frequency of calls and response times are not expected to change in 2021 (Merrill, 2016).

The department has a robust mutual aid agreement with both the City of Oak Harbor Fire Department and the North Whidbey Fire and Rescue Department. All three departments regularly train and respond to emergencies as necessary. NRNW F&ES is also part of the Island County Technical Rescue Team and responds to all calls for a technical rescue in the north end of Island County. In addition, NRNW F&ES is the only hazardous materials technician response provider for the entire county (Merrill, 2016).

Fire services in and around the City of Oak Harbor are provided by Oak Harbor Fire Department, which serves the City of Oak Harbor, and the North Whidbey Fire and Rescue Department, which serves the northern area of Whidbey Island (City of Oak Harbor, 2018b). In addition, the Central Whidbey Island Fire and Rescue Department provides service to the center portion of Island County.

The Oak Harbor Fire Department is located in the City of Oak Harbor and provides fire and emergency services to the 9.7-square-mile city and its estimated population of approximately 22,693 residents (City of Oak Harbor, 2018a; City of Oak Harbor Fire Department, 2017). In 2016, the department employed 11 career and 30 paid-on-call firefighters and had mutual and automatic aid agreements with all emergency service providers on Whidbey Island, including NAS Whidbey Island Fire. In 2016, the department responded to 1,177 emergency incidents and had an average response time of 4 minutes and 26 seconds. The fire department has four fire engines, one ladder truck, one rescue unit, and various support vehicles (City of Oak Harbor, 2018a; City of Oak Harbor Fire Department, 2017).

North Whidbey Fire and Rescue consists of seven fire stations and serves about 18,000 residents in approximately 55 square miles in the northern area of Whidbey Island, from Deception Pass Bridge southward to Libby Road, with the exception of the Oak Harbor city limits (City of Oak Harbor, 2018b; North Whidbey Fire and Rescue, n.d.[a]). It has a mutual aid agreement with NAS Whidbey Island Fire and other Whidbey Island fire departments. As of 2015, the department's personnel consisted of one fire chief, three paid deputy and battalion chiefs, 4.5 administrative staff, 11 volunteer officers, 25 to 30 compensated duty crew, and approximately 75 volunteer firefighters (North Whidbey Fire and Rescue, n.d.[b]). In 2016, the department responded to 2,302 calls for service (North Whidbey Fire and Rescue, n.d.[a]).

Central Whidbey Island Fire and Rescue has three fire stations; two are located in Coupeville, and one is located in the Greenbank area (Central Whidbey Fire and Rescue, 2017a). The department serves an area of approximately 50 square miles covering Coupeville, Greenbank, and Central Whidbey Island (Central Whidbey Fire and Rescue, 2017b). Based on 2010 population estimates, the department estimated it served approximately 8,264 residents (Central Whidbey Fire and Rescue, 2017b). The department provides emergency medical services as well as technical-level marine rescue and other services (Central Whidbey Fire and Rescue, 2017c). It has mutual and automatic aid agreements with each fire agency in Island County. The department is staffed by approximately nine full-time employees, 10 part-time employees, and 17 volunteers (Central Whidbey Fire and Rescue, 2017d).

3.10.3.4 Police Protection, Affected Environment

Security services around Ault Field and OLF Coupeville are provided by the Island County Sheriff's Department and local police departments. The Island County Sheriff's Department, which has an office located on 6th Street in Coupeville, serves all of Island County. The department's service area covers approximately 78,000 residents and includes a total of 517 square miles, of which 208 square miles are land. In 2017, the Island County Sheriff's Department had 75.5 fulltime-equivalent employees and a $9.2 million budget (Marlow, 2017).

Police protection is also provided by the Oak Harbor Police Department, which is located on S.E. Barrington Drive, and the Coupeville Marshal's Office, which is located on 7th Street. The Oak Harbor Police Department has a total of 38 personnel (three personnel in the administrative division, 20 in the special operations division, and 15 in the patrol division) (City of Oak Harbor, 2018c). The Coupeville Marshal's office is staffed through an agreement with the Island County Sheriff's Department and consists of two personnel, a town marshal, and a deputy marshal dedicated to the town.

3.10.3.5 On-Base Community Services Support

A number of services are available to Navy personnel and their dependents through the Fleet and Family Support Program. These services include individual, marriage, and family counseling; class reservations; individual resume assistance; financial counseling; and relocation assistance or deployment/mobilization support (Navy, n.d.[a]). Relocation assistance can offer families support with finding housing, childcare, schools, and employment (Navy, n.d.[b]). NAS Whidbey Island has a dedicated school liaison officer who serves as a point of contact between the Navy and school districts and can provide families with guidance on transitioning to a new school district (Navy, n.d.[c]). Financial management services can provide Navy families with access to accredited financial counselors and training to develop financial skills and long-term financial planning (Navy, n.d.[d]).

3.11 Environmental Justice

Closely aligned with socioeconomics are issues of environmental justice. The USEPA defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (USEPA, 2016h).

3.11.1 Environmental Justice, Regulatory Setting

Consistent with EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994), the Navy's policy is to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations.

3.11.2 Environmental Justice, Affected Environment

3.11.2.1 Environmental Justice Methodology

In order to assess the impacts to minority and low-income communities, the Navy first identified whether there were any areas of minority and low-income populations that may experience disproportionately high and adverse impacts from the Proposed Action. These environmental justice communities were determined by analyzing the demographic and economic characteristics of the affected area and comparing those to the characteristics of the larger community as a whole. This larger community is known as the community of comparison.

Once the presence or absence of environmental justice communities was determined, the Navy then assessed the impacts from the Proposed Action and determined whether these impacts would have a disproportionately high and adverse effect on these populations. This analysis involved comparing the impacts on the identified environmental justice communities to those on the general population within the affected environment (e.g., within the noise contours). In determining whether potential disproportionately high and adverse impacts exist, the Navy also considers the significance of the impacts under NEPA.

For the purposes of this EIS, the environmental justice analysis concentrates on the communities most likely affected by actions at the NAS Whidbey Island complex, namely Island and Skagit Counties, Washington. Data from the U.S. Census Bureau's 2010 Census of Population and Housing are utilized throughout the analysis to characterize minority populations in the area of impact. Likewise, data from the U.S. Census Bureau's 2006-2010 American Community Survey were used to define low-income populations throughout this section. Low-income populations in this analysis are defined using the percent of all individuals for whom poverty status has been determined, as defined by the U.S. Census Bureau, for each specific geographic area. The U.S. Census statistics were utilized in this analysis because of their ability to provide poverty estimates down to the census tract level. In addition, utilizing U.S Census Bureau data ensured that the demographic and poverty statistics used in the environmental justice analysis were consistent with the census block level population data that were used in the noise analysis. The 2006-2010 American Community Survey contains the most recent data published that provided income estimates that directly correlated to the 2010 census block population statistics utilized in the noise analysis.

Potential environmental justice communities that may be impacted by the Navy's actions were identified using population and demographic data from the U.S. Census Bureau, broken down to the census block group level. Data were collected on all census blocks and census block groups that were exposed to noise in the greater than 65 dB DNL noise contours.

Minority environmental justice communities are identified by comparing population characteristics from the census block groups to the larger community as a whole and determining whether there is a "meaningfully greater" difference between the two areas. Following recommendations made in the March 2016 report, *Promising Practices for Environmental Justice Methodologies in NEPA Reviews* (USEPA, 2016h), "the 'Meaningfully Greater' analysis requires use of a reasonable, subjective threshold (e.g., 10 percent to 20 percent greater than the reference community). What constitutes 'meaningfully greater' varies by agency, with some agencies considering any percentage in the selected geographic unit of analysis that is greater than the percentage in the appropriate reference community to qualify as being 'meaningfully greater.'" For this analysis, "meaningfully greater" is defined as demographic statistics that represent an increase in the proportion of minority populations and that differ by more than 15 percent from those of the community of comparison (the county). The 15-percent difference is an appropriate threshold for determining the presence of environmental justice communities because this increase is large enough to take into account natural variations in demographic populations within a community.

Low-income environmental justice communities are identified by comparing the percentage of the population living below the poverty level within census tracts to the larger community as a whole. If the percentage of residents with incomes below the poverty level in the census tract is greater than the percentage of residents in the community of comparison who have incomes below the poverty level, then there is a low-income environmental justice community.

For the purposes of this environmental justice analysis, Island and Skagit Counties have been identified as the communities of comparison. These counties were selected as the communities of comparison because they are the smallest geographic unit that incorporates the affected population within the entire No Action Alternative dB DNL noise contours. Although the No Action Alternative dB DNL noise contours do extend outside the limits of Island and Skagit Counties, all of the people impacted by the No Action Alternative dB DNL noise contours reside within the county borders. Figure 3.11-1 shows the location of the affected census block groups and the No Action Alternative dB DNL contours for Ault Field and OLF Coupeville.

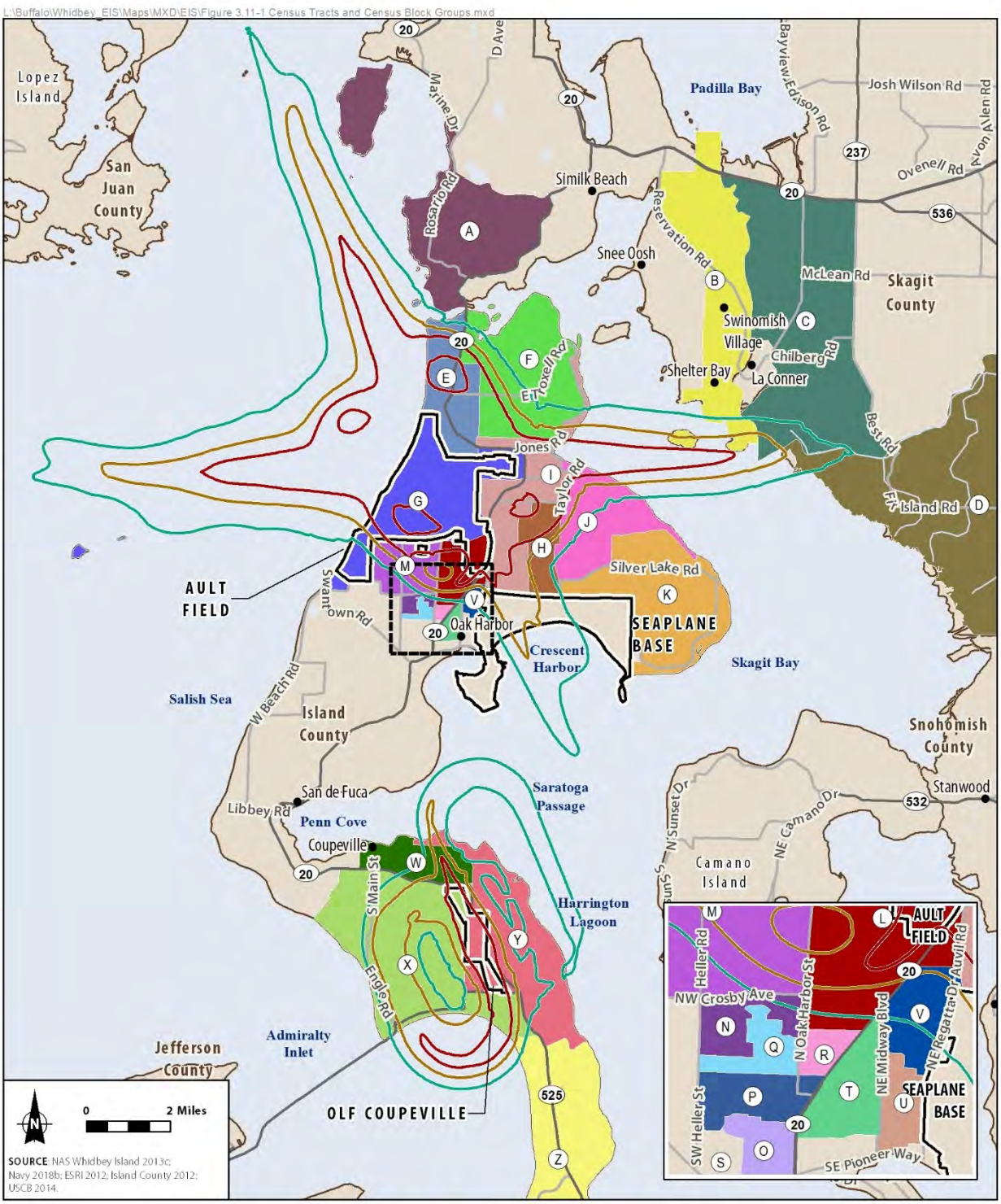


Figure 3.11-1
Census Tracts and Census Block Groups in the Environmental Justice Study Area
Whidbey Island, Island County, WA

3.11.2.2 Environmental Justice Assessment

In order to assess the presence of environmental justice communities from existing operations, the Navy looked at the census block groups within the No Action Alternative noise contours. Table 3-11.1 presents demographic and economic data that characterize the communities in which the potential for disproportionately high and adverse human health or environmental effects are assessed, in accordance with EO 12898. Demographic and economic data for Island and Skagit Counties as a whole are presented in Table 3-11.1.

Shading on Table 3.11-1 highlights minority and low-income populations affected by the No Action Alternative and indicates census block groups that contain environmental justice communities based on the indicated thresholds

As displayed on Table 3.11-1, minority environmental justice communities have seven census block groups where the percentage of these populations is “meaningfully greater” than the county percentages (i.e., the community of comparison). Additionally, there are eight census block groups where the percentage of residents with low incomes is greater than that of the communities of comparison. The remaining six census block groups in Island County and the two affected census block groups in Skagit County do not have a “meaningfully greater” concentration of minority residents and do not have a greater concentration of low-income residents compared to the community of comparison. Therefore, these areas are not considered environmental justice communities. Figure 3.11-2 shows the location of the census block groups that are considered environmental justice communities under the No Action Alternative.

Table 3.11-1 Comparison of Environmental Justice Populations in Census Block Groups Affected by the NAS Whidbey Island Complex under the No Action Alternative to County Totals

Census Block Group/County	*Percent Minority*[1]	*Percent Low Income*[2]
Island County (Community of Comparison) – County Total	***16.9%***	***8.0%***
Block Group 1, Census Tract 9701	18.7%	14.1%
Block Group 2, Census Tract 9701	13.6%	14.1%
Block Group 1, Census Tract 9702	35.2%	23.4%
Block Group 1, Census Tract 9703	24.3%	4.4%
Block Group 2, Census Tract 9703	15.7%	4.4%
Block Group 3, Census Tract 9703	13.5%	4.4%
Block Group 4, Census Tract 9703	11.6%	4.4%
Block Group 1, Census Tract 9704	39.3%	8.6%
Block Group 2, Census Tract 9704	31.9%	8.6%
Block Group 1, Census Tract 9706.01	41.3%	11.2%
Block Group 1, Census Tract 9708	25.9%	8.7%
Block Group 1, Census Tract 9710	12.7%	6.3%
Block Group 1, Census Tract 9711	14.7%	2.9%
Block Group 2, Census Tract 9711	7.5%	2.9%
Block Group 3, Census Tract 9713	5.9%	6.8%
Skagit County (Community of Comparison) – County Total	***23.3%***	***11.7%***
Block Group 2, Census Tract 9521	13.2%	9.1%
Block Group 3, Census Tract 9527	12.9%	7.3%

Sources: USCB, 2012c, 2012f, n.d.[d]
Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] Percent low income is defined as the percent of all residents identified as having incomes placing them below the U.S. Census-defined poverty level according to data published by the U.S. Census Bureau in the 2006-2010 American Community Survey (5-Year Estimates). The American Community Survey does not estimate income data at the census block group level; therefore, the income data displayed in this table are from the census tract level. Census block groups within the same census tract will have the same percent of low-income residents.

Note:

No Action Alternative dB DNL contours extend into portions of Jefferson and San Juan Counties. However, no permanent residences are located where the dB DNL contours extend into these counties; therefore, these counties have been excluded from further analysis.

Population on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have been excluded.

Shaded cells identify census block groups with a "meaningfully greater" percentage of minority residents or census block groups with a greater percentage of low-income residents than the community of comparison (i.e., the county within which the census block group is located). For this analysis, "meaningfully greater" is defined as demographic statistics that differ by more than 15 percent from those of the community of comparison. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$

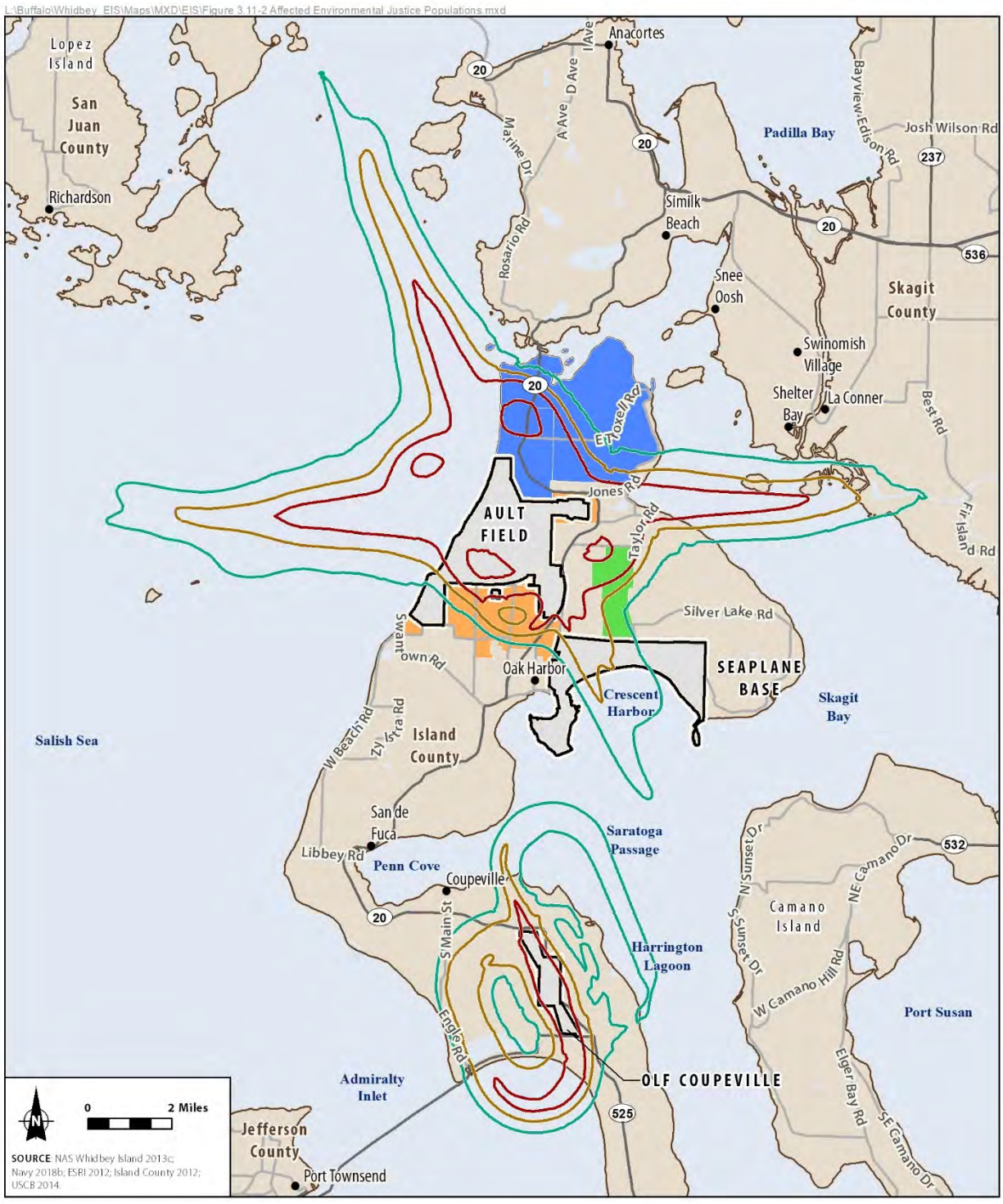


Figure 3.11-2
Environmental Justice Populations Affected by the No Action Alternative
NAS Whidbey Island Complex
Whidbey Island, Island County, WA

Based on the most current data available, an estimated total population (both environmental justice communities and non-environmental-justice communities) of 11,371 persons are affected by noise within the No Action Alternative dB DNL contours at Ault Field and OLF Coupeville. Approximately 22.4 percent of this population (2,543 persons) would be minorities, and approximately 7.9 percent of this population (1,083 persons) would be members of low-income populations (see Table 3.11-2). The analysis on whether or not these identified populations are disproportionately impacted under the No Action Alternative is included in Section 4.11.1 of this EIS. Section 4.11.1 includes a discussion and analysis of aircraft noise impacts, potential safety risks within Clear Zones/APZs, overcrowding within the Oak Harbor School District, and impacts on housing affordability and housing availability in relation to potential disproportionate impacts to minority and low-income populations. Section 3.2 describes the existing aircraft noise; Section 3.3 discusses potential safety risks within existing Clear Zones/APZs; and Section 3.10 describes existing conditions at the Oak Harbor School District and discusses existing housing affordability and housing availability in Island and Skagit Counties.

Table 3.11-2 Environmental Justice Populations[1] Affected by the NAS Whibdey Island Complex under the No Action Alternative

dB DNL Contours	*Total Population[2]*	*Total Minority[3] Population*	*Percent Minority[3]*	*Total Low-Income[4] Population*	*Percent Low Income[4]*
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**

Sources: USCB, 2012c, 2012f, n.d.[d]

Notes:

1 All population estimates for affected areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours.

2 Total population is the estimated number of residents living within the Ault Field and Outlying Landing Field (OLF) Coupeville dB DNL contours. These estimates were computed by utilizing the U.S. Census Bureau's 2010 Census of Population and Housing data. The percent area of the census block covered by the dB DNL contour range was applied to the population of that census block to estimate the population within the dB DNL contour range. This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville).

3 Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

4 Percent low income is defined as the percent of all residents identified as having incomes placing them below the U.S. Census-defined poverty level according to data published by the U.S. Census Bureau in the 2006-2010 American Community Survey (5-Year Estimates). The American Community Survey does not estimate income data at the census block group level; therefore, the income data displayed in this table are from the census tract level. Census block groups within the same census tract will have the same percent.

Key:
dB DNL = day-night average sound level in decibels

3.12 Transportation

This discussion of transportation includes all of the land and sea routes with the means of moving passengers and goods. A transportation system can consist of any or all of the following: roadways, bus routes, railways, subways, bikeways, trails, and taxi services and can be evaluated on a local or regional scale.

3.12.1 Transportation, Regulatory Setting

3.12.1.1 State

The Washington State Department of Transportation (WSDOT) is responsible for building, maintaining, and operating the state highway system and the state ferry system. WSDOT is also responsible for developing the Statewide Transportation Improvement Program (STIP) in coordination with regional and local partners. The STIP includes projects such as pavement overlays, roadway widening, bridge replacement or repair, signal systems, safety enhancements, bicycle and pedestrian facilities, and transit improvements. The STIP includes projects from transportation improvement programs developed by each Metropolitan Planning Organization. A transportation project must be included in the STIP to be eligible for federal funds, although projects are typically funded by a combination of federal, state, and local sources. Relevant state regulations and policies include:

- RCW 36.70A: The 1990 Growth Management Act was enacted to promote planned and coordinated development. The legislation requires that LOS standards be established for all arterials and transit routes, and provide a means to identify how proposed development would affect the transportation system. Local jurisdictions must adopt LOS standards as part of their general plan. Ordinances must be put in place that prohibit approval of development that results in the LOS of local transportation facilities to fall below set standards.
- RCW 47.06.140: WSDOT must work in coordination with local governments to set LOS standards for highways of statewide significance.
- RCW 46.44.091: A special permit must be obtained from WSDOT for oversize or overweight vehicles that would be operated on state highways.

3.12.1.2 Regional

Skagit Council of Governments (SCOG) serves as the lead agency for the federally designated Metropolitan Planning Organization and the state-designated Regional Transportation Planning Organization (RTPO).The former Island Sub-RTPO representing Island County was a sub-RTPO within SCOG. In 2016, the Island RTPO was formed as a separate RTPO for Island County and as an alternative to the former sub-RTPO (Island County, 2016b). The SCOG and Island RTPOs are required by federal and state regulations to develop a Regional Transportation Improvement Program (RTIP) for their respective counties that spans at least 4 years and is updated at least every 2 years. Projects in the RTIP are taken from local transportation improvement plans. Projects must be included in a RTIP and a STIP to be eligible for federal transportation funding (Skagit-Island RTPO, 2013). Both the SCOG and Island RTPOs have developed RTIPs for the 2018-2023 period.

As of early 2018, the Island RTPO is currently in the process of developing a new regional transportation plan for Island County; however, the Skagit-Island Counties Metropolitan and Regional Transportation Plan developed by SCOG in 2011 currently serves as the strategic framework for addressing Island County's transportation needs. Relevant local regulations and policies include:

- The Regional Transportation Plan calls for new development to mitigate transportation impacts (SCOG, 2011).

The Skagit 2040 Regional Transportation Plan was adopted in 2017 and serves as an update to the 2011 plan for Skagit County; no relevant policies were identified (SCOG, 2017).

3.12.1.3 Local

The Island County Public Works Department is responsible for maintaining 525 miles of county-owned roads (Island County, 2015a). The Department of Planning and Community Development oversees land use and development in unincorporated parts of Island County and is responsible for developing the county's comprehensive plan (Island County, 2015b). The comprehensive plan includes LOS standards for highways of statewide significance as well as other county roads. Relevant county regulations and policies include:

- SR 20 and SR 525 have been designated as highways of statewide significance (Island County, 2016d).
- Chapter 11.04 of the Island County code sets LOS standards at LOS C for rural roads, LOS D for urban roads, LOS D for rural highways of statewide significance, and LOS E for urban highways of statewide significance (Muni Code, 2017).
- A permit must be obtained from the Public Works Department for oversize and overweight vehicles traveling on county roads (Island County, 2015c).

Relevant Skagit County regulations and policies include:

- LOS standards are set at LOS D for all road segments that have Annualized Average Daily Traffic (ADT) counts greater than 7,000 vehicles, are not functionally classified by the federal government as an 09-Local Access Road, and are designated as a County Freight and Goods Transportation Systems Route (Skagit County, 2016).

The Street Division of the Oak Harbor Department of Public Works maintains city streets and rights of way (City of Oak Harbor, 2015c). The Planning Division of the Development Services Department was responsible for the creation of the city's comprehensive plan. Relevant local regulations and policies for Oak Harbor include:

- LOS standards are set at LOS D for city streets and intersections and LOS E for street segments and intersections along SR 20 (City of Oak Harbor, 2016).

Relevant local regulations and policies for Anacortes include:

- LOS standards are set at LOS D for SR 20 (City of Anacortes, 2016).

3.12.2 Transportation, Affected Environment

The traffic study area for describing transportation conditions consists of:

- SR 20 between Burlington and SR 525
- SR 525 between SR 20 and Clinton
- I-5 at its interchange with SR 20 in Burlington
- local roadways serving or immediately adjacent to Ault Field and the Seaplane Base

The roadways were identified based on their proximity to the NAS Whidbey Island complex and areas of concern identified in public scoping comments. Since Navy personnel and their dependents would be regionally distributed, trips on local roadways could not be reasonably determined; therefore, the analysis focused only on local roads near the gates to Ault Field. These intersections and roadways are depicted on Figures 3.12-1 and 3.12-2.

Information on the existing conditions of roadway networks and operations was obtained by a review of regional planning documents and transportation studies. The most recent traffic counts for state roads were obtained from the WSDOT and from Island County for local roadways near Ault Field. Traffic counts were used to estimate baseline traffic conditions (2021) and affected environment conditions presented in Section 4.12. Physical characteristics of nearby roads (i.e., number of lanes, intersection density) were obtained through visual inspection of aerial imagery. LOS for study area road segments was determined using the 2010 Highway Capacity Manual generalized daily service volumes for urban freeway facilities, urban multilane highways, two-lane highways, and urban street facilities. Assumptions used to categorize study area roadways are described below:

- Urban freeway facilities consist of four lanes or more, with limited access, divided highway, and a posted speed limit 55 miles per hour (mph) or higher.
- Urban multilane highways consist of four lanes or more with a posted speed limit of 55 mph or higher and signalized intersections 2 miles apart or more.
- Two-lane highways consist of two lanes, excluding a center turning lane or occasional right-turn-only lane, with a posted speed limit of 55 mph or higher and signalized intersections 2 miles apart or more.
- Urban street facilities consist of two to four lanes with a posted speed limit of 30 to 45 mph or higher and signalized intersections less than 2 miles apart.

Figure 3.12-1
Local and Regional Traffic Circulation – Ault Field
Whidbey Island, Island County, WA

Figure 3.12-2
Local and Regional Traffic Circulation – Seaplane Base
Whidbey Island, Island County, WA

3.12.2.1 Road Network and Access

Ground traffic and transportation refers to vehicle movement throughout a road and highway network. The American Association of Highway and Transportation Officials classifies roadways as principal arterials, minor arterial streets, collector streets, and local streets. Principal arterials (i.e., arterial highways and interstates) serve to move traffic regionally and between population and activity centers with a minimal level of access to adjacent properties. Collector roadways (i.e., minor arterial and collector streets) serve to move traffic from population and activity centers and funnel them onto principal arterials with a moderate level of access to adjacent properties. Local roadways provide access to adjacent properties and move traffic onto collector and arterial roadways.

3.12.2.1.1 Off-station Road Network

SR 20 and SR 525 serve as the principal arterials on Whidbey Island, and I-5 is a principal arterial providing regional land access to Skagit and Island Counties. SR 20 provides the only bridge connection to the mainland, via Fidalgo Island to the north. The study area for this analysis focuses on roadways near Ault Field that can reasonably be expected to be impacted by the Proposed Action and major roadways discussed as potential areas of concern in public scoping comments. A list of major roadways included in the study area is provided below:

- SR 20 is a main arterial in northern Washington State running from Port Townsend west to Newport near the Washington-Idaho state line. SR 20 within the study area begins at the Coupeville Ferry Terminal and runs east before turning north along the eastern boundary of OLF Coupeville. SR 20 then runs in a primarily north-south direction to Deception Pass Bridge and Canoe Pass Bridge. SR 20 is primarily two lanes on Whidbey Island with occasional turning lanes in the study area and four lanes through Oak Harbor. SR 20 provides the only bridge connection to the mainland via Fidalgo Island to the north. SR 20 becomes a four-lane divided roadway and heads in an east-west direction to an interchange with I-5 in Burlington, Washington. SR 20 is designated as part of the federal Strategic Highway Network, as a Highway of Statewide Significance, and as a State Scenic and Recreational Highway (Island County, 2016d).
- SR 525 is the primary arterial in the southern half of Whidbey Island, beginning at SR 20 near the southeast corner of OLF Coupeville. SR 525 runs south to the Clinton Ferry Dock. The road is primarily two lanes in the study area, with turning lanes at some intersections.
- Deception Pass Bridge/Canoe Pass Bridge (SR 20) provide the sole access point by land to Whidbey Island via SR 20. The bridges were built in 1935 and are listed on the NRHP (WSDOT, 2015a). The 28-foot-wide bridges include an 11-foot lane in each direction and sidewalks on both sides. Repairs were made to the bridges in the summer of 2015 that included repaving, replacement of bridge joint seals, and repairs to the bridge decks (WSDOT, 2015b). Some discussion has taken place in recent years regarding the replacement of the bridges; however, WSDOT has indicated that the bridges are in good condition, and no plans for their replacement have been made (Island County Sub-Regional RTPO, 2012). The WSDOT has identified the Deception Pass Bridge as one of 473 bridges in the state requiring seismic retrofits; however, no work on the bridge has been scheduled at this time (Gilbert and Doughton, 2017).
- I-5 is a main interstate highway on the West Coast of the U.S. and is a limited access, divided highway with primarily two lanes in each direction in the study area. On- and off-ramps in Burlington, Washington, provide direct access to SR 20.

- Ault Field Road is a minor arterial that begins at SR 20 north of Oak Harbor and continues west, providing access to Ault Field through the Charles Porter Avenue and Langley Boulevard gates. It is primarily a two-lane road (one lane in each direction) with both left and right turning lanes at a number of intersections.
- Heller Road provides a north-south route on the western edge of Oak Harbor, beginning at Ault Field Road south of Ault Field. Heller Road has one lane in each direction and right and left turning lanes at several intersections, including the Swantown Avenue intersection and the Ault Road/Clover Valley Road intersection.
- Whidbey Avenue is a minor arterial running east from Heller Road to its terminus at Regatta Drive. East of SR 20 and west of Oak Harbor Street, Whidbey Avenue has two lanes with left turning lanes at intersections. Two lanes in each direction and left turning lanes are present between SR 20 and Oak Harbor Street.
- Regatta Drive runs north from SE Pioneer Way along the western edge of the Seaplane Base and merges with SR 20 just north of Oak Harbor. Regatta Drive is a two-lane road with left turning lanes at major intersections.
- Crescent Harbor Road is located along the northern boundary of the Seaplane base, between Regatta Drive and North Reservation Road. Crescent Harbor Road is a two-lane road with left turning lanes at major intersections.

3.12.2.1.2 On-station Road Network

Ault Field is accessible through the four gates shown on Figure 3.12-1. The Langley Boulevard gate is accessed from Ault Field Road and serves as the main gate to Ault Field. The Langley Boulevard gate is the only gate for the station that is open 24 hours per day and on weekends. The Charles Porter gate is also accessed from Ault Field Road and serves as the gate for commercial and oversized vehicles. This gate is open between the hours of 5:00 a.m. and 8:00 p.m. (NAS Whidbey Island, n.d.[a]). The Saratoga Road gate is accessed from West Clover Valley Road, which extends west from the intersection of Heller Road and Ault Field Road. The Hammer Road gate is located at the northern border of Ault Field and is accessed from SR 20 via Banta Road. Gates for the Seaplane Base are located on Maui Avenue, north of the Oak Harbor City Marina, and Torpedo Road, to the east of the intersection of Regatta Drive and Crescent Harbor Road. Housing areas at the Seaplane Base can be accessed through non-gated roadways. Table 3.12-1 shows the daily average vehicle counts at each gate.

Table 3.12-1 NAS Whidbey Island Gate Traffic Counts

Ault Field Gate	*Daily Average Vehicle Count*
Charles Porter Avenue Gate	5,300
Langley Boulevard Gate	11,300
Saratoga Road Gate	1,800
Hammer Road Gate	1,000
Seaplane Base Gate	***Daily Average Vehicle Count***
Torpedo Gate	1,400
Maui Gate	3,800

Source: NAS Whidbey Island, n.d.(b)

Major roadways at Ault Field and the Seaplane Base are described below:

- **Charles Porter Avenue** is a two-lane road with a center turning lane that provides access to most work destinations at NAS Whidbey Island. The road runs from the Charles Porter Gate northwest through the installation.
- **Langley Boulevard** begins at Ault Field Road and runs north through the Langley Boulevard gate before connecting with Charles Porter Avenue in the center of the installation. Langley Boulevard is primarily two lanes with occasional turning lanes.
- **Maui Avenue** is a two-lane road with a median that alternates between a center turning lane and grassy area. The roadway serves as the main route into the Seaplane Base and extends from Regatta Drive east to the intersection of Coral Sea Avenue and Torpedo Road.
- **Torpedo Road** is a two-lane road that provides gated access to the Seaplane Base off of West Crescent Harbor Road and extends south to the intersection of Coral Sea Avenue and Torpedo Road.

Areas of congestion identified in the NAS Whidbey Island Transportation Plan include the intersections of Midway Street and Langley Boulevard, Midway and Charles Porter Avenue, and Lexington Street and Charles Porter Avenue. The plan recommends traffic improvements that include installation of a roundabout at the intersection of Midway Street and Langley Boulevard, and Rerouting Lexington Street to create a 90-degree connection with Princeton Street. Recommended improvements to Charles Porter Avenue that included reducing the road width from four through-lanes to two through-lanes with a center turning lane and bike lanes have been implemented. Additional recommendations include dedicated bicycle lanes on Langley Boulevard and sidewalk improvements throughout Ault Field (Makers, 2010).

3.12.2.2 Traffic Conditions

ADT and design capacity of the roadway represent two parameters to measure traffic (Transportation Research Board, 2010). Using these two measures of traffic, each roadway segment receives a corresponding LOS. The LOS designation is a professional industry standard used to describe the operating conditions of a roadway segment or intersection. The LOS is defined on a scale of A to F that describes the range of operating conditions on a particular type of roadway facility. LOS A through LOS B indicates free flow of travel. LOS C indicates stable traffic flow. LOS D indicates the beginning of traffic congestion. LOS E indicates the nearing of traffic breakdown conditions. LOS F indicates stop-and-go traffic conditions and represents unacceptable congestion and delay.

Impacts to ground traffic and transportation are analyzed in this EIS by considering the possible changes to baseline traffic conditions (2021) and the capacity of area roadways from proposed increases in commuter traffic. Table 3.12-2 presents existing ADT volumes on state roads and Island County roads within the study area along with an estimate of existing LOS. Estimated ADT volumes and LOS under the No Action Alternative and action alternatives are provided in Chapter 4.12. The highest existing traffic volumes are located on I-5 in Burlington and SR 20 between Burlington and Anacortes. On Whidbey Island, the highest traffic volumes are found on SR 20 in Oak Harbor. Most roadways operate at LOS C or higher. A segment of SR 20 between Anacortes and Oak Harbor currently operates at LOS D. All of the studied roadways currently meet standards set for highways of statewide significance, as discussed in Section 3.12.1. Seasonal traffic volumes for roadways within the study area were not available;

however, it is assumed traffic volumes would generally be higher, and roadways would therefore experience more congestion, in the summer months.

Table 3.12-2 Existing Average Daily Traffic and Level of Service within the NAS Whidbey Island Complex Study Area

Location	*ADT*	*Existing LOS*
Road: Interstate I-5 (I-5)		
Municipality: Burlington		
South of SR 20	73,000	C
North of SR 20	57,000	B
Road: State Route 20 (SR 20)		
Municipality: Burlington		
Under I-5	27,000	B
Municipality: Skagit County		
East of Pulver Road	28,000	B
East of Avon Allen Road	29,000	B
West of Avon Allen Road	27,000	B
East of SR 536	25,000	B
West of SR 536	32,000	B
East of LaConner Whitney Road	34,000	B
West of LaConner Whitney Road	34,000	B
East of March Point Road	33,000	B
West of March Point Road	33,000	B
Road enters Anacortes		
North of Rosario Drive	15,000	D
South of Rosario Drive	18,000	D
Road enters Island County		
Municipality: Anacortes		
East of SR 20 Spur	33,000	B
South of SR 20 Spur	19,000	D
Municipality: Island County		
North of Banta Road	17,000	D
North of Frostad Road	17,000	D
South of Frostad Road	18,000	D
Road enters Oak Harbor		
North of Sidney Street	13,000	C
South of Libbey Road	12,000	C
Road enters Coupeville		
East of Quail Trail Lane	8,800	C
North of SR 525 and Race Road	7,100	B
West of SR 525 and Race Road	1,100	B
Municipality: Oak Harbor		
North of Regatta Drive	17,000	D
North of Case Road	13,000	C
North of Goldie Street	15,000	C
South of SE Midway Boulevard	18,000	C
North of SE Sixth Avenue	21,000	C
South of SE Sixth Avenue	21,000	C
North of SE Barrington Avenue	19,000	C

Table 3.12-2 Existing Average Daily Traffic and Level of Service within the NAS Whidbey Island Complex Study Area

Location	*ADT*	*Existing LOS*
North of SE Pioneer Way	15,000	C
West of Beeksma Drive	18,000	C
North of Swantown Road	20,000	C
South of Swantown Road	16,000	C
Municipality: Coupeville		
West of Main Street	11,000	C
East of Main Street	8,500	B
Road: State Route 525 (SR 525)		
Municipality: Island County		
South of SR 20	7,600	B
North of Ellwood Drive	7,000	B
Road enters Freeland		
West of Bayview Road	13,000	C
West of Maxwelton Road	12,000	C
East of Maxwelton Road	11,000	C
West of Campbell Road	9,500	C
East of Cedar Vista Drive	9,400	C
West of Humphrey Road	8,700	C
East of Humphrey Road	7,300	C
At Clinton Ferry Dock	6,100	C
Municipality: Freeland		
West of Honeymoon Bay Road	7,200	B
East of Honeymoon Bay Road	12,000	C
West of Fish Road	14,000	C
Road: Banta Road (Island County)		
East of SR 20 Spur	1,470	C
Road: Clover Valley Road (Island County)		
West of Heller Road	2,864	C
Road: Heller Road (Island County)		
South of Ault Field Road	6,995	C
Road: Ault Field Road (Island County)		
West of Langley Boulevard	8,171	C
East of Langley Boulevard	10,073	C
East of Oak Harbor Road	10,506	C
East of Goldie Road	8,876	C
Road: Oak Harbor Road (Island County)		
South of Ault Field Road	5,174	C
Road: Goldie Road (Island County)		
North of Ault Field Road	8,864	C
South of Ault Field Road	7,561	C

Table 3.12-2 Existing Average Daily Traffic and Level of Service within the NAS Whidbey Island Complex Study Area

Location	*ADT*	*Existing LOS*

Source: WSDOT, 2016e; Island County, 2010, 2011, 2014, and 2016c

Note: LOS is based on 2010 Highway Capacity Manual (Transportation Research Board, 2010); Appendix D, Transportation Trip Generation Data; and methodology described in Section 4.12.

Key:
ADT = Average Daily Traffic
LOS = level of service
SR = state route

Traffic Safety

In 2016, 778 vehicle crashes were reported in Island County. While the majority of these incidents involved no apparent injury, five involved a fatality, and an additional 89 involved a serious or minor injury (WSDOT, 2016a). A total of 223 of the crashes that occurred in Island County were within the Oak Harbor city limits; of these, 18 crashes involved a serious or minor injury (WSDOT, 2016a). Approximately 10 crashes occurred on roadways or intersections near an Ault Field gate; however, none were reported to involve a fatality or serious injury (WSDOT, 2016a). Pedestrians were involved in 11 of the vehicle crashes, and bicyclists were involved in five of the collisions (including one fatality) (WSDOT 2016b, 2016c). The majority of these collisions involving pedestrians and bicyclists occurred within Oak Harbor; none occurred near OLF Coupeville (WSDOT 2016b, 2016c). Reported collision rates in Island County were lower compared to statewide rates. In 2014, the statewide collision rate per 10,000 licensed drivers was 203.3, while in Island County it was 104.3. In 2014, the statewide collision rate per 10,000 registered vehicles was 172.1, while in Island County it was 78.6 (WSDOT, 2016d).

3.12.2.3 Transit, Pedestrian, and Bicycle Facilities

3.12.2.3.1 Off-station Facilities

Public transportation near the NAS Whidbey Island complex is provided by Island Transit. Fixed route and deviated service is available for all of Whidbey Island. Many of the regional routes travel along SR 20 and SR 525 and stop at the Harbor Station in Oak Harbor. Route 12 begins at Harbor Station and provides service near NAS Whidbey Island, with a stop near Ault Field and North Langley Boulevard. Route 411W provides service between March's Point in Skagit County and Oak Harbor, with the closest stops near Ault Field at SR 20/Banta Road and at Whidbey General Hospital North in Oak Harbor (Island Transit, 2017). Route 3 has bus stops located along Regatta Drive near the Seaplane Base and on Crescent Harbor Road near the housing areas on the Seaplane Base (Island Transit, 2017). Route 10 provides circulation around Oak Harbor and has bus stops at the Oak Harbor City Marina and the Navy Exchange on the Seaplane Base (Island Transit, 2017).

Ferries in Washington State are operated by the WSDOT. Ferry routes provide access for vehicles to Whidbey Island at two locations (Coupeville and Clinton). In 2016, approximately 807,000 riders traveled between Port Townsend and Coupeville, representing 3.3 percent of the state's ferry system ridership. Over 4.1 million riders traveled between Mukilteo and Clinton, which accounted for 16.8 percent of the system's total ridership (WSDOT, 2018a).

Bicycle routes are concentrated in more populated areas such as Oak Harbor, Anacortes, and Burlington. However, a number of rural bicycle routes are located throughout Island and Skagit Counties. SR 20 is designated as a bicycle route throughout its entire length in the study area. Additional bicycle routes near NAS Whidbey Island are located on Ault Field Road, Heller Road, Frostad Road, and Hoffmann Road. Most bike routes do not have separate lanes but instead rely on shoulders or shared road space (Island County, n.d.).

3.12.2.3.2 On-station Facilities

No public transit service is available within the installation. Most roadways at Ault Field have sidewalks on at least one side; however, some roads lack adequate pedestrian facilities. Roads with limited pedestrian access include Langley Boulevard, Midway Street, North Princeton Street, and North Ranger Street (Makers, 2010). Dedicated bike lanes are limited to a section of Charles Porter Avenue between Oriskany Avenue and Wasp Street. Ault Field generally has adequate parking. Specific locations with possible parking deficiencies include the south flight line, Fleet Readiness Center, portions of the bachelor housing area, PSD (Building 2641), and Navy Exchange (Makers, 2010).

The Seaplane Base is considered more auto-oriented, with incomplete sidewalk networks that do not adequately connect family housing areas with the retail core (i.e., the Commissary and Navy Exchange) (Makers, 2010). The Maylor Point housing area is connected to the retail core via a pedestrian path along Coral Sea Drive. No dedicated bike lanes are present at the Seaplane Base. An informal trail runs along the Crescent Harbor shoreline for approximately 1.4 miles between Torpedo Road and Solomon Road (Makers, 2010). The City of Oak Harbor's waterfront trail was recently extended along the western edge of the Seaplane Base to Maylor Point.

3.13 Infrastructure

This section discusses infrastructure, including utilities (i.e., water distribution, wastewater collection, stormwater collection, solid waste management, energy, and communications) and facilities. Transportation systems and traffic are addressed separately in Section 3.12.

3.13.1 Infrastructure, Regulatory Setting

3.13.1.1 Federal Regulations

EO 13834, Efficient Federal Operations, requires that agencies meet statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. In implementing this policy, each agency shall prioritize actions that reduce waste, cut costs, and enhance the resilience of federal infrastructure and operations. This EO also requires agencies to track and report on energy-management activities, performance improvements, cost reductions, GHG emissions, energy and water savings, and other appropriate performance measures. EO 13834 requires federal agencies to meet goals associated with energy use, water use, building design and utilization, fleet vehicles, and procurement and acquisition decisions.

OPNAVINST 4100.5E outlines the Secretary of the Navy's vision for shore energy management. The focus of this instruction is establishing the energy goals and implementing strategy to achieve energy efficiency.

DoD installations are required to report energy and water use performance data related to pertinent laws, regulations, EOs, and policies. Information and data collected are used to develop the Department of Energy Annual Report to Congress on Federal Government Energy Management. This report is referred to as the Annual Energy Management Report (AEMR) or, when combined with other reporting areas, the larger Annual GHG and Sustainability Report. It is distributed to the Office of Management and Budget and the House and Senate Committees on Armed Services. (NAS Whidbey Island, 2016).

Section 402 of the CWA established the NPDES to regulate the discharge of effluents into Waters of the United States. The regulation requires a permit be obtained for the discharge of pollutants. The State of Washington Department of Ecology is responsible for administering the state's stormwater management program, which includes NPDES permits. State NPDES regulations are found in RCW 90.48.260, and water quality standards are identified in 173-201A WAC.

3.13.1.2 Local Regulations

Chapter 15.01 of Island County municipal code established the stormwater management program, which was created as a way to fund stormwater control facilities in the Marshall Drainage Basin in Island County. Owners of properties that have been determined to contribute to stormwater runoff and that would benefit from control facilities are required to pay fees to fund the program.

Chapter 15.03 of Island County municipal code established the clean water utility to allow for the management of surface water drainage to protect surface and groundwater quality in unincorporated areas of Island County that are located outside the Marshal Drainage Basin. Properties owned by the federal government are excluded from the utility.

3.13.2 Infrastructure, Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under infrastructure at the NAS Whidbey Island complex.

Infrastructure Study Area

Infrastructure refers to the system of public works, such as utilities, that provides the underlying framework for a community or installation. Infrastructure components and utilities discussed in this EIS include the water supply system, wastewater system, stormwater drainage system, electrical supply facilities, natural gas system, and solid waste management facilities. Transportation infrastructure components, including roadway and street systems, the movement of vehicles, and mass transit, are discussed in Section 3.12, Transportation.

Because infrastructure and utilities systems are directly related to activities within the NAS Whidbey Island complex and the communities from which it draws its services, the potentially affected area includes the complex and the counties where it occurs. The infrastructure study area is based on existing distribution of where Navy personnel reside and includes the NAS Whidbey Island complex, Oak Harbor, and Anacortes.

3.13.2.1 Potable Water

3.13.2.1.1 Water Supply and Distribution System

Island County has 229 public community water systems serving over 98,000 individuals (USEPA, 2018c). The majority of these systems serve fewer than 1,000 individuals and rely on groundwater sources.

Approximately 7 percent of the county relies on individual wells for water (Island County, 2016d). Saltwater intrusion (i.e., movement of marine saltwater intro a freshwater aquifer) has the potential to cause some aquifers to be unsuitable for irrigation or drinking. Aquifers below sea level are at greatest risk for saltwater intrusion. Water level elevations close to or below sea level on Whidbey Island are generally located close to shorelines, including some areas west of Oak Harbor and Coupeville and along the eastern shore of central Whidbey Island (Island County, 2016d).

The two largest public water systems in Island County are those owned by the City of Oak Harbor and NAS Whidbey Island, which serve over 19,215 and 12,791 individuals, respectively (USEPA, 2018b). The City of Oak Harbor operates 90 miles of water mains. Water is purchased wholesale from the City of Anacortes (City of Oak Harbor, 2014b). Water is transmitted from Anacortes' system to Oak Harbor via 24-inch and 10-inch mains located along SR 20. Water is then pumped through three pump stations to three storage reservoirs with a storage capacity of 6.6 million gallons. The city's water system plan includes a 20-year plan for capital improvements that includes replacement of water mains (City of Oak Harbor, 2014b).

Skagit County has 88 public water systems (USEPA, 2018c). The largest district includes the Skagit County Public Utility District (PUD), which serves 65,000 residents in Burlington, Mount Vernon, and unincorporated parts of Skagit County, including Fidalgo Island residents (USEPA, 2018c). The Anacortes system provides water for over 20,000 residents in Anacortes in addition to selling water to Oak Harbor and NAS Whidbey Island. Anacortes' water treatment plant is located in Mount Vernon (USEPA, 2018c). The treatment plant was built in 2013 and replaced the previous facility that was located on the same site (City of Anacortes, 2018a).

3.13.2.1.2 NAS Whidbey Island Water Supply and Distribution System

The NAS Whidbey Island complex purchases water for Ault Field and the Seaplane Base wholesale from the City of Oak Harbor, which receives its water from Anacortes (NAVFAC, 2014). OLF Coupeville is considered self-sufficient regarding water and is served by two wells located at the site (NAVFAC, 2014). The installation also maintains two wells used for emergency purposes, but the majority of potable water is received from Oak Harbor (NAVFAC, 2014). NAS Whidbey Island is responsible for 50 percent of the cost of maintaining the 24-inch main that transmits water from Anacortes to Oak Harbor (NAVFAC, 2014). The system has four active storage tanks and two reservoirs with a distributed capacity of 4.9 million gallons (NAVFAC, 2014). The reservoirs provide potable water to Ault Field and the Seaplane Base, each with a storage capacity of 1.5 million gallons (NAVFAC, 2016a). Average daily demand at Ault Field and the Seaplane base was 0.63 million gallons per day (mgd) in 2013. Water usage has decreased from an average daily demand of 0.83 mgd in 2007, in large part due to implementation of water-conservations measures, such as low-flow plumbing fixtures and high-efficiency water heaters and appliances, and the implementation of the Advanced Metering Initiative (NAVFAC, 2014). The City of Oak Harbor is interested in creating two connections to the Seaplane Base; however, the Navy needs to evaluate system demands before further discussions with Oak Harbor take place (City of Oak Harbor, 2014b; NAVFAC, 2016a). OLF Coupeville is relatively undeveloped and used for FCLP; therefore, water usage at that site is assumed to be minimal.

3.13.2.1.3 Water Supply Capacity and Usage

The City of Anacortes obtains its drinking water from the Skagit River (City of Anacortes, 2018b). The water treatment plant has a capacity of 42 mgd and is expandable to 55 mgd (City of Anacortes, 2018b).

The city has water rights to 54.94 mgd from the Skagit River (City of Anacortes, 2011). In 2013, the plant produced 5.74 billion gallons of water, or approximately 15.7 mgd (City of Anacortes, 2014). The Skagit County PUD water treatment plant has a capacity of 24 mgd, with current use around 12 mgd, and has water rights to withdraw 35.8 mgd from the Skagit River (Skagit PUD, 2014). The surface water obtained from the Skagit River is largely dependent on the mountain snowpack. The spring of 2015 experienced one of the lightest mountain snowpacks in decades; although no water shortage was reported, the City of Anacortes encouraged costumers to voluntarily conserve water (City of Oak Harbor, 2015b).

Oak Harbor receives 99.7 percent of its potable drinking water from Anacortes, and Oak Harbor is committed to 970 million gallons per year (City of Oak Harbor, 2014b, 2016). The city also holds water rights to 11 wells, with only three currently active that serve as additional backup supply. The city's current agreement with Anacortes will expire in 2027; however, the two cities typically renegotiate every three years to change the annual amount of water committed. Total water consumption has varied from 880 mg in 2007 to 746 mg in 2012, with a decrease largely attributable to repair and replacement of leaky pipes and equipment, and average daily demand is 1.4 mgd (City of Oak Harbor 2014b). The NAS Whidbey Island Water System Plan states that average daily demand for water is expected to increase to 0.77 mgd by 2034 (NAVFAC, 2014). Oak Harbor is expected to have sufficient capacity under the current agreement with Anacortes to meet projected demand for the City of Oak Harbor and NAS Whidbey Island until 2024. Improvements to existing wells that would permit maximum allowable water withdrawals based on water rights would allow Oak Harbor to meet projected demand until 2060 (City of Oak Harbor, 2014b). However, the current water service contract between the Navy and Oak Harbor requires the city to have capacity to transmit no less than 4.5 mgd to NAS Whidbey Island (Navy, 1971).

Water for the Skagit County PUD is diverted from streams in the Cultus Mountains and the Skagit River to Judy Reservoir. The utility district recently upgraded its treatment facility at Judy Reservoir and constructed a new pumping facility on the Skagit River, doubling the system's capacity to produce up to 36 mgd (Skagit PUD, 2016a). Average annual production is approximately 2.9 mgd (Skagit PUD, 2014). The system is anticipated to have enough capacity to meet projected water demands for the next four decades (Skagit PUD, 2016b).

Each year, water data are reported by NAS Whidbey Island to the DoD in the AEMR (NAS Whidbey Island, 2016). In 2015, NAS Whidbey Island used over 94 million gallons of water. This water use represents a decrease of 40.6 percent from the FY 2007 usage baseline. Water use reduction is the result of building managers' and building energy monitors' efforts to identify, secure, and report leaks for repair. NAS Whidbey Island has achieved a 40.6-percent reduction in water consumption compared to the FY 2007 baseline. Table 3.13-1 shows a summary of water consumption at NAS Whidbey and the progress toward water use reduction goals.

Table 3.13-1 Water Consumption Data at NAS Whidbey Island, 2010 through 2015

Fiscal Year	*Water Consumed (x1,000 gallons)*	*Water Use Intensity (1,000 gallons per 1,000 square feet)*	*% Progress from Previous Year*	*% Progress from 2007 Baseline*
FY 07 Baseline	164,550	41.20	N/A	N/A
FY 15	83,520	21.34	3.90%	-48.21%
FY 14	80,382	20.54	-8.92%	-50.15%
FY 13	88,256	22.55	-16.54%	-45.27%
FY 12	105,750	27.02	-21.79%	-34.42%
FY 11	136,899	34.54	7.89%	-16.15%
FY 10	126,883	32.02	N/A	-22.29%

Source: NAS Whidbey Island, 2016

Key:
N/A = not applicable

3.13.2.2 Wastewater

3.13.2.2.1 Wastewater Collection and Treatment System

The City of Oak Harbor's current wastewater system serves approximately 24,000 people within Oak Harbor and the Seaplane Base (Carollo Engineers, 2013). Less than 2 percent of the city's population relies upon on-site sewer systems (Carollo Engineers, 2013). The city owns, operates, and maintains a rotating biological contactor treatment plant, near the city's central business district, with a capacity of 0.7 mgd (Tetra Tech, 2008). The rotating biological contactor does not discharge into state waters but serves as a pretreatment facility for up to 20 percent of the city's wastewater (Carollo Engineers, 2013). Under a lease agreement with the U.S. Navy, the city also operates an aerated lagoon facility with anaerobic pretreatment; this facility is located on the Seaplane Base and has a capacity of 2.5 mgd (Tetra Tech, 2008). Oak Harbor's gravity collection system consists of approximately 65 miles of pipe, including older clay pipes in the downtown area that were installed in 1940; these older pipes often require additional maintenance (Tetra Tech, 2008). The City of Anacortes' wastewater treatment plant was constructed in 1992 (City of Anacortes, 2018b).

3.13.2.2.2 NAS Whidbey Island Wastewater Collection and Treatment System

NAS Whidbey Island's current NPDES permit allows for discharge from an outfall into the Strait of Juan de Fuca. The NAS Whidbey Island Ault Field Wastewater Treatment Plant was upgraded in 1997 with a sequencing batch reactor and a chlorine contact chamber. Additional upgrades in 2005 allowed for discharging of effluent during high tides, increasing effectiveness during high tide events (USEPA, 2008). As discussed above, the Seaplane Base is served by Oak Harbor's current treatment facility located on Navy property. The Navy and City of Oak Harbor are currently under a 50-year contract for the city to operate and maintain the sewage lagoon (Navy, 1987). The collection system serving the Seaplane Base is owned, operated, and maintained by the Navy.

3.13.2.2.3 Wastewater Supply Capacity and Usage

The total combined maximum monthly flow for the City of Oak Harbor wastewater system (including the Seaplane Base) was 2.9 mgd in 2011 (Carollo Engineers, 2013). The city projects total maximum monthly

flow in 2030 to be 3.9 mgd, assuming no additional growth at the Seaplane Base. The existing contract between the city and the Navy allows the Navy to discharge up to 0.85 mgd into the lagoon. The city is currently in the process of constructing a new wastewater plant to replace the aging facilities that will be unable to handle expected population growth and increasing water quality standards (City of Oak Harbor, 2017). The new facility is expected to increase the city's wastewater capacity by 2.7 mgd (City of Oak Harbor, 2015a) and to be online by mid-2018 (City of Oak Harbor, 2017). The City of Ancoretes' wastewater treatment plan has an average daily flow of 1.89 mgd and a permitted capacity for 4.5 mgd (City of Anacortes, 2018b).

The Ault Field Wastewater Treatment Plant has a design capacity of 0.85 mgd. The system currently serves approximately 10,000 Navy personnel and discharges 0.366 mgd (USEPA, 2008). The Navy is expected to resume control of the aerated lagoon facility at the Seaplane Base after completion of the city's new wastewater plant (NAVFAC, 2016b).

3.13.2.3 Stormwater

3.13.2.3.1 Stormwater Supply and Distribution System

Oak Harbor's stormwater system is served by a combination of pipes of varying diameter, ditches, and other natural features. There are two primary 42-inch-diameter outfalls in Oak Harbor. Numerous smaller outfalls serve much smaller tributary areas along the waterfront (Tetra Tech, 2006). The city's comprehensive stormwater drainage plan identified a number of existing areas that experience high flows during storm events that could experience flooding, including:

- Oak Harbor Street North of Whidbey Avenue
- Whidbey Avenue between Fairhaven Drive and Oak Harbor Street
- SW 6th Avenue West of Oak Harbor Street
- Barrington Drive East of SR 20
- SR 20 Near Beeksma Drive
- SR 20 South of the intersection with Midway Boulevard
- SE 4th Avenue vicinity between SE Ely Street and O'Leary Street
- SE Pioneer Way near Ireland Street
- SE Bayshore Drive near SE City Beach Street
- SW Erie Street north of SR 20
- SW Scenic Heights south of SR 20

3.13.2.3.2 NAS Whidbey Island Stormwater Supply and Distribution System

Ault Field's stormwater system includes approximately 20 miles of channelized and straightened surface ditches and subsurface storm drains. Ault field has approximately 600 acres of impervious surface. Surface runoff drains toward Dugualla Bay and is then pumped through a dike into the bay. Surface runoff from the airfield aprons and runways is collected and passed through oil-water separators before being discharged. Surface ditches and subsurface storm drains serve as the storm sewer system at the Seaplane Base that carries runoff to outfalls in Oak Harbor and Crescent Harbor (NAVFAC, 2016b).

3.13.2.3.3 Stormwater Supply Capacity and Usage

Oak Harbor's stormwater system is currently operating at maximum capacity, and the city's stormwater management plan indicates an increase in impervious surface of 8 percent within the city could substantially increase the number of areas that could be susceptible to flooding (Tetra Tech, 2006).

Storm-related flooding at Ault Field and the Seaplane Base has only been an issue related to high-tide and high-wind events. While the Installation Development Plan does not identify current stormwater capacity as an issue, it does recognize water quality in stormwater infrastructure is often poor. The plan recommends use of green infrastructure outside of the airfield and runways and use of Low Impact Development practices be used in construction projects (NAVFAC, 2016b).

3.13.2.4 Solid Waste Management

3.13.2.4.1 Solid Waste Distribution System

Solid waste collection in Oak Harbor is provided by the city for residents and businesses located within its jurisdiction. Island Disposal, Inc., collects waste generated in unincorporated areas of Whidbey Island and the City of Langley. Residents and businesses may also haul their own waste to receiving facilities in the county. Over half of the waste in Island County is collected at curbside, while 46 percent is self-hauled to a receiving facility. The county has two solid waste transfer stations and two drop box stations where waste collection providers or self-haulers bring waste. Allied Waste transports non-recyclable waste generated in Island County via truck to Everett, where it is then transported by rail to the Roosevelt Regional Landfill (Green Solutions, 2008).

3.13.2.4.2 NAS Whidbey Island Solid Waste Distribution System

A private company is under contract to the federal government to collect waste at NAS Whidbey Island. The waste is transported to a transfer station located at NAS Whidbey Island and then shipped to the Roosevelt Regional Landfill (Green Solutions, 2008).

3.13.2.4.3 Solid Waste Capacity and Usage

Approximately 60,700 tons of waste was generated in Island County in 2005, of which 9,215 tons was recycled. The per capita disposal rate varied between 2.8 and 3.7 pounds between 2000 and 2005. The county projects that in 2025, 221 tons of waste will be generated each day (Green Solutions, 2008). The Roosevelt Regional Landfill has a permitted capacity of 120 million tons over 40 years and is anticipated to have adequate capacity to accept solid waste until 2050 (Republic Services, 2012; USEPA, 2018d). Whidbey Island has been designated a sole-source aquifer under the federal Safe Drinking Water Act (Public Law 93-523), and, therefore, no new or expanded landfills may be sited in Island County (Green Solutions, 2008).

3.13.2.5 Energy

3.13.2.5.1 Energy Supply

Puget Sound Energy (PSE) is the sole provider of electricity within the study area and the largest electric utility in Washington (Island County, 2016d; PSE, 2018).

PSE serves approximately 37,000 customers on Whidbey Island. The island contains over 500 miles of underground distribution lines and 600 miles of overhead distribution lines (Island County, 2016d).

Twelve distribution centers are located on the island. Whidbey Island relies on power from Skagit County and the mainland. The U.S. Energy Information Administration reports that over 114 million megawatt-hours of electricity were generated in Washington in 2016 (EIA, 2018a). Hydroelectric power makes up approximately two-thirds of Washington's electricity generation, with additional generation from natural gas (12.9 percent), nuclear (11.0 percent), coal (9.7 percent), and other sources such as wind and biomass (EIA, 2018b). The prominence of renewable energy sources in Washington's electricity generation system (approximately 66 percent) results in the State of Washington achieving the lowest carbon intensity of its energy supply (36.4 kilograms of energy-related CO_2 per million British thermal units [BTU]) in the U.S. (EIA, 2018b).

Cascade Natural Gas Corporation (CNG) is the sole provider of natural gas in the study area, including Oak Harbor and Anacortes. Natural gas service on Whidbey Island is limited to Oak Harbor, NAS Whidbey Island, and surrounding unincorporated areas (Island County, 2016d; CNG, 2012). Natural gas is supplied to Oak Harbor via a 6-inch high-pressure line from Camano Island that crosses Skagit Bay to Strawberry Point to the east of the Seaplane Base. Gas pipelines in Oak Harbor are typically located in street rights-of-way and occasionally easements on adjoining properties (City of Oak Harbor, 2014a).

3.13.2.5.2 NAS Whidbey Island Energy Distribution System

Ault Field, the Seaplane Base, and OLF Coupeville are connected to three separate electric systems, with two service connections at Ault Field and one connection each at the Seaplane Base and OLF Coupeville. Electricity is purchased from PSE. A separate connection at the Seaplane Base provides service to housing directly from PSE. Ault Field contains two substations: Central Switching Station (owned by the Navy), which is fed by Clover Valley Substation (owned by the PSE) (NAVFAC, 2016a). The distribution system on Ault Field was originally constructed in the 1940s and includes approximately 4.1 miles of overhead and 37.9 miles of underground lines. The system has received a number of system upgrades, the most recent in 2011. The Seaplane Base includes one switching station. The distribution system at the Seaplane Base includes approximately 0.9 mile of overhead and 4 miles of underground lines, and it was also first constructed in the 1940s (NAVFAC, 2016a). The electrical system at OLF Coupeville was built in the 196os and includes a short distance of underground lines (NAVFAC, 2016a).

Natural gas for NAS Whidbey Island is supplied by CNG, which owns and operates the majority of the natural gas infrastructure at the installation. The Navy owns and operates approximately 7.5 miles of distribution piping and approximately 400 residential service points (NAVFAC, 2016a, 2016b).

NAS Whidbey Island also operates a centralized steam plant for heating and hot water at Ault Field. The plant and distribution system were originally constructed in 1954. Two additional boilers were installed in 1994 (NAVFAC, 2016a). The steam system is designed to use natural gas as the primary fuel source, with fuel oil serving as a backup (NWCAA, 2013). The plant currently serves 40 major buildings (NAVFAC, 2016a). The steam plant is currently operating at about 25 percent of its capacity, and the current boilers are oversized and costly to maintain. The distribution system primarily consists of underground steam pipes and condensate return pipes (NAVFAC, 2016b).

3.13.2.5.3 Energy Capacity and Usage

PSE anticipates the electric demand within its service area to grow between 1.3 percent and 1.4 percent annually between 2018 and 2037 (PSE, 2017). PSE's Integrated Resource Plan indicates that PSE could generate enough energy on its own annually to meet demand through 2025 in addition to the ability to

purchase wholesale market energy (this projection does not take into consideration changes in usage under the alternatives) (PSE, 2017).

The current peak electrical load demand for NAS Whidbey Island is approximately 8 to 8.5 megawatts daily. The lease agreement between the Navy and PSE was recently amended to provide 12 megawatts of power to the station, or 60 percent of the Clover Valley Substation (Navy, 2015c).

Each year, energy data are reported by NAS Whidbey Island to the DoD in the AEMR (NAS Whidbey Island, 2016). In 2015, NAS Whidbey Island used over 50 million kilowatt hours, or 171,511 million British thermal units of electricity, and 244,426 million British thermal units of natural gas. This energy use represents a decrease of 40 percent in energy use from the FY 03 baseline. Table 3.13-2 shows a summary of energy consumption at NAS Whidbey and the progress toward energy use reduction goals.

Table 3.13-2 Energy Use Data at NAS Whidbey Island, 2009 through 2015

Fiscal Year	*Energy Consumed (Million BTU)*	*Energy Intensity (Million BTU per 1,000 square feet)*	*% Progress from Previous Year*	*% Progress from 2007 Baseline*
FY 03 Baseline	630,431.72	179.20		
FY 15	421,069.00	107.58	-4.17%	-39.97%
FY 14	439,392.00	112.26	-4.50%	-37.35%
FY 13	460,113.02	117.56	-4.52%	-34.40%
FY 12	481,913.32	123.13	2.03%	-31.29%
FY 11	478,246.19	120.68	2.35%	-32.66%
FY 10	467,287.60	117.91	-6.22%	-34.20%
FY 09	498,278.15	125.73		-29.84%

Source: NAS Whidbey Island, 2016

Key:
BTU = British thermal unit

NAS Whidbey Island has improved electricity-usage efficiency through implementation of several building renovation projects. The installation has won six Secretary of the Navy Platinum and eight Gold awards for Energy and Water Conservation (NAVFAC, 2016a). Energy Independence and Security Act of 2007 goals were achieved early, and the installation continues to reduce energy use. Many energy efficiencies were developed through the use of advanced metering to determine the largest energy users and implement effective scheduling and energy management of them (NAS Whidbey Island, 2016).

CNG obtains its natural gas from production sites in the Rocky Mountains and Western Canada (CNG, 2016). CNG's Integrated Resource Plan indicates additional resources will be needed by 2020 to meet demand under a high-growth scenario (CNG, 2016). Extension of natural gas service must be requested by customers; however, properties must be within a reasonable distance to main lines (Island County, 2016d).

3.13.2.6 Communications

3.13.2.6.1 Communications Distribution System

Verizon provides landline telephone service in northern Whidbey Island, including Oak Harbor and the surrounding urban growth area (City of Oak Harbor, 2015a). Local telephone service in South Whidbey Island and parts of Central Whidbey Island is provided by Whidbey Telecom, with additional service in Oak Harbor and Coupeville provided by Frontier (Island County, 2016d). Verizon, Sprint, AT&T, and T-Mobile all provide nearly complete cellphone coverage of Whidbey Island and western Skagit County, with some variation in service levels (Verizon, 2016; Sprint, 2016; AT&T, 2016; T-Mobile, 2016). More than 20 communications towers are located throughout Whidbey Island (Island County, 2016d). Advances in technology are expected to continue to increase cell site capacity, while consumer demand will drive construction of new cell sites where needed (City of Oak Harbor, 2015a).

3.13.2.6.2 NAS Whidbey Island Communication System

A complex network of fiber-optic and copper cables constitutes the communications system at NAS Whidbey Island. This network supports the installation's alarm, telephone, video conferencing, enterprise land/mobile radio, and other systems. Systems are managed by the Information Resource Management Department, the Navy Marine Corps Intranet, Naval Computer and Telecommunications Area Master Station, Pacific Detachment Puget Sound. The majority of facilities are connected to the fiber-optic system; however, capacity is often insufficient to meet demand (NAVFAC, 2016b).

3.13.2.7 Facilities

Ault Field and the Seaplane Base include over 3.7 million square feet of facilities to support NAS Whidbey Island's mission. Facilities covering approximately 3.2 million square feet are located at Ault Field, facilities covering 550,000 square feet are located at the Seaplane Base, and facilities covering 6,500 square feet are located at OLF Coupeville. The largest portion of facilities is for Sailor & Family Readiness, which uses over 1.3 million square feet of space and includes housing, food services, and Moral, Welfare and Recreation facilities. Airfield operations make up the next largest category, which does not include pavement for runways. The majority of facilities at NAS Whidbey Island have "fair" or "good" ratings for configuration and capacity, but many facilities are ranked "poor" for condition.

3.14 Geological Resources

This discussion of geological resources includes topography, geology, seismic activity, and soils. The principal geological factors influencing the stability of structures are soil stability and seismic properties. Topography describes the physical state of the land and includes elevation and relief features of the land surface. Topographic characteristics can include both manmade and natural features but generally includes hills, ridges, mountains, valleys, and plains (USGS [U.S. Geological Survey], n.d.). Soil is the unconsolidated material above bedrock. Soil is formed from the weathering of bedrock and other parent materials. Topography and soils are analyzed in this EIS in terms of drainage and erosion. The analysis of topography and soils focuses on the area of soils that would be disturbed, the potential for erosion of soils from construction areas, and the potential for eroded soils to become pollutants in downstream surface water during storm events. The analysis also examines potential impacts from geologic hazards, including liquefaction, landslides, and earthquakes, to project activities.

3.14.1 Geological Resources, Regulatory Setting

3.14.1.1 State Regulations

The Washington State Building Code Act was amended in 2006, at which time the 2006 international codes were adopted that included provisions for structural design regarding earthquake loads (WSSPC, 2016). The building codes are driven in part by soil and liquefaction maps prepared by the Washington Department of Natural Resources. Liquefaction can occur when very wet soils are shaken during an earthquake and lose their structure and the ability to support foundations for buildings, which therefore may tilt or sink. These soils also slide more easily, resulting in landslides.

3.14.2 Geological Resources, Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under geological resources at Ault Field.

3.14.2.1 Topography

Ault Field on the NAS Whidbey Island complex comprises the study area for topography and soils because this is where any impacts to topography would occur as a result of any military construction that would be required to support the Proposed Action. Current landforms are predominantly the result of erosion and deposition that occurred as the Vashon ice retreated northward. Whidbey Island lies within the Puget Sound Lowland, a topographic and structural depression between the Olympic Mountains and the Cascade Range (Navy, 2014b). Topographical features around Ault Field consist mainly of gentle to moderate slopes with elevations ranging from sea level to approximately 220 feet above MSL. Gentle ridges run the length of the other regions of the island. The developed area of Ault Field, including the airfield and surrounding facilities, is in a level, low-lying area with elevations ranging from 10 feet to approximately 50 feet above MSL (Navy, 2014b). Steep slopes occur mainly along the shoreline of the station.

3.14.2.2 Geology

The NAS Whidbey Island complex is underlain by layers of unconsolidated gravels, sands, silts, and clays with a thickness of 500 to 1,800 feet. These layers were deposited over the past 2 million years during alternating glacial and non-glacial periods and overlie much older bedrock. Most near-surface deposits in the project area are associated with the most recent glaciation, including till and advance outwash, which are approximately 12,000 to 16,000 years old (Navy, 2011).

3.14.2.3 Seismic Activity and Geologic Hazards

Five fault lines occur within 15 miles of Ault Field, including, in order of closest to farthest, Strawberry Point Fault (less than 1 mile to the south), Devil's Mountain Fault (approximately 1 mile to the north), Utsalady Point Fault (approximately 2 miles to the south), unnamed faults in the Strait of Juan de Fuca and Puget Sound (approximately 4 miles to the north and northwest), and Southern Whidbey Island Fault (approximately 12 miles to the south and southwest) (USGS, 2016). Seismic activity in this region results from subduction of the Juan de Fuca plate beneath North America. An inactive fault discovered in the 1970s, known as the Northern Whidbey Island Fault, crosses the island in an east-west direction approximately 3 miles north of Oak Harbor. The most recent apparent significant activity at this fault was approximately 18,000 years ago (Cheney, 1987). Since earthquakes are a reflection of active tectonic processes, this fault does not appear to present any significant seismic hazard. Evidence

suggests an approximately 6.7 magnitude or greater earthquake may have occurred at the Utsalady Point Fault between 1550 and 1850 (Johnson et al., 2004). However, no human record of the quake exists. The Utsalady Point Fault, Strawberry Point Fault, and Devil's Mountain Fault may be active (Johnson et al., 2004). Hazards associated with seismic activity on the faults include surface fault rupturing, strong ground motion or shaking, and liquefaction. The northern portion of Ault Field has a high liquefaction susceptibility, while the southern portion has a low to moderate liquefaction susceptibility (Palmer et al., 2004). Whidbey Island also has several regions with a variety of instabilities along its shoreline; these instabilities are associated with landslides (Washington State Department of Ecology, 1979).

3.14.2.4 Soils

Forty-one soil types are mapped within the boundaries of the NAS Whidbey Island complex. The primarily soils mapped include Sholander, cool-Spieden complex, and Urban Land-Coupeville-Coveland cool complex. These somewhat poorly drained soils are generally found in valleys and are made up of glacial drift, glacial outwash, dense glaciomarine deposits, and organic material. Scholander permeability is moderately rapid to very rapid above the densic contact and very slow in the densic material, and erodibility is relatively low (USDA, 2009, 2011; SoilWeb, 2015a). Spieden series permeability is moderately high to very high, and erodibility is relatively low (USDA, 2007, 2009; SoilWeb, 2015b). The permeability of Urban Land-Coupeville-Coveland cool complex is very low to high, and erodibility is relatively low (SoilWeb, 2015c, 2015d; USDA, 2008). Typical soil profiles contain gravelly loam, gravelly sandy loam, and sandy loam soils. Areas also occur that have been previously filled to construct the airfield and support facilities, so natural surface soils do not occur in these areas (Navy, 2014b). The soil series occurring on the NAS Whidbey Island complex lands were grouped into six categories according to the formation processes and geologic features with which they are associated.

These categories are:

- **Soils of Glacial Uplands**
  Soils that occur on glacial uplands occupy approximately 75 percent of Island County. On the NAS Whidbey Island complex, they include Bozarth, Casey, Hoypus, Keystone, Swantown, Townsend, and Whidbey soil series. These soils are derived from coarse- to fine-textured glacial drift and all developed under forest except for the Townsend soils. Their internal drainage is moderately good to somewhat excessive (NAS Whidbey Island, 2013a).

  Most of these soils have only fair suitability for agricultural use. The Hoypus and Keystone soils are generally too droughty for growing crops and are typically used for pasture or left in forest. Casey soils retain moisture to a greater extent than many of the other soils occurring on glacial uplands and so are typically used for agriculture, primarily for pasture and hay in conjunction with dairying. Townsend soils have a higher organic content and retain adequate moisture for growing a number of crops (NAS Whidbey Island, 2013a).

- **Soils of Terraces**
  Terraces are raised, level areas with vertical or sloping sides, often occurring in series, one above the other. On Whidbey Island, they were probably formed by isostatic rebound and the resultant varying sea level. Isostatic rebound occurs as landforms are freed from the weight of ice sheets and glaciers during periods of glacial retreat. Land masses rise up and relative sea level drops during interglacial periods (NAS Whidbey Island, 2013a).

Terrace soils do not cover extensive areas at the NAS Whidbey Island complex. They include Coupeville, Ebeys, San Juan, and Snakelum soil series. These soils formed from marine or lake sediments and from glacial outwash; their internal drainage is moderately good to excessive.

The San Juan and Snakelum series are prairie soils derived from gravelly or sandy outwash and are considered relatively good agricultural soils. The Coupeville and Ebeys soils are considered the most highly productive in Island County, producing high yields of wheat, oats, squash, cabbage for seed, alfalfa, and other crops (NAS Whidbey Island, 2013a).

- **Soils of Depressions in Uplands and Terraces**
  These soils occur in small depressions, basins, or sloping concave areas that receive considerable seepage and runoff from surrounding uplands. The soils are often saturated during the rainy months and are poorly drained. They include Bellingham, Coveland loam, and Norma soils. Norma and Bellingham soils developed under forest, while Coveland soils developed under grasses, sedges, and brush. These are typically poorly drained soils that are associated with wetlands unless drained. When drained, Norma and Bellingham soils are used for pasture grasses; Coveland soils are used to grow cereal grains and vegetables (NAS Whidbey Island, 2013a).
- **Soils of Deltas, Tidal Flats, Tidal Marshes, and Coastal Beaches**
  Soils of deltas and tidal flats at the NAS Whidbey Island complex include Hovde, Lummi, and Tidal Marsh. Hovde sand is found in nearly level beach areas adjacent to coastal beach soils. Lummi silt loam occurs on deltas and tidal flats in tidal salt marsh areas that have been artificially drained using dikes and ditches. Soils mapped as Tidal Marsh are bordered by salty or brackish water and are generally submerged at high tide. These soils have developed from marine sediments and are generally alkaline unless diked and drained (NAS Whidbey Island, 2013a).

  Coastal beaches are long, narrow, nearly level strips of sandy and gravelly materials. They are above the level of the mean tide but are swept by storm waves. They occur at the base of coastal bluffs or lowlands bordering the Strait of Juan de Fuca. Tacoma peat occurs in depressional areas adjacent to coastal beach. These soils are not typically considered for agricultural purposes unless diked or drained (NAS Whidbey Island, 2013a).
- **Organic Soils**
  Organic soils are formed from the decomposition of plant material that has accumulated in shallow lakes, on slow-moving stream banks, or in permanently wet depressions. Organic soils are characterized by poor drainage, surface-water ponding, and a slight erosion hazard. By definition, they are hydric soils, and wetlands are typically associated with them. Most of these soils receive runoff and seepage from higher elevations; surface runoff from organic soils is typically slow. Soil series of this type occurring at the NAS Whidbey Island complex include Carbondale, Rifle, Tacoma, and Tanwax (NAS Whidbey Island, 2013a).
- **Disturbed Soils**
  The surface layers of disturbed soils have usually been modified by the placement of fill for construction purposes or the removal of surface soil for landfill material. The subsurface characteristics of the original soil have usually not been altered, and these characteristics control the movement of water on and through the soils. Areas where significant amounts of fill have been placed are mapped on soils maps as “Made Land” (NAS Whidbey Island, 2013a).

3.15 Hazardous Materials and Wastes

This section discusses hazardous materials, hazardous waste, and contaminated sites.

3.15.1 Hazardous Material and Wastes, Regulatory Setting

Hazardous materials are defined by 49 CFR section 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table, and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations.

Hazardous wastes are defined by the Resource Conservation and Recovery Act, as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR part 273. Four types of waste are currently covered under the universal wastes regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

The DoD established the DERP to facilitate thorough investigation and cleanup of contaminated sites on military installations (active installations, installations subject to Base Realignment and Closure, and formerly used defense sites). The Installation Restoration Program and the Military Munitions Response Program are components of the DERP. The Installation Restoration Program requires each DoD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The Military Munitions Response Program addresses nonoperational rangelands that are suspected or known to contain unexploded ordnance, discarded military munitions, or munitions constituent contamination. The Environmental Restoration Program is the Navy's initiative to address the DERP.

3.15.2 Hazardous Materials and Wastes, Affected Environment

The Navy has implemented a strict Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program for all activities. These programs are governed Navy-wide by applicable OPNAVINST and at the installation by specific instructions issued by the Base Commander. The Navy continuously monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes.

3.15.2.1 Hazardous Materials

Hazardous materials are used at Ault Field for airfield operations and industrial support activities, including petroleum, oils, and lubricants; solvents and thinners; caustic cleaning compounds and surfactants; cooling fluids (antifreeze); adhesives; acids and corrosives; paints; and herbicides, pesticides, and fungicides. Hazardous materials are also used for aircraft and vehicle repair and maintenance at Ault Field (Navy, 2014b).

3.15.2.2 Hazardous Wastes

Ault Field is classified as a large-quantity hazardous waste generator, as defined by the Resource Conservation and Recovery Act, because it has the potential to generate more than 2,200 pounds of hazardous waste every month. Activities at Ault Field that generate hazardous wastes include painting, using solvents for cleaning and degreasing, mechanical and chemical paint and corrosion removal, fluids change-out, electroplating, metal casting, machining, and welding and soldering. Hazardous wastes are accumulated at less-than-90-day accumulation points throughout the installation before being transferred to and collected at less-than-90-day central processing facilities prior to transportation offsite and disposal at a permitted Treatment, Storage, and Disposal facility. Ault Field maintains a hazardous waste management plan that establishes procedures and provides guidance regarding hazardous waste generation, accumulation, and disposal at the installation (Navy, 2014b).

3.15.2.3 Defense Environmental Restoration Program

The Navy is committed to ensuring all individuals who live or work on or near Navy installations and facilities are protected from contaminants from past releases. The Navy maintains comprehensive environmental instructions detailing procedures to meet the requirements found in state and federal regulations and policies. The Navy manages past releases of contaminants through the DERP. The Navy has several sites in various stages of investigation, remediation, or site closure at Ault Field, the Seaplane Base, and OLF Coupeville.

3.16 Climate Change and Greenhouse Gases

Climate change refers to any significant change in measures of climate lasting for an extended period. Global climate change threatens ecosystems, water resources, coastal regions, crop and livestock production, and human health. Many scientific studies correlate the observed rise in global annual average temperature and the resulting change in global climate patterns with the increase in GHGs in the Earth's atmosphere from human (anthropogenic) activity (IPCC [Intergovernmental Panel on Climate Change], 2013). Most of the average worldwide warming effect that appears to be driving climate change has been caused by human emissions of GHGs, which are the result of the burning of fossil fuels for energy, removing forest, releasing emissions from landfills, producing certain industrial products, applying agricultural fertilizers, and raising livestock. These emissions include CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers (USEPA, 2016e). Each GHG is assigned a global warming potential, which refers to the ability of a gas or aerosol to trap heat in the atmosphere (USEPA, 2016e). An increase in GHGs, especially those with larger global warming potentials, causes more heat to be retained. This additional heat can disrupt the natural balance of global energy inputs, which leads to changes in long-term atmospheric conditions (i.e., climate), depending on the resulting environmental feedbacks (e.g., changes in snow and ice cover) (IPCC, 2013). The global warming potential rating system is standardized to CO_2, which has a value of one. The equivalent CO_2 rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs, referred to as the CO_2 Equivalent, abbreviated as CO_2e (USEPA, 2016e).

3.16.1 Policies for the Mitigation of and Adaptation to Climate Change

In the U.S., federal agencies and state governments have implemented programs and policies in an attempt to reduce GHG emissions to mitigate the extent of climate change and adapt to the impacts that are likely to occur.

3.16.1.1 Federal Policies Related to Climate Change

Legislation includes the Energy Policy Act of 2005, which addressed energy efficiency, renewable energy, energy tax incentives, and ethanol in motor fuels (USEPA, 2016f), and the Energy Independence and Security Act of 2007, which reinforces energy reduction goals for federal agencies. Under the CAA, the USEPA has developed and implemented GHG emission standards for stationary sources through the Greenhouse Gas Tailoring Rule and the Greenhouse Gas Reporting Program (USEPA, 2016g).

Several EOs have been issued in recent years that direct federal agencies to address climate change, and GHG emissions with emission reductions and preparedness planning and implementation. EO 13834, Efficient Federal Operations, requires that agencies meet statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. In implementing this policy, each agency shall prioritize actions that reduce waste, cut costs, and enhance the resilience of federal infrastructure and operations. This EO also requires agencies to track and report on energy management activities, performance improvements, cost reductions, GHG emissions, energy and water savings, and other appropriate performance measures (EO 13834, 2018).

Federal agencies are required to consider GHG emissions and climate change in environmental assessment in accordance with NEPA. The Office of the Chief of Naval Operations M-5090.1D Environmental Readiness Program Manual (Navy, 2014a) states that the Navy must address the effects of climate change, identifying and quantifying GHG emissions (where possible) that may be generated in executing the Proposed Action, and also describing the beneficial activities being implemented Navy-wide to reduce GHG emissions.

3.16.1.2 Department of Defense Policies Related to Climate Change

The DoD and the Department of the Navy have established various directives, including the Navy's Environmental Readiness Program Manual mentioned above and DoD Directive 4715.21, from January 2016, which integrates climate change considerations into all aspects of the department (DoD, 2016a). DoD components are charged with assessing, managing risks, and mitigating the effects of climate change on natural and cultural resource management, force structure, basing, and training and testing activities in the field environment.

Additionally, the DoD 2016 Operational Energy Strategy (DoD, 2016b) sets forth plans to reduce the demand for energy and secure energy supplies. This policy also directs DoD components to reduce GHG emissions from operational forces. Other recent policies, updates, and/or directives include the FY 15 DoD Sustainability Performance Plan (DoD, 2015) and the 2014 Climate Change Adaptation Roadmap (DoD, 2014), which focuses on various actions DoD is taking to increase its resilience to the impacts of climate change. The Secretary of the Navy set goals to improve energy security, increase energy independence, and reduce the reliance on petroleum by increasing the use of alternative energy (Navy, 2010b). Section 4.16, Climate Change and Greenhouse Gases, provides more details on the DoD and Navy programs to address GHG emissions and climate change in the future.

3.16.1.3 State Policies Related to Climate Change

Washington State's *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy* (Washington State Department of Ecology, 2012) was published to describe the risks of climate change to the state and identify the state's priorities in addressing these risks.

In 2009, the Washington State Legislature approved the State Agency Climate Leadership Act E2SSB 5560, which established GHG emissions reduction limits for state agencies in law (RCW 70.235.050 and RCW 70.235.060) and directed state agencies to quantify GHG emissions, report on actions taken to reduce GHG emissions, and develop a strategy to meet the GHG reduction targets. Washington State has established the following GHG reduction targets to reduce overall emissions (RCW 70.235.020):

- by 2020, reduce overall emissions of GHGs in the state to 1990 levels
- by 2035, reduce overall emissions of GHGs in the state to 25 percent below 1990 levels
- by 2050, the state will do its part to reach global climate stabilization levels by reducing overall emissions to 50 percent below 1990 levels, or 70 percent below the state's expected emissions that year (Washington State Department of Ecology, 2016b)

Chapter 173-442 WAC, The Clean Air Rule, was adopted in September 2016 and regulates the businesses that are responsible for about two-thirds of carbon pollution in Washington State, such as transportation, refining, and manufacturing. In 2017, organizations that are responsible for 100,000 MT of carbon pollution annually were required to cap and gradually reduce their emissions. Every three years, the threshold is lowered by 5,000 MT, and more emitters are brought into the program. By 2035, the threshold will reach 70,000 MT, where it will remain (Washington State Department of Ecology, n.d.[g]).

NAS Whidbey Island was not identified as a potentially eligible party under the new clean air rule (Washington State Department of Ecology, 2016a) because its stationary emissions have historically been below 25 tons.

In June 2017, Washington Governor Jay Inslee formed the U.S. Climate Alliance with the governors of New York and California to commit to reducing emissions by 26 to 28 percent from 2005 levels in order to meet or exceed targets of the federal Clean Power Plan. (Office of the Governor of Washington, 2017). The U.S. Climate Alliance, which was joined by 12 other states and Puerto Rico (*National Geographic*, 2017), was created in response to President Donald Trump's decision to withdraw from the Paris Climate Accord (White House Office of the Press Secretary, 2017).

3.16.2 Affected Environment

Evidence for global, national, and regional effects of climate change has been growing. In 2016, the USEPA released the fourth report describing trends related to the causes and effects of climate change (USEPA, 2016e):

- While U.S. GHG emissions decreased 7 percent since 2005, these annual emissions still represent a 7-percent increase between 1990 and 2015. CO_2 in the atmosphere has increased from a historical peak of 280 parts per million to an average of 400 parts per million.
- Average U.S. and global temperatures have increased since 1900, more quickly since the 1970s. The top 10 warmest years on record have all occurred since 1998, and extreme high and low temperature conditions are becoming more common. Changes to climate patterns include more intense storms in some areas and more severe droughts in others.

- Average sea surface temperatures have increased, resulting in more acidic oceans, as well as rising sea levels. Average global sea levels rose an average of 0.06 inch per year from 1880 to 2013; however, they have risen 0.11 to 0.14 inch per year since 1993. Despite overall increases, regional changes in sea level vary, and increases in land elevation have resulted in a decrease in sea level in some locations in Alaska and the Pacific Northwest.
- Climate change has resulted in changes to snow and ice. On average, snowfall, snow cover, and snowpack in the northern U.S. have decreased. Changes to snow cover and reduced snowfall affect water supplies, hydroelectric power production, transportation, recreation, vegetation, and wildlife.
- Changes to the earth's climate will have secondary effects on the health and well-being of its human inhabitants and natural ecosystems. (USEPA, 2016e)

3.16.2.1 Impacts of Climate Change on Department of Defense Mission

The 2014 DoD Climate Change Adaptation Roadmap indicates that rising global temperatures, changing precipitation patterns, increasing frequency or intensity of extreme weather events, and rising sea levels and associated storm surges are likely to affect the DoD's activities, and adaptation will require consideration of climate change in DoD planning and, operations; training; buildings and infrastructure; and acquisition (DoD, 2014). For Example, climate change may affect planning and operations. Sea level rise and changing temperatures could impact amphibious landings and operation timing windows. Increased frequency of extreme weather could impact operational capabilities and require new domestic and international need for disaster relief and humanitarian services. The opening of Arctic seas lanes could result in an expanded mission to monitor and safeguard navigation. (DoD, 2014).

3.16.2.2 Impacts of Climate Change in Washington State and Puget Sound

According to Washington State's *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy* (Washington State Department of Ecology, 2012), climate change is affecting the state with warmer temperatures, rising sea levels, reduced snow pack, and extreme weather (Washington State Department of Ecology, n.d.[h]).

Warmer temperatures have resulted in milder winters, more rain, and hotter summers with less rain. Changes in weather are already having an impact on the state's agricultural industry through increasing droughts (Washington State Department of Ecology, n.d.[i]). Sea level rise effects include coastal community flooding, coastal erosion and landslides, seawater intrusion into groundwater wells, and lost wetlands and estuaries (Washington State Department of Ecology, n.d.[j]). Washington has experienced reduced snow pack and earlier runoff. Much of Washington's water supply is stored in its snow pack and glaciers that melt into rivers. Downstream effects include changes in the timing of peak freshwater flows, power output at hydropower facilities, fish migration, and water availability in the dry summer season (Washington State Department of Ecology, n.d.[k]).

3.16.3 Greenhouse Gas Emissions

3.16.3.1 Regional and State Greenhouse Gas Emissions

The USEPA and Washington State have a number of programs designed to collect and analyze GHG emissions to better understand the sources of GHGs in the state. These programs help the state design

policies to reduce GHG emissions and track its progress towards meeting the state's statutory GHG reduction limits.

The USEPA collects and reports nationally GHG emissions in the *Annual Inventory of U.S. Greenhouse Gas Emissions and Sinks*. The State of Washington's anthropogenic GHG emissions for the period from 1990 to 2013 (see Table 3.16-1) were developed using a set of generally accepted principles and guidelines for state GHG emission inventories, with adjustments for Washington-specific data and context, as appropriate—including the addition of military aircraft (Washington State Department of Ecology, 2007). The most recent inventory was published in October 2016 (Washington State Department of Ecology, 2016b).

Table 3.16-1 Washington State Annual Greenhouse Gas Air Emissions Inventory

Million Metric Tons CO_2e	***1990***	***2010***	***2011***	***2012***	***2013***
Electricity, Net Consumption-based	***16.9***	***20.7***	***15.7***	***15.2***	***18.2***
Coal	16.8	15.8	12.8	12.1	13.3
Natural Gas	0.1	4.8	2.8	3.0	4.8
Petroleum	-	0.1	0.1	0.1	0.07
Residential/Commercial/Industrial	***18.6***	***19.7***	***20.8***	***20.5***	***21.9***
Transportation	***37.5***	***42.2***	***41.9***	***42.5***	***40.4***
Onroad Gasoline	20.4	21.9	21.3	21.2	21.7
Onroad Diesel	4.1	8.0	8.0	7.4	7.0
Marine Vessels	2.6	3.0	3.3	4.1	3.4
Jet Fuel and Aviation Gasoline	9.1	8.1	7.6	8.0	6.6
Natural Gas Industry	***0.5***	***0.8***	***0.8***	***0.8***	***0.8***
Industrial Process	***7.0***	***4.5***	***4.6***	***4.6***	***4.8***
Waste Management	***1.5***	***3.1***	***3.1***	***3.2***	***3.3***
Agriculture	***6.4***	***6.2***	***6.5***	***6.6***	***5.9***
Total Gross Emissions	***88.4***	***97.2***	***93.7***	***93.6***	***94.4***

Source: Washington State Department of Ecology, 2016b

Bold values are included in the total gross emissions; all other rows and values included are subsets of the category above.
2010-2012 data have been revised based on values contained in the new International Panel on Climate Change Fourth Assessment Report for Global Warming Potential.

Key:
CO_2e = carbon dioxide equivalent

3.16.3.2 NAS Whidbey Island Greenhouse Gas Emissions

The NAS Whidbey Island complex also reports GHG emissions, as required under WAC 173-401-200 (19) and (35) (9/10/11) (NWCAA, 2013). Recent annual GHG emissions from stationary sources reported for the NAS Whidbey Island complex are shown in Table 3.16-2. Station-wide mobile GHG emissions are not reported or estimated.

Table 3.16-2 NAS Whidbey Island Complex Annual Reported GHG Air Emissions Inventory (Required Stationary Sources Only)

Year	*CO_2*	*CH_4[1]*	*N_2O[2]*	*Total $MTCO_2e$ Emissions*
2009	11,407	NR	NR	11,407
2010	11,129	5	21	11,155
2011	15,939	8	0	15,947
2012	17,843	8.4	13.6	17,864
2013	16,542	7.14	12.4	16,562
2014	11,357	5	6	11,371
2015	13,373	6.3	7.7	13,387
2016	13,560	6.5	8.0	13,575

Sources: NWCAA, 2013; NAS Whidbey Island, 2013b, 2017b; Stewart, 2018

Note: Measurements in $MTCO_2e$ per year totals may not sum because of rounding.

[1] 2010-2013 Global warming potential of CH_4 = 21, 2014-2016 GWP for CH_4 = 25.
[2] 2010-2013 Global warming potential of N_2O = 310, 2014-2016 GWP for N_2O = 298.

Key:
CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
GWP = global warming potential
MT = metric tons
N_2O = nitrous oxide
NR = not reported

Using methods, emissions factors, and average time-in-mode assumptions described in Section 3.4, GHG emissions from the Growler aircraft have been estimated. Counting all operations that produce emissions (i.e., all engine and auxiliary power unit use), each typical sortie with one full landing and take-off cycle (including all ground operations, such as warm-up, taxiing in and out, and refueling operations), transit to OLF Coupeville, and eight touch-and-go operations would take 95 minutes, or 1.6 hours, including an estimated 40 seconds total of AB use. Each such sortie would burn 1,480 gallons of jet fuel and produce 14.25 MT of equivalent carbon dioxide ($MTCO_2e$), for an average fuel use of 937 gallons per hour and an emission rate of 9.03 $MTCO_2e$ per hour.

This analysis has estimated the emissions that will be produced by Growler OLF training over the course of a year. While there are a certain number of operations per year, they are not constant, and power settings vary based on the type of operation. The total GHG emissions from NAS Whidbey Island's Growler aircraft operations are currently 89,145 $MTCO_2e$ per year, and GHG emissions from current Growler aircraft personnel commuting are 9,091 $MTCO_2e$ per year (Refer to Appendix B for complete air emissions calculations).

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4 Environmental Consequences

This chapter presents an analysis of the potential direct and indirect effects of each alternative on the affected environment. The following discussion elaborates on the nature of the characteristics that might relate to resources. "Significantly," as used in the National Environmental Policy Act (NEPA), requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts, such as society as a whole (for example [e.g.], human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant (40 Code of Federal Regulations [CFR] Section 1508.27). Intensity refers to the severity or extent of the potential environmental impact, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential impact needs to be in order to be considered significant. Likewise, the less sensitive the context, the more intense a potential impact would be expected to be to be categorized as significant.

Construction of new and improved facilities could begin as early as 2018. Personnel and aircraft would arrive incrementally, as aircraft are delivered by the manufacturer, personnel are trained, and families relocate to the area, until the action is complete. The year 2021 is the end-state used in this analysis, which represents full implementation of the Proposed Action. In addition, 2021 is the appropriate baseline because it is when the P-8A Poseidon transition will be complete and therefore represents the existing environment if no action is taken. This includes additional aircraft, facilities, infrastructure, and personnel levels that will exist in 2021. Therefore, with these other actions complete, the analysis isolates the impacts of this Proposed Action of adding additional Growler aircraft, personnel, and associated construction. The analysis of the environmental consequences includes the following: airspace and airfield operations; noise associated with aircraft operations; public health and safety; air quality; land use; cultural resources; American Indian traditional resources; biological resources; water resources; socioeconomics; environmental justice; transportation; infrastructure; geological resources; hazardous materials and waste; and climate change and greenhouse gases. Section 1.5, Scope of Environmental Analysis, provides more detail on which environmental resource areas were considered for analysis in this Environmental Impact Statement (EIS).

The Navy did not identify a Preferred Alternative prior to publication of the Draft EIS in November 2016 because it was evaluating operational and environmental considerations necessary to make that determination. The Navy announced the Preferred Alternative on June 25, 2018, prior to release of the Final EIS, in order to provide timely information to the public once the alternative had been identified. Alternative 2, adding 36 Growler aircraft to the Naval Air Station (NAS) Whidbey Island complex, has been identified as the Preferred Alternative. This alternative best meets operational demands by both establishing two new expeditionary squadrons and adding two aircraft to each squadron that operates off aircraft carriers. Further, Scenario A has been identified as the preferred scenario under Alternative 2 for field carrier landing practice (FCLP) distribution because it results in the least disruption of other operations at Ault Field, provides the best training for Navy pilots, and impacts the fewest number of residents living in the community. No final decision has yet been made. The ultimate decision with respect to force structure and FCLP distribution will be made by the Secretary of the Navy or his representative and announced in a Record of Decision (RoD) no earlier than 30 days following the public release of the Final EIS. For more details on the Preferred Alternative, see Section 2.4.

4.1 Airspace and Airfield Operations

The analysis of airspace management and use involves consideration of many factors, including the types, locations, and frequency of airspace operations, the presence or absence of already designated (controlled) airspace, and the amount of air traffic using or transiting through a given area. Specifically, this assessment examines how the Proposed Action would affect airspace management structure and airfield operations related to the NAS Whidbey Island complex. The communities surrounding Ault Field and Outlying Landing Field (OLF) Coupeville are assessed for impacts from changes to the number of annual operations that would occur from the Proposed Action under each of the alternatives and scenarios. These increases represent levels of operations similar to historic levels of operations experienced over the life of the complex (see Section 1.4).

The alternatives and sub-alternatives, comprised of operational scenarios, are more fully described in Section 2.3 and are summarized below:

- **Scenario A**
  20 percent of all FCLP operations conducted at Ault Field, and 80 percent of all FCLPs conducted at OLF Coupeville
- **Scenario B**
  50 percent of all FCLPs conducted at Ault Field, and 50 percent of all FCLPs conducted at OLF Coupeville
- **Scenario C**
  80 percent of all FCLPs conducted at Ault Field, and 20 percent of all FCLPs conducted at OLF Coupeville
- **Scenario D**
  30 percent of all FCLPs conducted at Ault Field, and 70 percent of all FCLPs conducted at OLF Coupeville
- **Scenario E**
  70 percent of all FCLPs conducted at Ault Field, and 30 percent of all FCLPs conducted at OLF Coupeville

Airspace and Airfield Operations

Net increase of 35 or 36 Growler aircraft; total annual airfield operations for the NAS Whidbey Island complex (Ault Field and OLF Coupeville) would increase up to approximately 112,600 operations, a 33-percent increase, which represents a return to previous levels of airfield operations at the NAS Whidbey Island complex.

Airspace

No changes are proposed to existing airspace under any of the alternatives.

Airfield

Ault Field and OLF Coupeville meet all the operational requirements and have sufficient capacity under routine operating conditions to support the airfield operations of the additional Growler aircraft. Airfield operations at Ault Field may be adversely impacted under Scenario C of all the action alternatives, with approximately 80 percent of the FCLP operations conducted at Ault Field. Airfield operations at Ault Field under all scenarios would not result in significant adverse impacts to airfields and airspace at the NAS Whidbey Island complex.

The analysis includes the continuation and expansion of Growler operations at the NAS Whidbey Island complex, including FCLPs at Ault Field and OLF Coupeville. In addition, the analysis includes all flight operations of other aircraft at the NAS Whidbey Island complex. Total airfield operations are considered all aircraft operations that occur; these include Touch-and-Goes, Depart and Re-enter, Ground

Controlled Approaches, and FCLPs. Total airfield operations include all aircraft for Ault Field and OLF Coupeville. Total operations may differ between alternative and scenario due to varying training requirements and randomness inherent in modeling. In addition, the percentages depicted are used for general description of the scenarios.

4.1.1 Airspace and Airfield Operations, No Action Alternative

Under the No Action Alternative, the United States (U.S.) Department of the Navy (Navy) would not add additional EA-18G "Growler" aircraft or increase operations at Ault Field. Under the No Action Alternative, the FCLP patterns at OLF Coupeville would remain unchanged (Figure 4.1-1). The primary mission of OLF Coupeville is to support Growler FCLPs; however, MH-60 helicopter operations would continue to occur at OLF Coupeville. Helicopter operations total fewer than 400 operations annually and would be scheduled on a not-to-interfere basis with Growler operations.

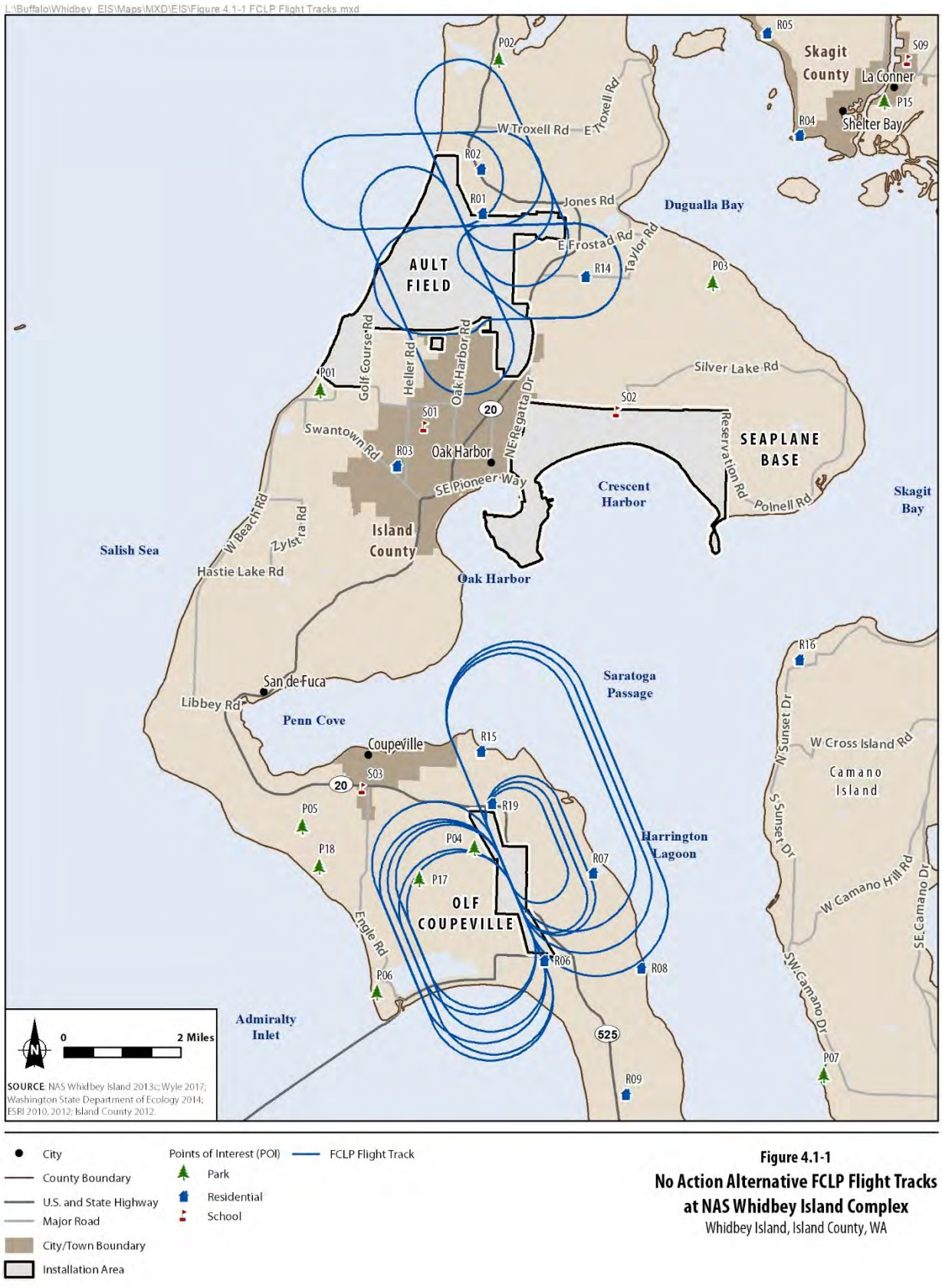

Figure 4.1-1
No Action Alternative FCLP Flight Tracks at NAS Whidbey Island Complex
Whidbey Island, Island County, WA

4.1.2 Airspace and Airfield Operations, Alternative 1

Under Alternative 1, carrier capabilities would be expanded by adding three additional aircraft and associated aircrews to each existing carrier squadron and augmenting the Fleet Replacement Squadron (FRS) with eight additional aircraft and additional squadron personnel (a net increase of 35 aircraft and 335 personnel).

4.1.2.1 Airspace and Airfield Operations, Potential Impacts under Alternative 1

4.1.2.1.1 Airspace, Alternative 1

No changes are proposed to existing airspace under Alternative 1. Proposed Growler operations within controlled airspace and Special Use Airspace (SUA) in the vicinity of the NAS Whidbey Island complex would be similar to current Growler operations. Growler operations would occur in Ault Field's Class C controlled airspace, Class A and E controlled airspace, Alert Area-680, Naval Weapons Systems Training Facility (NWSTF) Boardman Okanogan A/B/C Military Operations Area (MOA), Olympic A/B MOAs, Roosevelt A/B MOAs, W-237 A/B/C/D/E/F/G/H/J, and Instrument Flight Rules (IR) and Visual Flight Rules (VR) Military Training Routes (MTRs) IR-341, IR342, IR-343, IR-344, IR-346, IR-348, VR-1350, VR-1351, VR-1352, VR-1353, VR-1354, and VR-1355. Training operations are analyzed under other NEPA documents that focus on all training activities, including Growler operations, occurring within a range complex or MOA, and involve many different types of aircraft, ships, and range complex enhancements. Growler training occurring in Okanogan, Roosevelt, and Olympic MOAs and W-237 is analyzed in the 2010 Northwest Training Range Complex Final EIS/Overseas EIS (OEIS). The 2015 Northwest Training and Testing EIS/OEIS analyzed a small increase in Growler training in the Olympic MOAs and W-237.

Existing Growler aircraft that are transiting from Ault Field's Class C controlled airspace to nearby military training areas (Olympic, Okanogan, Roosevelt, and NWSTF Boardman) fly at altitudes between 14,000 feet and 16,000 feet above mean sea level (MSL). The aircrews that train with aircraft in the MOAs and NWSTF Boardman arrive in the SUA via established, standard flight routes within the national airspace system and are under the direct control of the Federal Aviation Administration (FAA).

Under all alternatives, the number of transits to all training areas would increase by approximately two or three flights per day. Proposed Growler operations would transit between Ault Field and military training areas (Olympic, Okanogan, Roosevelt, and NWSTF Boardman) in a similar manner as existing Growlers (at altitudes between 14,000 feet and 23,000 feet above MSL) and would generate similar sound levels. Because the area between Ault Field and the military training areas is mountainous, the associated altitude above ground level (AGL) would range from approximately 6,000 feet AGL to 16,000 feet AGL. Therefore, Growler aircraft operating at these transit altitudes would create a sound exposure level (SEL) at ground level between 69 and 84 decibels (dB) and a maximum A-weighted sound level (L_{max}) of 54 to 72 dB, comparable to the sound level of a passing automobile. Noise metrics are outlined in Section 3.2. The public would hear noise from aircraft overflights if they are in the vicinity of an event. However, these effects would occur on a temporary and intermittent basis. All flight activity within 10 miles of the NAS Whidbey Island complex is analyzed in more detail in Section 4.2.

The cumulative effects of Growler training associated with this alternative and Growler training that occurs outside the study area of this EIS, which are addressed in other NEPA documents, are analyzed in the cumulative impacts chapter of this EIS (see Chapter 5).

Airspace usage and capacity were analyzed by evaluating flight track congestion in the NAS Whidbey Island complex by counting the number of aircraft using a specific flight track at the time the next arriving aircraft requests to use that flight track. Projected MTR operations would increase under Alternative 1 by approximately 32 percent across the 12 MTRs listed above, as shown in Table 4.1-1, and the MTRs would have sufficient capacity for the increased operations. SUA in the vicinity of the NAS Whidbey Island complex (listed above) was evaluated to ensure adequate capacity for increased operations generated by the Proposed Action. Additionally, this alternative would not change existing procedures for airspace access for civil aviation transiting airspace under the control of the NAS Whidbey Island air traffic control (ATC) Facility, located at Ault Field. Therefore, implementation of Alternative 1 would not result in significant impacts to airspace.

Table 4.1-1 Annual Military Training Route Operations[1] in the Affected Environment

Route Type	*No Action*	*Alternative 1*	*Alternative 2*	*Alternative 3*
IR-341	12	16	16	16
IR-342	7	10	10	10
IR-343	0	0	0	0
IR-344	192	254	260	258
IR-346	62	82	85	84
IR-348	34	44	46	45
Total IFR Routes	**308**	**413**	**417**	**413**
VR-1350	743	980	1,006	997
VR-1351	108	143	146	145
VR-1352	62	82	85	84
VR-1353	26	35	36	35
VR-1354	5	6	7	6
VR-1355	1,058	1,395	1,432	1,420
Total VFR Routes	**2,002**	**2,641**	**2,712**	**2,688**
Total for All VFR and IFR Routes	**2,310**	**3,046**	**3,128**	**3,101**

Note:
[1] Estimated

Key:
IFR = Instrument Flight Rules
VFR = Visual Flight Rules

4.1.2.1.2 Airfield Operations, Alternative 1

Table 4.1-2 presents the projected number of aircraft operations at the NAS Whidbey Island complex under Alternative 1 as compared to the No Action Alternative. There is a net increase of 35 Growler aircraft under Alternative 1; total annual airfield operations for the NAS Whidbey Island complex would increase from approximately 84,700 to approximately 112,600, a 33-percent increase. This increase represents a level of operation similar to historical levels of operations experienced over the life of the NAS Whidbey Island complex (see Section 1.4). Under any scenario, the Proposed Action represents an increase in the number of operations at both Ault Field and OLF Coupeville. Aircraft operations are presented for the Growler squadrons, all other aircraft, and total operations ("other aircraft" are defined as all stationed and transient aircraft that utilize Ault Field and OLF Coupeville). Although the

MH-60 helicopters, C-40A aircraft, and transient aircraft would continue to operate at Ault Field, operations of these aircraft types are represented in the category entitled "all other aircraft operations" as part of the Proposed Action because the projected operations are not expected to change. Ault Field and OLF Coupeville meet all the operational requirements and have sufficient capacity under routine operating conditions to support the airfield operations of the additional Growler aircraft, given the increase in operations is consistent with previous levels of operations as described in Section 1.4.

Operation and maintenance of additional Growler aircraft would continue to adhere to established procedures in the affected environment. Further analysis related to impacts from personnel, maintenance operations, and environmental impacts are detailed later in Chapter 4 to include socioeconomics (see Section 4.10.2), hazardous materials (see Section 4.15.2), direct and indirect stationary air emissions (see Section 4.4), and land use (4.5.2).

Ault Field

Projected operations at Ault Field would include arrivals, departures, FCLPs, and other pattern operations, as depicted in Figures 3.1-3 to 3.1-5. FCLPs for Ault Field under Alternative 1 are depicted in Figure 4.1-2. The majority of airfield operations at Ault Field are conducted on runways 14 and 25, primarily due to prevailing wind conditions, but also due to noise-abatement procedures when allowed by weather conditions. See Section 3.2.4.1 for a noise-complaint and noise-abatement discussion. Noise-abatement procedures would continue to be followed under all alternatives analyzed as part of the Proposed Action. See Figure 1.2-2 for runway designations.

During an average year, total airfield operations at Ault Field would result in an increase of 9,100 projected operations under Scenario A, when 20 percent of all FCLPs would be conducted at Ault Field, to an increase of 25,000 projected operations under Scenario C, when 80 percent of all FCLPs would be conducted at Ault Field (Table 4.1-2). Compared to Scenarios A, B, and D, impacts related to airspace congestion would be experienced with greater frequency under Scenarios C and E at Ault Field. Airfield operations at Ault Field would be adversely impacted under the alternatives with 80 percent (Scenario C) or more of the FCLPs conducted at Ault Field. Under Scenario C, an expected increase in scheduling challenges and mission delays could occur at Ault Field, which in turn could cause deficiencies in pilot proficiency and unit readiness. These scheduling delays could result in flights and training occurring at Ault Field later into the night. The numbers above represent the average year conditions. Overall, Alternative 1 would not result in adverse impacts to airspace at Ault Field from proposed Growler operations. There would be an impact to operations when 80 percent of FCLP operations are conducted at Ault Field (Scenario C) due to instances of pattern congestion. As stated in Section 3.1.2, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. Since Ault Field is a major airfield supporting home based aircraft as well as transient aircraft, a significantly greater number of operations occur at Ault Field than at OLF Coupeville, which is primarily used for FCLP.

In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A, Aircraft Noise Study. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations at Ault Field would increase approximately 1 to 2 percent across all operational scenarios as compared to the corresponding alternative (see Appendix A).

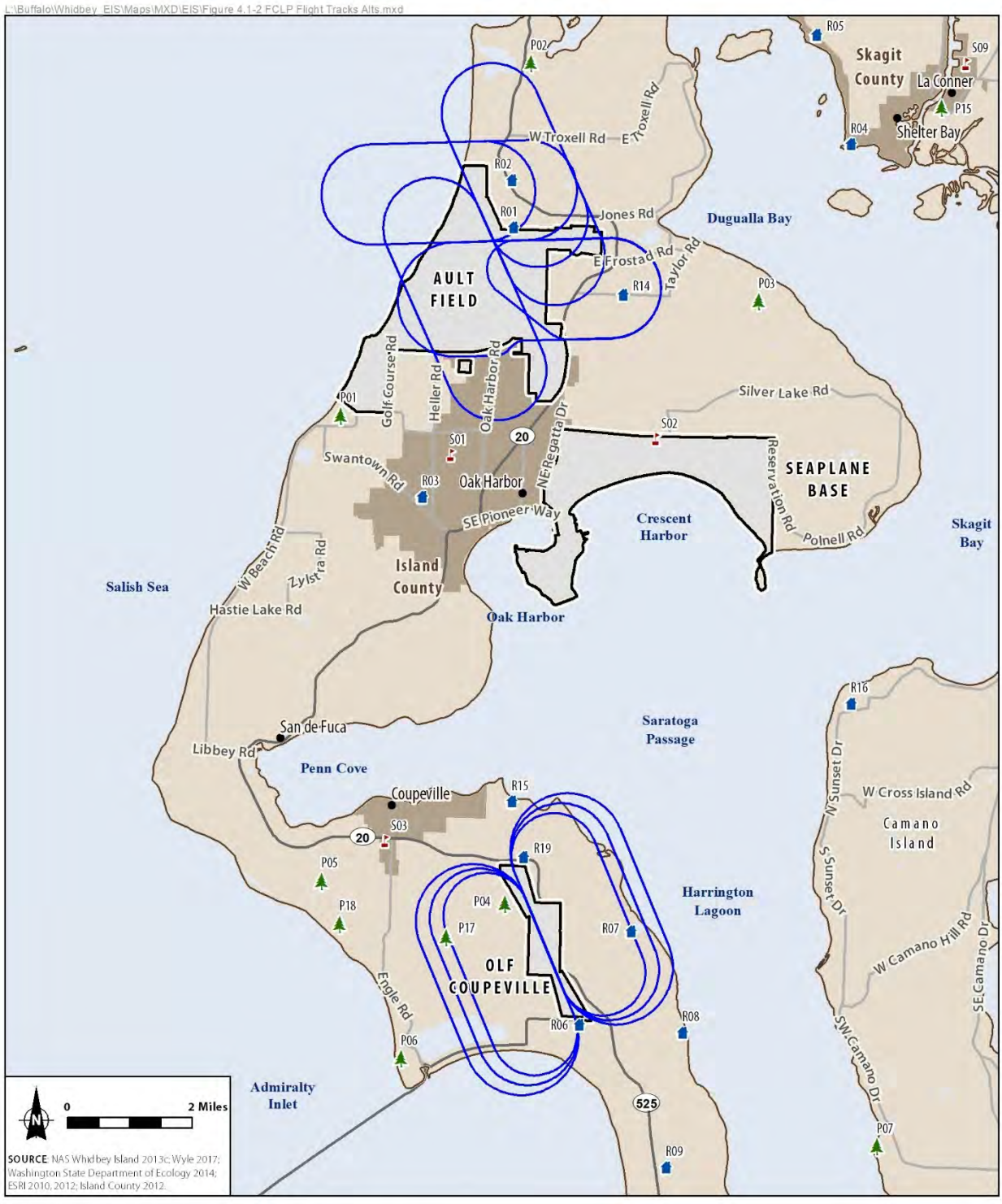

Figure 4.1-2
Alternatives 1-3 FCLP Flight Tracks at NAS Whidbey Island Complex
Whidbey Island, Island County, WA

OLF Coupeville

Airfield operations at OLF Coupeville would primarily be conducted by the Growler squadrons and would include arrivals, departures, other pattern operations, and FCLPs, as depicted in Figures 3.1-3 through 3.1-5. FCLPs at OLF Coupeville under Alternative 1 are depicted in Figure 4.1-2. At OLF Coupeville, annual airfield operations would result in an increase of 18,800 operations during an average year under Scenario A, when 80 percent of the FCLPs would be conducted at OLF Coupeville, to an increase of 100 operations during an average year under Scenario C, when 20 percent of the FCLPs would be conducted at OLF Coupeville (Table 4.1-2). The numbers above represent the average year conditions. Overall, Alternative 1 would not result in significant adverse impacts to airspace at OLF Coupeville from proposed Growler operations. There are no congestion concerns for OLF Coupeville under any of the scenarios. As previously stated, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. As such, under all scenarios, periods of concentrated FCLP training would occur more frequently. Periods of FCLP training are often followed by several days or weeks with little or no activity because squadrons are deployed. A typical training session lasts for about 45 minutes, with three to five aircraft participating, and may occur several times during a 24-hour period. FCLP training schedules are managed by NAS Whidbey Island complex Air Operations and the VAQ Wing to ensure operations remain consistent with conditions studied under NEPA.

Historically, the runway utilization goal at OLF Coupeville has been to split FCLPs equally between Runways 14 and 32. In recent years, however, due to a non-standard pattern on Runway 14, the utilization of Runway 14 has been significantly lower. The Proposed Action involves modifications to the FCLP patterns at OLF Coupeville primarily due to the non-standard pattern on Runway 14. This narrower pattern requires an unacceptably steep bank angle for the Growler due to performance differences from the Prowler's flight capabilities, resulting in limited use of Runway 14. The modifications of the FCLP patterns will also maintain the same pattern for both day and night operations as opposed to current operations, which change the pattern between day and night. The proposed OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-2. The proposed flight profile would be similar to the current one, with the downwind leg having a 600-foot altitude relative to the runway. Under Alternative 1 (and all alternatives), these patterns would be used in order to improve the standardization of training and enable more use of Runway 14. The standard FCLP patterns would result in runway use percentages based on the prevailing winds rather than aircraft performance and quality of training. Based on historical meteorological conditions at the OLF, the projected runway utilization for Runway 14 is approximately 30 percent, and the remaining percentage would be utilized on Runway 32.

Implementation of Alternative 1 would increase total airfield operations by up to 289 percent above the No Action Alternative. However, Alternative 1 would not require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures in order to accommodate the increased air traffic.

In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A, Aircraft Noise Study. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations could increase approximately 9 to 10 percent at OLF Coupeville based on the operational scenarios selected as compared to the corresponding alternative (see Appendix A).

4.1.2.1.3 Alternative 1 Conclusion

Overall, Alternative 1 would not result in significant adverse impacts to airfields and airspace at the NAS Whidbey Island complex from proposed Growler operations. There would be impacts to operations when 80 percent of FCLPs (Scenario C) are conducted at Ault Field due to instances of pattern congestion. There would be an increase of 9,100 to 25,000 annual aircraft operations at Ault Field and an increase of 100 to 18,800 annual aircraft operations at OLF Coupeville, depending on the scenario selected. Growler operations would be conducted in a manner similar to the current Navy aircraft training missions conducted at the NAS Whidbey Island complex with the exception of standardizing the FCLP pattern for Runway 14 at OLF Coupeville utilizing the same pattern for day and night operations. There would be increases in the number of annual operations that would be consistent with previous levels, but additional Growler operations would not require changes to the structure of the affected SUA, and current safety procedures would continue to be emphasized.

Table 4.1-2 Comparison of Modeled No Action Alternative and Alternative 1, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8, 9]

Aircraft Type	*FCLP[2]*	*Other Operations[3]*	*Total*	*Total Change from No Action[6]*
Average Year Scenarios for Ault Field				
No Action	11,300	66,900	78,200	
Alternative 1, Scenario A (20% of FCLPs at Ault Field)				
Growler	6,100	67,000	73,100	
All Other Aircraft[4, 6]	0	14,200	14,200	
Total Airfield Operations	6,100	81,200	87,300	+9,100
Alternative 1, Scenario B (50% of FCLPs at Ault Field)				
Growler	15,500	65,600	81,100	
All Other Aircraft[4, 6]	0	14,200	14,200	
Total Airfield Operations	15,500	79,800	95,300	+17,100
Alternative 1, Scenario C (80% of FCLPs at Ault Field)				
Growler	24,900	64,400	89,300	
All Other Aircraft[4, 6]	0	13,900	13,900	
Total Airfield Operations	24,900	78,300	103,200	+25,000
***Alternative 1, Scenario D* (30% of FCLPs at Ault Field)**				
Growler	9,200	66,600	75,800	
All Other Aircraft[4, 6]	0	14,200	14,200	
Total Airfield Operations	9,200	80,800	90,000	+11,800
***Alternative 1, Scenario E* (70% of FCLPs at Ault Field)**				
Growler	21,700	64,800	86,500	
All Other Aircraft[4, 6]	0	13,900	13,900	
Total Airfield Operations	21,700	78,700	100,400	+22,200

Table 4.1-2 Comparison of Modeled No Action Alternative and Alternative 1, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8, 9]

Aircraft Type	*FCLP[2]*	*Other Operations[3]*	*Total*	*Total Change from No Action[6]*
Average Year Scenarios for OLF Coupeville				
No Action	6,100	400	6,500	
Alternative 1, Scenario A (80% of FCLPs at OLF Coupeville)				
Growler	24,900	0	24,900	
All Other Aircraft[4, 6]	0	400	400	
Total Airfield Operations	24,900	400	25,300	+18,800
Alternative 1, Scenario B (50% of FCLPs at OLF Coupeville)				
Growler	15,500	0	15,500	
All Other Aircraft[4, 6]	0	400	400	
Total Airfield Operations	15,500	400	15,900	+9,400
Alternative 1, Scenario C (20% of FCLPs at OLF Coupeville)				
Growler	6,200	0	6,200	
All Other Aircraft[4, 6]	0	400	400	
Total Airfield Operations	6,200	400	6,600	+100
***Alternative 1, Scenario D* (70% of FCLPs at OLF Coupeville)**				
Growler	21,800	0	21,800	
All Other Aircraft[4, 6]	0	400	400	
Total Airfield Operations	21,800	400	22,200	+15,700
***Alternative 1, Scenario E* (30% of FCLPs at OLF Coupeville)**				
Growler	9,300	0	9,300	
All Other Aircraft[4, 6]	0	400	400	
Total Airfield Operations	9,300	400	9,700	+3,200
Average Year Scenarios for the NAS Whidbey Island Complex				
No Action Total	17,400	67,300	84,700	
Alternative 1, Scenario A				
Total Airfield Operations	31,000	81,600	112,600	+27,900
Alternative 1, Scenario B				
Total Airfield Operations	31,000	80,200	111,200	+26,500
Alternative 1, Scenario C				
Total Airfield Operations	31,100	78,700	109,800	+25,100
Alternative 1, Scenario D				
Total Airfield Operations	31,000	81,200	112,200	+27,500
Alternative 1, Scenario E				
Total Airfield Operations	31,000	79,100	110,100	+25,400

Table 4.1-2 Comparison of Modeled No Action Alternative and Alternative 1, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8, 9]

Aircraft Type	*FCLP[2]*	*Other Operations[3]*	*Total*	*Total Change from No Action[6]*

Source: Wyle, 2017

Notes:

1 Three-digit numbers are rounded to nearest 100 if ≥ to 100; two-digit numbers are rounded to the nearest 10 if ≥ 10 or if between 1 and 9.

2 Each FCLP pass = 2 operations (one arrival and one departure).

3 Other operations include Touch-and-Goes, Depart and Re-enter, and Ground Controlled Approaches.

4 All other aircraft include P-8A, H-60, C-40, and transient aircraft. The 400 other operations at OLF Coupeville are H-60 search and rescue helicopter operations.

5 An operation is defined as one arrival or one departure.

6 The number of operations fluctuates slightly between alternative and scenario due to varying training requirements and randomness inherent in modeling.

7 The NAS Whidbey Island complex includes Ault Field and OLF Coupeville.

8 Scenario A: 20 percent of FCLPs conducted at Ault Field, and 80 percent conducted at OLF Coupeville; Scenario B: 50 percent of FCLPs conducted at Ault Field, and 50 percent conducted at OLF Coupeville; Scenario C: 80 percent of FCLPs conducted at Ault Field, and 20 percent conducted at OLF Coupeville; Scenario D: 30 percent of FCLPs conducted at Ault Field, and 70 percent conducted at OLF Coupeville; Scenario E: 70 percent of FCLPs conducted at Ault Field, and 30 percent conducted at OLF Coupeville.

9 Since the publication of the Draft EIS, two new operational scenarios for each action alternative have been added to the analysis. In addition, several updates were applied to the noise analysis; these included incorporation of Precision Landing Mode, which reduces FCLP requirements by approximately 20 percent and leads to a reduction in FCLP operations, across all scenarios and updating the number of pilots per squadron (reduction); see Section 1.13.

Key:
FCLP = field carrier landing practice
OLF = outlying landing field

4.1.3 Airspace and Airfield Operations, Alternative 2

Under Alternative 2, expeditionary and carrier capabilities would be expanded by adding two expeditionary squadrons, two additional aircraft to each existing carrier squadron, and eight additional aircraft to the training squadron (a net increase of 36 aircraft and 628 personnel).

4.1.3.1 Airspace and Airfield Operations, Potential Impacts under Alternative 2

The potential impacts and analysis are similar to Alternative 1. The Proposed Action would have a minor impact to local area civil and commercial aviation airspace use because, although the additional Growler aircraft would be operating with an increased frequency, they would be doing so within the same flight parameters currently used by aircraft under existing conditions within the controlled airspace surrounding the NAS Whidbey Island complex. Airfield operations at OLF Coupeville would not be adversely affected under any scenario. Airfield operations at Ault Field will be adversely impacted under the Proposed Action, Alternative 2, with 80 percent or more of the FCLPs conducted at Ault Field, under Scenario C. An expected increase in scheduling challenges and mission delays would occur at Ault Field under Scenario C, which could cause intermittent deficiencies in pilot proficiency and unit readiness. When more FCLPs are flown at Ault Field, other flights and aircrews training with aircraft at Ault Field are restricted or delayed. This causes more people off base to be affected because training is extended later into the night, and more aircraft are held in larger or extended flight patterns while FCLPs are conducted.

4.1.3.1.1 Airspace, Alternative 2

No changes are proposed to existing airspace under Alternative 2. Proposed Growler operations within controlled airspace and SUA in the vicinity of the NAS Whidbey Island complex would be similar to current Growler operations. Proposed Growler operations would transit between Ault Field and military training areas in a similar manner to that used by existing Growlers and would generate similar sound levels. Projected MTR operations would increase under Alternative 2 by approximately 35 percent across the MTRs, as shown in Table 4.1-1, and the MTRs would have sufficient capacity for the increased operations. SUA in the vicinity of the NAS Whidbey Island complex was evaluated to ensure adequate capacity for increased operations generated by the Proposed Action. Additionally, this alternative would not change existing procedures for airspace access for civil aviation transiting airspace under control of the NAS Whidbey Island ATC Facility, located at Ault Field. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced. Therefore, implementation of Alternative 2 would not result in significant impacts to airspace.

4.1.3.1.2 Airfield Operations, Alternative 2

Table 4.1-3 presents the projected number of aircraft operations at the NAS Whidbey Island complex under Alternative 2 as compared to the No Action Alternative. There is a net increase of 36 Growler aircraft under Alternative 2; total annual airfield operations for the NAS Whidbey Island complex would increase from approximately 84,700 to approximately 112,100--a 32-percent increase. Aircraft operations are presented for the Growler squadrons, all other aircraft, and total operations. All other aircraft in addition to transient aircraft would continue to operate at Ault Field as part of the Proposed Action because the projected operations are not expected to change for these aircraft.

Ault Field

Projected operations at Ault Field would include arrivals, departures, FCLPs, and other pattern operations (i.e., touch-and-go [T&G] operations and Ground Controlled Approach [GCA]/Carrier Controlled Approach [CCA] patterns) as depicted in Figures 3.1-3 through 3.1-5. FCLPs for Ault Field under Alternative 2 are depicted in Figure 4.1-2. The majority of airfield operations at Ault Field are conducted on runways 14 and 25, primarily due to prevailing wind conditions but also due to noise-abatement procedures when allowed by weather conditions. See Section 3.2.4.1 for noise-complaint and noise-abatement discussion. Noise-abatement procedures would continue to be followed under the Proposed Action. See Figure 1.2-2 for runway designations.

During an average year, total airfield operations at Ault Field would result in an increase of 9,800 projected operations under Scenario A, when 20 percent of all FCLPs would be conducted at Ault Field, to an increase of 25,000 projected operations under Scenario C, when 80 percent of all FCLPs would be conducted at Ault Field (Table 4.1-3). As compared to Scenarios A, B, and D, impacts related to airspace congestion would be experienced with greater frequency under Scenarios C and E at Ault Field. Airfield operations at Ault Field would be adversely impacted under the alternatives with 80 percent or more of the FCLPs conducted at Ault Field. FCLP schedules are managed by NAS Whidbey Island complex Air Operations and the VAQ Wing. Under Scenario C, an expected increase in scheduling challenges and mission delays could occur at Ault Field, which in turn could cause deficiencies in pilot proficiency and unit readiness. These scheduling delays could result in flights and training occurring at Ault Field later into the night. The numbers above represent the average year conditions. Overall, Alternative 2 would not result in significant adverse impacts to airspace at Ault Field from proposed Growler operations. There would be an impact to operations when 80 percent of operations are conducted at Ault Field (Scenario C) due to instances of pattern congestion. The need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. Since Ault Field is a major airfield supporting home based aircraft as well as transient aircraft, a larger number of operations occur at Ault Field than at OLF Coupeville, which is primarily used for FCLP.

In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A, Aircraft Noise Study. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations at Ault Field increase approximately 1 to 3 percent, based on the operational scenario selected (see Appendix A).

OLF Coupeville

Airfield operations at OLF Coupeville would primarily be conducted by the Growler squadrons and would include arrivals, departures, other pattern operations, and FCLPs, as depicted in Figures 3.1-3 through 3.1-5. FCLPs at OLF Coupeville under Alternative 2 are depicted in Figure 4.1-2. At OLF Coupeville, annual airfield operations would result in an increase of 17,600 operations during an average year under Scenario A, when 80 percent of the FCLPs would be conducted at OLF Coupeville, to a decrease of 200 operations during an average year under Scenario C, when 20 percent of the FCLPs would be conducted at OLF Coupeville (Table 4.1-3). The numbers above represent the average year conditions. Overall, Alternative 2 would not result in significant adverse impacts to airspace at OLF Coupeville from proposed Growler operations. There are no congestion concerns for OLF Coupeville under any of the scenarios. As previously stated, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. As such, under all

scenarios, periods of concentrated FCLP training will occur more frequently. Periods of FCLP training are often followed by several days or weeks with little or no activity because squadrons are deployed. A typical FCLP training session lasts for about 45 minutes, with three to five aircraft participating, and may occur several times during a 24-hour period. FCLP training schedules will be managed by NAS Whidbey Island complex Air Operations and the VAQ Wing to ensure operations remain consistent with conditions studied under NEPA.

The OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-2; under Alternative 2 (as stated for Alternative 1), these patterns would be used in order to improve the standardization of training and enable more use of Runway 14. The standard FCLP patterns would result in runway use percentages based on the prevailing winds. Based on meteorological conditions at the OLF, the projected runway utilization for Runway 14 is approximately 30 percent, and the remaining percentage is to be utilized on Runway 32. Additionally, for aircraft performance, safety, and improved training quality, the increased use of standard FCLP flight tracks for OLF Coupeville is expected to continue.

Implementation of Alternative 2 would increase total airfield operations by up to 270 percent above the No Action Alternative. However, Alternative 2 would not require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures in order to accommodate the increased air traffic.

The numbers above represent the average number of operations. In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations would increase approximately 9 to 10 percent at OLF Coupeville based on the operational scenario selected as compared to the corresponding alternative (see Appendix A).

The OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-2; under Alternative 2 (as stated for Alternative 1), these patterns would be used in order to improve the standardization of training and enable more use of Runway 14. The standard FCLP patterns would result in runway use percentages based on the prevailing winds. Based on meteorological conditions at the OLF, the projected runway utilization for Runway 14 is approximately 30 percent, and the remaining percentage is to be utilized on Runway 32. Additionally, for aircraft performance, safety, and improved training quality, the increased use of standard FCLP flight tracks for OLF Coupeville is expected to continue.

4.1.3.1.3 Alternative 2 Conclusion

Overall, Alternative 2 would not result in significant adverse impacts to airfields and airspace at the NAS Whidbey Island complex from proposed Growler operations. There would be an increase of 9,800 to 25,000 annual aircraft operations at Ault Field and a decrease of 200 to an increase of 17,600 annual aircraft operations at OLF Coupeville, depending on the scenario selected. Growler operations would be conducted in a manner similar to the current Navy missions conducted by aircraft training at the NAS Whidbey Island complex with the exception of standardizing the FCLP pattern for Runway 14 at OLF Coupeville. There would be increases in the number of annual operations, additional Growler operations would not require changes to the structure of the affected SUA, and current safety procedures would continue to be emphasized.

Table 4.1-3 Comparison of Modeled No Action Alternative and Alternative 2, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8, 9]

Aircraft Type	*FCLP[2]*	*Other Operations[3]*	*Total*	*Total Change from No Action[6]*
Average Year Scenarios for Ault Field				
No Action	11,300	66,900	78,200	
Alternative 2, Scenario A (20% of FCLPs at Ault Field)				
Growler	5,900	67,900	73,800	
All Other Aircraft[3, 5]	0	14,200	14,200	
Total Airfield Operations	5,900	82,100	88,000	+9,800
Alternative 2, Scenario B (50% of FCLPs at Ault Field)				
Growler	14,800	66,500	81,300	
All Other Aircraft[3, 5]	0	14,200	14,200	
Total Airfield Operations	14,800	80,700	95,500	+17,300
Alternative 2, Scenario C (80% of FCLPs at Ault Field)				
Growler	23,700	65,400	89,100	
All Other Aircraft[3, 5]	0	14,100	14,100	
Total Airfield Operations	23,700	79,500	103,200	+25,000
***Alternative 2, Scenario D* (30% of FCLPs at Ault Field)**				
Growler	8,900	67,500	76,400	
All Other Aircraft[3, 5]	0	14,200	14,200	
Total Airfield Operations	8,900	81,700	90,600	+12,400
***Alternative 2, Scenario E* (70% of FCLPs at Ault Field)**				
Growler	20,800	65,800	86,600	
All Other Aircraft[3, 5]	0	14,100	14,100	
Total Airfield Operations	20,800	79,900	100,700	+22,500
Average Year Scenarios for OLF Coupeville				
No Action	6,100	400	6,500	
Alternative 2, Scenario A (80% of FCLPs at OLF Coupeville)				
Growler	23,700	0	23,700	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	23,700	400	24,100	+17,600
Alternative 2, Scenario B (50% of FCLPs at OLF Coupeville)				
Growler	14,800	0	14,800	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	14,800	400	15,200	+8,700
Alternative 2, Scenario C (20% of FCLPs at OLF Coupeville)				
Growler	5,900	0	5,900	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	5,900	400	6,300	-200
***Alternative 2, Scenario D* (70% of FCLPs at OLF Coupeville)**				
Growler	20,800	0	20,800	
All Other Aircraft[3, 5]	0	400	400	
Total Airfield Operations	20,800	400	21,200	+14,700
***Alternative 2, Scenario E* (30% of FCLPs at OLF Coupeville)**				
Growler	8,900	0	8,900	
All Other Aircraft[3, 5]	0	400	400	
Total Airfield Operations	8,900	400	9,300	+2,800

Table 4.1-3 Comparison of Modeled No Action Alternative and Alternative 2, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8, 9]

Aircraft Type	*FCLP[2]*	*Other Operations[3]*	*Total*	*Total Change from No Action[6]*
Average Year Scenarios for the NAS Whidbey Island Complex				
No Action Total	17,400	67,300	84,700	
Alternative 2, Scenario A				
Total Airfield Operations	29,600	82,500	112,100	+27,400
Alternative 2, Scenario B				
Total Airfield Operations	29,600	81,100	110,700	+26,000
Alternative 2, Scenario C				
Total Airfield Operations	29,600	79,900	109,500	+24,800
Alternative 2, Scenario D				
Total Airfield Operations	29,700	82,100	111,800	+27,100
Alternative 2, Scenario E				
Total Airfield Operations	29,700	80,300	110,000	+25,300

Source: Wyle, 2017

Notes:

1 Three-digit numbers are rounded to nearest 100 if ≥ to 100; two-digit numbers are rounded to the nearest 10 if ≥ 10 or if between 1 and 9.

2 Each FCLP pass = 2 operations (one arrival and one departure).

3 Other operations include Touch-and-Goes, Depart and Re-enter, and Ground Controlled Approaches.

4 All other aircraft include P-8A, H-60, C-40, and transient aircraft. The 400 other operations at OLF Coupeville are H-60 search and rescue helicopter operations.

5 An operation is defined as one arrival or one departure.

6. The number of operations fluctuates slightly between alternative and scenario due to varying training requirements and randomness inherent in modeling.

7 The NAS Whidbey Island complex includes Ault Field and OLF Coupeville.

8 Scenario A: 20 percent of FCLPs conducted at Ault Field, and 80 percent conducted at OLF Coupeville; Scenario B: 50 percent of FCLPs conducted at Ault Field, and 50 percent conducted at OLF Coupeville; Scenario C: 80 percent of FCLPs conducted at Ault Field, and 20 percent conducted at OLF Coupeville; Scenario D: 30 percent of FCLPs conducted at Ault Field, and 70 percent conducted at OLF Coupeville; Scenario E: 70 percent of FCLPs conducted at Ault Field, and 30 percent conducted at OLF Coupeville.

9 Since the publication of the Draft EIS, two new operational scenarios for each action alternative have been added to the analysis. In addition, several updates were applied to the noise analysis; these included incorporation of Precision Landing Mode, which reduces FCLP requirements by approximately 20 percent and leads to a reduction in FCLP operations, across all scenarios and updating the number of pilots per squadron (reduction); see Section 1.13.

Key:
FCLP = field carrier landing practice
OLF = outlying landing field

4.1.4 Airspace and Airfield Operations, Alternative 3

Under Alternative 3, expeditionary and carrier capabilities would be expanded by adding three additional aircraft to each existing expeditionary squadron, adding two additional aircraft to each existing carrier squadron, augmenting the FRS with nine additional aircraft, and adding additional squadron personnel (a net increase of 36 aircraft and 341 personnel).

4.1.4.1 Airspace and Airfield Operations, Potential Impacts under Alternative 3

The potential impacts and analysis are similar to those of Alternatives 1 and 2. The Proposed Action would have a minor impact to local area civil and commercial aviation airspace use because although the additional Growler aircraft would be operating with an increased frequency they would be doing so within the same flight parameters currently used by aircraft under existing conditions within the controlled airspace surrounding the NAS Whidbey Island complex. Airfield operations at OLF Coupeville would not be adversely affected under any scenario. Airfield operations at Ault Field will be adversely impacted under the Proposed Action, Alternative 3, with 80 percent or more of the FCLPs conducted at Ault Field. An expected increase in scheduling challenges and mission delays could occur at Ault Field under Scenario C, which could cause intermittent deficiencies in pilot proficiency and unit readiness. When more FCLPs are flown at Ault Field, other flights and aircrews training with aircraft at Ault Filed are restricted or delayed. This causes flights and training occurring at Ault Field later into the night, and more aircraft are held in larger or extended flight patterns while FCLP is conducted.

4.1.4.1.1 Airspace, Alternative 3

No changes are proposed to existing airspace under Alternative 3, and analysis is similar to that of Alternatives 1 and 2. Proposed Growler operations within controlled airspace and SUA in the vicinity of the NAS Whidbey Island complex would be similar to current Growler operations. Proposed Growler operations would transit between Ault Field and military training areas in a similar manner to those used by existing Growlers and would generate similar sound levels. Projected MTR operations would increase under Alternative 3 by approximately 34 percent across the MTRs, as shown in Table 4.1-1, and the MTRs would have sufficient capacity for the increased operations. SUA in the vicinity of the NAS Whidbey Island complex was evaluated to ensure adequate capacity for increased operations generated by the Proposed Action. Additionally, this alternative would not change existing procedures for airspace access for civil aviation transiting airspace under the control of the NAS Whidbey Island ATC Facility, located at Ault Field. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced. Therefore, implementation of Alternative 3 would not result in significant impacts to airspace.

4.1.4.1.2 Airfield Operations, Alternative 3

Table 4.1-4 presents the projected number of aircraft operations at the NAS Whidbey Island complex under Alternative 3 as compared to the No Action Alternative. There is a net increase of 36 Growler aircraft under Alternative 3; total annual airfield operations for the NAS Whidbey Island complex would increase from approximately 84,700 to approximately 111,800--a 32-percent increase. Aircraft operations are presented for the Growler squadrons, all other aircraft, and total operations. All other aircraft in addition to transient aircraft would continue to operate at Ault Field as part of the Proposed Action because the projected operations are not expected to change for these aircraft.

Ault Field

Projected operations at Ault Field would include arrivals, departures, FCLPs, and other pattern operations (i.e., T&G and GCA/CCA patterns) as depicted in Figures 3.1-3 through 3.1-5. FCLPs for Ault Field under Alternative 3 are depicted in Figure 4.1-2. The majority of airfield operations at Ault Field are conducted on runways 14 and 25 due to prevailing wind conditions but also due to noise-abatement procedures when allowed by existing weather conditions. See Section 3.2.4.1 for noise-complaint and noise-abatement discussion. Noise-abatement procedures would continue to be followed under the Proposed Action. See Figure 1.2-2 for runway designations.

During an average year, total airfield operations at Ault Field would result in an increase of 9,500 projected operations under Scenario A, when 20 percent of all FCLPs would be conducted at Ault Field, to an increase of 24,700 projected operations under Scenario C, when 80 percent of all FCLPs would be conducted at Ault Field (see Table 4.1-4). As compared to Scenarios A, B, and D, impacts related to airspace congestion would be experienced with greater frequency under Scenarios C and E at Ault Field. Airfield operations at Ault Field would be adversely impacted under the alternatives with 80 percent or more of the FCLPs conducted at Ault Field. Under Scenario C, an expected increase in scheduling challenges and mission delays could occur at Ault Field, which in turn could cause deficiencies in pilot proficiency and unit readiness. These scheduling delays could result in flights and training occurring at Ault Field later into the night. The numbers above represent the average year conditions. Overall, Alternative 3 would not result in significant adverse impacts to airspace at Ault Field from proposed Growler operations. There would be an impact to operations when 80 percent of operations are conducted at Ault Field (Scenario C) due to instances of pattern congestion. As previously stated, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. Since Ault Field is a major airfield supporting home based aircraft as well as transient aircraft, a larger number of operations occur at Ault Field than at OLF Coupeville, which is primarily used for FCLP.

In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations at Ault Field would increase approximately 0.5 to 2 percent based on the operational scenario selected as compared to the corresponding alternative (see Appendix A).

OLF Coupeville

Airfield operations at OLF Coupeville would primarily be conducted by the Growler squadrons and would include arrivals, departures, other pattern operations, and FCLPs, as depicted in Figures 3.1-3 through 3.1-5. FCLPs at OLF Coupeville under Alternative 3 are depicted in Figure 4.1-2. At OLF Coupeville, annual airfield operations would result in an increase of 17,600 operations during an average year under Scenario A, when 80 percent of the FCLPs would be conducted at OLF Coupeville, to a decrease of 200 operations during an average year under Scenario C, when 20 percent of the FCLPs would be conducted at OLF Coupeville (Table 4.1-4). The numbers above represent the average year conditions. Overall, Alternative 3 would not result in significant adverse impacts to airspace at OLF Coupeville from proposed Growler operations. There are no congestion concerns for OLF Coupeville under any of the scenarios. As previously stated, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. As such, under all scenarios, periods of concentrated FCLP training will occur more frequently. Periods of FCLP training are

often followed by several days or weeks with little or no activity because squadrons are deployed. A typical training session lasts for about 45 minutes, with three to five aircraft participating, and may occur several times during a 24-hour period. FCLP training schedules will be managed by NAS Whidbey Island complex Air Operations and the VAQ Wing to ensure operations remain consistent with conditions studied under NEPA.

The OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-2; under Alternative 3 (as stated for Alternative 1), these patterns would be used in order to improve the standardization of training and enable more use of Runway 14. The standard FCLP patterns would result in runway use percentages based on the prevailing winds. Based on meteorological conditions at the OLF, the projected runway utilization for Runway 14 is approximately 30 percent, and the remaining percentage is to be utilized on Runway 32. Additionally, for aircraft performance, safety, and improved training quality, the increased use of standard FCLP flight tracks for OLF Coupeville is expected to continue.

Implementation of Alternative 3 would increase total airfield operations by up to 270 percent above the No Action Alternative. However, Alternative 3 would not require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures in order to accommodate the increased air traffic.

The numbers above represent the average number of operations. In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations would increase approximately 9 to 11 percent at OLF Coupeville based on the operational scenario selected as compared to the corresponding alternative (see Appendix A).

4.1.4.1.3 Alternative 3 Conclusion

Overall, Alternative 3 would not result in significant adverse impacts to airfields and airspace at the NAS Whidbey Island complex from proposed Growler operations. There would be an increase of 9,500 to 24,700 annual aircraft operations at Ault Field and a decrease of 200 to an increase of 17,600 in annual aircraft operations at OLF Coupeville depending on the scenario selected. Growler operations would be conducted in a manner similar to the current Navy aircraft training missions conducted by aircraft at the NAS Whidbey Island complex with the exception of standardizing the FCLP pattern for Runway 14 at OLF Coupeville. There would be increases in the number of annual operations, additional Growler operations would not require changes to the structure of the affected SUA, and current safety procedures would continue to be emphasized.

Table 4.1-4 Comparison of Modeled No Action Alternative and Alternative 3, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8, 9]

Aircraft Type	*FCLP[2]*	*Other Operations[3]*	*Total*	*Total Change from No Action[6]*
Average Year Scenarios for Ault Field				
No Action	11,300	66,900	78,200	
Alternative 3, Scenario A (20% of FCLPs at Ault Field)				
Growler	5,900	67,700	73,600	
All Other Aircraft[3, 5]	0	14,100	14,100	
Total Airfield Operations	5,900	81,800	87,700	+9,500
Alternative 3, Scenario B (50% of FCLPs at Ault Field)				
Growler	14,800	66,600	81,400	
All Other Aircraft[3, 5]	0	13,900	13,900	
Total Airfield Operations	14,800	80,500	95,300	+17,100
Alternative 3, Scenario C (80% of FCLPs at Ault Field)				
Growler	23,700	65,200	88,900	
All Other Aircraft[3, 5]	0	14,000	14,000	
Total Airfield Operations	23,700	79,200	102,900	+24,700
***Alternative 3, Scenario D* (30% of FCLPs at Ault Field)**				
Growler	8,900	67,300	76,200	
All Other Aircraft[3, 5]	0	14,100	14,100	
Total Airfield Operations	8,900	81,400	90,300	+12,100
***Alternative 3, Scenario E* (70% of FCLPs at Ault Field)**				
Growler	20,700	65,600	86,300	
All Other Aircraft[3, 5]	0	14,000	14,000	
Total Airfield Operations	20,700	79,600	100,300	+22,100
Average Year Scenarios for OLF Coupeville				
No Action	6,100	400	6,500	
Alternative 3, Scenario A (80% of FCLPs at OLF Coupeville)				
Growler	23,700	0	23,700	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	23,700	400	24,100	+17,600
Alternative 3, Scenario B (50% of FCLPs at OLF Coupeville)				
Growler	14,800	0	14,800	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	14,800	400	15,200	+8,700
Alternative 3, Scenario C (20% of FCLPs at OLF Coupeville)				
Growler	5,900	0	5,900	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	5,900	400	6,300	-200
***Alternative 3, Scenario D* (70% of FCLPs at OLF Coupeville)**				
Growler	20,700	0	20,700	
All Other Aircraft[3, 5]	0	400	400	
Total Airfield Operations	20,700	400	21,100	+14,600
***Alternative 3, Scenario E* (30% of FCLPs at OLF Coupeville)**				
Growler	8,900	0	8,900	
All Other Aircraft[3, 5]	0	400	400	
Total Airfield Operations	8,900	400	9,300	+2,800

Table 4.1-4 Comparison of Modeled No Action Alternative and Alternative 3, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8, 9]

Aircraft Type	*FCLP[2]*	*Other Operations[3]*	*Total*	*Total Change from No Action[6]*
Average Year Scenarios for the NAS Whidbey Island Complex				
No Action Total	17,400	67,300	84,700	
Alternative 3, Scenario A				
Total Airfield Operations	29,600	82,200	111,800	+27,100
Alternative 3, Scenario B				
Total Airfield Operations	29,600	80,900	110,500	+25,800
Alternative 3, Scenario C				
Total Airfield Operations	29,600	79,600	109,200	+24,500
Alternative 3, Scenario D				
Total Airfield Operations	29,600	81,800	111,400	+26,700
Alternative 3, Scenario E				
Total Airfield Operations	29,600	80,000	109,600	+24,900

Source: Wyle, 2017

Notes:

1 Three-digit numbers are rounded to nearest 100 if ≥ to 100; two-digit numbers are rounded to the nearest 10 if ≥ 10 or if between 1 and 9.

2 Each FCLP pass = two operations (one arrival and one departure).

3 Other operations include Touch-and-Goes, Depart and Re-enter, and Ground Controlled Approaches.

4 All other aircraft include P-8A, H-60, C-40, and transient aircraft. The 400 other operations at OLF Coupeville are H-60 search and rescue helicopter operations.

5 An operation is defined as one arrival or one departure.

6 The number of operations fluctuates slightly between alternative and scenario due to varying training requirements and randomness inherent in modeling.

7 The NAS Whidbey Island complex includes Ault Field and OLF Coupeville.

8 Scenario A: 20 percent of FCLPs conducted at Ault Field, and 80 percent conducted at OLF Coupeville; Scenario B: 50 percent of FCLPs conducted at Ault Field, and 50 percent conducted at OLF Coupeville; Scenario C: 80 percent of FCLPs conducted at Ault Field, and 20 percent conducted at OLF Coupeville; Scenario D: 30 percent of FCLPs conducted at Ault Field, and 70 percent conducted at OLF Coupeville; Scenario E: 70 percent of FCLPs conducted at Ault Field, and 30 percent conducted at OLF Coupeville.

9 Since the publication of the Draft EIS, two new operational scenarios for each action alternative have been added to the analysis. In addition, several updates were applied to the noise analysis; these included incorporation of Precision Landing Mode, which reduces FCLP requirements by approximately 20 percent and leads to a reduction in FCLP operations, across all scenarios and updating the number of pilots per squadron (reduction); see Section 1.13.

Key:
FCLP = field carrier landing practice
OLF = outlying landing field

4.1.5 Airspace and Airfield Operations Conclusion, Alternatives 1 through 3

4.1.5.1 Airspace Summary

Implementation of Alternatives 1 through 3 would increase total airfield operations by up to 33 percent at the NAS Whidbey Island complex. Table 4.1-5 lists airfield operations at NAS Whidbey Island. Additionally, under Alternatives 1 through 3, operations at Ault Field would increase up to a total of approximately 103,200 total annual airfield operations (Alternative 1, Scenario C, and Alternative 2, Scenario C). Likewise, operations at OLF Coupeville would increase, with a total of approximately 25,300 operations (Alternative 1, Scenario A). However, none of the alternatives would require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures in order to accommodate the increased air traffic. The expected volume of air traffic on each flight track would increase slightly (approximately one to two flights per day).

Table 4.1-5 Comparison of Alternatives, under All Scenarios (Average Year), and No Action Alternative for Total Aircraft Operations at the NAS Whidbey Island Complex[1, 2, 4, 5]

Aircraft Type	*Ault Field[3]*	*OLF Coupeville[3]*	*Total Airfield Operations[5, 6]*
Average Year Scenarios			
Alternative 1			
Scenario A	87,300	25,300	112,600
Scenario B	95,300	15,900	111,200
Scenario C	103,200	6,600	109,800
Scenario D	90,000	22,200	112,200
Scenario E	100,400	9,700	110,100
Alternative 2			
Scenario A	88,000	24,100	112,100
Scenario B	95,500	15,200	110,700
Scenario C	103,200	6,300	109,500
Scenario D	90,600	21,200	111,800
Scenario E	100,700	9,300	110,000
Alternative 3			
Scenario A	87,700	24,100	111,800
Scenario B	95,300	15,200	110,500
Scenario C	102,900	6,300	109,200
Scenario D	90,300	21,100	111,400
Scenario E	100,300	9,300	109,600
No Action Alternative			
No Action	78,200	6,500	84,700

Table 4.1-5 Comparison of Alternatives, under All Scenarios (Average Year), and No Action Alternative for Total Aircraft Operations at the NAS Whidbey Island Complex[1, 2, 4, 5]

Aircraft Type	*Ault Field[3]*	*OLF Coupeville[3]*	*Total Airfield Operations[5, 6]*

Source: Wyle, 2016

Notes:
1. Three-digit numbers are rounded to nearest 100 if ≥ to 100; two-digit numbers are rounded to the nearest 10 if ≥ 10 or if between 1 and 9.
2. An operation is defined as one landing, one take-off, one approach, or one departure.
3. The number of operations fluctuates slightly between alternative and scenario due to varying training requirements and randomness inherent in modeling.
4. Scenario A: 20 percent of operations conducted at Ault Field and 80 percent conducted at OLF Coupeville; Scenario B: 50 percent of operations conducted at Ault Field; Scenario C: 80 percent of operations conducted at Ault Field.
5. The NAS Whidbey Island complex includes Ault Field and OLF Coupeville.
6. Total airfield operations are considered all aircraft operations that occur and include Touch-and-Goes, Depart and Re-enter, Ground Controlled Approaches, and FCLPs. Total airfield operations include all aircraft for Ault Field and OLF Coupeville. Detailed airfield operations tabulated by type of airfield operation are provided above.

Key:
OLF = outlying landing field

The Proposed Action for all alternatives would have no adverse effect on local area civil and commercial aviation airspace use because the additional Growler aircraft would be operating within the same flight parameters currently used by aircraft under existing conditions within the controlled airspace surrounding the NAS Whidbey Island complex. None of the alternatives would change existing procedures for airspace access or have an adverse impact to civil aviation transiting airspace under the control of the NAS Whidbey Island ATC Facility, located at Ault Field. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced. Therefore, implementation of any of the three alternatives would not result in significant impacts to airspace.

4.1.5.2 Airfield Operations Summary

Projected operations at Ault Field would include arrivals, departures, FCLPs, and other pattern operations (i.e., T&G and GCA patterns), as depicted in Figures 3.1-3 through 3.1-5. FCLPs for Ault Field are depicted in Figure 4.1-2. Airfield operations at Ault Field are primarily conducted on Runways 14 and 25 due to noise-abatement procedures and prevailing wind conditions. The primary mission of OLF Coupeville is to support Growler FCLPs; however, MH-60 helicopter operations would continue to occur at OLF Coupeville.

No changes are proposed to existing mission types (e.g., FCLP, T&G, etc.); however, flight operations are expected to increase with the increase in Growler aircraft and aircrews. Ault Field and OLF Coupeville meet all the operational requirements and have sufficient capacity under routine operating conditions to support the airfield operations of the additional Growler aircraft. Airfield operations at OLF Coupeville would not be adversely affected under any alternative or scenario. Airfield operations at Ault Field would be adversely impacted under the alternatives with 80 percent or more of the FCLPs conducted at Ault Field. An expected increase in scheduling challenges and mission delays could occur at Ault Field under Scenario C, which could cause deficiencies in pilot proficiency and unit readiness. These scheduling delays could result in flights and training occurring at Ault Field later into the night.

4.2 Noise Associated with Aircraft Operations

The information presented in this noise section is the result of noise modeling that analyzed the projected noise levels based upon a wide range of inputs (such as flight tracks, aircraft type, and number of aircraft operations, etc.). For a full discussion of noise modeling and background data used for this analysis, refer to Section 3.2.2, Noise Metrics and Modeling, as well as Appendix A, Aircraft Noise Study. The noise levels analyzed and described within this study are from computer-modeled noise and not actual, on-site noise measurements at Ault Field or OLF Coupeville. As discussed in Section 3.2.2, computer modeling provides a tool to assess potential noise impacts. Day-Night Average Sound Level (DNL) noise contours are generated by a computer model that draws from a library of actual aircraft noise measurements. Noise contours produced by the model allow a comparison of existing conditions and proposed changes or alternative actions that do not currently exist or operate at the installation. For these reasons, on-site noise monitoring is seldom used at military air installations, especially when the aircraft mix and operational tempo are not uniform (see Section 3.2.2).

This section presents potential noise impacts related to aircraft operations for the No Action Alternative and the three action alternatives.

Noise Associated with Aircraft Operations

The 65 dB DNL noise contour for Alternatives 1 through 3 is larger and covers more area than the No Action Alternative, although some of this increased area is over water. This would result in some additional people living within the 65 dB DNL noise contour compared to the No Action Alternative conditions.

Supplemental metrics utilized in the analysis show additional events for Alternatives 1 through 3 when compared to the No Action Alternative for indoor and outdoor speech interference, an increase in the number of events causing classroom/learning interference, an increase in the probability of awakening, and an increase in the population that may be vulnerable to experiencing potential hearing loss of 5 dB or more.

The methodology and metrics used for evaluating potential noise impacts associated with the Proposed Action were developed based on guidance from the Department of Defense Noise Working Group as well as public scoping comments received on this project and public comments received on the Draft EIS. The analysis contained within this section, by alternative, is presented in two parts, discussed below. In addition, as discussed in Section 3.2.4, several updates were applied to the noise analysis between release of the Draft EIS and the Final EIS, which included 1) updating the noise model using the latest version of NOISEMAP (Version 7.3); 2) applying refinements to certain flight profiles/aircraft operating assumptions, 3) incorporating the effects of Precision Landing Mode (PLM), also known as Maritime Augmented Guidance with Integrated Controls for Carrier Approach and Recovery Precision Enabling Technologies (MAGIC CARPET), into the noise analysis; and 4) updating the number of pilots per squadron (more details on these four items are discussed individually in Section 3.2.4). In addition, although not a change to the noise analysis, the presentation of the DNL noise contours on the figures for the Final EIS has been revised based upon public comments. The 55 dB DNL noise contour has been added to figures for illustrative purposes (similar to how the 60 dB DNL noise contour was depicted in the Draft EIS). However, the analysis of population and acreage impacts is still based upon the 65 dB DNL noise contour (which is the federal standard for measuring noise impacts consistent with guidance from the FAA , U.S. Environmental Protection Agency [USEPA], U.S. Department of Defense [DoD], Federal Interagency Committee on Noise, American National Standards Institute, and World Health

Organization, among others), where areas with noise levels greater than 65 dB DNL are generally not recommended for residential uses.

These changes applied to both the noise results for the No Action Alternative as well as the action alternatives proposed.

Day-Night Average Sound Level (DNL), which is the federal standard for analyzing the long-term community annoyance with noise exposure from aircraft operations. The data associated with the DNL analysis are presented utilizing the following outputs:

- DNL contour maps
- acreages and population within the projected noise contours

Supplemental Noise Metrics, which are used to provide more detailed information on potential impacts of noise exposure as it relates to specific noise events and their effects. It should be noted that an "event" would be considered an aircraft operation/overflight/activity, and could include an arrival, departure, or pattern operation. The supplemental noise metrics are presented as follows:

- single event noise levels for all 48 points of interest (POIs)
- indoor speech Interference for 30 POIs (residences and schools)
- classroom/learning interference for 12 POIs (schools, residences [where schools may be located])
- sleep disturbance for 30 POIs (residences, schools [in residential locations])
- outdoor speech interference for 48 POIs (residences, schools, and parks)
- Potential hearing loss (PHL) for populations within the 80 dB DNL contour

A review of existing literature addressing nonauditory health effects from aircraft noise exposure was included in the Draft EIS. In addition to this and based upon public comment, specifically from the State of Washington Department of Health, the USEPA), and other public comments, requests were received to review additional published articles. In preparation of the Final EIS, the Navy reviewed 260 published articles as suggested by public comment. An in-depth review of these documents is provided in Appendix A, Aircraft Noise Study. The Navy determined that many of these studies had been already reviewed and included in the Navy's literature review or were referenced in or by studies the Navy has already considered. However, expanded information has been incorporated as appropriate. The studies did not change the overall findings of the Navy's original literature review. See Appendix A-8 for details on the literature review process. Although the noise analysis presented in this section is specific to the noise environment as it relates to aircraft operations, there would be other noise generated as part of the Proposed Action, such as construction noise and occupational noise. However, based upon scoping comments received, as well as public comments on the Draft EIS, the location and duration of the potential noise, as well as other factors, these types of noise impacts were not considered potentially significant. They are discussed individually below, and they would generally be the same impact across the three alternatives.

Construction Noise

Construction noise generated by multiple construction, modification, expansion, and demolition projects under each alternative would result in short-term noise impacts at and near Ault Field. Construction activities are described in Section 2.4.2.3. Since the proposed construction is located on

the flight line, aircraft-related noise would likely dominate construction noise. No residential areas or other POIs are located in the vicinity of the proposed construction activity; therefore, there would not be a significant construction-noise-related impact. There is no proposed construction at OLF Coupeville associated with the Proposed Action.

Occupational Noise

Navy occupational noise exposure prevention procedures, such as hearing protection and monitoring, would continue to be required at the NAS Whidbey Island complex in compliance with all applicable Occupational Safety and Health Administration and Navy occupational noise exposure regulations. As a result, these measures are designed to minimize occupational hearing hazards, and no increased risk of hearing impacts associated with occupational noise would be expected to occur under the Proposed Action compared to the affected environment conditions.

4.2.1 Noise, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and the Navy would not operate additional Growler aircraft (see Section 2.4.2.4). Consequently, implementing the No Action Alternative, or taking "no action", means annual Growler airfield operations would be consistent with levels identified in the 2005 and 2012 transition Environmental Assessments (EAs). The transition of the P-3 to the P-8A aircraft would still take place as it is a separate, ongoing action. In addition and as noted in Section 3.2.4, modeling noise for Calendar Year 21 (CY 21) will also account for the Navy's full implementation of the PLM technology, which will be implemented regardless of the Proposed Action. Therefore, the DNL noise contours presented in Section 3.2.4, Noise Affected Environment, were modeled based upon the anticipated aircraft operating levels and assuming the full implementation of PLM for CY 21. Implementation of the No Action Alternative would, by default, result in the same acreage and population coverage as noted under the affected environment (see Table 3.2-2).

Similarly, the supplemental analyses (indoor and outdoor speech interference, classroom/learning interference, sleep disturbance, and PHL conditions) presented throughout Section 3.2.4 would be the same under the No Action Alternative, and there would be no change from the affected environment. Therefore, no significant impacts to the noise environment would occur with implementation of the No Action Alternative.

4.2.2 Noise, Alternative 1

This section outlines the noise environment as modeled for Alternative 1 and describes the noise conditions associated with aircraft activity at Ault Field and OLF Coupeville using DNL and several supplemental noise metrics outlined in Section 3.2, including equivalent sound level (L_{eq}), SEL, L_{max}, and the number of events above a threshold (NA), which are used to evaluate such noise effects as community noise exposure, indoor and outdoor speech interference, sleep disturbance, classroom/learning interference, and PHL. Additional information on the noise metrics is also available in Appendix A, Aircraft Noise Study.

The following sections detail potential impacts using projected DNL contours (the federally approved noise metric) and several supplemental metrics (to more fully describe the noise effects).

4.2.2.1 Projected DNL Contours, Alternative 1

As part of the noise analysis and as discussed in Section 3.2.1.1, the DNL noise contours for the alternatives were modeled for an "average year" at Ault Field and OLF Coupeville. An average year represents conditions that are projected to occur on an annual basis, or a typical operating tempo at the NAS Whidbey Island complex. In addition, the five scenarios, which present the optional FCLP allocations, were modeled individually to provide a comparative presentation of the potential noise levels.

Figure 4.2-1 presents the projected DNL noise contours for all scenarios under Alternative 1. This overview figure of the NAS Whidbey Island complex (both Ault Field and OLF Coupeville) presents the 65 dB DNL contour under all scenarios for comparison.

Figures 4.2-2 through 4.2-6 present the five scenarios separately for Ault Field, and Figures 4.2-7 through 4.2-11 present the five scenarios separately for OLF Coupeville[26]. In these sets of figures, the projected 65 dB, 70 dB, and greater than 75 dB DNL contours for Alternative 1 are compared to the No Action Alternative DNL contours. The 65 dB DNL contour at Ault Field extends approximately 10 miles from the four runway endpoints. Under Alternative 1, the length of these lobes is primarily due to the Growler on the approach portion of the GCA patterns (described in Section 3.1), where the aircraft generally descends on a 3-degree glide slope through 3,000 feet AGL 10 miles from the runway.

The DNL noise exposure at OLF Coupeville is due to the FCLPs. The 65 to less than 70 dB DNL contour range takes the shape of two ovals, on each side of OLF Coupeville's runway, which corresponds to the FCLP flight tracks. The 65 dB DNL contours extend approximately 2 miles to the north and south of the airfield under all scenarios. Generally speaking, around Ault Field, the 65 dB DNL contours associated with Scenario C extend the farthest from the airfield and cover the most land area (13,922 acres, compared to 13,226 acres under Scenario A). Conversely, around OLF Coupeville, the 65 dB DNL contours associated with Scenario A extend the farthest from the airfield and cover the most land area (10,197 acres, compared to 8,092 acres under Scenario C). The differences between the scenarios at the two airfields are sometimes small (nearly overlapping) and at other times can differ by approximately one mile. The overall difference in the size of the noise contours between the scenarios is more pronounced at OLF Coupeville than at Ault Field due to the larger proportional difference of operations at OLF Coupeville than at Ault Field.

[26] In addition and as discussed further in Section 3.2.2.1, 65 dB DNL is the established federal standard for determining potential for high annoyance. This level has been identified in both the Federal Aviation Administration's (FAA's) Part 150 Program and the Department of Defense's (DoD's) Air Installations Compatible Use Zones (AICUZ) Program (including the individual Air Force and Navy programs) as a threshold for land use recommendations. Consistent with this guidance, 65 dB DNL is used to show areas with potential for high annoyance in this analysis. However, aircraft noise does occur outside the 65 dB DNL contour. In order to more fully reflect the noise environment, the Draft EIS included noise contours of 60 dB DNL as well as detailed noise analysis for specific points of interest (POIs). In response to public comments, the Navy has expanded the analysis in the Final EIS to show geographic areas subject to greater than 55 dB DNL and has analyzed 18 additional POIs.

Table 4.2-1 presents an overall comparison of the number of land acres and population in each of the DNL contour ranges, as well as the difference in conditions between the No Action Alternative and Alternative 1 under all scenarios. As indicated in the table, the total change in population within the entire 65 dB DNL contour increases from the No Action Alternative by between 169 and 1,312 at Ault Field (primarily in and around Oak Harbor), depending on the scenario and, for OLF Coupeville (primarily in and around Coupeville), increases from the No Action Alternative by between 538 and 1,236, depending on the scenario.

As also presented within Table 4.2-1, under several of the alternatives/scenarios, the majority of the increase in population is located within the greater than 75 dB DNL noise contour, especially at OLF Coupeville. The greater than 75 dB DNL noise contour is the area where there is the highest level of community annoyance associated with aircraft noise. Therefore, these populations would be significantly impacted.

For purposes of comparison and to be fully transparent regarding the possible range of impacts that could arise from the Proposed Action, DNL noise contours were also modeled for a high-tempo FCLP year, which represents conditions when pre-deployment training for multiple units overlaps and, therefore, FCLP activity would be expected to increase over average conditions. The high-tempo FCLP year data are depicted on the same figures noted previously, as well as included in Appendix A, Aircraft Noise Study. Figures 4.2-2 through 4.2-11 present both the average year and high-tempo FCLP year DNL noise contours on the same figures for the airfields to illustrate the relatively small differences in the overall noise environment, with many of the areas where they diverge occurring over water.

In addition, Table 4.2-2 shows the percentage change in acreage and population between the average year DNL contour ranges and the high-tempo FCLP year DNL contour ranges. The higher percent change means the deviation between the average year DNL noise contours and the high-tempo FCLP year DNL noise contours is larger; however, most changes are within +/- 5 percent of zero.

Table 4.2-1 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 1 (Average Year)[2,3]

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
	Area (acres)	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*
Ault Field								
No Action Alternative								
Average Year	3,596	3,279	3,269	2,283	5,549	3,379	12,414	8,941
Alternative 1								
Scenario A (20/80 FCLP split)	4,033 (+437)	3,684 (+405)	3,259 (-10)	1,908 (-375)	5,934 (+385)	3,518 (+139)	13,226 (+812)	9,110 (+169)
Scenario B (50/50 FCLP split)	3,922 (+326)	3,619 (+340)	3,271 (+2)	2,450 (+167)	6,423 (+874)	3,786 (+407)	13,616 (+1,202)	9,855 (+914)
Scenario C (80/20 FCLP split)	3,947 (+351)	3,761 (+482)	3,115 (-154)	2,515 (+232)	6,860 (+1,311)	3,977 (+598)	13,922 (+1,508)	10,253 (+1,312)
Scenario D (30/70 FCLP split)	3,976 (+380)	3,712 (+433)	3,184 (-85)	2,171 (-112)	6,235 (+686)	3,679 (+300)	13,395 (+981)	9,562 (+621)
Scenario E (70/30 FCLP split)	3,924 (+328)	3,713 (+434)	3,139 (-130)	2,487 (+204)	6,755 (+1,206)	3,919 (+540)	13,818 (+1,404)	10,119 (+1,178)
OLF Coupeville								
No Action Alternative								
Average Year	3,681	861	3,088	786	638	583	7,407	2,230
Alternative 1								
Scenario A (20/80 FCLP split)	1,562 (-2,119)	573 (-288)	3,248 (+160)	936 (+150)	5,387 (+4,749)	1,957 (+1,374)	10,197 (+2,790)	3,466 (+1,236)
Scenario B (50/50 FCLP split)	2,015 (-1,666)	542 (-319)	3,451 (+363)	1,061 (+275)	4,025 (+3,387)	1,531 (+948)	9,491 (+2,084)	3,134 (+904)
Scenario C (80/20 FCLP split)	3,447 (-234)	1,041 (+180)	3,180 (+92)	1,036 (+250)	1,465 (+827)	691 (+108)	8,092 (+685)	2,768 (+538)
Scenario D (30/70 FCLP split)	1,588 (-2,093)	531 (-330)	3,387 (+299)	992 (+206)	5,032 (+4,394)	1,850 (+1,267)	10,007 (+2,600)	3,373 (+1,143)
Scenario E (70/30 FCLP split)	3,014 (-667)	855 (-6)	3,198 (+110)	1,058 (+272)	2,580 (+1,942)	1,018 (+435)	8,792 (+1,385)	2,931 (+701)

Table 4.2-1 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 1 (Average Year)[2,3]

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
	Area (acres)	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*
NAS Whidbey Island Complex								
No Action Alternative								
Average Year	7,277	4,140	6,357	3,069	6,187	3,962	19,821	11,171
Alternative 1								
Scenario A (20/80 FCLP split)	5,595 (-1,682)	4,257 (+117)	6,507 (+150)	2,844 (-225)	11,321 (+5,134)	5,475 (+1,513)	23,423 (+3,602)	12,576 (+1,405)
Scenario B (50/50 FCLP split)	5,937 (-1,340)	4,161 (+21)	6,722 (+365)	3,511 (+442)	10,448 (+4,261)	5,317 (+1,355)	23,107 (+3,286)	12,989 (+1,818)
Scenario C (80/20 FCLP split)	7,394 (+117)	4,802 (+662)	6,295 (-62)	3,551 (+482)	8,325 (+2,138)	4,668 (+706)	22,014 (+2,193)	13,021 (+1,850)
Scenario D (30/70 FCLP split)	5,564 (-1,713)	4,243 (+103)	6,571 (+214)	3,163 (+94)	11,267 (+5,080)	5,529 (+1,567)	23,402 (+3,581)	12,935 (+1,764)
Scenario E (70/30 FCLP split)	6,938 (-339)	4,568 (+428)	6,337 (-20)	3,545 (+476)	9,335 (+3,148)	4,937 (+975)	22,610 (+2,789)	13,050 (+1,879)

Table 4.2-1 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 1 (Average Year)[2,3]

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
	Area (acres)	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*

Notes:

[1] All five scenarios are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[2] Acreage presented does not include areas over water or areas over the NAS Whidbey Island complex.

[3] The difference between the No Action Alternative and Alternative 1 is noted in parentheses.

[4] Population counts of people within the DNL contour ranges were computed using 2010 Census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour range, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the DNL contour ranges (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville). All population estimates for areas within the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.

[5] Numbers have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level
FCLP = Field Carrier Landing Practice

Table 4.2-2 Percent Difference in the Estimated Acreage and Population within the Average and High-Tempo FCLP Year DNL Contour Ranges for the NAS Whidbey Island Complex, Alternative 1

	DNL Contour Ranges[1]							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
DNL Contours	*Area (acres)*	*Pop*	*Area (acres)*	*Pop*	*Area (acres)*	*Pop*	*Area (acres)*	*Pop*
Ault Field								
Scenario A	0.8%	0.2%	0.6%	3.4%	1.2%	0.9%	0.9%	1.1%
Scenario B	1.3%	1.3%	0.1%	2.2%	1.6%	1.1%	1.2%	1.4%
Scenario C	1.3%	2.5%	<0.0%	2.0%	2.2%	2.2%	1.4%	2.2%
Scenario D	0.5%	0.6%	0.6%	2.6%	1.2%	1.0%	0.9%	1.2%
Scenario E	1.6%	2.1%	-0.1%	2.4%	2.1%	1.8%	1.4%	2.1%
OLF Coupeville								
Scenario A	1.3%	6.9%	-5.7%	-7.0%	6.0%	4.9%	1.5%	2.0%
Scenario B	-5.8%	-9.1%	0.5%	2.3%	4.7%	4.0%	0.9%	1.1%
Scenario C	0.2%	-0.2%	0.1%	0.2%	2.2%	1.3%	0.5%	0.4%
Scenario D	-2.0%	4.7%	-3.6%	-5.0%	6.1%	5.2%	1.6%	2.1%
Scenario E	-0.6%	-0.8%	-0.1%	-1.0%	1.4%	2.0%	0.2%	0.1%
NAS Whidbey Island Complex								
Scenario A	0.9%	1.1%	-2.5%	-<0.1%	3.5%	2.3%	1.2%	1.4%
Scenario B	-1.1%	-<0.1%	0.3%	2.2%	2.8%	1.9%	1.1%	1.4%
Scenario C	0.8%	1.9%	0.1%	1.5%	2.2%	2.1%	1.1%	1.8%
Scenario D	-0.2%	1.1%	-1.6%	0.3%	3.4%	2.4%	1.2%	1.5%
Scenario E	0.6%	1.6%	-0.1%	1.4%	1.9%	1.9%	1.0%	1.6%

Key:
dB = decibel
DNL = day-night average sound level
NAS = Naval Air Station
OLF = outlying landing field

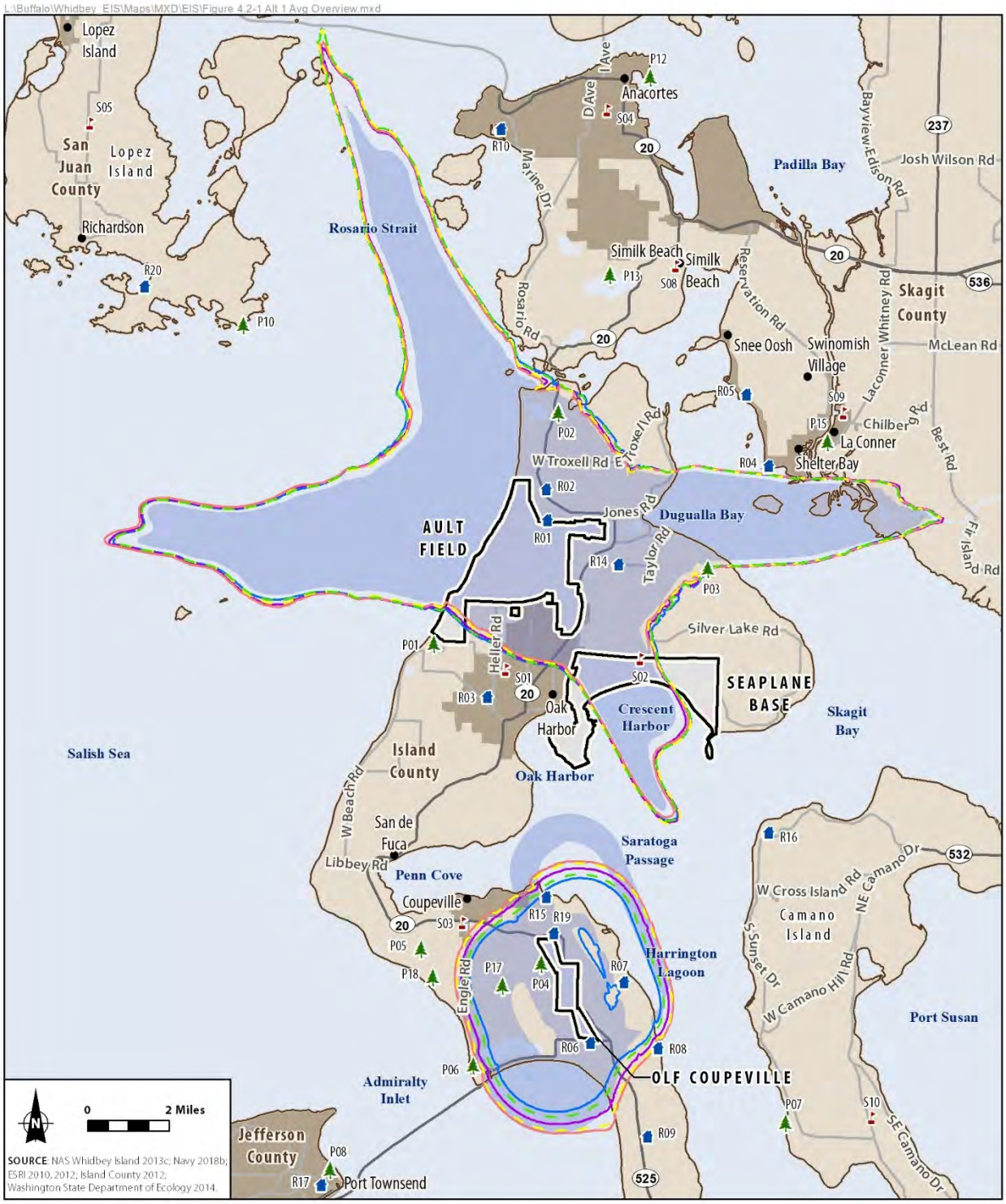

Figure 4.2-1
Alternative 1 Overview of the 65 dB DNL Noise Contours for the NAS Whidbey Island Complex
Whidbey Island, Island County, WA

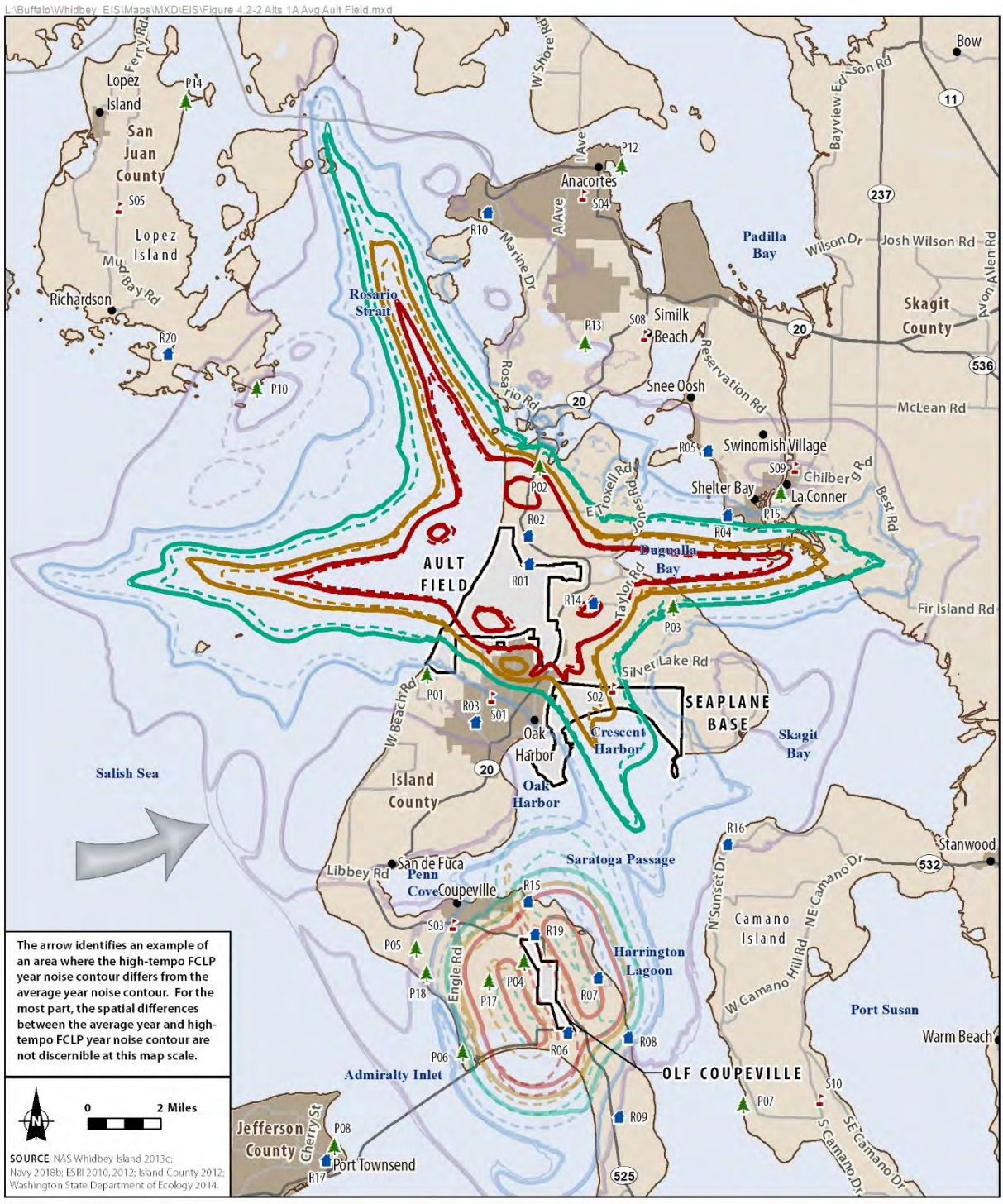

Figure 4.2-2
Alternative 1A DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

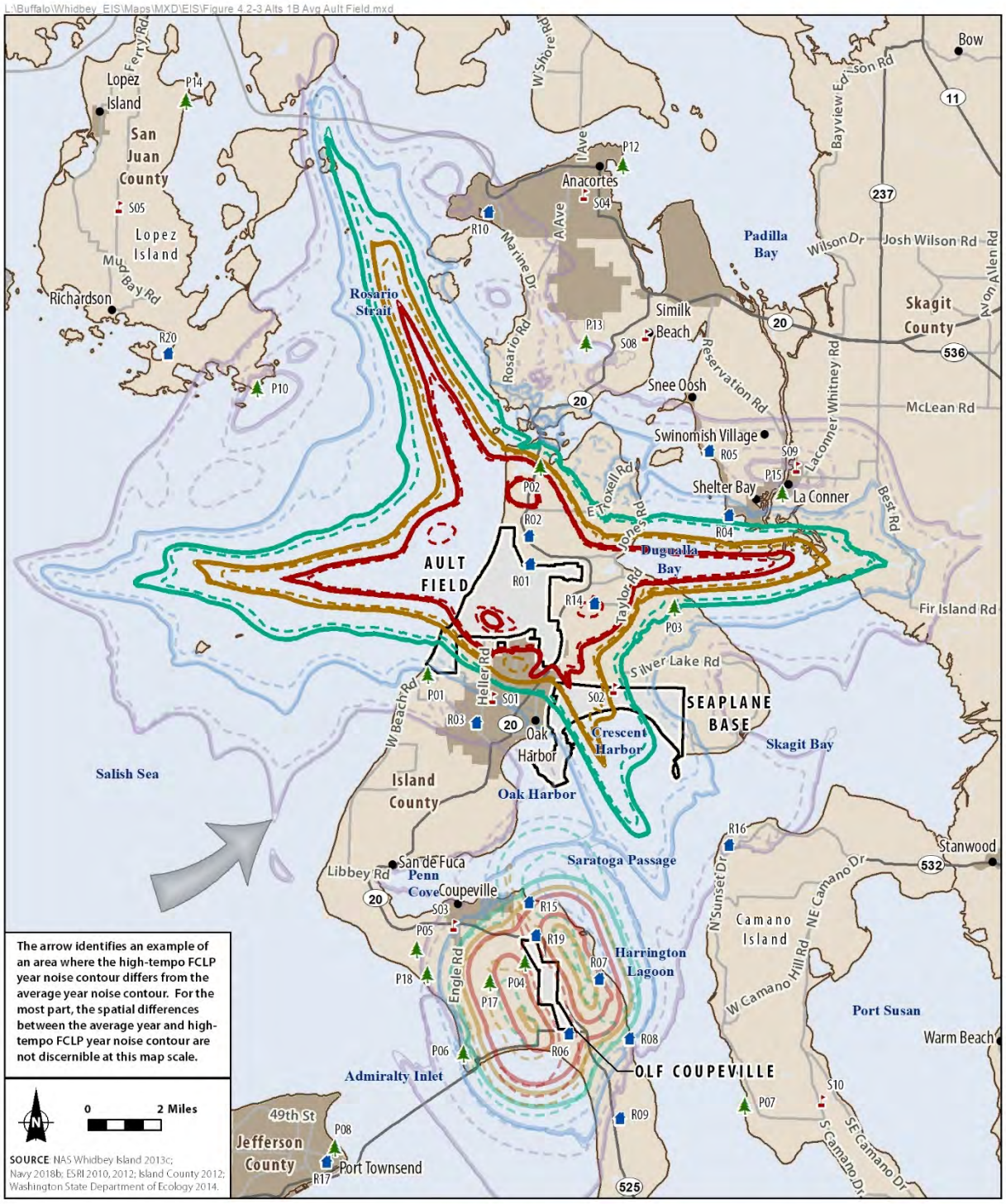

Figure 4.2-3
Alternative 1B DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

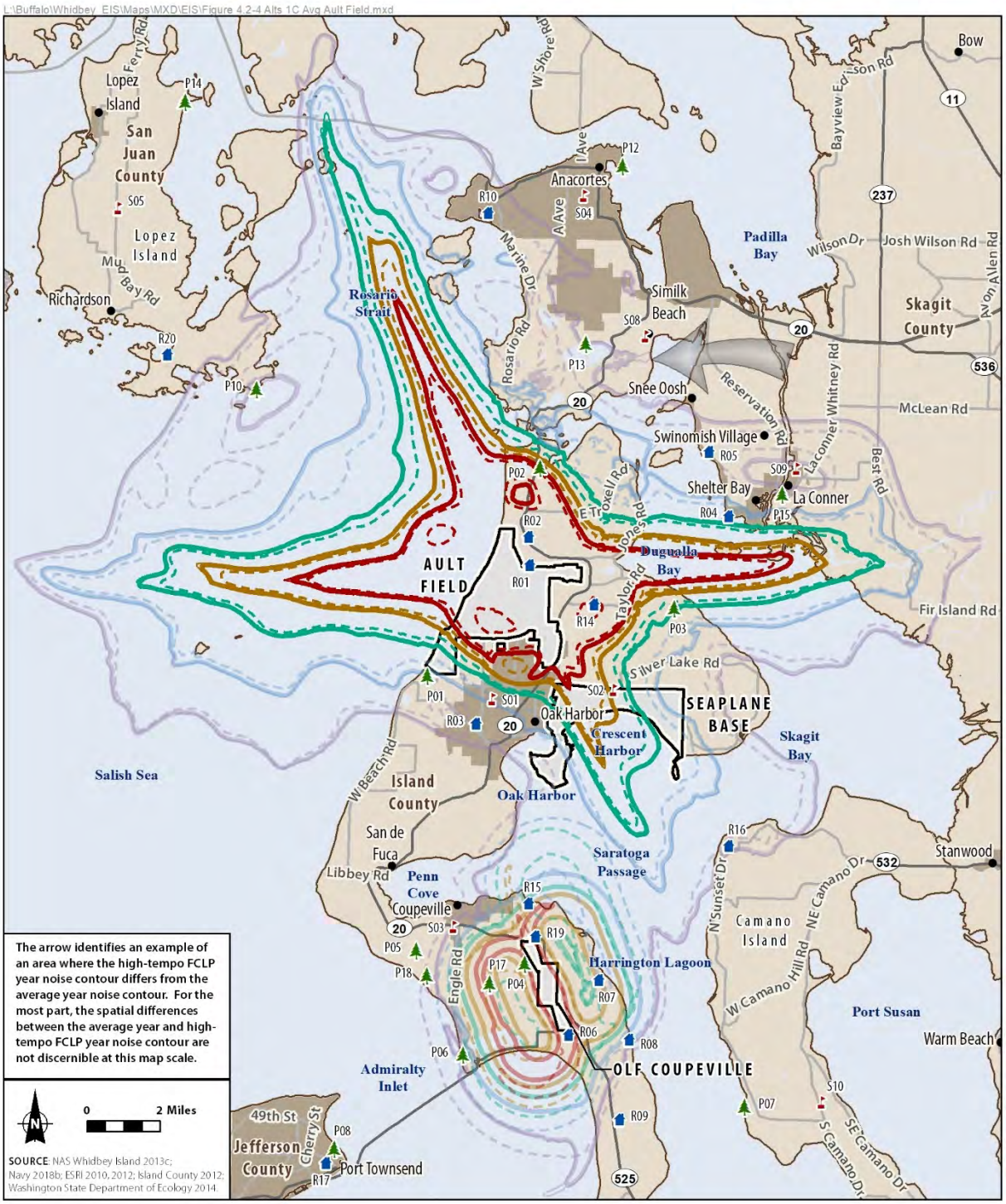

Figure 4.2-4
Alternative 1C DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

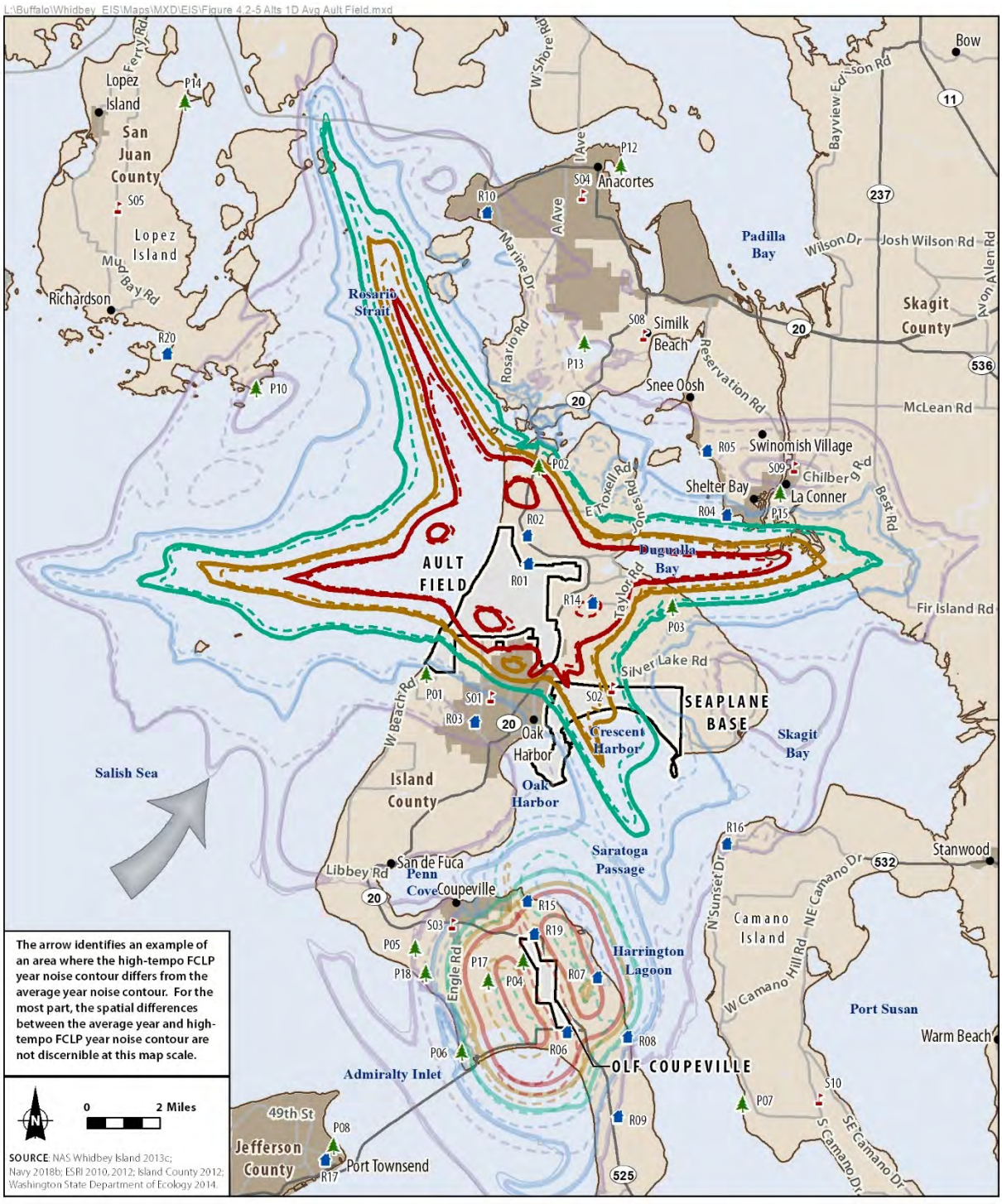

Figure 4.2-5
Alternative 1D DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

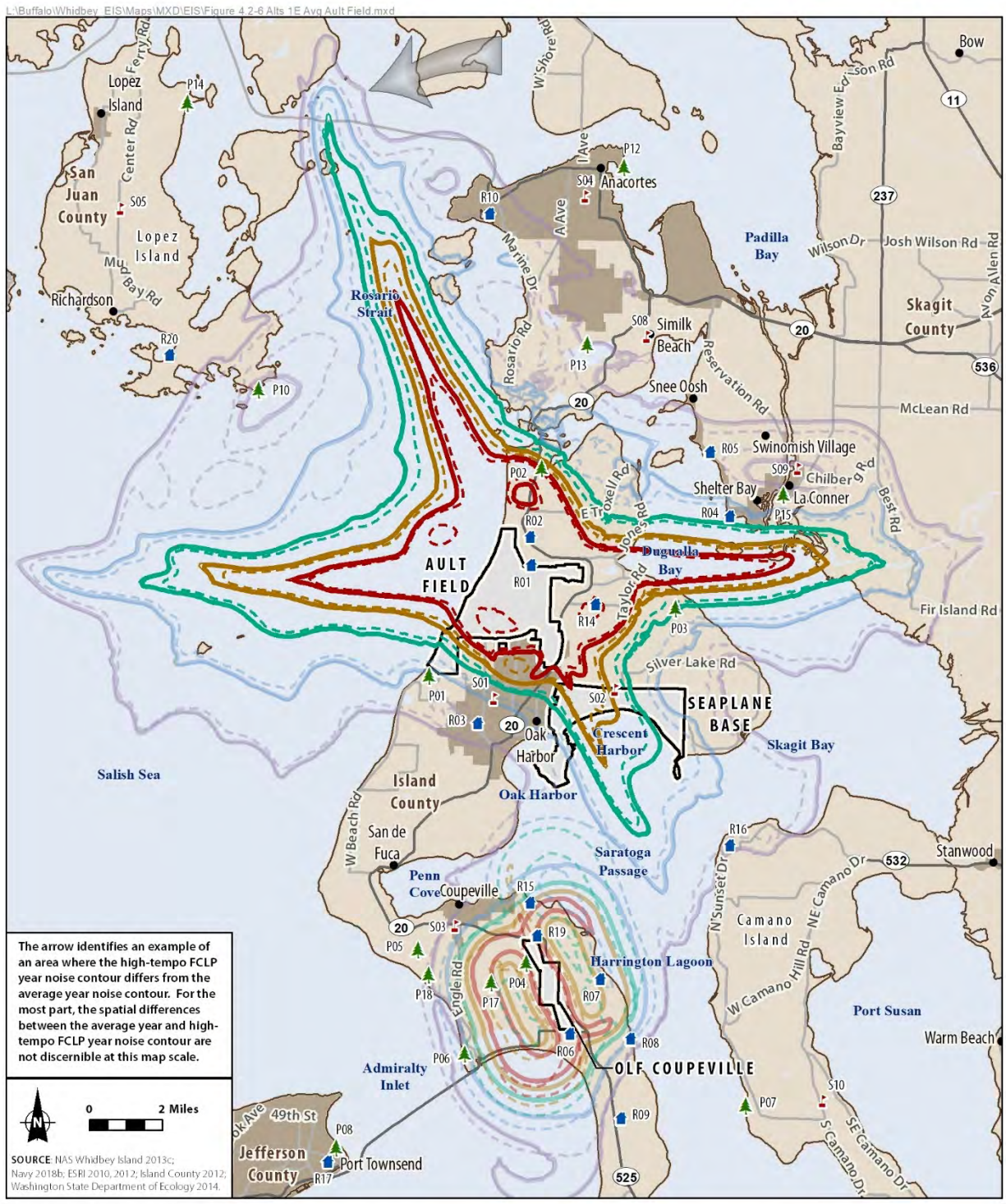

Figure 4.2-6
Alternative 1E DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

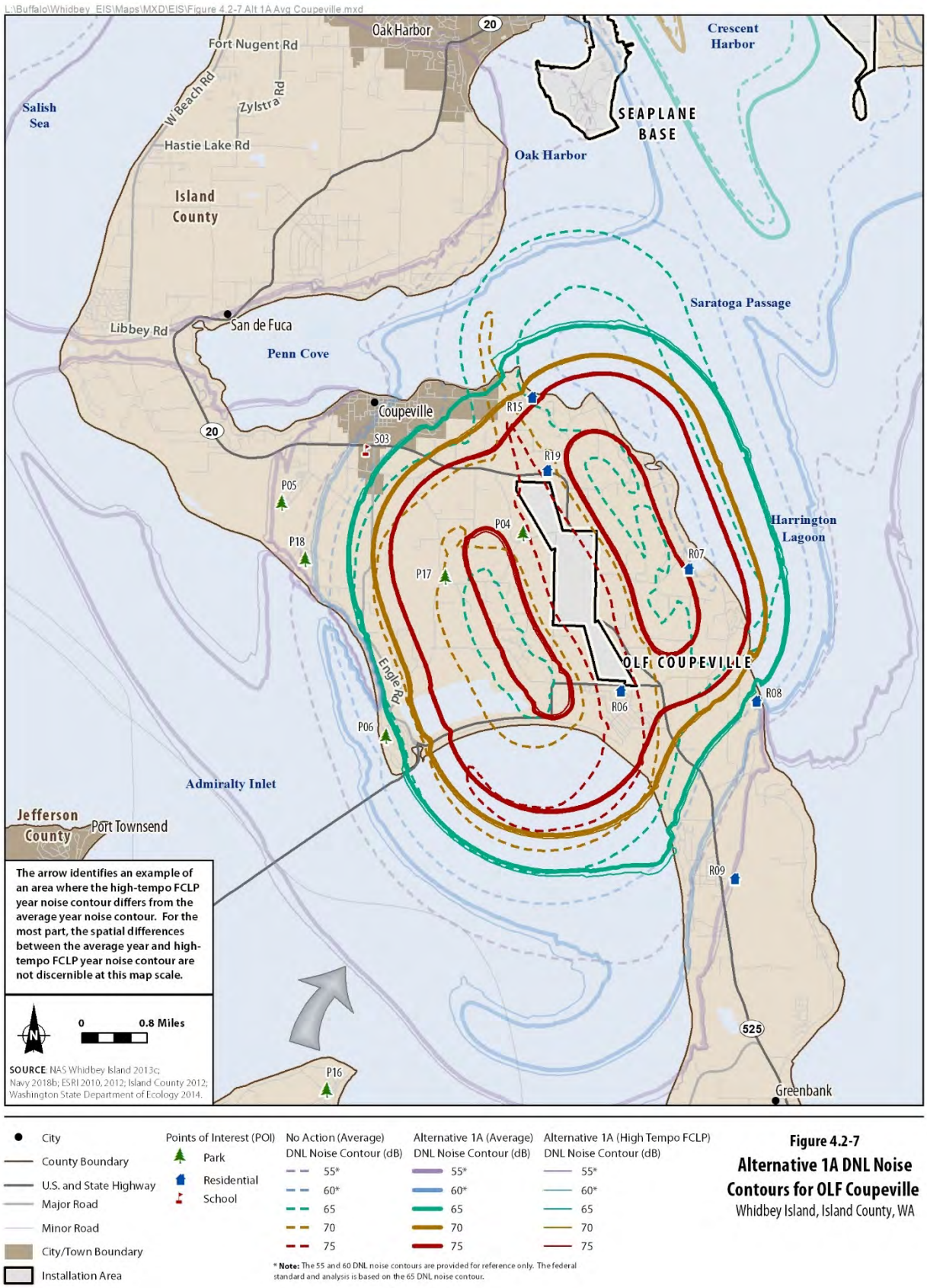

Figure 4.2-7
Alternative 1A DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

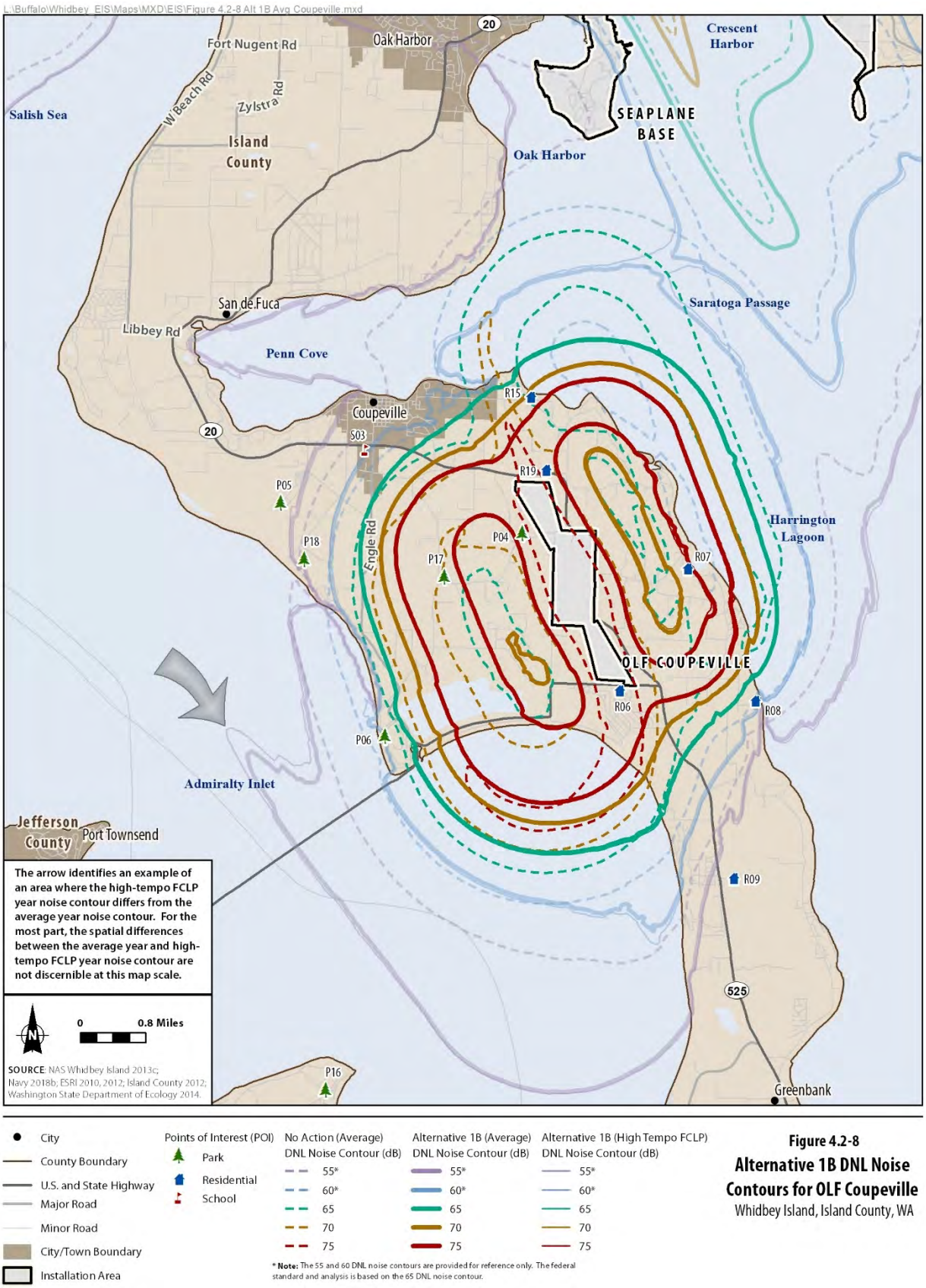

Figure 4.2-8
Alternative 1B DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

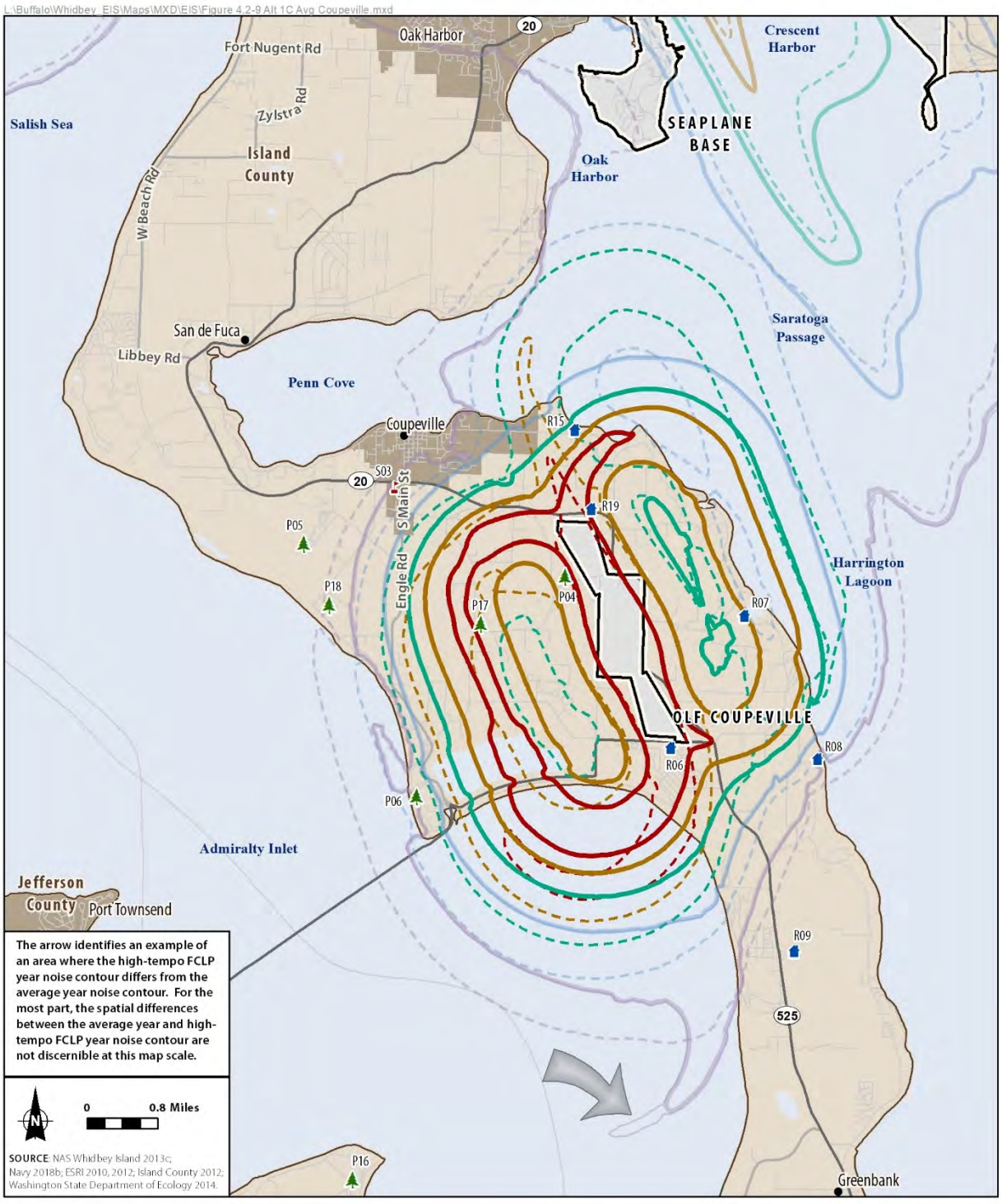

Figure 4.2-9
Alternative 1C DNL Noise Contours OLF Coupeville
Whidbey Island, Island County, WA

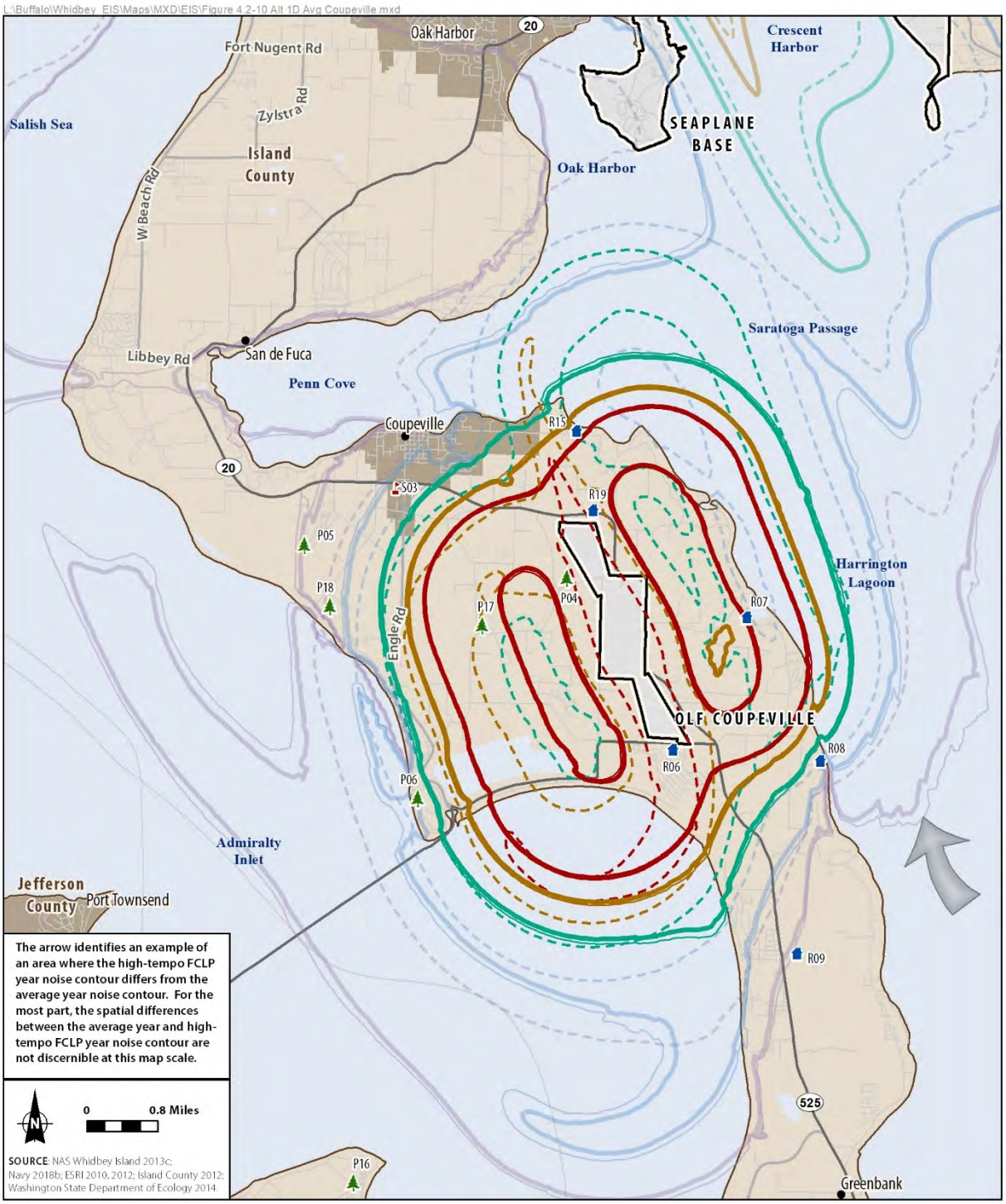

Figure 4.2-10
Alternative 1D DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

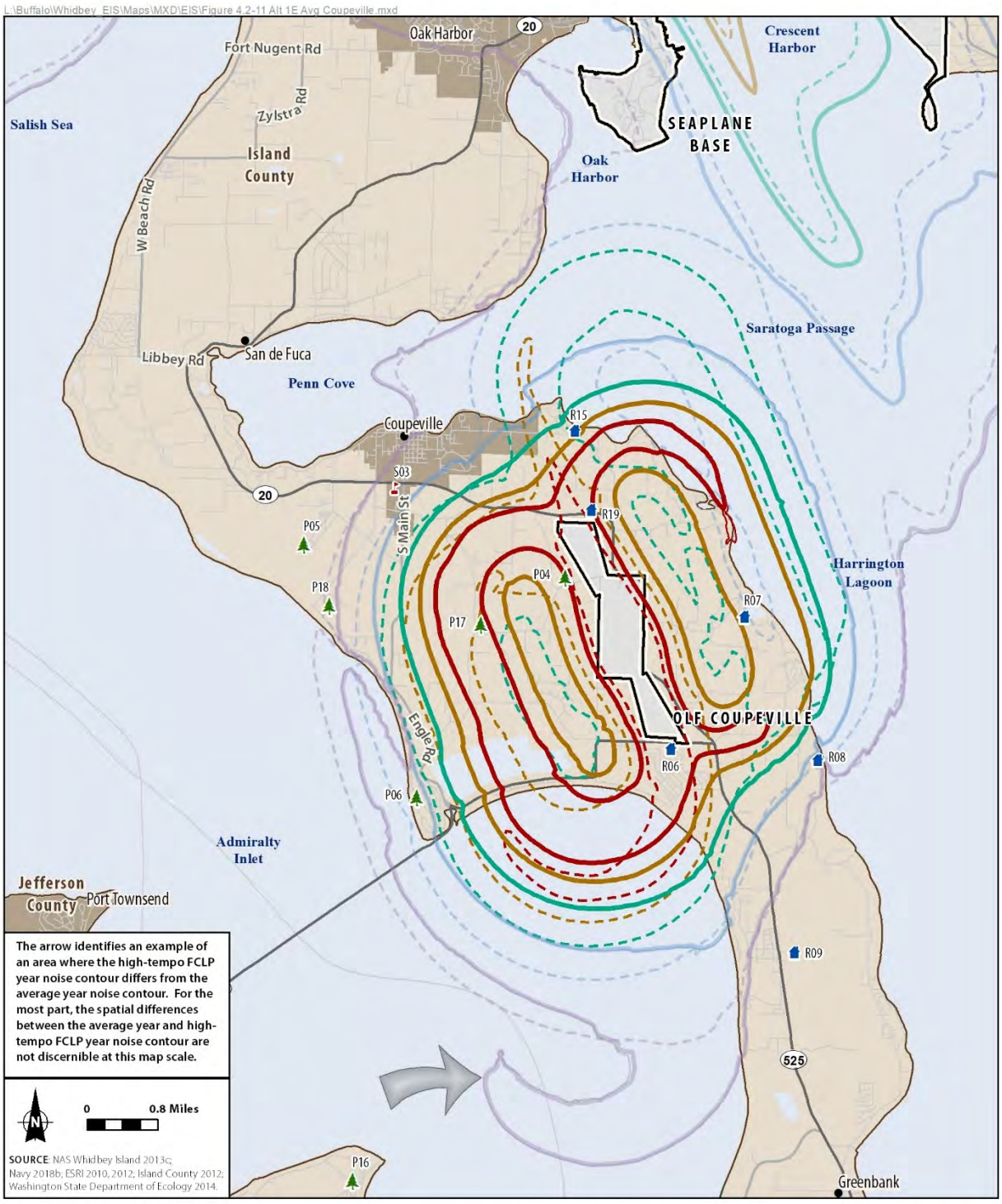

Figure 4.2-11
Alternative 1E DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

4.2.2.2 Supplemental Noise Analyses, Alternative 1

Additional supplemental noise analyses were conducted for a variety of representative POIs identified in the communities surrounding Ault Field and OLF Coupeville. The wide geographic distribution of POIs provides broad coverage and context to compare the noise effects under each of the alternatives with the noise effects for the No Action Alternative. These supplemental noise analyses include single event noise, indoor speech interference, classroom/learning interference, sleep disturbance, outdoor speech interference, and PHL. The POIs chosen for this analysis are presented in Section 3.2, and they are depicted on Figure 3.2-6. Not all POIs are used for each analysis because the location and type of POI dictates whether the particular analysis would apply; however, for the Final EIS, an analysis of outdoor speech interference was also included for all POIs, including residential areas and schools, as individuals would spend time outdoors at both of those types of locations. In addition, between the Draft EIS and Final EIS, an additional 18 POIs were added to the analysis to provide the public and decision makers with more data to compare. These included additional residential areas, schools, and parks, as well as two points from the National Park Service's (NPS's) acoustical monitoring report. The two points from that report (designated as EBLA001 [Reuble Farmstead] and EBLA002 [Ferry House]) correspond to POIs P17 and P18, respectively.

In general, the POIs were chosen based upon several factors, including geographic dispersal from the airfields and under flight operations, major/identifiable landmarks, and areas that have had a history of noise impacts. It should be noted that for POIs located close to one another (i.e., within about 0.25 mile, depending on topography), the results will most likely be the same or very similar and thus not add value to the analysis.

4.2.2.2.1 Single Event Noise, Alternative 1

As noted in Section 3.2.4.3.1, several types of metrics are presented in this subsection that address the question of "how loud" the aircraft are and "how often" someone will hear them. To understand the "how loud" question, the single events can be compared for the 48 POIs evaluated, which was done using two different noise metrics: SEL and L_{max}. The SEL metric is a composite metric that represents both the intensity of a sound and its duration. SEL provides a measure of total sound energy of an entire acoustic event (i.e., arrival, departure, or tough-and-go [T&G]). The L_{max} metric is the maximum, instantaneous level of noise that a particular event produces, and it is most closely related to what an individual would hear. The SEL and L_{max} provide the noise level of a single aircraft event. These events are intermittent in nature, and, therefore, the noise levels do not represent a continuous source of noise. For more details on SEL or L_{max}, see Section 3.2.2 as well as Appendix A, Aircraft Noise Study.

The SEL and L_{max} values for the loudest single event (i.e., arrival, departure, or T&G) for each POI under Alternative 1 at Ault Field and OLF Coupeville are presented in Table 4.2-3. Under Alternative 1, the maximum SEL/L_{max} values vary depending on the location of the POI and its proximity to the airfields and flight tracks. These noise level measurements under Alternative 1 are compared to the noise level measurements that were modeled under the No Action Alternative, and the difference is noted in the table.

As shown in the data, many of the maximum SEL and L_{max} values modeled under Alternative 1 are identical to those modeled in the No Action Alternative analysis. Measurements at 12 of the 48 POIs changed from the No Action Alternative to Alternative 1. These include increases at R06 and R07, and decreases at R08, R15, R19, S03, P04, P05, P06, P16, and P18, while at R09, the SEL decreased slightly and the L_{max} increased slightly. In addition, the SEL and L_{max} values for the representative POIs are all identical under all of the scenarios analyzed; therefore, they are not broken down and presented individually.

Table 4.2-3 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1,2]

		Maximum SEL (dB)		*L_{max} (dB)*	
ID	*Description*	*No Action Alternative*	*Alt 1*	*No Action Alternative*	*Alt 1*
Residences					
R01	Sullivan Rd.	121	121 (0)	114	114 (0)
R02	Salal St. and N. Northgate Dr.	110	110 (0)	101	101 (0)
R03	Central Whidbey	101	101 (0)	49	49 (0)
R04	Pull and Be Damned Point	99	99 (0)	91	91 (0)
R05	Snee-Oosh Point	92	92 (0)	84	84 (0)
R06	Admirals Dr. and Byrd Dr.	118	120 (+2)	115	117 (+2)
R07	Race Lagoon	114	115 (+1)	109	110 (+1)
R08	Pratts Bluff	112	101 (-11)	106	93 (-13)
R09	Cox Rd. and Island Ridge Way	92	90 (-2)	46	51 (+5)
R10	Skyline	100	100 (0)	90	90 (0)
R11	Sequim	73	73 (0)	60	60 (0)
R12	Port Angeles	75	75 (0)	65	65 (0)
R13	Beverly Beach, Freeland	75	75 (0)	63	63 (0)
R14	E. Sleeper Road and Slumber Lane	104	104 (0)	96	96 (0)
R15	Long Point Manor	110	109 (-1)	105	103 (-2)
R16	Rocky Point Heights	100	100 (0)	91	91 (0)
R17	Port Townsend	85	85 (0)	N/A	N/A
R18	Marrowstone Island (Nordland)	68	68 (0)	N/A	N/A
R19	Island Transit Offices, Coupeville	120	115 (-5)	117	108 (-9)
R20	South Lopez Island (Agate Beach)	95	95 (0)	87	87 (0)

Table 4.2-3 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1,2]

		Maximum SEL (dB)		*L_{max} (dB)*	
ID	*Description*	*No Action Alternative*	*Alt 1*	*No Action Alternative*	*Alt 1*
Schools					
S01	Oak Harbor High School	98	98 (0)	90	90 (0)
S02	Crescent Harbor Elementary School	104	104 (0)	94	94 (0)
S03	Coupeville Elementary School	98	94 (-4)	90	86 (-4)
S04	Anacortes High School	93	93 (0)	83	83 (0)
S05	Lopez Island School	76	76 (0)	68	68 (0)
S06	Friday Harbor Elementary School	51	51 (0)	39	39 (0)
S07	Sir James Douglas Elementary	61	61 (0)	51	51 (0)
S08	Fidalgo Elementary School	93	93 (0)	59	59 (0)
S09	La Conner Elementary School	92	92 (0)	86	86 (0)
S10	Elger Bay Elementary School	83	83 (0)	N/A	N/A
Parks					
P01	Joseph Whidbey State Park	93	93 (0)	60	60 (0)
P02	Deception Pass State Park	107	107 (0)	104	104 (0)
P03	Dugualla State Park	105	105 (0)	88	88 (0)
P04	Ebey's Landing – Rhododendron Park	114	111 (-3)	111	105 (-6)
P05	Ebey's Landing – Ebey's Prairie	91	88 (-3)	78	76 (-2)
P06	Fort Casey State Park	102	96 (-6)	91	86 (-5)
P07	Cama Beach State Park	82	82 (0)	73	73 (0)
P08	Port Townsend	85	85 (0)	N/A	N/A
P09	Moran State Park	62	62 (0)	51	51 (0)
P10	San Juan Island National Monument	95	95 (0)	85	85 (0)
P11	San Juan Island Visitors Center	64	64 (0)	50	50 (0)

Table 4.2-3 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1,2]

		Maximum SEL (dB)		*L_{max} (dB)*	
ID	*Description*	*No Action Alternative*	*Alt 1*	*No Action Alternative*	*Alt 1*
P12	Cap Sante Park	82	82 (0)	74	74 (0)
P13	Lake Campbell	94	94 (0)	86	86 (0)
P14	Spencer Spit State Park	76	76 (0)	63	63 (0)
P15	Pioneer Park	92	92 (0)	83	83 (0)
P16	Marrowstone Island (Fort Flagler)	85	79 (-6)	70	67 (-3)
P17	Reuble Farm	115	115 (0)	110	110 (0)
P18	Ferry House	96	91 (-5)	85	82 (-3)

Notes:

[1] The difference between the No Action Alternative and Alternative 1 is noted in parentheses for both the maximum SEL and L_{max} metrics, as well as the number of annual events.

[2] Typically, and as is the case for the majority of the points of interest (POIs) in this analysis, the same aircraft event generates both the SEL and the L_{max}. However, in certain cases when a POI is a farther distance from the airfield, a different event may generate the highest SEL and the L_{max}.

Key:

dB = decibel

L_{max} = maximum sound level

n/a = not available; the aircraft that generates the highest L_{max} at this POI is the P-8A.

SEL = sound exposure level

To answer the "how often" question, a separate analysis was conducted to estimate the number of events above a maximum noise level threshold ($NAXXL_{max}$) (see Section 3.2.2.5 for a description of this metric). For the purposes of this analysis, three L_{max} noise levels were chosen: 1) number of events above 80 dB L_{max} ($NA80L_{max}$), 2) number of events above 90 dB L_{max} ($NA90L_{max}$), and 3) number of events above 100 dB L_{max} ($NA100L_{max}$). This provides context for the frequency of noise events an individual may experience at that POI at three different noise levels and that may be considered disruptive. See Figure 3.2-1 for sound levels from typical sources.

Table 4.2-4 presents the number of events above the three identified thresholds for the POIs analyzed (note, for 21 of the 48 POIs analyzed, the noise model indicated there would be zero events above the 80 dB L_{max}; therefore, they were omitted from the table).

As presented in the table, there is a large range in the number of events based upon the location of the POI. Under certain scenarios, some POIs would experience an increase in the range of 10,000 to over 15,000 annual events above 80 dB L_{max} (i.e., the sound of a garbage disposal). This would be approximately 27 to 41 events per day when averaged. Other POIs would experience some degree less than these numbers. The POIs with the highest number of events above these thresholds were very close to Ault Field. In addition, the results show that as the L_{max} threshold is increased, the number of events decrease, as would be expected. Therefore, when looking at the number of events above a threshold of 100 dB L_{max}, the highest increase is 11,655 at R01 over the No Action Alternative conditions.

What this combined analysis shows is that while there may not be a substantive difference in the loudest event (i.e., SEL or L_{max}) at a particular POI, there may be a substantial increase in the number of loud or disruptive events that occur between alternatives or scenarios when compared to the No Action Alternative.

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1,2]

			Number of Annual Events[3]					
ID	Description	L_{max} (db)	No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D	Alt 1 E
Residences								
R01	Sullivan Rd.	Above 80 dB	48,311	56,395 (+8,084)	59,719 (+11,408)	63,333 (+15,022)	57,571 (+9,260)	62,145 (+13,834)
		Above 90 dB	43,603	50,606 (+7,003)	54,168 (+10,565)	57,792 (+14,189)	51,836 (+8,233)	56,575 (+12,972)
		Above 100 dB	30,199	34,019 (+3,820)	37,992 (+7,793)	41,865 (+11,666)	35,149 (+4,950)	40,509 (+10,310)
R02	Salal St. and N. Northgate Dr.	Above 80 dB	38,892	45,522 (+6,630)	48,692 (+9,800)	53,045 (+14,153)	46,963 (+8,071)	51,807 (+12,915)
		Above 90 dB	36,058	41,690 (+5,632)	45,344 (+9,286)	49,897 (+13,839)	43,344 (+7,286)	48,566 (+12,508)
		Above 100 dB	4,771	6,073 (+1,302)	5,672 (+901)	6,204 (+1,433)	6,667 (+1,896)	6,289 (+1,518)
R04	Pull and Be Damned Point	Above 80 dB	4,985	6,324 (+1,339)	6,189 (+1,204)	5,949 (+964)	6,005 (+1,020)	5,949 (+964)
		Above 90 dB	370	431 (+61)	402 (+32)	402 (+32)	406 (+36)	402 (+32)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R05	Snee-Oosh Point	Above 80 dB	2,767	3,665 (+898)	3,665 (+898)	3,501 (+734)	3,501 (+734)	3,501 (+734)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R06	Admirals Dr. and Byrd Dr.	Above 80 dB	3,101	12,787 (+9,686)	8,003 (+4,902)	3,207 (+106)	11,197 (+8,096)	4,813 (+1,712)
		Above 90 dB	2,451	11,310 (+8,859)	7,090 (+4,639)	2,836 (+385)	9,910 (+7,459)	4,256 (+1,805)
		Above 100 dB	2,227	8,078 (+5,851)	4,925 (+2,698)	1,998 (-229)	6,981 (+4,754)	2,998 (+771)
R07	Race Lagoon	Above 80 dB	938	4,923 (+3,985)	3,251 (+2,313)	1,298 (+360)	4,418 (+3,480)	1,928 (+990)
		Above 90 dB	230	3,402 (+3,172)	2,272 (+2,042)	881 (+651)	3,080 (+2,207)	1,323 (+1,093)
		Above 100 dB	183	2,641 (+2,458)	1,763 (+1,580)	684 (+501)	2,390 (+2,207)	1,027 (+844)
R08	Pratts Bluff	Above 80 dB	368	3,837 (+3,469)	2,564 (+2,196)	995 (+627)	3,475 (+3,107)	1,494 (+1,126)
		Above 90 dB	223	948 (+725)	635 (+412)	246 (+23)	860 (+637)	370 (+147)
		Above 100 dB	65	0 (-65)	0 (-65)	0 (-65)	0 (-65)	0 (-65)

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1,2]

			Number of Annual Events[3]					
ID	Description	L_{max} (db)	No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D	Alt 1 E
R10	Skyline	Above 80 dB	1,548	2,167 (+619)	2,092 (+544)	2,339 (+791)	2,344 (+796)	2,339 (+791)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R14	E. Sleeper Road and Slumber Lane	Above 80 dB	40,516	46,545 (+6,029)	50,726 (+10,210)	54,058 (+13,542)	47,785 (+7,269)	52,778 (+12,262)
		Above 90 dB	10,220	11,031 (+811)	13,752 (+3,532)	16,310 (+6,090)	11,595 (+1,375)	15,372 (+5,152)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R15	Long Point Manor	Above 80 dB	2,524	5,054 (2,530)	3,446 (+922)	1,706 (-818)	4,596 (+2,072)	2,288 (-236)
		Above 90 dB	847	4,522 (+3,675)	2,953 (2,106)	1,160 (+313)	4,046 (+3,199)	1,724 (+877)
		Above 100 dB	41	2,284 (+2,243)	1,530 (+1,489)	592 (+551)	2,070 (+2,029)	888 (+847)
R16	Rocky Point Heights	Above 80 dB	1,525	1,921 (+396)	1,830 (+305)	1,970 (+445)	1,990 (+465)	1,970 (+445)
		Above 90 dB	69	63 (-6)	78 (+9)	62 (-7)	63 (-6)	62 (-7)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R19	Island Transit Offices, Coupeville	Above 80 dB	3,172	12,849 (+9,677)	8,081 (+4,909)	3,269 (+97)	11,260 (+8,088)	4,876 (+1,704)
		Above 90 dB	2,412	12,414 (+10,002)	7,790 (+5,378)	3,155 (+743)	10,866 (+8,454)	4,705 (+2,293)
		Above 100 dB	847	4,522 (+3,675)	2,953 (+2,106)	1,160 (+313)	4,046 (+3,199)	1,742 (+895)
R20	South Lopez Island (Agate Beach)	Above 80 dB	112	142 (+30)	131 (+19)	150 (+38)	151 (+39)	150 (+38)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Schools								
S01	Oak Harbor High School	Above 80 dB	997	624 (-373)	952 (-45)	1,003 (+6)	788 (-209)	961 (-36)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1,2]

			Number of Annual Events[3]					
ID	Description	L_{max} (db)	No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D	Alt 1 E
S02	Crescent Harbor Elementary School	Above 80 dB	4,436	5,525 (+1,089)	5,278 (+842)	5,712 (+1,276)	5,759 (+1,323)	5,712 (+1,276)
		Above 90 dB	3,957	5,109 (+1,152)	4,748 (+791)	5,243 (+1,286)	5,288 (+1,331)	5,243 (+1,286)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S03	Coupeville Elementary School	Above 80 dB	1,852	3,077 (+1,225)	1,870 (+18)	761 (-1,091)	2,655 (+803)	1,144 (-708)
		Above 90 dB	316	0 (-316)	0 (-316)	0 (-316)	0 (-316)	0 (-316)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S04	Anacortes High School	Above 80 dB	112	142 (+30)	131 (+19)	150 (+38)	151 (+39)	150 (+38)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S09	La Conner Elementary School	Above 80 dB	352	387 (+35)	397 (+45)	375 (+23)	379 (+27)	375 (+23)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parks								
P02	Deception Pass State Park	Above 80 dB	8,950	9,762 (+812)	10,877 (+1,927)	13,382 (+4,432)	10,763 (+1,813)	12,867 (+3,917)
		Above 90 dB	5,479	5,683 (+204)	6,711 (+1,232)	9,033 (+3,554)	6,576 9+1,097)	8,546 (+3,067)
		Above 100 dB	5,449	5,492 (+43)	6,583 (+1,134)	8,983 (+3,534)	6,402 (+953)	8,471 (+3,022)
P03	Dugualla State Park	Above 80 dB	16,278	18,310 (+2,032)	20,953 (+4,675)	22,293 (+6,015)	18,798 (+2,520)	21,583 (+5,305)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P04	Ebey's Landing – Rhododendron Park	Above 80 dB	3,172	12,849 (+9,677)	8,081 (+4,909)	3,269 (+97)	11,260 (+8,088)	4,876 (+1,704)
		Above 90 dB	3,103	12,787 (+9,684)	8,003 (+4,900)	3,207 (+104)	11,197 (+8,094)	4,813 (+1,710)
		Above 100 dB	2,720	4,522 (+1,802)	2,953 (+233)	1,160 (-1,560)	4,046 (+1,326)	1,742 (-978)

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1,2]

			Number of Annual Events[3]					
ID	Description	L_{max} (db)	No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D	Alt 1 E
P06	Fort Casey State Park	Above 80 dB	2,189	7,830 (+5,641)	4,759 (+2,570)	1,933 (-256)	6,756 (+4,567)	2,900 (+711)
		Above 90 dB	547	0 (-547)	0 (-547)	0 (-547)	0 (-547)	0 (-547)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P10	San Juan Island National Monument	Above 80 dB	481	549 (+68)	536 (+55)	626 (+145)	631 (+150)	626 (+145)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P13	Lake Campbell	Above 80 dB	254	177 (-77)	235 (-19)	293 (+39)	296 (+42)	293 (+39)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P15	Pioneer Park	Above 80 dB	370	431 (+61)	402 (+32)	402 (+32)	406 (+36)	402 (+32)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P17	Reuble Farm	Above 80 dB	3,061	12,429 (+9,368)	7,770 (+4,709)	3,115 (+54)	10,877 (+7,816)	4,675 (+1,614)
		Above 90 dB	1,641	7,830 (+6,189)	4,759 (+3,118)	1,933 (+292)	6,756 (+5,115)	2,900 (+1,259)
		Above 100 dB	693	5,872 (+5,179)	3,569 (+2,876)	1,450 (+757)	5,067 (+4,374)	2,175 (+1,482)
P18	Ferry House	Above 80 dB	1,180	1,957 (+777)	1,190 (+10)	483 (-697)	1,689 (+509)	725 (-455)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1,2]

			Number of Annual Events[3]					
ID	Description	L_{max} (db)	No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D	Alt 1 E

Notes:

[1] The difference between the No Action Alternative and Alternative 1 is noted in parentheses for the number of events above the specified noise.

[2] POIs that had zero events above an L_{max} of 80 dB, 90 dB, and 100 dB were omitted from the table. These included POIs R03, R09, R11, R12, R13, R17, R18, S05, S06, S07, S08, S10, P01, P05, P07, P08, P09, P11, P12, P14, and P16.

Key:
dB = decibel
L_{max} = maximum sound level

4.2.2.2.2 Speech Interference (Indoor), Alternative 1

Conversations or indoor speech are assumed to be interrupted when a single aircraft event exceeds the maximum sound level, or L_{max}, of 50 dB indoors (Sharp et al, 2009). Normal conversation is about 60 dB; therefore, the use of a 50 dB indoor level is a very conservative threshold such that a soft speaking voice could be heard. For this analysis, the model calculated the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level, or L_{max}, of 50 dB at the 20 residential POIs and the 10 schools, since they are commonly located in residential areas. Because the individual is assumed to be indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis was conducted assuming both "windows-open" and "windows-closed" conditions. Table 4.2-5 presents the average daily (7:00 a.m. to 10:00 p.m.) events per hour that exceed an L_{max} of 50 dB indoors at these POIs under Alternative 1, all scenarios.

Compared to the No Action Alternative, Alternative 1 would result in between zero and two additional events per hour at representative POIs during which conversations or indoor speech would be interrupted. The largest change (with two additional events per daytime hour) would occur at several POIs, including R01, R02, R06, R07, R08, R14, and R15, under various scenarios. However, there are also several POIs at which no change would occur under any of the scenarios compared to the No Action Alternative.

Table 4.2-5 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1]

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour[2]											
		Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]
Residences													
R01	Sullivan Rd.	8	8	9 (+1)	9 (+1)	10 (+2)	10 (+2)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R02	Salal St. and N. Northgate Dr.	8	8	9 (+1)	9 (+1)	9 (+1)	9 (+1)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R03	Central Whidbey	5	-	5 (0)	- (0)	6 (+1)	- (0)	6 (+1)	- (0)	5 (0)	- (0)	6 (+1)	- (0)
R04	Pull and Be Damned Point	2	1	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)
R05	Snee-Oosh Point	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R06	Admirals Dr. and Byrd Dr.	-	-	2 (+2)	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	2 (+2)	2 (+2)	1 (+1)	1 (+1)
R07	Race Lagoon	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	1 (+1)	- (0)	2 (+2)	1 (+1)	1 (+1)	- (0)
R08	Pratts Bluff	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	2 (+2)	1 (+1)	1 (+1)	- (0)
R09	Cox Rd and Island Ridge	-	-	1 (+1)	- (0)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R10	Skyline	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R11	Sequim	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R12	Port Angeles	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R13	Beverly Beach, Freeland	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R14	E. Sleeper Rd. and Slumber Ln.	8	7	9 (+1)	8 (+1)	9 (+1)	8 (+1)	10 (+2)	9 (+2)	9 (+1)	8 (+1)	10 (+2)	9 (+2)

Table 4.2-5 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1]

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour[2]											
		Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]
R15	Long Point Manor	1	1	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R16	Rocky Point Heights	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R17	Port Townsend	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	1	1	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R20	South Lopez Island (Agate Beach)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Schools													
S01	Oak Harbor High School	6	2	6 (0)	2 (0)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	6 (0)	3 (+1)	7 (+1)	3 (+1)
S02	Crescent Harbor Elementary	5	2	5 (0)	2 (0)	6 (+1)	2 (0)	6 (+1)	3 (+1)	6 (+1)	2 (0)	6 (+1)	3 (+1)
S03	Coupeville Elementary	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
S04	Anacortes High School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Table 4.2-5 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1]

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour[2]											
		Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]	Windows Open[3]	Windows Closed[3]
S09	La Conner Elementary School	1	-	1 (0)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S10	Elger Bay Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Notes:

[1] The difference between the No Action Alternative and Alternative 1 is noted in parentheses. Hyphens (-) indicate result equals zero.

[2] Number of annual average daily daytime (7:00 a.m. to 10:00 p.m.) events at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 decibels (dB). See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as "quiet urban daytime" at 40 dB and a garbage disposal at 80 dB.

[3] Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation and other building features that reduce the noise levels inside (FICON, 1992).

4.2.2.2.3 Classroom/learning Interference, Alternative 1

Two metrics were analyzed to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights: interior equivalent sound level during an 8-hour school day ($L_{eq[8]}$) (8:00 a.m. to 4:00 p.m.), and the average number of interfering aircraft events per hour during that time period. Single aircraft events that generate interior sound levels (L_{max}) greater than 50 dB have the potential to interfere with student and teacher interaction by affecting conversation and comprehension (Sharp et al, 2009). Because the classroom interaction occurs indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis considered both windows-open and windows-closed conditions. Table 4.2-6 presents the 8-hour equivalent sound level ($L_{eq[8]}$) and the number of events that exceed an L_{max} of 50 dB indoors under Alternative 1, all scenarios, at the representative POIs, which are schools (and the two residential POIs located in the vicinity of schools). It is important to note that Table 4.2-6 presents average values, and there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all and therefore have no potential for classroom/learning interference.

Most schools would experience interior $L_{eq(8)}$ due to Navy aircraft operations close to ambient levels of 45 dB or less, which would not impact learning and conversation. Crescent Harbor Elementary School (S02) would experience the highest $L_{eq(8)}$ of 52 dB for No Action and the highest under Scenarios C and E of 54 dB when windows are open. When windows are closed, the $L_{eq(8)}$ at Crescent Harbor Elementary School (S02) would drop to less than 45 dB. Given the relatively cool climate in the area, it is likely that windows at schools would be closed a majority of the time.

The potential for classroom interference from single aircraft events generating sound levels inside classrooms greater than 50 dB L_{max} would increase under Alternative 1 by up to two events per hour (at S01, S02, and S03, as well as school surrogate R03) compared to the No Action Alternative; that is, on average, no school would experience an increase of more than two learning-disrupting events per hour under any scenario under Alternative 1 compared to the No Action Alternative. Oak Harbor High School (S01) under Scenarios B, C, and E (with windows open) shows an increase in classroom/learning interference of an additional two events per hour. Crescent Harbor Elementary (S02) under Scenarios B and C (with windows open) shows an increase in classroom/learning interference of an additional two events per hour. Under Scenarios A and D, the Coupeville Elementary School (S03) also shows an increase in classroom/learning interference of an average of an additional two events per hour (with windows open). School surrogate location for Central Whidbey (R03) shows an additional two events per hour (with windows open) under Scenarios C and E as well. All other schools either show no change from the No Action Alternative or an increase of one event per hour during the school day, primarily under the windows-open condition. Under the windows-closed condition, nearly all of the schools would be expected to experience no more than one additional event per hour of classroom/learning interference, with most being unchanged from the No Action Alternative. Many modern schools have central air conditioning and heating systems; therefore, it is more likely that classroom windows would remain closed the majority of the time.

Work and homework disturbance were not quantified in the analysis. Generally, the number of work and homework disturbance events can be assumed to be similar to the number of speech interference events or classroom learning interference events. While increased noise will likely lead to increased work and homework disturbance, it is important to note that the data listed in classroom learning interference tables present average values. This means there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all, thereby creating no potential for classroom learning interference.

Table 4.2-6 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1]

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]	
ID	Description	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]
School Surrogates																									
R03	Central Whidbey	<45	4	<45	-	<45	5 (+1)	<45	- (0)	<45	5 (+1)	<45	- (0)	<45	6 (+2)	<45	- (0)	<45	5 (+1)	<45	- (0)	<45	6 (+2)	<45	- (0)
R11	Sequim	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
Schools																									
S01	Oak Harbor High School	<45	5	<45	2	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)
S02	Crescent Harbor Elementary	52	4	<45	2	53	5 (+1)	<45	2 (0)	53	6 (+2)	<45	2 (0)	54	6 (+2)	<45	3 (+1)	53	5 (0)	<45	2 (0)	54	6 (+1)	<45	2 (0)
S03	Coupeville Elementary	<45	-	<45	-	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	- (0)	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	- (0)
S04	Anacortes High School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S05	Lopez Island School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S06	Friday Harbor Elementary	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S07	Sir James Douglas Elementary	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S08	Fidalgo Elementary School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S09	La Conner Elementary School	<45	1	<45	-	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)
S10	Elger Bay Elementary School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)

Table 4.2-6 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1]

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]	
ID	Description	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]

Notes:

[1] The difference between the No Action Alternative and Alternative 1 is noted in parentheses. Hyphens (-) indicate result equals zero.

[2] Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).

[3] For this metric, daily classroom hours are assumed to be 8:00 a.m. to 4:00 p.m.

[4] Number of average school-day events per hour during an 8-hour school day (8:00 a.m. to 4:00 p.m.) at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 dB. See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as "quiet urban daytime" at 40 dB and a garbage disposal at 80 dB.

Key:

dB = decibel

$L_{eq(8)}$ = 8-hour sound level equivalent

L_{max} = maximum A-weighted sound level

4.2.2.2.4 Sleep Disturbance, Alternative 1

The analysis of sleep disturbance is a calculation of the probability of awakening from aircraft overflights. Thus, it is based on the outdoor SEL at each of the residential POIs, converted to an indoor SEL. Events that were considered are those that occur between 10:00 p.m. and 7:00 a.m. Although individuals sleep outside of these hours, these are considered typical sleeping hours for this type of analysis. Table 4.2-7 presents the results of the sleep disturbance analysis for the 20 POI locations that are in the residential category, as well as the 10 schools, which are commonly located in residential areas.

Under Alternative 1, the majority of the POIs analyzed show an increase in the percent probability of awakening for all scenarios during nights of average aircraft activity. The highest percent increase is for R06 (Admirals Drive and Byrd Drive), where there would be an increase of 32 percent under Scenario A with windows open, meaning that there is a 32-percent greater probability or chance of awakening at least once under windows-open conditions compared to the No Action Alternative. Generally, the POIs around OLF Coupeville had a higher percent probability of awakening under Scenario A than under the other scenarios, and for the POIs around Ault Field, there was a larger increase in the percent probability of awakening for Scenario C than for the other scenarios.

Table 4.2-7 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[3]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
ID	*Description*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*
Residences													
R01	Sullivan Rd.	58%	43%	68% (+10%)	52% (+9%)	72% (+14%)	56% (+13%)	77% (+19%)	61% (+18%)	69% (+11%)	53% (+10%)	75% (+17%)	60% (+17%)
R02	Salal St. and N. Northgate Dr.	41%	29%	50% (+9%)	36% (+7%)	53% (+12%)	39% (+10%)	58% (+17%)	43% (+14%)	51% (+10%)	37% (+8%)	57% (+16%)	42% (+13%)
R03	Central Whidbey	16%	8%	20% (+4%)	11% (+3%)	22% (+6%)	12% (+4%)	25% (+9%)	13% (+5%)	21% (+5%)	11% (+3%)	24% (+8%)	13% (+5%)
R04	Pull and Be Damned Point	19%	9%	25% (+6%)	12% (+3%)	27% (+8%)	13% (+4%)	29% (+10%)	13% (+4%)	26% (+7%)	12% (+3%)	28% (+9%)	13% (+4%)
R05	Snee-Oosh Point	15%	5%	21% (+6%)	8% (+3%)	22% (+7%)	8% (+3%)	24% (+9%)	8% (+3%)	21% (+6%)	8% (+3%)	23% (+8%)	8% (+3%)
R06	Admirals Dr. and Byrd Dr.	9%	6%	41% (+32%)	29% (+23%)	27% (+18%)	19% (+13%)	12% (+3%)	8% (+2%)	37% (+28%)	26% (+20%)	17% (+8%)	11% (+5%)
R07	Race Lagoon	5%	2%	19% (+14%)	9% (+7%)	14% (+9%)	6% (+4%)	7% (+2%)	2% (0%)	18% (+13%)	8% (+6%)	9% (+4%)	3% (+1%)
R08	Pratts Bluff	4%	2%	15% (+11%)	9% (+7%)	10% (+6%)	6% (+4%)	4% (0%)	2% (0%)	13% (+9%)	8% (+6%)	6% (+2%)	4% (+2%)
R09	Cox Rd and Island Ridge Way	3%	2%	12% (+9%)	8% (+6%)	7% (+4%)	5% (+3%)	3% (0%)	2% (0%)	11% (+8%)	7% (+5%)	5% (+2%)	3% (+1%)
R10	Skyline	5%	2%	8% (+2%)	3% (+1%)	8% (+3%)	3% (+1%)	10% (+5%)	3% (+1%)	9% (+4%)	3% (+1%)	10% (+5%)	3% (+1%)
R11	Sequim	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R12	Port Angeles	0%	0%	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	0% (0%)	0% (0%)	1% (+1%)	0% (0%)
R13	Beverly Beach, Freeland	2%	0%	6% (+4%)	0% (0%)	4% (+2%)	0% (0%)	2% (0%)	0% (0%)	5% (+3%)	0% (0%)	2% (0%)	0% (0%)
R14	E. Sleeper Rd. and Slumber Ln.	37%	25%	45% (+8%)	32% (+7%)	49% (+12%)	35% (+10%)	53% (+16%)	39% (+14%)	46% (+9%)	33% (+8%)	52% (+15%)	37% (+12%)
R15	Long Point Manor	11%	4%	24% (+13%)	13% (+9%)	19% (+8%)	8% (+4%)	14% (+3%)	4% (0%)	22% (+11%)	11% (+7%)	16% (+5%)	5% (+1%)

Table 4.2-7 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[3]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
ID	*Description*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*
R16	Rocky Point Heights	9%	3%	11% (+2%)	4% (+1%)	12% (+3%)	4% (+1%)	14% (+5%)	4% (+1%)	12% (+3%)	4% (+1%)	13% (+4%)	4% (+1%)
R17	Port Townsend	1%	0%	1% (0%)	0% (0%)	1% (0%)	0% (0%)	0% (-1%)	0% (0%)	1% (0%)	0% (0%)	1% (0%)	0% (0%)
R18	Marrowstone Island (Nordland)	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R19	Island Transit Offices, Coupeville	9%	5%	34% (+25%)	22% (+17%)	23% (+14%)	14% (+9%)	12% (+3%)	6% (+1%)	31% (+22%)	19% (+14%)	16% (+7%)	9% (+4%)
R20	South Lopez Island (Agate Beach)	3%	1%	4% (+1%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)
Schools (near residential areas)[5]													
S01	Oak Harbor High School	20%	12%	26% (+6%)	15% (+3%)	28% (+8%)	17% (+5%)	31% (+11%)	19% (+7%)	27% (+7%)	16% (+4%)	30% (+10%)	19% (+7%)
S02	Crescent Harbor Elementary	21%	12%	27% (+6%)	16% (+4%)	29% (+8%)	18% (+6%)	32% (+11%)	20% (+8%)	28% (+7%)	17% (+5%)	31% (+10%)	19% (+7%)
S03	Coupeville Elementary	5%	3%	17% (+12%)	11% (+8%)	11% (+6%)	7% (+4%)	6% (+1%)	3% (0%)	16% (+11%)	10% (+7%)	8% (+3%)	4% (+1%)
S04	Anacortes High School	2%	1%	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)
S05	Lopez Island School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S06	Friday Harbor Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S07	Sir James Douglas Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S08	Fidalgo Elementary School	6%	2%	9% (+3%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)	10% (+4%)	3% (+1%)	10% (+4%)	3% (+1%)
S09	La Conner Elementary School	8%	3%	11% (+3%)	5% (+2%)	11% (+3%)	5% (+2%)	10% (+2%)	5% (+2%)	11% (+3%)	5% (+2%)	10% (+2%)	5% (+2%)
S10	Elger Bay Elementary School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)

Table 4.2-7 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[3]

		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
ID	Description	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]

Notes:

1 For this metric, nightly sleeping hours are assumed to be 10:00 p.m. to 7:00 a.m.

2 This metric represents the probability of awakening at least once during a night of average aircraft noise activities.

3 The difference between the No Action Alternative and Alternative 1 is noted in parentheses.

4 Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).

5 All school points of interest were included in the potential sleep disturbance analysis because of their typical proximity to residential areas.

4.2.2.2.5 Outdoor Speech Interference: Potential Noise Effects on Recreation and Outdoor Activities, Alternative 1

The analysis of outdoor speech interference is based on the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). Details on the analysis of outdoor speech interference are available in Section 3.2, as well as in Appendix A, Aircraft Noise Study. Table 4.2-8 presents the results of the analysis for Alternative 1 for all 48 of the POIs because individuals could experience outdoor speech interference when outside in their yard (residential), outside at school for recess or outdoor learning (schools), or recreating at a park or recreational center (parks).

Under Alternative 1, the data in the table show a slight increase for several POIs where there would be potential for up to an average of two additional daytime events per hour during which an individual may experience outdoor speech interference while outside their home or school or while recreating at a park. For many of the POIs, there is no change from the No Action Alternative. As the data indicate and as expected, when the POI is closer to OLF Coupeville, there would be more events under Scenario A, whereas if the POI is located closer to Ault Field, there would be more events under Scenario C. Section 4.5 has additional discussion on parks and recreation in the vicinity of the airfields. The data show that there is a range of potential outdoor speech interference that may disturb individuals participating in outdoor activities depending on the location of the POI relative to the airfields and flight tracks. The average number of events is mostly consistent with those expected under the No Action Alternative conditions; however, some POIs may experience an increase in the average daily events. These increases range from zero to an increase of two events per hour depending on the scenario.

In addition, the number of events per hour that could cause nighttime outdoor speech interference, which would give an estimation of how much an individual tent-camping or sleeping outdoors may be disturbed during the night, was also analyzed. These range from an increase of two events per hour at three of the POIs (P10, R05, and R15) to no change in the number of events per hour at several of the POIs, depending upon the scenario.

Table 4.2-8 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1]

ID	Description	No Action Alternative		Alternative 1 Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
		NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]
Parks													
P01	Joseph Whidbey State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	9 (+1)	3 (+1)
P02	Deception Pass State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	10 (+2)	3 (+1)
P03	Dugualla State Park	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	3 (+1)	9 (+2)	2 (0)	9 (+2)	3 (+1)
P04	Ebey's Landing – Rhododendron Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
P05	Ebey's Landing – Ebey's Prairie	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	3 (+1)	1 (+1)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
P06	Fort Casey State Park	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	- (0)
P07	Cama Beach State Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	5 (+2)	1 (+1)	4 (+1)	1 (+1)
P08	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
P09	Moran State Park	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P10	San Juan Island National Monument	7	1	8 (+1)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	3 (+2)	8 (+1)	2 (+1)	9 (+2)	2 (+1)
P11	San Juan Island Visitors Center	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P12	Cap Sante Park	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
P13	Lake Campbell	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)

Table 4.2-8 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1]

		No Action Alternative		*Alternative 1*									
		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*
ID	*Description*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*
P14	Spencer Spit State Park	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P15	Pioneer Park	4	1	4 (0)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)
P16	Marrowstone Island (Fort Flagler)	-	-	1 (+1)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	1 (+1)	1 (+1)	- (0)
P17	Reuble Farm	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
P18	Ferry House	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
Residences													
R01	Sullivan Road	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	10 (+2)	3 (+1)
R02	Salal Street and N. Northgate Drive	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	10 (+2)	3 (+1)
R03	Central Whidbey	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	3 (+1)	8 (+1)	2 (0)	9 (+2)	2 (0)
R04	Pull and Be Damned Point	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	3 (+1)	9 (+2)	2 (0)	9 (+2)	2 (0)
R05	Snee-Oosh Point	7	1	8 (+1)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	3 (+2)	8 (+1)	2 (+1)	9 (+2)	2 (+1)
R06	Admirals Drive and Byrd Drive	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	- (0)
R07	Race Lagoon	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
R08	Pratts Bluff	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	- (0)

Table 4.2-8 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1]

		No Action Alternative		*Alternative 1*									
		Scenario A		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*			
		Annual Average Outdoor Daily Events per Hour											
		Daytime	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*
ID	*Description*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*
R09	Cox Road and Island Ridge Way	1	-	2 (+1)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
R10	Skyline	4	1	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)
R11	Sequim	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R12	Port Angeles	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
R13	Beverly Beach, Freeland	-	-	1 (+1)	- (0)	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R14	E. Sleeper Road and Slumber Lane	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	10 (+2)	3 (+1)
R15	Long Point Manor	7	1	8 (+1)	3 (+2)	8 (+1)	2 (+1)	8 (+1)	3 (+2)	8 (+1)	2 (+1)	8 (+1)	3 (+2)
R16	Rocky Point Heights	4	1	5 (+1)	1 (0)	5 (+1)	2 (+1)	5 (+1)	2 (+1)	5 (+1)	1 (0)	5 (+1)	2 (+1)
R17	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	- (0)	- (-1)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	3	1	5 (+2)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)
R20	South Lopez Island (Agate Beach)	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
Schools													
S01	Oak Harbor High School	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	9 (+1)	3 (+1)

Table 4.2-8 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)[1]

		No Action Alternative		Alternative 1									
				Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
ID	Description	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]
S02	Crescent Harbor Elementary School	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	3 (+1)	8 (+1)	2 (0)	9 (+2)	2 (0)
S03	Coupeville Elementary School	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
S04	Anacortes High School	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	4	1	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)
S09	La Conner Elementary School	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
S10	Elger Bay Elementary School	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)

Notes:

[1] The difference between the No Action Alternative and Alternative 1 is noted in parentheses. A hyphen (-) indicates the result equals zero.

[2] Number of events at or above an outdoor maximum single event sound level (L_{max}) of 50 dB; this reflects potential for outdoor speech interference.

Key:

dB = decibel

L_{max} = maximum A-weighted sound level

NA50 = Number of Events above an L_{max} of 50 dB

4.2.2.2.6 Potential Hearing Loss, Alternative 1

The available literature on the subject of permanent threshold shifts and aircraft noise exposure indicates that exposure to military aviation noise has not resulted in permanent threshold shifts, even in sensitive populations such as children. Ludlow and Sixsmith (1999) found that exposure to aircraft noise at levels typical of those who live on or near a jet station was unlikely to cause permanent threshold shifts. Additionally, the report found that there were no major differences in audiometric test results between military personnel who, as children, had lived on or near installations where jet aircraft operations were based and military personnel who, as children, had no such exposure (Ludlow and Sixsmith, 1999; ACRP [Aircraft Cooperative Research Program], 2008).

As part of this analysis, an evaluation of the risk of PHL for populations in the areas around the NAS Whidbey Island complex was conducted (including both Ault Field and OLF Coupeville). Details on the PHL metric, methodology for the analysis, and assumptions are outlined in Section 3.2, as well as Appendix A, Aircraft Noise Study. The 1982 *U.S. EPA Guidelines for Noise Impact Analysis* provides that people who experience continuous, daily exposure to high noise over a normal working lifetime of 40 years, with exposure lasting 8 hours per day for 5 days per week, beginning at an age of 20 years old, may be at risk for a type of hearing loss called Noise Induced Permanent Threshold Shift (NIPTS). NIPTS defines a permanent change in hearing level, or threshold, caused by exposure to noise (USEPA, 1982). This workplace exposure standard, which is being applied to outdoor noise levels, is not intended to accurately describe the impact of intermittent noise events such as periodic aircraft overflights but is presented as a "worst-case" analytical tool. To put the conservative nature of this analysis into context, the national average of time spent indoors is approximately 87 percent (or almost 21 hours of the day) (Klepeis et al., n.d.). With intermittent aircraft operations and the time most people spend indoors, it is very unlikely that individuals would experience noise exposure that would result in hearing loss. In fact, it is highly unlikely for an individual living around Ault Field or OLF Coupeville to meet all of the criteria upon which the PHL metric is based. Nonetheless, this analysis is provided per DoD policy directive to support informed decision making and provide a standard for comparison across a wide range of proposed actions that result in community exposure to aircraft noise.

The procedure for determining PHL includes first identifying the number of persons residing in the greater than or equal to 80 dB DNL contour. Then, $L_{eq(24)}$ contours are developed by 1 dB increments in order to determine the potential for NIPTS for both the population with average sensitivity to noise and the population with the most sensitivity to noise. Table 4.2-9 presents the potentially affected populations in and near Ault Field and OLF Coupeville by 1 dB increments of the 24-hour equivalent sound level ($L_{eq[2]}$) as compared to the No Action Alternative numbers presented in Section 3.2.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable (USEPA, 1974). Therefore, using the data provided in Table 4.2-9 for the population with average sensitivity to noise, the level at which there may be a noticeable NIPTS would be at the 84 to 85 dB $L_{eq(24)}$ range and above. There is an increase in the population within the 80 dB DNL noise contour (i.e., potential at-risk population) under Alternative 1 at both Ault Field and OLF Coupeville. The largest increase in the potential at-risk population in the vicinity of Ault Field would be under Scenario C (47 additional people) and for OLF Coupeville would be under Scenario A (45 additional people). The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville. The potential NIPTS values presented in Table 4.2-9 are only applicable in the extreme case of continuous outdoor exposure at one's residence to all aircraft events occurring over a period of 40 years. Because it is highly unlikely for any individuals to meet all those criteria, the actual potential NIPTS for individuals would be far less than the values reported here.

In addition, the actual value of NIPTS for any given person will depend on his or her physical sensitivity to noise; some could experience more hearing loss than others (DNWG, 2013). This noise-sensitive population could be considered the young, the elderly, or those predisposed to hearing sensitivity for other reasons. Therefore, to capture this, the USEPA guidelines provided information on the estimated NIPTS exceeded by the 10 percent of the population most sensitive to noise. Using the same 1 dB incremental data in Table 4.2-9 and the column identified as the 10^{th} Percentile NIPTS, those individuals are vulnerable to noticeable NIPTS at the 77 to 78 dB $L_{eq(24)}$ range and above. Using this even more conservative estimate, the range of potential NIPTS could be up to 18.0 dB for the most noise-sensitive population around Ault Field and up to 12.0 dB for the most noise-sensitive population around OLF Coupeville. As noted previously, it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period; therefore, the actual potential NIPTS for individuals would be far less than the values reported here.

Table 4.2-9 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 1 at NAS Whidbey Island Complex (Average Year)

Band of $L_{eq(24)}$ (dB)[1]	Avg NIPTS (dB)[2,3]	10th Pct NIPTS (dB)[2,]	Estimated Population[4,5,6]											
			Ault Field						OLF Coupeville					
			No Action	Alt 1A	Alt 1B	Alt 1C	Alt 1D	Alt 1E	No Action	Alt 1A	Alt 1B	Alt 1C	Alt 1D	Alt 1E
75-76	1.0	4.0	0	0 (0)	3 (+3)	38 (+38)	0 (0)	30 (+30)	31	141 (+110)	73 (+42)	32 (+1)	125 (+94)	39 (+8)
76-77	1.0	4.5	123	176 (+53)	393[7] (+270)	561[8] (+438)	214 (+91)	507[9] (+384)	45	168 (+123)	94 (+49)	57 (+12)	167 (+122)	65 (+20)
77-78	1.5	5.0	233	262 (+29)	337 (+104)	434 (+201)	310 (+77)	357 (+124)	47	144 (+97)	77 (+30)	66 (+19)	102 (+55)	58 (+11)
78-79	2.0	5.5	145	147 (+2)	246 (+101)	296 (+151)	174 (+29)	294 (+149)	24	96 (+72)	67 (+43)	39 (+15)	85 (+61)	59 (+35)
79-80	2.5	6.0	92	132 (+40)	165 (+73)	250 (+158)	142 (+50)	221 (+129)	7	76 (+69)	60 (+53)	1 (-6)	72 (+65)	86 (+79)
80-81	3.0	7.0	73	78 (+5)	94 (+21)	130 (+57)	81 (+8)	117 (+44)	0	68 (+60)	58 (+58)	0 (0)	64 (+64)	4 (+4)
81-82	3.5	8.0	51	62 (+11)	72 (+21)	80 (+29)	67 (+16)	76 (+25)	0	60 (+60)	67 (+67)	0 (0)	54 (+54)	0 (0)
82-83	4.0	9.0	37	48 (+11)	58 (+21)	64 (+27)	48 (+11)	61 (+24)	0	56 (+56)	32 (+32)	0 (0)	62 (+62)	0 (0)
83-84	4.5	10.0	34	33 (-1)	35 (+1)	38 (+4)	35 (+1)	36 (+2)	0	65 (+65)	1 (+1)	0 (0)	69 (+69)	0 (0)
84-85	5.5	11.0	11	26 (+15)	26 (+15)	29 (+18)	28 (+17)	28 (+17)	0	44 (+44)	0 (0)	0 (0)	2 (+2)	0 (0)
85-86	6.0	12.0	9	9 (0)	22 (+13)	26 (+17)	10 (+1)	24 (+15)	0	1 (+1)	0 (0)	0 (0)	0 (0)	0 (0)
86-87	7.0	13.5	6	8 (+2)	9 (+3)	10 (+4)	9 (+3)	10 (+4)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
87-88	7.5	15.0	4	6 (+2)	6 (+2)	7 (+3)	6 (+2)	7 (+3)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
88-89	8.5	16.5	2	4 (+2)	4 (+2)	5 (+3)	4 (+2)	4 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
89-90	9.5	18.0	0	1 (+1)	2 (+2)	2 (+2)	1 (+1)	2 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-9 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 1 at NAS Whidbey Island Complex (Average Year)

Band of $L_{eq(24)}$ (dB)[1]	Avg NIPTS (dB)[2,3]	10th Pct NIPTS (dB)[2,]	Estimated Population[4,5,6]											
			Ault Field						OLF Coupeville					
			No Action	Alt 1A	Alt 1B	Alt 1C	Alt 1D	Alt 1E	No Action	Alt 1A	Alt 1B	Alt 1C	Alt 1D	Alt 1E
90-91	10.5	19.5	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Notes:

1 L_{eq} bands with no population were omitted from table.

2 NIPTS values rounded to nearest 0.5 dB.

3 NIPTS below 5 dB are generally not considered noticeable.

4 This analysis assumes the population is outdoors at one's residence and exposed to all aircraft noise events for 40 years. Given the amount of time spent indoors and the intermittent occurrence of aircraft noise events, it is highly unlikely that individuals would meet all those criteria, and the actual potential for hearing loss would be far less than the values reported here.

5 Estimated Population was determined by those living within the 80 dB DNL noise contour around each airfield, including those living on-base at Ault Field (there is no on-base population at OLF Coupeville).

6 Population counts of people within the DNL contours were computed using 2010 census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). In addition, per guidance on potential hearing loss, on-base populations at Ault Field have been included in the analysis. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.

7 Of this estimated population, 58 are military personnel living on base at Ault Field.

8 Of this estimated population, 195 are military personnel living on base at Ault Field.

9 Of this estimated population, 96 are military personnel living on base at Ault Field.

Key:
dB = decibel
$L_{eq(24)}$ = 24-hour Equivalent Sound Level
NIPTS = Noise Induced Permanent Threshold Shift

4.2.2.3 Nonauditory Health Effects, Alternative 1

Per studies noted and evaluated in Section 3.2.3, the data and research are inconclusive with respect to the linkage between potential nonauditory health effects of aircraft noise exposure. As outlined within the analysis of DNL contours and supplemental metrics presented within this section, the data show that the Proposed Action would result in both an increase in the number of people exposed to noise as well as those individuals exposed to higher levels of noise. However, research conducted to date has not made a definitive connection between intermittent military aircraft noise and nonauditory health effects. The results of most cited studies are inconclusive and cannot identify a causal link between aircraft noise exposure and the various type of nonauditory health effects that were studied. An individual's health is greatly influenced by many factors known to cause health issues, such as hereditary factors, medical history, and life style choices regarding smoking, diet, and exercise. Research has demonstrated that these factors have a larger and more direct effect on a person's health than aircraft noise.

Based upon public comments received on the Draft EIS, the Navy has expanded its nonauditory health effects literature review, using journals and published articles referred to by the Washington State Department of Health, the USEPA, and public comment submittals. Additional topics discussed included, but were not limited to, hypertension and cardiovascular health, lack of sleep, stress, and anxiety, and details can be found in Appendix A1 of the Aircraft Noise Study (Appendix A).

4.2.2.4 Vibration Effects from Aircraft Operations, Alternative 1

In addition to the noise effects on the population outlined above, noticeable structural vibration may result from certain aircraft operations at either Ault Field or OLF Coupeville. Depending on the aircraft operation, altitude, heading, power settings, and the structure, certain vibration effects may be observed. Typically, the structural elements that are most susceptible to vibration from aircraft noise are windows and sometimes walls or ceilings. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (CHABA, 1977). Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. See Appendix A, Aircraft Noise Study, and the Noise and Vibration Associated with Operational Impacts discussion in Section 4.6.2.1 for additional details on noise-induced vibration effects.

The data show that the Proposed Action will result in both an increase in the number of aircraft operations and area/structures exposed to noise. Therefore, there could be an increase in vibration effects due to the Proposed Action. However, as shown in Table 4.2-3, for the representative POIs analyzed, the highest L_{max} value was 117 dB, and therefore sound levels damaging to structural components of buildings are not likely to occur.

4.2.2.5 Noise Conclusion, Alternative 1

Overall, Alternative 1 would have significant noise impacts in the communities surrounding Ault Field and OLF Coupeville. Both the total number of acres and the total number of individuals within the DNL noise contours would increase for all scenarios analyzed. There would be a larger impact to the

communities around Ault Field under Scenario C, while there would be a larger impact for the communities around OLF Coupeville under Scenario A.

There would be a slight increase in the number of incidents of indoor and outdoor speech interference, and classroom interference. There would also be a higher probability of awakening under all scenarios, especially for POIs located closer to the airfields. In addition, depending on the scenario, the population potentially at risk for PHL would increase. The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville for the population with average sensitivity to noise and up to 18.0 dB at Ault Field and 12.0 dB at OLF Coupeville for the population highly sensitive to noise (the 10 percent of the population with the most sensitivity to noise). The potential NIPTS values are only applicable in the extreme case of continuous outdoor exposure at one's residence to all aircraft events occurring over a period of 40 years. As it is highly unlikely any individuals would meet all these criteria, the actual potential NIPTS for individuals would be far less than the values reported here. With intermittent aircraft operations and the time most people spend indoors, it is very unlikely that individuals would experience noise exposure that would result in hearing loss. Nonetheless, this analysis is provided per DoD policy directive to support informed decision making.

4.2.3 Noise, Alternative 2

This section outlines the noise environment as modeled for Alternative 2 and describes the noise conditions associated with aircraft activity at Ault Field and OLF Coupeville using DNL and several supplemental noise metrics outlined in Section 3.2, including L_{eq}, SEL, L_{max}, and NA, which are used to evaluate such noise effects as community noise exposure, indoor and outdoor speech interference, sleep disturbance, classroom/learning interference, and PHL. Additional information on the noise metrics is also available in Appendix A, Aircraft Noise Study.

The following sections detail potential impacts using projected DNL contours (the federally approved noise metric) and several supplemental metrics (to more fully describe the noise effects).

4.2.3.1 Projected DNL Contours, Alternative 2

As part of the noise analysis and as discussed in Section 3.2.1.1, the DNL noise contours for the alternatives were modeled for an "average year" at Ault Field and OLF Coupeville. An average year represents conditions that are projected to occur on an annual basis, or a typical operating tempo at the NAS Whidbey Island complex. In addition, the five scenarios, which present the optional FCLP allocations, were modeled individually to provide a comparative presentation of the potential noise levels.

Figure 4.2-12 presents the projected DNL noise contours for all scenarios under Alternative 2. This overview figure of the NAS Whidbey Island complex (both Ault Field and OLF Coupeville) presents the 65 dB DNL contour under all scenarios for comparison.

Figures 4.2-13 through 4.2-17 present the five scenarios separately for Ault Field, and Figures 4.2-18 through 4.2-22 present the five scenarios separately for OLF Coupeville[27]. In these sets of figures, the projected 60 dB, 65 dB, 70 dB, and greater than 75 dB DNL contours for Alternative 2 are compared to the No Action Alternative DNL contours. The 65 dB DNL contour at Ault Field extends approximately 10 miles from the four runway endpoints. Under Alternative 2, the length of these contour lobes is primarily due to the Growler on the approach portion of the GCA patterns (described in Section 3.1), where the aircraft generally descends on a 3-degree glide slope through 3,000 feet AGL 10 miles from the runway.

Similar to the No Action Alternative and other alternatives, the shape of the DNL contour at OLF Coupeville would be determined by the FCLPs conducted at the airfield. The 65 to less than 70 dB DNL contour range takes the shape of two ovals, one on each side of OLF Coupeville's runway, which correspond to the FCLP flight tracks. Generally speaking, around Ault Field, the 65 dB DNL contours associated with Scenario C extend the farthest from the airfield and cover the most land area (13,788 acres, compared to 13,164 acres under Scenario A). Conversely, around OLF Coupeville, the 65 dB DNL contours associated with Scenario A extend the farthest from the airfield and cover the most land area (10,082 acres, compared to 7,877 acres under Scenario C). The differences between the scenarios at the two airfields are sometimes small (nearly overlapping) and at other times can differ by approximately one mile. The overall difference in the size of the noise contours between the scenarios is more pronounced at OLF Coupeville than at Ault Field due to the larger proportional difference of operations at OLF Coupeville than at Ault Field.

Table 4.2-10 presents an overall comparison of the number of land acres and population in each of the DNL contour ranges, as well as the difference in conditions between the No Action Alternative and Alternative 2 under all scenarios. As indicated in the table, the total change in population within the entire 65 dB DNL contour increases from the No Action Alternative by between 137 and 1,154 at Ault Field (primarily in and around Oak Harbor), depending on the scenario and, for OLF Coupeville (primarily in and around Coupeville), increases from the No Action Alternative by between 489 and 1,179, depending on the scenario.

[27] In addition, as discussed further in Section 3.2.2.1, 65 dB DNL is the established federal standard for determining potential for high annoyance. This level has been identified in both the FAA's Part 150 Program and the DoD's AICUZ Program (including the individual Air Force and Navy programs) as a threshold for land use recommendations. Consistent with this guidance, 65 dB DNL is used to show areas with potential for high annoyance in this analysis. However, aircraft noise does occur outside the 65 dB DNL contour. In order to more fully reflect the noise environment, the Draft EIS included noise contours of 60 dB DNL as well as detailed noise analysis for specific POIs. In response to public comments, the Navy has expanded the analysis in the Final EIS to show geographic areas subject to greater than 55 dB DNL and has analyzed 18 additional POIs.

As also presented within Table 4.2-10, under several of the alternatives/scenarios, the majority of the increase in population is located within the greater than 75 dB DNL noise contour, especially at OLF Coupeville. The greater than 75 dB DNL noise contour is the area where there is the highest level of community annoyance associated with aircraft noise. Therefore, these populations would be significantly impacted.

For purposes of comparison and to be fully transparent regarding the possible range of impacts that could arise from the Proposed Action, DNL noise contours were also modeled for a high-tempo FCLP year, which represents conditions when pre-deployment training for multiple units overlaps and, therefore, FCLP activity would be expected to increase over average conditions. The high-tempo FCLP year data are depicted on the same figures noted previously, as well as included in Appendix A, Aircraft Noise Study. Figures 4.2-13 through 4.2-22 present both the average year and high-tempo FCLP year DNL noise contours on the same figures for the airfields to illustrate the relatively small differences in the overall noise environment, with many of the areas where the contours diverge occurring over water.

In addition, Table 4.2-11 shows the percentage change in acreage and population between the average year DNL contour ranges and the high-tempo FCLP year DNL contour ranges. The higher the percent change means the deviation between the average year DNL noise contours and the high-tempo FCLP year DNL contours is larger; however, most changes are within +/- 5 percent of zero.

Table 4.2-10 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 2 (Average Year)[2,3]

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
	Area (acres)	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*
Ault Field								
No Action Alternative								
Average Year	3,596	3,279	3,269	2,283	5,549	3,379	12,414	8,941
Alternative 2								
Scenario A (20/80 FCLP split)	4,015 (+419)	3,699 (+420)	3,263 (-6)	1,886 (-397)	5,886 (+337)	3,493 (+114)	13,164 (+750)	9,078 (+137)
Scenario B (50/50 FCLP split)	3,899 (+303)	3,595 (+316)	3,266 (-3)	2,423 (+140)	6,370 (+821)	3,763 (+384)	13,535 (+1,121)	9,781 (+840)
Scenario C (80/20 FCLP split)	3,903 (+307)	3,701 (+422)	3,130 (-139)	2,472 (+189)	6,755 (+1,206)	3,922 (+543)	13,788 (+1,374)	10,095 (+1,154)
Scenario D (30/70 FCLP split)	3,966 (+370)	3,703 (+424)	3,234 (-35)	2,189 (-94)	6,129 (+580)	3,606 (+227)	13,329 (+915)	9,498 (+557)
Scenario E (70/30 FCLP split)	3,898 (+302)	3,667 (+388)	3,152 (-117)	2,435 (+152)	6,657 (+1,108)	3,876 (+497)	13,707 (+1,293)	9,978 (+1,037)
OLF Coupeville								
No Action Alternative								
Average Year	3,681	861	3,088	786	638	583	7,407	2,230
Alternative 2								
Scenario A (20/80 FCLP split)	1,553 (-2,128)	539 (-322)	3,380 (+292)	987 (+201)	5,149 (+4,511)	1,883 (+1,300)	10,082 (+2,675)	3,409 (+1,179)
Scenario B (50/50 FCLP split)	2,124 (-1,557)	583 (-278)	3,470 (+382)	1,065 (+279)	3,784 (+3,146)	1,447 (+864)	9,378 (+1,971)	3,095 (+865)
Scenario C (80/20 FCLP split)	3,442 (-239)	1,059 (+198)	3,148 (+60)	1,018 (+232)	1,287 (+649)	642 (+59)	7,877 (+470)	2,719 (+489)
Scenario D (30/70 FCLP split)	1,651 (-2,030)	518 (-343)	3,443 (+355)	1,027 (+241)	4,793 (+4,155)	1,774 (+1,191)	9,887 (+2,480)	3,319 (+1,089)
Scenario E (70/30 FCLP split)	3,136 (-545)	896 (+35)	3,157 (+69)	1,047 (+261)	2,413 (+1,775)	968 (+385)	8,706 (+1,299)	2,911 (+681)

Table 4.2-10 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 2 (Average Year)[2,3]

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
	Area (acres)	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*
NAS Whidbey Island Complex								
No Action Alternative								
Average Year	7,277	4,140	6,357	3,069	6,187	3,962	19,821	11,171
Alternative 2								
Scenario A (20/80 FCLP split)	5,568 (-1,709)	4,238 (+98)	6,643 (+286)	2,873 (-196)	11,035 (+4,848)	5,376 (+1,414)	23,246 (+3,425)	12,487 (+1,316)
Scenario B (50/50 FCLP split)	6,023 (-1,254)	4,178 (+38)	6,736 (+379)	3,488 (+419)	10,154 (+3,967)	5,210 (+1,248)	22,913 (+3,092)	12,876 (+1,705)
Scenario C (80/20 FCLP split)	7,345 (+68)	4,760 (+620)	6,278 (-79)	3,490 (+421)	8,042 (+1,855)	4,564 (+602)	21,665 (+1,844)	12,814 (+1,643)
Scenario D (30/70 FCLP split)	5,617 (-1,660)	4,221 (+81)	6,677 (+320)	3,216 (+147)	10,922 (+4,735)	5,380 (+1,418)	23,216 (+3,395)	12,817 (+1,646)
Scenario E (70/30 FCLP split)	7,034 (-243)	4,563 (+423)	6,309 (-48)	3,482 (+413)	9,070 (+2,883)	4,844 (+882)	22,413 (+2,592)	12,889 (+1,718)

Table 4.2-10 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 2 (Average Year)[2,3]

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
	Area (acres)	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*

Notes:

[1] All five scenarios are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[2] Acreage presented does not include areas over water or areas over the NAS Whidbey Island complex.

[3] The difference between the No Action Alternative and Alternative 1 is noted in parentheses.

[4] Population counts of people within the DNL contour ranges were computed using 2010 Census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour range, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the DNL contour ranges (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville). A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.

[5] Numbers have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level
FCLP = Field Carrier Landing Practice

Table 4.2-11 Percent Difference in the Estimated Acreage and Population within the Average and High-Tempo FCLP Year DNL Contour Ranges for the NAS Whidbey Island Complex, Alternative 2

DNL Contours	DNL Contour Ranges[1]							
	65 to <70 dB DNL		70 to <75 dB DNL		Greater than or equal to 75 dB DNL		Total	
	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop
Ault Field								
Scenario A	1.7%	1.1%	0.3%	2.3%	1.1%	0.6%	1.1%	1.2%
Scenario B	1.4%	1.8%	0.0%	2.8%	1.9%	1.4%	1.3%	1.9%
Scenario C	2.3%	1.8%	0.3%	1.8%	1.3%	1.0%	1.4%	1.5%
Scenario D	1.5%	1.4%	0.3%	1.6%	1.0%	0.7%	1.0%	1.2%
Scenario E	1.8%	1.5%	0.3%	2.1%	1.3%	0.8%	1.2%	1.4%
OLF Coupeville								
Scenario A	0.6%	4.3%	-2.9%	-3.9%	3.4%	2.9%	0.9%	1.2%
Scenario B	-2.9%	-3.7%	-0.3%	-0.5%	3.6%	3.4%	0.7%	0.7%
Scenario C	0.1%	-3.1%	0.9%	2.4%	26.6%	14.6%	4.8%	3.1%
Scenario D	-3.9%	1.8%	-0.5%	-2.0%	3.6%	3.2%	0.9%	1.3%
Scenario E	-6.8%	-7.9%	2.1%	0.4%	12.6%	10.9%	1.8%	1.3%
NAS Whidbey Island Complex								
Scenario A	1.4%	1.5%	-1.3%	0.2%	2.2%	1.4%	1.0%	1.2%
Scenario B	-0.1%	1.1%	-0.1%	1.8%	2.5%	1.9%	1.1%	1.6%
Scenario C	1.3%	0.7%	0.6%	2.0%	5.4%	2.9%	2.6%	1.8%
Scenario D	-0.1%	1.4%	-0.1%	0.5%	2.2%	1.5%	1.0%	1.2%
Scenario E	-2.0%	-0.4%	1.2%	1.6%	4.3%	2.8%	1.4%	1.4%

Key:
dB = decibel
DNL = day-night average sound level
NAS = Naval Air Station
OLF = outlying landing field

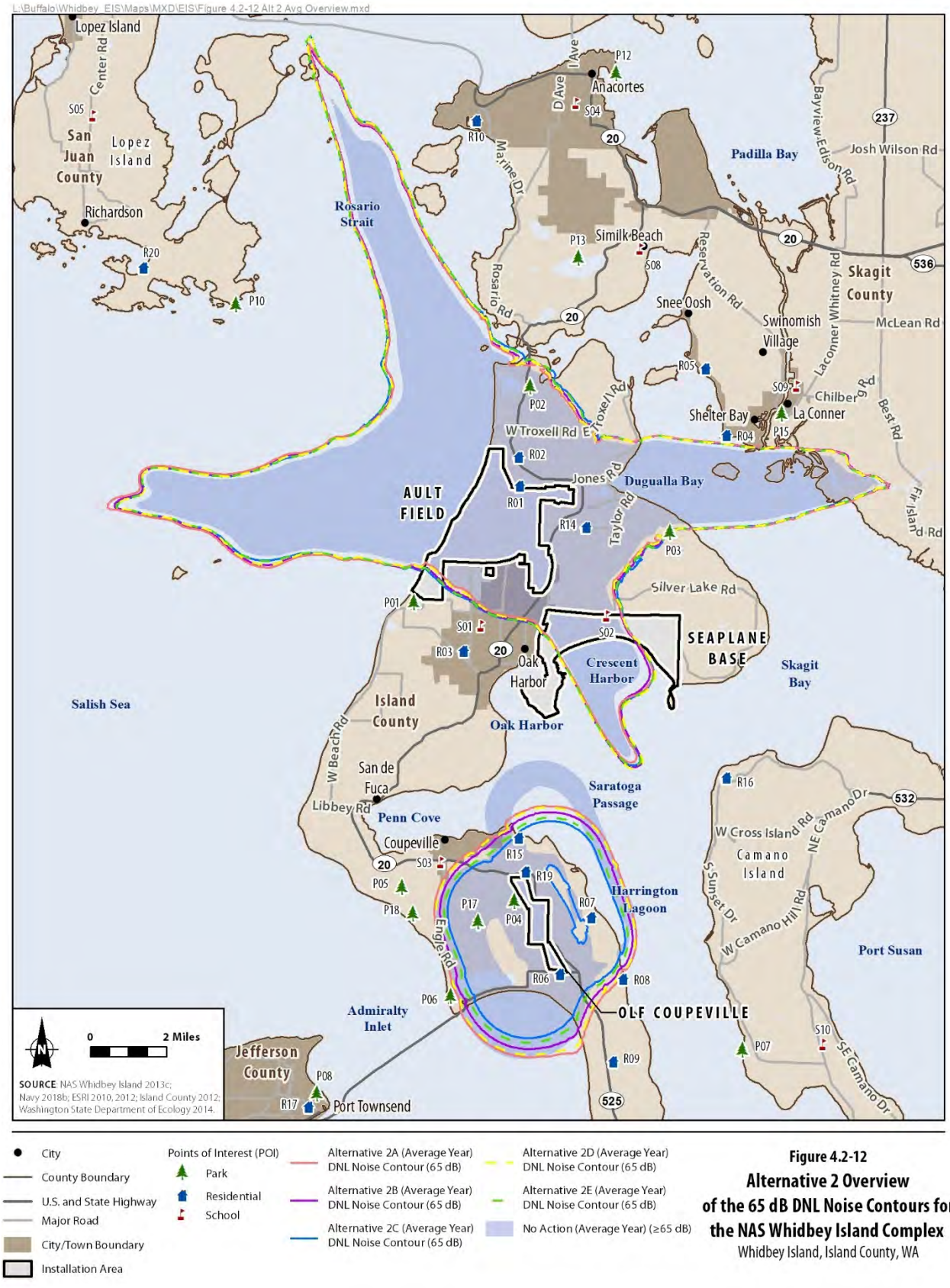

Figure 4.2-12
Alternative 2 Overview of the 65 dB DNL Noise Contours for the NAS Whidbey Island Complex
Whidbey Island, Island County, WA

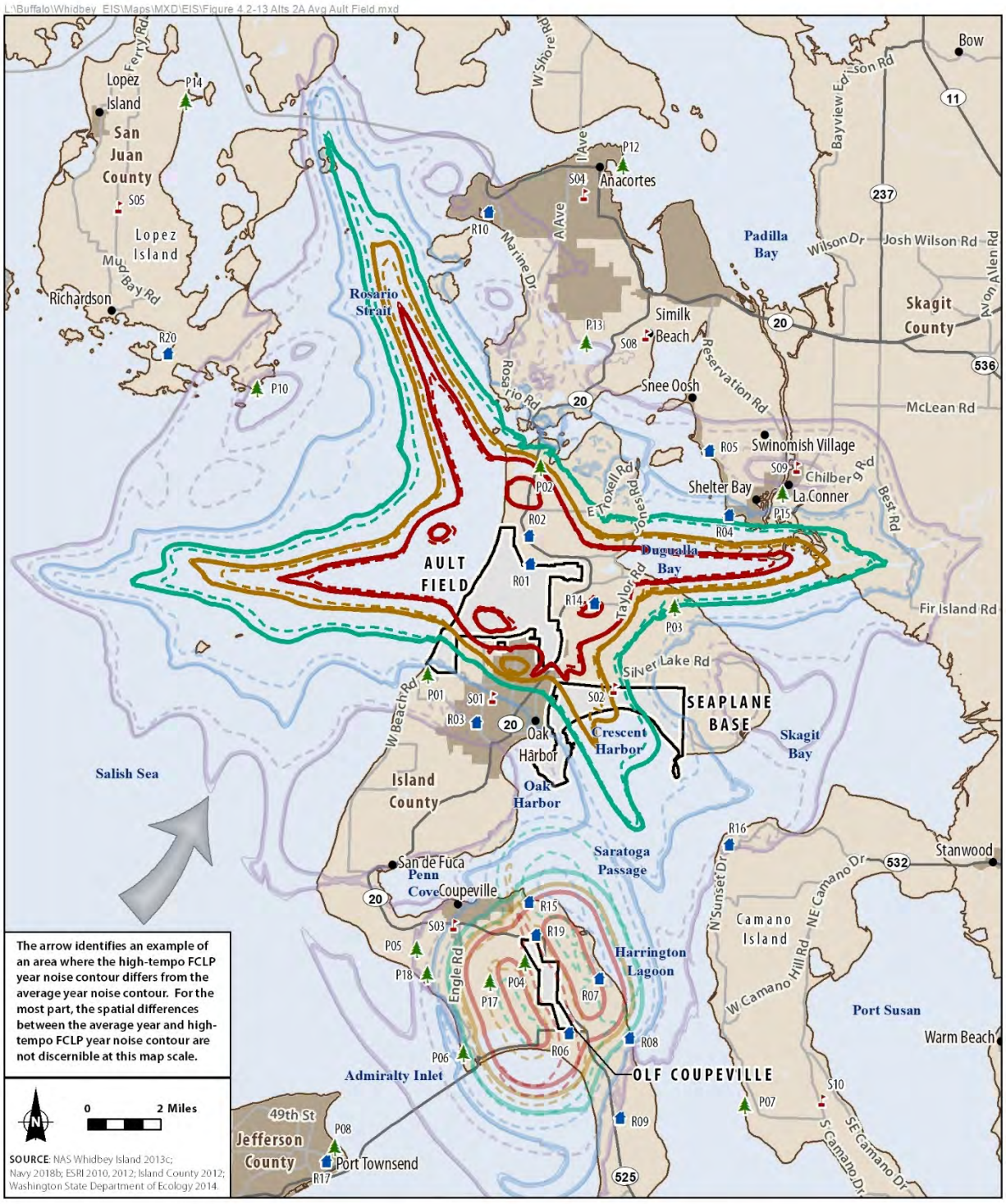

Figure 4.2-13
Alternative 2A DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

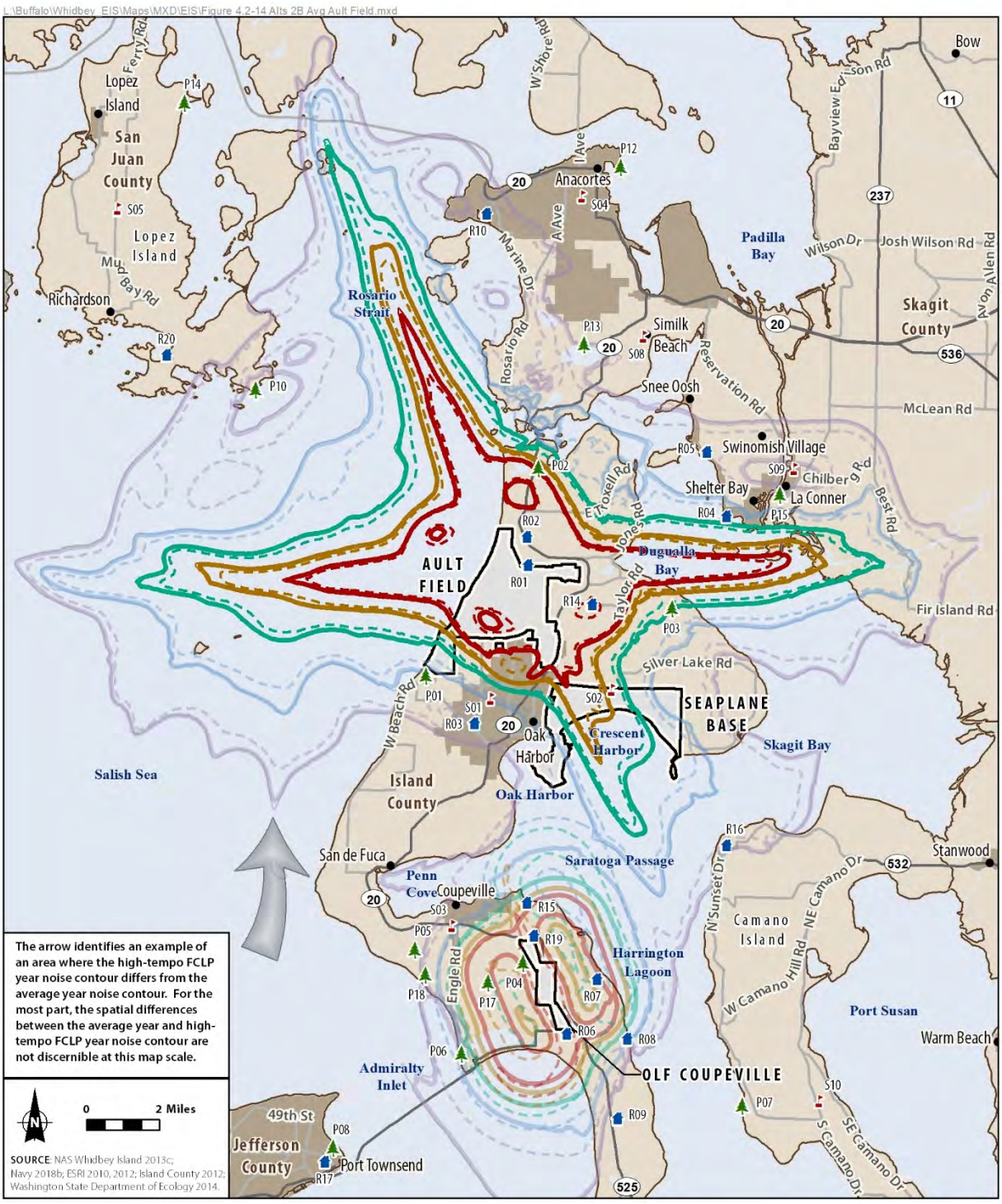

Figure 4.2-14
Alternative 2B DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

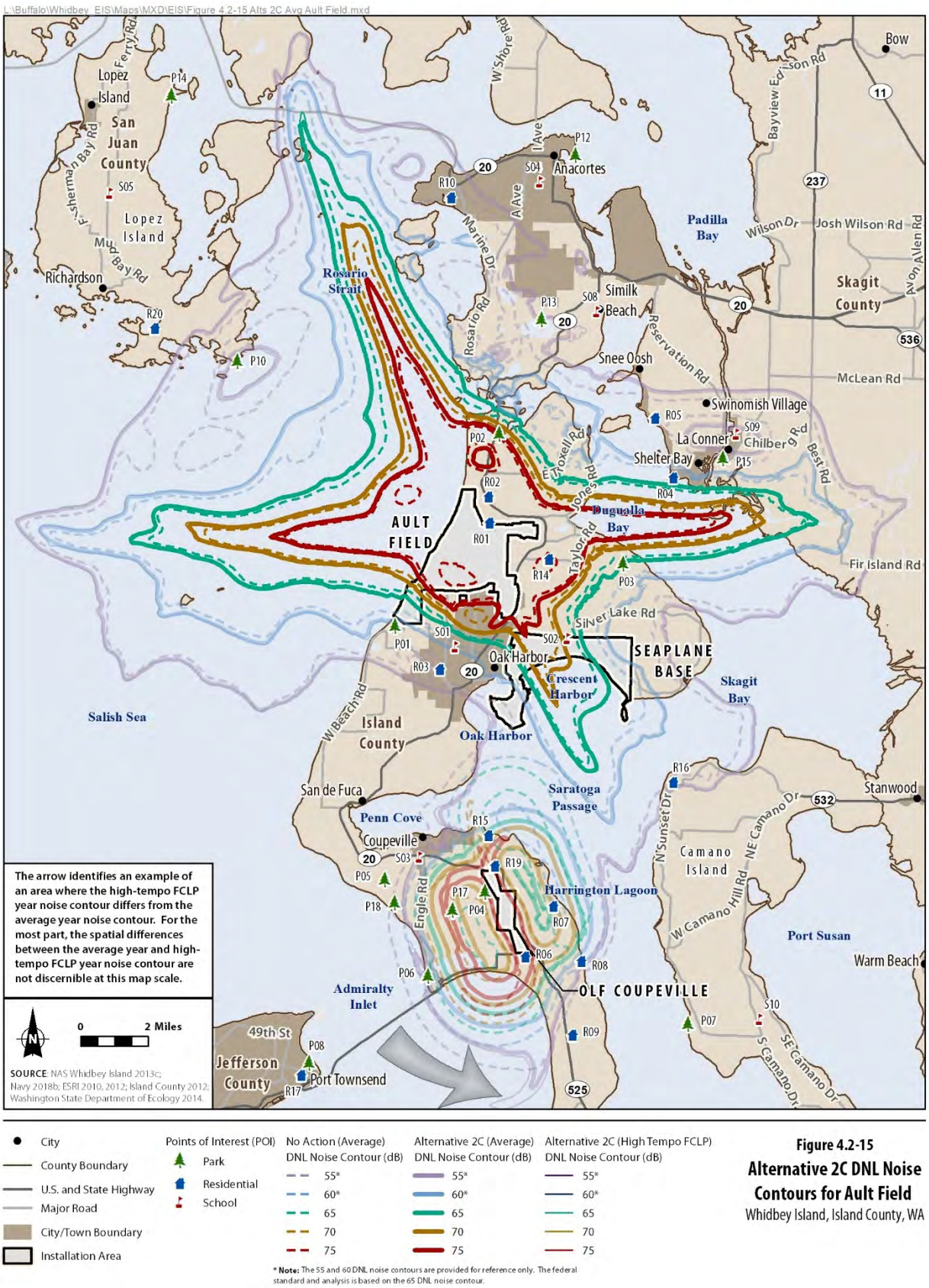

Figure 4.2-15
Alternative 2C DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

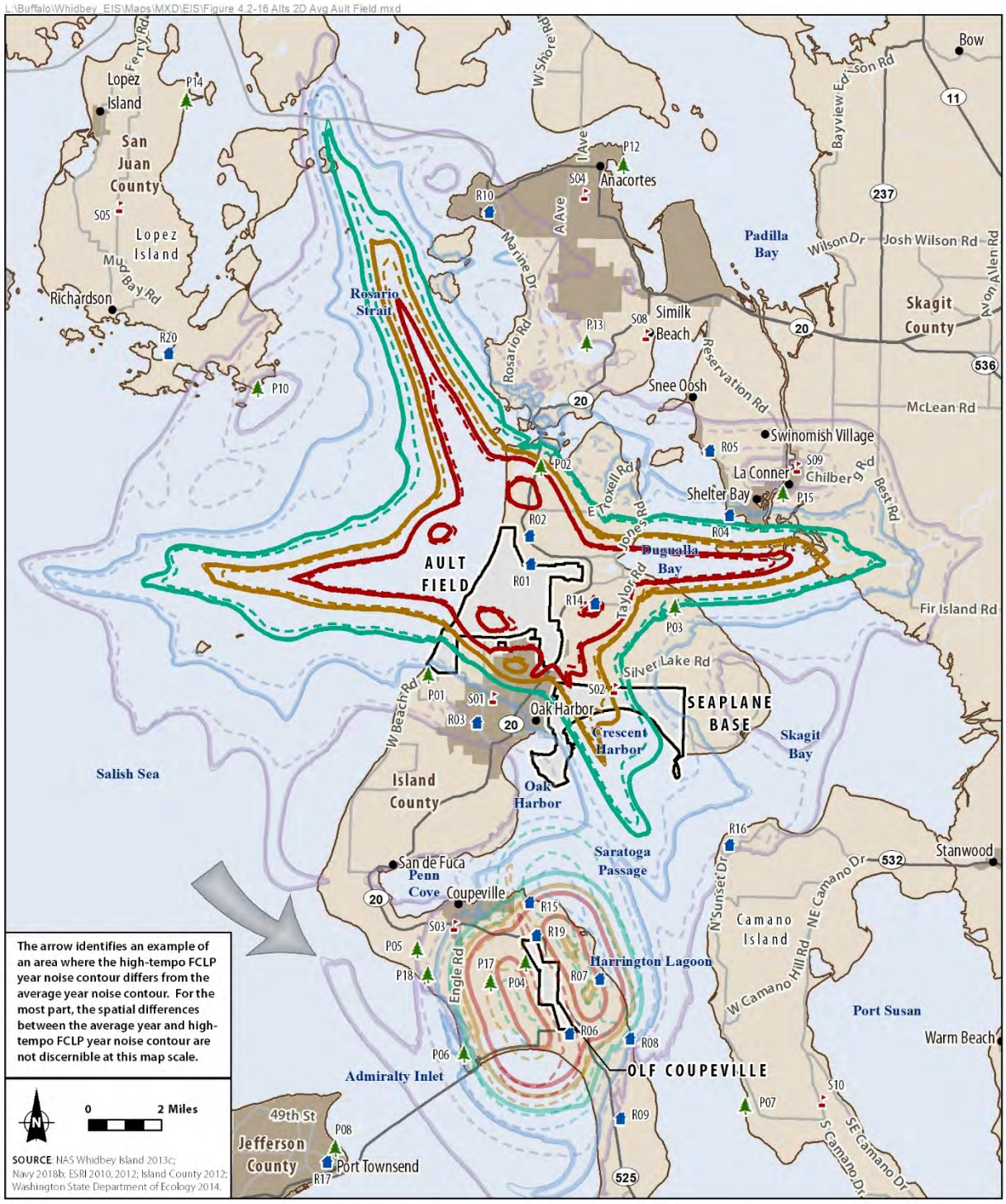

Figure 4.2-16
Alternative 2D DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

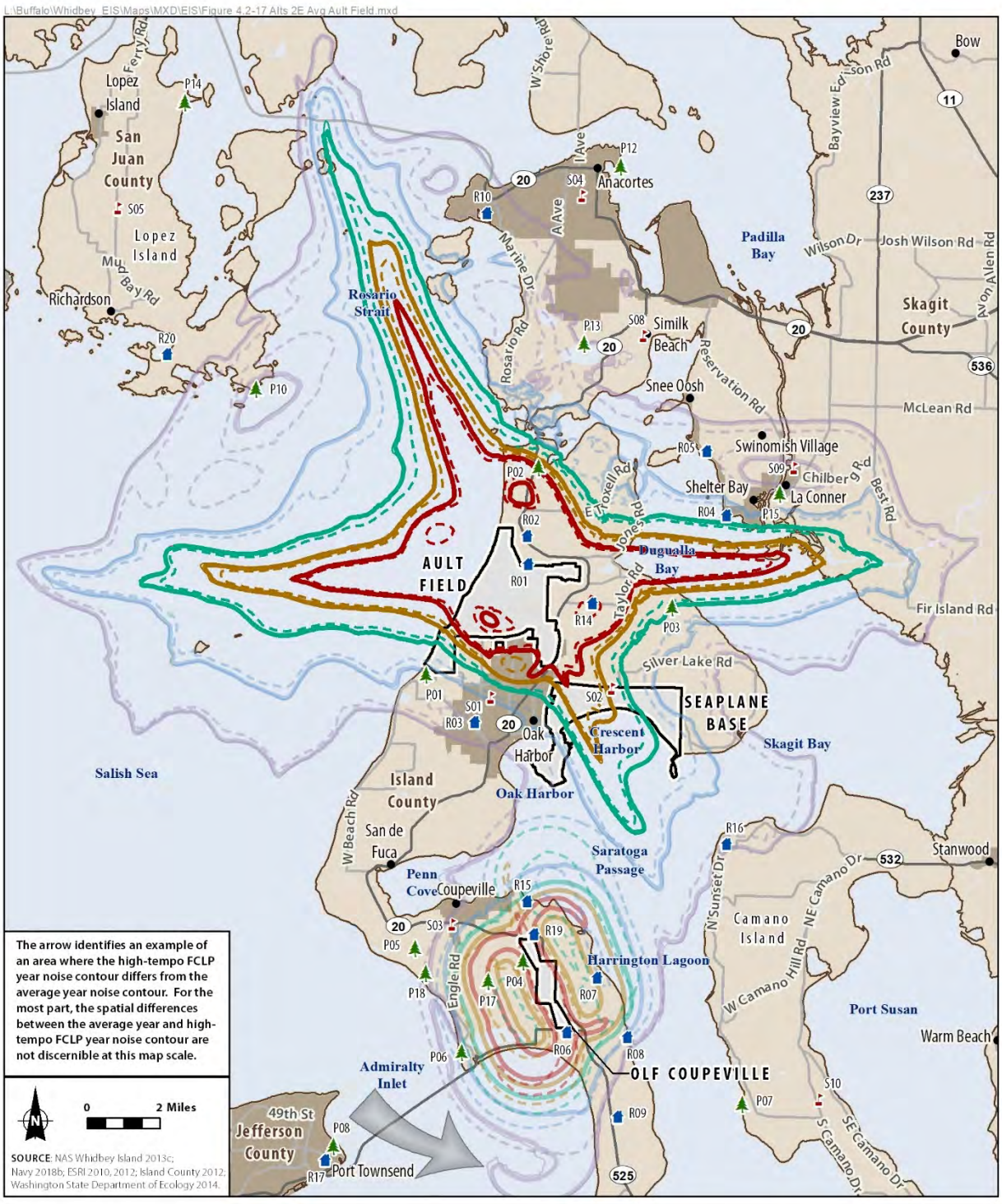

Figure 4.2-17
Alternative 2E DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

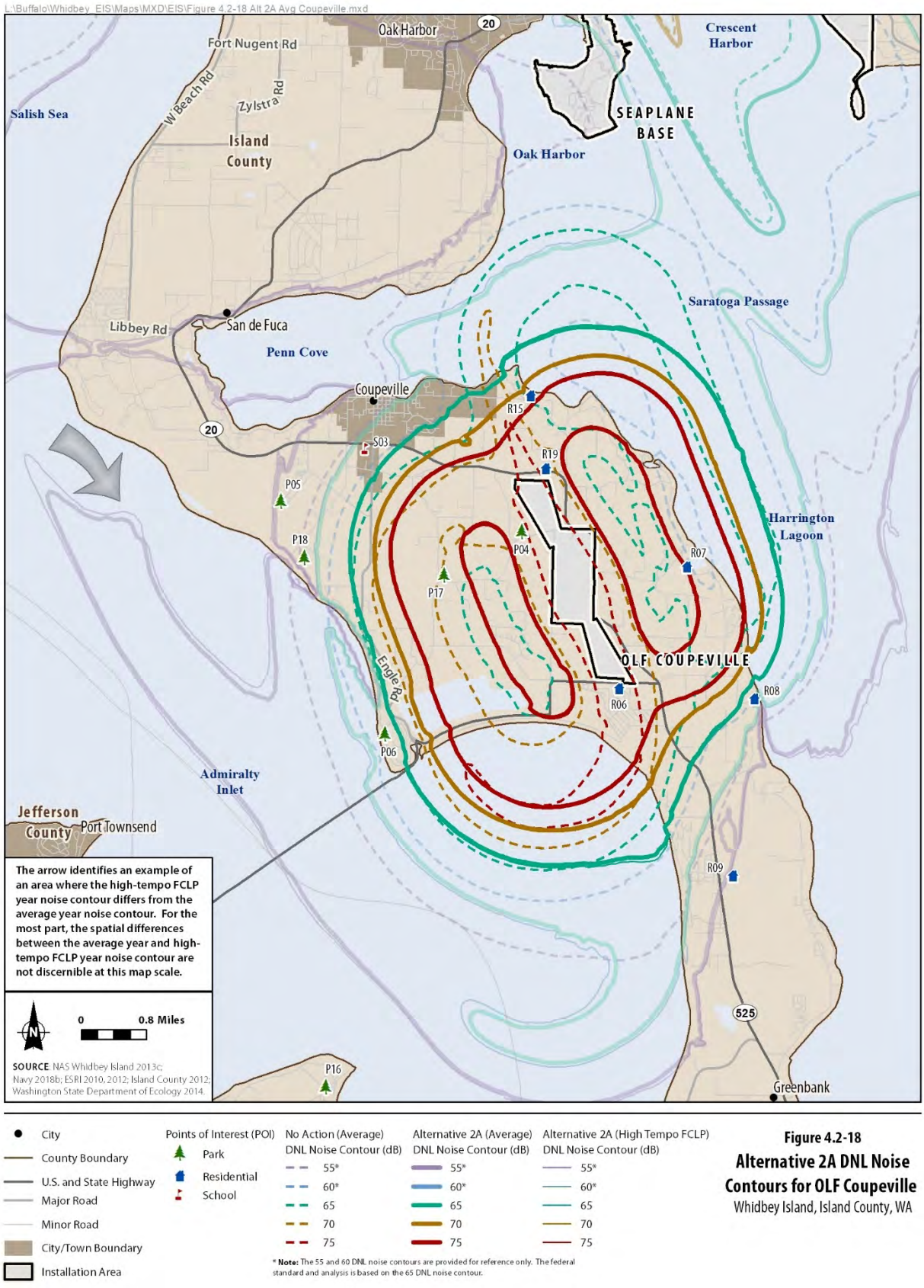

Figure 4.2-18
Alternative 2A DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

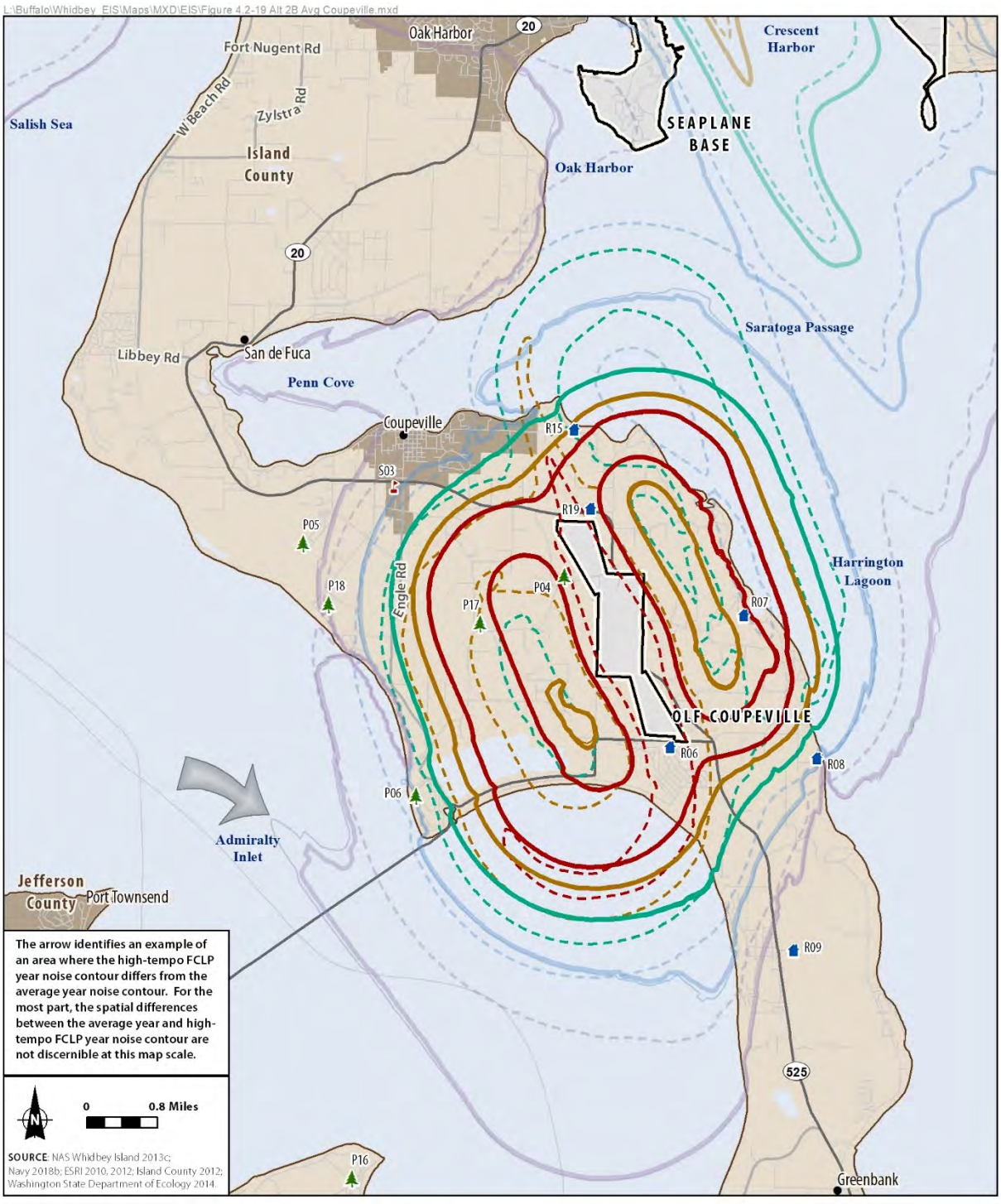

Figure 4.2-19
Alternative 2B DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

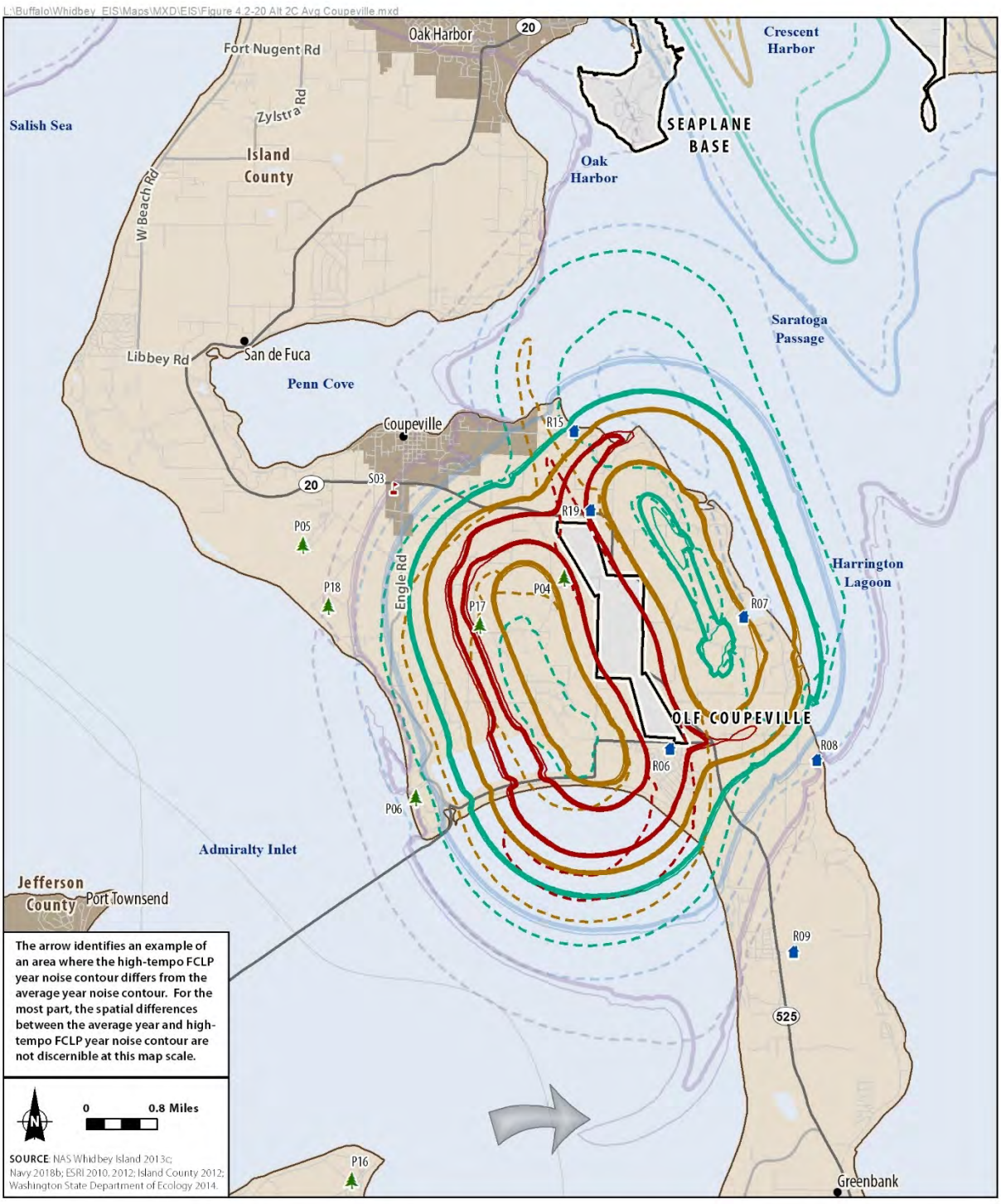

Figure 4.2-20
Alternative 2C DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

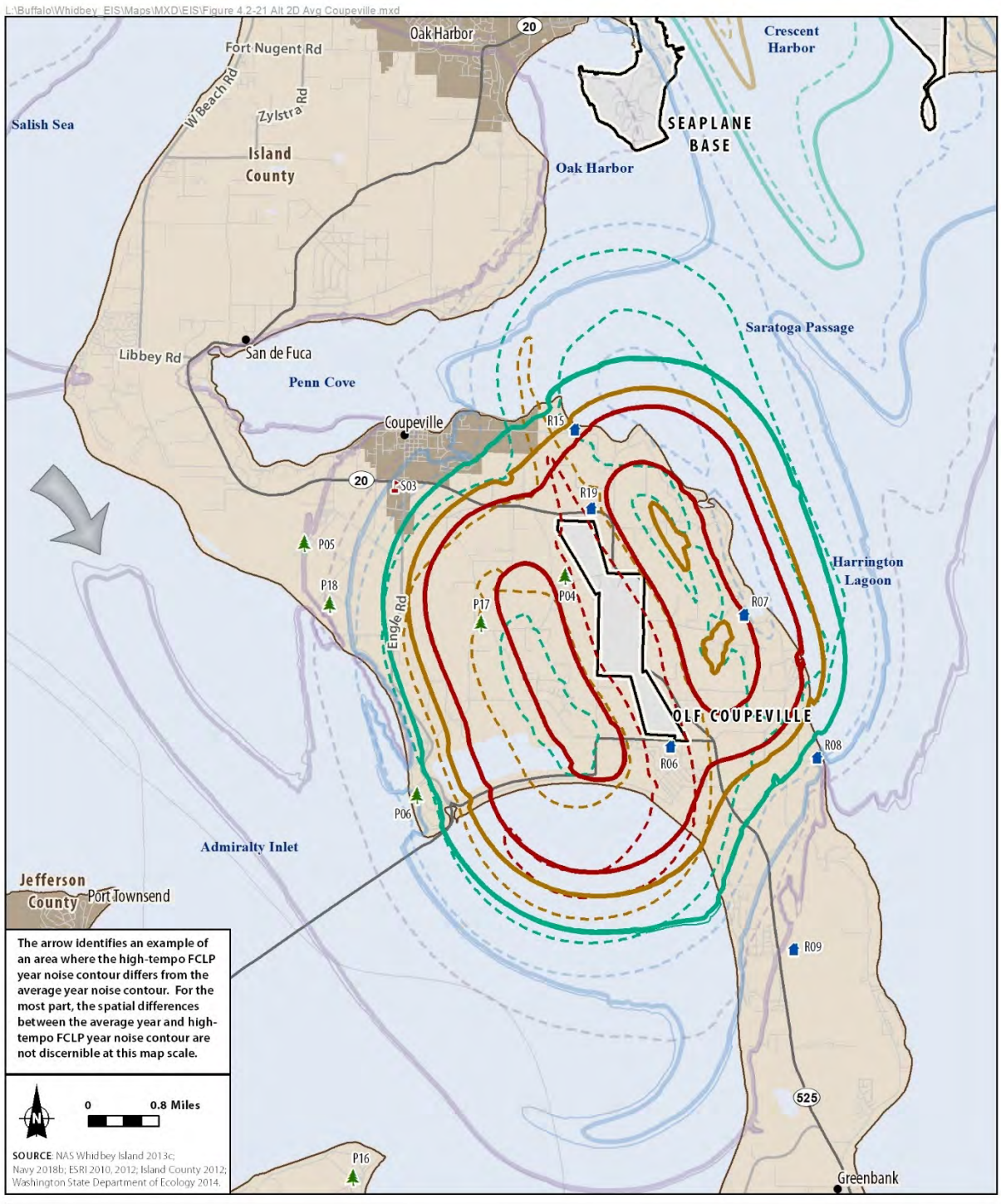

Figure 4.2-21
Alternative 2D DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

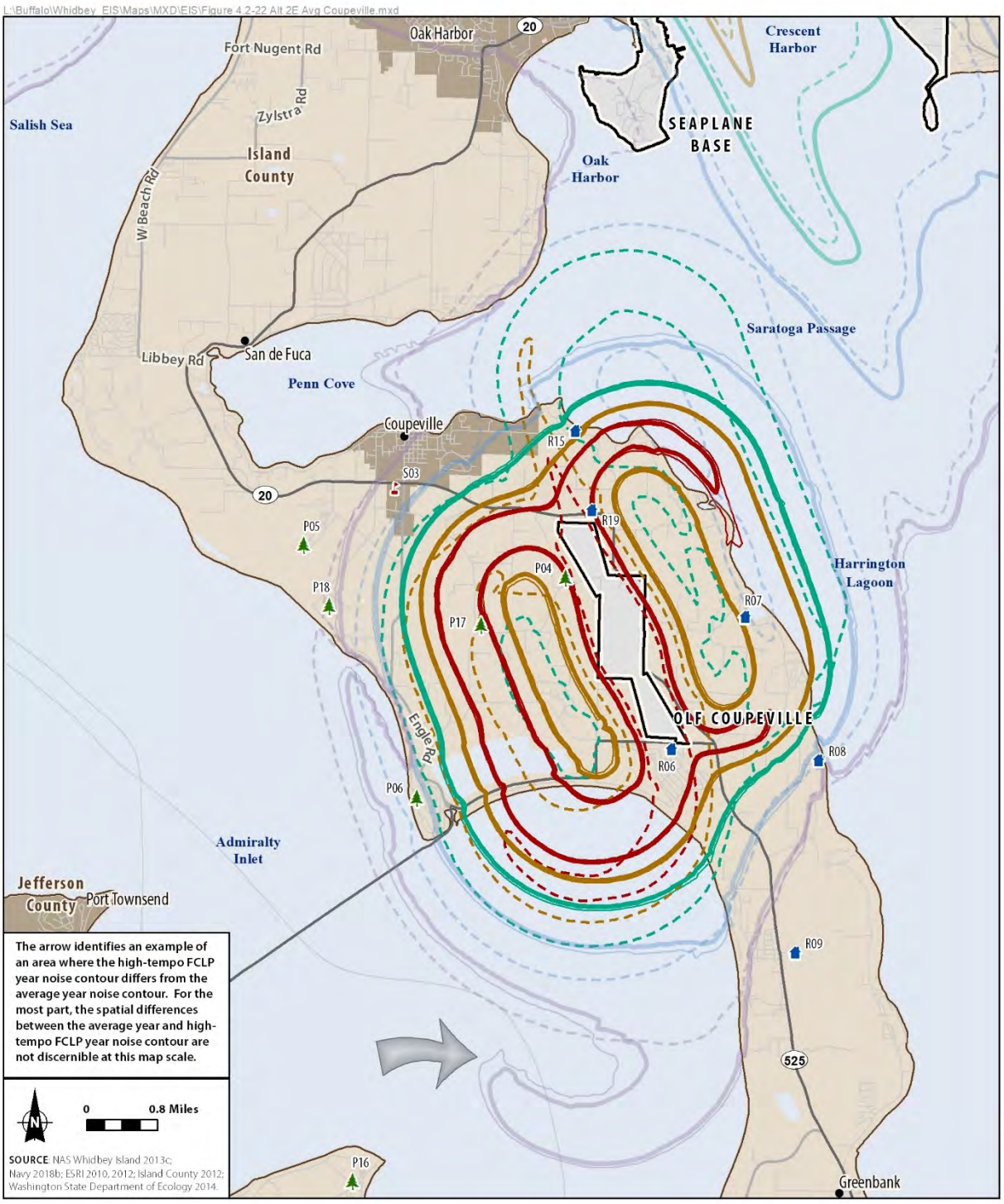

Figure 4.2-22
Alternative 2E DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

4.2.3.2 Supplemental Noise Analyses, Alternative 2

Additional supplemental noise analyses were conducted for a variety of representative POIs identified in the communities surrounding Ault Field and OLF Coupeville. The wide geographic distribution of POIs provides broad coverage and context to compare the noise effects under each of the alternatives with the noise effects for the No Action Alternative. These supplemental noise analyses include single event noise, indoor speech interference, classroom/learning interference, sleep disturbance, outdoor speech interference, and PHL. The POIs chosen for this analysis are presented in Section 3.2 and are depicted on Figure 3.2-6. Not all POIs are used for each analysis because the location and type of POI dictates whether the particular analysis would apply; however, for the Final EIS, an analysis of outdoor speech interference was also included for all POIs, including residential areas and schools, as individuals would spend time outdoors at both of those types of locations. In addition, between the Draft EIS and Final EIS, an additional 18 POIs were added to the analysis to provide the public and decision makers with more data to compare. These included additional residential areas, schools, and parks, as well as two points from the NPS's acoustical monitoring report. The two points from that report (designated as EBLA001 [Reuble Farmstead] and EBLA002 [Ferry House]) correspond to POIs P17 and P18, respectively.

In general, the POIs were chosen based upon several factors, including their geographic dispersal from the airfields and being located under flight operations, major or identifiable landmarks, and areas that have had a history of noise impacts. It should be noted that for POIs located close to one another (i.e., within about 0.25 mile, depending on topography), the results will most likely be the same or very similar and thus not add value to the analysis.

4.2.3.2.1 Single Event Noise, Alternative 2

As noted in Section 3.2.4.3.1, several types of metrics are presented in this subsection that address question of "how loud" the aircraft are and "how often" someone will hear them. To understand the "how loud" question, certain single noise events may be relative to the 48 POIs, and two different noise metrics are utilized: SEL and L_{max}. The SEL metric is a composite metric that represents both the intensity of a sound and its duration. SEL provides a measure of total sound energy of an entire acoustic event (i.e., arrival, departure, or T&G). The L_{max} metric is the maximum, instantaneous level of noise that a particular event produces, and it is most closely related to what an individual would hear. The SEL and L_{max} provide the noise level of a single aircraft event. These events are intermittent in nature, and, therefore, the noise levels do not represent a continuous source of noise. For more details on SEL or L_{max}, see Section 3.2.2 as well as Appendix A, Aircraft Noise Study.

The SEL and L_{max} values for the loudest single event (i.e., arrival, departure, or T&G) for each POI under Alternative 2 at Ault Field and OLF Coupeville are identical to those presented under Alternative 1 in Table 4.2-3. As with Alternative 1, under Alternative 2, the maximum SEL/L_{max} values vary depending on the location of the POI and its proximity to the airfields and flight tracks. These noise level measurements under Alternative 2 are compared to the noise level measurements that were modeled under the No Action Alternative, and the difference is noted in the table.

As shown in the data, many of the maximum SEL and L_{max} values modeled under Alternative 2 are identical to those modeled in the No Action Alternative analysis. Measurements at 12 of the 48 POIs changed from the No Action Alternative to Alternative 2. These include increases at R06 and R07, and decreases at R08, R15, R19, S03, P04, P05, P06, P16, and P18, while at R09, the SEL decreased slightly and the L_{max} increased slightly. In addition, the SEL and L_{max} values for the representative POIs are all

identical under all of the scenarios analyzed; therefore, they are not broken down and presented individually.

To answer the "how often" question, a separate analysis was conducted to estimate the number of events above a maximum noise level threshold (NAXXL_{max}) (see Section 3.2.2.5 for a description of this metric). For the purposes of this analysis, three L_{max} noise levels were chosen: 1) number of events above 80 dB L_{max} (NA80L_{max}), 2) number of events above 90 dB L_{max} (NA90L_{max}), and 3) number of events above 100 dB L_{max} (NA100L_{max}). This provides context for the frequency of noise events an individual may experience at that POI at three different noise levels and that may be considered disruptive. See Figure 3.2-1 for sound levels from typical sources.

Table 4.2-12 presents the number of events above the three identified thresholds for the POIs analyzed (note, for 21 of the 48 POIs analyzed, the noise model indicated there would be zero events above the 80 dB L_{max}; therefore, they were omitted from the table).

As presented in the table, there is a large range in the number of events based upon the location of the POI. Under certain scenarios, some POIs would experience an increase in the range of 10,000 to over 15,000 annual events above 80 dB L_{max} (i.e., the sound of a garbage disposal). This would be approximately 27 to 41 events per day when averaged. Other POIs would experience some degree less than these numbers. The POIs with the highest number of events above these thresholds were very close to Ault Field. In addition, the results show that as the L_{max} threshold is increased, the number of events decrease, as would be expected. Therefore, when looking at the number of events above a threshold of 100 dB L_{max}, the highest increase is 11,551 at R01 over the No Action Alternative conditions.

What this combined analysis shows is that while there may not be a substantive difference in the loudest event (i.e., SEL or L_{max}) at a particular POI, there may be a substantial increase in the number of loud or disruptive events that occur between alternatives and scenarios when compared to the No Action Alternative.

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1,2]

			Number of Annual Events[3]					
ID	Description		No Action Alternative	Alt 2 A	Alt 2 B	Alt 2 C	Alt 2 D	Alt 2 E
Residences								
R01	Sullivan Rd.	Above 80 dB	48,311	57,195 (+8,884)	60,310 (+11,999)	63,748 (+15,437)	58,335 (+10,024)	62,611 (+14,300)
		Above 90 dB	43,603	51,303 (+7,700)	54,666 (+11,063)	58,108 (+14,505)	52,501 (+8,898)	56,943 (+13,340)
		Above 100 dB	30,199	34,324 (+4,125)	38,067 (+7,868)	41,750 (+11,551)	35,408 (+5,209)	40,454 (+10,255)
R02	Salal St. and N. Northgate Dr.	Above 80 dB	38,892	46,046 (+7,154)	48,993 (+10,101)	53,184 (+14,292)	47,455 (+8,563)	51,999 (+13,107)
		Above 90 dB	36,058	42,152 (+6,094)	45,574 (+9,516)	49,955 (+13,897)	43,774 (+7,716)	48,683 (+12,625)
		Above 100 dB	4,771	6,221 (+1,450)	5,821 (+1,050)	6,376 (+1,605)	6,827 (+2,056)	6,457 (+1,686)
R04	Pull and Be Damned Point	Above 80 dB	4,985	6,310 (+1,325)	6,142 (+1,157)	5,928 (+943)	5,991 (+1,006)	5,928 (+943)
		Above 90 dB	370	444 (+74)	414 (+44)	414 (+44)	418 (+48)	414 (+44)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R05	Snee-Oosh Point	Above 80 dB	2,767	3,616 (+849)	3,616 (+849)	3,454 (+687)	3,454 (+687)	3,454 (+687)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R06	Admirals Dr. and Byrd Dr.	Above 80 dB	3,101	12,206 (+9,105)	7,642 (+4,541)	3,061 (-40)	10,689 (+7,588)	4,594 (+1,493)
		Above 90 dB	2,451	10,798 (+8,349)	6,770 (+4,319)	2,709 (+258)	9,462 (+7,011)	4,064 (+1,613)
		Above 100 dB	2,227	7,712 (+5,485)	4,703 (+2,476)	1,908 (-319)	6,665 (+4,438)	2,863 (+636)
R07	Race Lagoon	Above 80 dB	938	4,702 (+3,764)	3,108 (+2,170)	1,242 (+304)	4,220 (+3,282)	1,842 (+904)
		Above 90 dB	230	3,248 (+3,018)	2,170 (+1,940)	842 (+612)	2,941 (+2,711)	1,263 (+1,033)
		Above 100 dB	183	2,521 (+2,338)	1,683 (+1,500)	653 (+470)	2,282 (+2,099)	980 (+797)
R08	Pratts Bluff	Above 80 dB	368	3,663 (+3,295)	2,448 (+2,080)	950 (+582)	3,317 (+2,949)	1,426 (+1,058)
		Above 90 dB	223	905 (+682)	607 (+384)	235 (+12)	821 (+598)	353 (+130)
		Above 100 dB	65	0 (-65)	0 (-65)	0 (-65)	0 (-65)	0 (-65)

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1,2]

			Number of Annual Events[3]					
ID	*Description*		*No Action Alternative*	*Alt 2 A*	*Alt 2 B*	*Alt 2 C*	*Alt 2 D*	*Alt 2 E*
R10	Skyline	Above 80 dB	1,548	2,164 (+616)	2,090 (+542)	2,337 (+789)	2,341 (+793)	2,337 (+789)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R14	E. Sleeper Road and Slumber Lane	Above 80 dB	40,516	47,129 (+6,613)	51,097 (+10,581)	54,232 (+13,716)	48,325 (+7,809)	53,007 (+12,491)
		Above 90 dB	10,220	11,023 (+803)	13,584 (+3,364)	16,019 (+5,799)	11,553 (+1,333)	15,121 (+4,901)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R15	Long Point Manor	Above 80 dB	2,524	4,864 (+2,340)	3,327 (+803)	1,669 (-855)	4,429 (+1,905)	2,224 (-300)
		Above 90 dB	847	4,315 (+3,468)	2,819 (+1,972)	1,107 (+260)	3,862 (+3,015)	1,661 (+814)
		Above 100 dB	41	2,180 (+2,139)	1,461 (+1,420)	566 (+525)	1,976 (+1,935)	849 (+808)
R16	Rocky Point Heights	Above 80 dB	1,525	1,976 (+451)	1,879 (+354)	2,026 (+501)	2,047 (+522)	2,026 (+501)
		Above 90 dB	69	65 (-4)	81 (+12)	65 (-4)	65 (-4)	65 (-4)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R19	Island Transit Offices, Coupeville	Above 80 dB	3,172	12,271 (+9,099)	7,722 (+4,550)	3,126 (-46)	10,755 (+7,583)	4,659 (+1,487)
		Above 90 dB	2,412	11,856 (+9,444)	7,444 (+5,032)	3,018 (+606)	10,378 (+7,966)	4,497 (+2,085)
		Above 100 dB	847	4,315 (+3,468)	2,819 (+1,972)	1,107 (+260)	3,862 (+3,015)	1,661 (+814)
R20	South Lopez Island (Agate Beach)	Above 80 dB	112	147 (+35)	136 (+24)	156 (+44)	157 (+45)	156 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Schools								
S01	Oak Harbor High School	Above 80 dB	997	635 (-362)	952 (-45)	998 (+1)	796 (-201)	958 (-39)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1,2]

			Number of Annual Events[3]					
ID	*Description*		*No Action Alternative*	*Alt 2 A*	*Alt 2 B*	*Alt 2 C*	*Alt 2 D*	*Alt 2 E*
S02	Crescent Harbor Elementary School	Above 80 dB	4,436	5,685 (+1,249)	5,423 (+987)	5,871 (+1,435)	5,922 (+1,486)	5,871 (+1,435)
		Above 90 dB	3,957	5,261 (+1,304)	4,884 (+927)	5,395 (+1,438)	5,445 (+1,488)	5,395 (+1,438)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S03	Coupeville Elementary School	Above 80 dB	1,852	2,937 (+1,085)	1,786 (-66)	726 (-1,126)	2,534 (+682)	1,091 (-761)
		Above 90 dB	316	0 (-316)	0 (-316)	0 (-316)	0 (-316)	0 (-316)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S04	Anacortes High School	Above 80 dB	112	147 (+35)	136 (+24)	156 (+44)	157 (+45)	156 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S09	La Conner Elementary School	Above 80 dB	352	400 (+48)	412 (+60)	389 (+37)	392 (+40)	389 (+37)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parks								
P02	Deception Pass State Park	Above 80 dB	8,950	9,734 (+784)	10,786 (+1,836)	13,208 (+4,258)	10,741 (+1,791)	12,714 (+3,764)
		Above 90 dB	5,479	5,741 (+262)	6,709 (+1,230)	8,943 (+3,464)	6,620 (+1,141)	8,477 (+2,998)
		Above 100 dB	5,449	5,558 (+109)	6,587 (+1,138)	8,895 (+3,446)	6,455 (+1,006)	8,406 (+2,957)
P03	Dugualla State Park	Above 80 dB	16,278	18,577 (+2,299)	21,094 (+4,816)	22,329 (+6,051)	19,029 (+2,751)	21,650 (+5,372)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P04	Ebey's Landing – Rhododendron Park	Above 80 dB	3,172	12,271 (+9,099)	7,722 (+4,550)	3,126 (-46)	10,755 (+7,583)	4,659 (+1,487)
		Above 90 dB	3,103	12,206 (+9,103)	7,642 (+4,539)	3,061 (-42)	10,689 (+7,586)	4,594 (+1,491)
		Above 100 dB	2,720	4,315 (+1,595)	2,819 (+99)	1,107 (-1,613)	3,862 (+1,142)	1,661 (-1,059)

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1,2]

			Number of Annual Events[3]					
ID	*Description*		*No Action Alternative*	*Alt 2 A*	*Alt 2 B*	*Alt 2 C*	*Alt 2 D*	*Alt 2 E*
P06	Fort Casey State Park	Above 80 dB	2,189	7,476 (+5,287)	4,544 (+2,355)	1,847 (-342)	6,451 (+4,262)	2,770 (+581)
		Above 90 dB	547	0 (-547)	0 (-547)	0 (-547)	0 (-547)	0 (-547)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P10	San Juan Island National Monument	Above 80 dB	481	568 (+87)	556 (+75)	649 (+168)	653 (+172)	649 (+168)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P13	Lake Campbell	Above 80 dB	254	183 (-74)	242 (-12)	302 (+48)	305 (+51)	302 (+48)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P15	Pioneer Park	Above 80 dB	370	444 (+74)	414 (+44)	414 (+44)	418 (+48)	414 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P17	Reuble Farm	Above 80 dB	3,061	11,865 (+8,804)	7,419 (+4,358)	2,974 (-87)	10,384 (+7,323)	4,462 (+1,401)
		Above 90 dB	1,641	7,476 (+5,835)	4,544 (+2,903)	1,847 (+206)	6,451 (+4,810)	2,770 (+1,129)
		Above 100 dB	693	5,606 (+4,913)	3,408 (+2,715)	1,385 (+692)	4,838 (+4,145)	2,078 (+1,385)
P18	Ferry House	Above 80 dB	1,180	1,869 (+689)	1,136 (-44)	462 (-718)	1,613 (+433)	692 (-488)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1,2]

		Number of Annual Events[3]					
ID	*Description*	*No Action Alternative*	*Alt 2 A*	*Alt 2 B*	*Alt 2 C*	*Alt 2 D*	*Alt 2 E*

Notes:

[1] The difference between the No Action Alternative and Alternative 2 is noted in parentheses for the number of events above the specified noise.

[2] POIs that had zero events above an L_{max} of 80 dB, 90 dB, and 100 dB were omitted from the table. These included POIs R03, R09, R11, R12, R13, R17, R18, S05, S06, S07, S08, S10, P01, P05, P07, P08, P09, P11, P12, P14, and P16.

Key:
dB = decibel
L_{max} = maximum sound level

4.2.3.2.2 Speech Interference (Indoor), Alternative 2

Conversation or indoor speech is assumed to be interrupted when a single aircraft event exceeds the maximum sound level, or L_{max}, of 50 dB indoors (Sharp et al, 2009). Normal conversation is about 60 dB; therefore, the use of a 50 dB indoor level is a very conservative threshold such that a soft speaking voice could be heard. For this analysis, the model calculated the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level, or L_{max}, of 50 dB at the 20 residential POIs and the 10 schools, since they are commonly located in residential areas. Because the individual is assumed to be indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis was conducted assuming both windows-open and windows-closed conditions. Table 4.2-13 presents the average daily (7:00 a.m. to 10:00 p.m.) events per hour that exceed an L_{max} of 50 dB indoors at these POIs under Alternative 2, all scenarios.

Compared to the No Action Alternative, Alternative 2 would result in between zero and two additional events per hour at representative POIs during which conversations or indoor speech would be interrupted. The largest change (with two additional events per daytime hour) would occur at several POIs, including R01, R02, R06, R07, R08, R14, and R15 under various scenarios. However, there are several POIs at which no change would occur under any of the scenarios compared to the No Action Alternative.

Table 4.2-13 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Average Number of Events per Daytime Hour[2]											
ID	*Description*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*
Residences													
R01	Sullivan Rd.	8	8	9 (+1)	9 (+1)	10 (+2)	10 (+2)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R02	Salal St. and N. Northgate Dr.	8	8	9 (+1)	9 (+1)	10 (+2)	9 (+1)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R03	Central Whidbey	5	-	5 (0)	- (0)	6 (+1)	- (0)	6 (+1)	- (0)	5 (0)	- (0)	6 (+1)	- (0)
R04	Pull and Be Damned Point	2	1	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)
R05	Snee-Oosh Point	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R06	Admirals Dr. and Byrd Dr.	-	-	2 (+2)	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	2 (+2)	2 (+2)	1 (+1)	1 (+1)
R07	Race Lagoon	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	1 (+1)	- (0)	2 (+2)	1 (+1)	1 (+1)	0 (0)
R08	Pratts Bluff	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	2 (+2)	1 (+1)	1 (+1)	0 (0)
R09	Cox Rd and Island Ridge	-	-	1 (+1)	- (0)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R10	Skyline	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R11	Sequim	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R12	Port Angeles	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R13	Beverly Beach, Freeland	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R14	E. Sleeper Rd. and Slumber Ln.	8	7	9 (+1)	8 (+1)	9 (+1)	9 (+2)	10 (+2)	9 (+2)	9 (+1)	8 (+1)	10 (+2)	9 (+2)

Table 4.2-13 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Average Number of Events per Daytime Hour[2]											
ID	*Description*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*
R15	Long Point Manor	1	1	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R16	Rocky Point Heights	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R17	Port Townsend	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	1	1	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R20	South Lopez Island (Agate Beach)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Schools													
S01	Oak Harbor High School	6	2	6 (0)	2 (0)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	7 (+1)	3 (+1)
S02	Crescent Harbor Elementary	5	2	5 (0)	2 (0)	6 (+1)	2 (0)	6 (+1)	3 (+1)	6 (+1)	2 (0)	6 (+1)	3 (+1)
S03	Coupeville Elementary	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
S04	Anacortes High School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Table 4.2-13 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Average Number of Events per Daytime Hour[2]											
ID	*Description*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*
S09	La Conner Elementary School	1	-	1 (0)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S10	Elger Bay Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Notes:

[1] The difference between the No Action Alternative and Alternative 2 is noted in parentheses. Hyphens (-) indicate result equals zero.

[2] Number of annual average daily daytime (7:00 a.m. to 10:00 p.m.) events at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 decibels (dB). See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as "quiet urban daytime" at 40 dB and a garbage disposal at 80 dB.

[3] Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation and other building features that reduce the noise levels inside (FICON, 1992).

4.2.3.2.3 Classroom/learning Interference, Alternative 2

Two metrics were analyzed to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights: interior $L_{eq(8)}$ during an 8-hour school day (8:00 a.m. to 4:00 p.m.), and the average number of interfering aircraft events per hour during that time period. Single aircraft events that generate interior sound levels (L_{max}) greater than 50 dB have the potential to interfere with student and teacher interaction by affecting conversation and comprehension (Sharp et al, 2009). Because the classroom interaction occurs indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis considered both windows-open and windows-closed conditions. Table 4.2-14 presents the $L_{eq(8)}$ and the number of events that exceed an L_{max} of 50 dB indoors under Alternative 2, all scenarios, at the representative POIs that are schools (and the two residential POIs located in the vicinity of schools). It is important to note that Table 4.2-14 presents average values, and there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all, and therefore would have no potential for classroom/learning interference.

Most schools would experience interior $L_{eq(8)}$ due to Navy aircraft operations close to ambient levels of 45 dB or less, which would not impact learning and conversation. Crescent Harbor Elementary School (S02) would experience the highest $L_{eq(8)}$ of 52 dB for the No Action Alternative and the highest under Scenarios A, C, D, and E of 54 dB when windows are open. When windows are closed, the $L_{eq(8)}$ at Crescent Harbor Elementary School (S02) would drop to less than 45 dB. Given the relatively cool climate in the area, it is likely that windows at schools would be closed a majority of the time.

The potential for classroom interference from single aircraft events generating sound levels inside classrooms greater than 50 dB L_{max} would increase under Alternative 2 by an average of up to two events per hour (at S01, S02, and S03, as well as school surrogate R03) compared to the No Action Alternative; that is, on average, no school would experience an increase of more than two learning-disrupting events per hour under any scenario under Alternative 2 compared to the No Action Alternative. The highest increase of an additional two events is shown for Oak Harbor High School (S01) and Crescent Harbor Elementary School (S02) under Scenarios B, C, and E with windows open. Under Scenario A, the Coupeville Elementary School (S03) also shows an increase in classroom/learning interference by an average of an additional two events per hour (with windows open). In addition, school surrogate Central Whidbey (R03) would experience an average increase of two events per hour (with windows open) under Scenarios C and E. All other schools either show no change from the No Action Alternative or an increase of one event per hour during the school day, primarily under the windows-open condition. Under the windows-closed condition, nearly all of the schools would be expected to experience no more than one additional event per hour of classroom/learning interference, with most being unchanged from the No Action Alternative. Many modern schools have central air conditioning and heating systems; therefore, it is more likely that classroom windows would remain closed the majority of the time.

Work and homework disturbance were not quantified in the analysis. Generally, the number of work and homework disturbance events can be assumed to be similar to the number of speech interference events or classroom learning interference events. While increased noise will likely lead to increased work and homework disturbance, it is important to note that the data listed in classroom learning interference tables present average values. This means there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all, thereby creating no potential for classroom learning interference.

Table 4.2-14 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1]

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]	
ID	Description	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]
School Surrogates																									
R03	Central Whidbey	<45	4	<45	-	<45	5 (+1)	<45	- (0)	<45	5 (+1)	<45	- (0)	<45	6 (+2)	<45	- (0)	<45	5 (+1)	<45	- (0)	<45	6 (+2)	<45	- (0)
R11	Sequim	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
Schools																									
S01	Oak Harbor High School	<45	5	<45	2	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)
S02	Crescent Harbor Elementary	52	4	<45	2	54	5 (+1)	<45	2 (0)	53	6 (+2)	<45	2 (0)	54	6 (+2)	<45	3 (+1)	54	5 (+1)	<45	2 (0)	54	6 (+2)	<45	2 (0)
S03	Coupeville Elementary	<45	-	<45	-	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	- (0)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	- (0)
S04	Anacortes High School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S05	Lopez Island School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S06	Friday Harbor Elementary	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S07	Sir James Douglas Elementary	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S08	Fidalgo Elementary School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S09	La Conner Elementary School	<45	1	<45	-	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)
S10	Elger Bay Elementary School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)

Table 4.2-14 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1]

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]	
ID	Description	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]

Notes:

[1] The difference between the No Action Alternative and Alternative 2 is noted in parentheses. Hyphens (-) indicate result equals zero.

[2] Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).

[3] For this metric, daily classroom hours are assumed to be 8:00 a.m. to 4:00 p.m.

[4] Number of average school-day events per hour during an 8-hour school day (8:00 a.m. to 4:00 p.m.) at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 dB. See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as "quiet urban daytime" at 40 dB and a garbage disposal at 80 dB.

Key:

dB = decibel

$L_{eq(8)}$ = 8-hour sound level equivalent

L_{max} = maximum sound level

4.2.3.2.4 Sleep Disturbance, Alternative 2

The analysis of sleep disturbance is a calculation of the probability of awakening from aircraft overflights. Thus, it is based on the outdoor SEL at each of the residential POIs being converted to an indoor SEL. Events that were considered are those that occur between 10:00 p.m. and 7:00 a.m. Although individuals sleep outside of these hours, these are considered typical sleeping hours for this type of analysis. Table 4.2-15 presents the results of the sleep disturbance analysis for the 20 POI locations that are in the residential category, as well as the 10 schools, which are commonly located in residential areas.

Under Alternative 2, the majority of the POIs analyzed show an increase in the percent probability of awakening for all scenarios during nights of average aircraft activity. The highest percent increase is for R06 (Admirals Drive and Byrd Drive), where there would be an increase of 29 percent under Scenario A with windows open, meaning that there is a 29-percent greater probability or chance of awakening at least once under windows-open conditions compared to the No Action Alternative. Generally, the POIs around OLF Coupeville had a higher percent probability of awakening under Scenario A than under the other scenarios, and for the POIs around Ault Field, there was a larger increase in the percent probability of awakening for Scenario C than for the other scenarios.

Table 4.2-15 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[3]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
ID	*Description*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*
Residences													
R01	Sullivan Rd.	58%	43%	67% (+9%)	51% (+8%)	71% (+13%)	55% (+12%)	74% (+16%)	58% (+15%)	68% (+10%)	52% (+9%)	73% (+15%)	57% (+14%)
R02	Salal St. and N. Northgate Dr.	41%	29%	49% (+8%)	35% (+6%)	52% (+11%)	38% (+9%)	56% (+15%)	41% (+12%)	50% (+9%)	36% (+7%)	55% (+14%)	40% (+11%)
R03	Central Whidbey	16%	8%	19% (+3%)	10% (+2%)	21% (+5%)	11% (+3%)	23% (+7%)	12% (+4%)	20% (+4%)	11% (+3%)	23% (+7%)	12% (+4%)
R04	Pull and Be Damned Point	19%	9%	25% (+6%)	12% (+3%)	26% (+7%)	12% (+3%)	27% (+8%)	12% (+3%)	25% (+6%)	12% (+3%)	27% (+8%)	12% (+3%)
R05	Snee-Oosh Point	15%	5%	20% (+5%)	7% (+2%)	21% (+6%)	7% (+2%)	22% (+7%)	7% (+2%)	20% (+5%)	7% (+2%)	22% (+7%)	7% (+2%)
R06	Admirals Dr. and Byrd Dr.	9%	6%	38% (+29%)	27% (+21%)	25% (+16%)	17% (+11%)	11% (+2%)	7% (+1%)	34% (+25%)	24% (+18%)	16% (+7%)	11% (+5%)
R07	Race Lagoon	5%	2%	18% (+13%)	8% (+6%)	13% (+8%)	5% (+3%)	7% (+2%)	2% (0%)	17% (+12%)	7% (+5%)	9% (+4%)	3% (+1%)
R08	Pratts Bluff	4%	2%	13% (+9%)	8% (+6%)	9% (+5%)	5% (+3%)	4% (0%)	2% (0%)	12% (+8%)	8% (+6%)	6% (+2%)	3% (+1%)
R09	Cox Rd and Island Ridge Way	3%	2%	11% (+8%)	7% (+5%)	7% (+4%)	4% (+2%)	3% (0%)	2% (0%)	10% (+7%)	6% (+4%)	4% (+1%)	3% (+1%)
R10	Skyline	5%	2%	8% (+3%)	3% (+1%)	8% (+2%)	3% (+1%)	9% (+4%)	3% (+1%)	8% (+3%)	3% (+1%)	9% (+4%)	3% (+1%)
R11	Sequim	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R12	Port Angeles	0%	0%	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	0% (0%)	0% (0%)	1% (+1%)	0% (0%)	0% (0%)	0% (0%)
R13	Beverly Beach, Freeland	2%	0%	5% (+3%)	0% (0%)	3% (+1%)	0% (0%)	2% (0%)	0% (0%)	5% (+3%)	0% (0%)	2% (0%)	0% (0%)
R14	E. Sleeper Rd. and Slumber Ln.	37%	25%	44% (+7%)	31% (+6%)	47% (+10%)	34% (+9%)	51% (+14%)	37% (+12%)	45% (+8%)	32% (+7%)	50% (+13%)	36% (+11%)
R15	Long Point Manor	11%	4%	22% (+11%)	12% (+8%)	18% (+7%)	8% (+4%)	14% (+3%)	4% (0%)	21% (+10%)	10% (+6%)	15% (+4%)	5% (+1%)

Table 4.2-15 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[3]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
ID	*Description*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*
R16	Rocky Point Heights	9%	3%	11% (+2%)	4% (+1%)	12% (+3%)	4% (+1%)	13% (+4%)	3% (0%)	12% (+3%)	4% (+1%)	13% (+4%)	3% (0%)
R17	Port Townsend	1%	0%	1% (0%)	0% (0%)	1% (0%)	0% (0%)	0% (-1%)	0% (0%)	1% (0%)	0% (0%)	1% (0%)	0% (0%)
R18	Marrowstone Island (Nordland)	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R19	Island Transit Offices, Coupeville	9%	5%	31% (+22%)	20% (+15%)	22% (+13%)	13% (+8%)	11% (+2%)	5% (0%)	28% (+19%)	18% (+13%)	15% (+5%)	8% (+3%)
R20	South Lopez Island (Agate Beach)	3%	1%	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)
Schools (near residential areas)[5]													
S01	Oak Harbor High School	20%	12%	25% (+5%)	14% (+2%)	27% (+7%)	16% (+4%)	29% (+9%)	18% (+6%)	26% (+6%)	15% (+3%)	29% (+9%)	17% (+5%)
S02	Crescent Harbor Elementary	21%	12%	26% (+5%)	15% (+3%)	28% (+7%)	17% (+5%)	30% (+9%)	19% (+7%)	27% (+6%)	16% (+4%)	30% (+9%)	18% (+6%)
S03	Coupeville Elementary	5%	3%	16% (+11%)	10% (+7%)	11% (+6%)	6% (+3%)	5% (0%)	3% (0%)	14% (+9%)	9% (+6%)	7% (+2%)	4% (+1%)
S04	Anacortes High School	2%	1%	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)
S05	Lopez Island School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S06	Friday Harbor Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S07	Sir James Douglas Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S08	Fidalgo Elementary School	6%	2%	9% (+3%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)
S09	La Conner Elementary School	8%	3%	11% (+3%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)
S10	Elger Bay Elementary School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)

Table 4.2-15 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[3]

		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
ID	Description	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]

Notes:

1 For this metric, nightly sleeping hours are assumed to be 10:00 p.m. to 7:00 a.m.

2 This metric represents the probability of awakening at least once during a night of average aircraft noise activities.

3 The difference between the No Action Alternative and Alternative 2 is noted in parentheses.

4 Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).

5 All school points of interest were included in the potential sleep disturbance analysis because of their typical proximity to residential areas.

4.2.3.2.5 Outdoor Speech Interference: Potential Noise Effects on Recreation and Outdoor Activities, Alternative 2

The analysis of outdoor speech interference is based on the number of events occurring per DNL daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). Details on the analysis of outdoor speech interference are available in Section 3.2, as well as Appendix A, Aircraft Noise Study. Table 4.2-16 presents the results of the analysis for Alternative 2 for all 48 of the POIs because individuals could experience outdoor speech interference when outside in their yard (residential), outside at school for recess or outdoor learning (schools), and recreating at a park or recreational center (parks).

Under Alternative 2, the data in the table show a slight increase for several POIs where there would be potential for up to an average of two additional daytime events per hour during which individuals may experience outdoor speech interference while outside their home or school, or recreating at a park. For many of the POIs, there is no change from the No Action Alternative. As the data in the table indicate and as expected, when the POI is closer to OLF Coupeville, there would be more events under Scenario A, whereas if the POI is located closer to Ault Field, there would be more events under Scenario C. Section 4.5 has additional discussion on parks and recreation in the vicinity of the airfields. The data show that there is a range of potential outdoor speech interference that may disturb individuals participating in outdoor recreational activities depending on the location of the POI in relation to the airfields and flight tracks. The average number of events is mostly consistent with those expected under the No Action Alternative conditions; however, some POIs may experience an increase in the average daily events. This increase ranges from zero to three events per hour, depending on the scenario.

In addition, the number of events per hour that could cause nighttime outdoor speech interference, which would give an estimation of how much an individual tent-camping or sleeping outdoors may be disturbed during the night, was also analyzed. These range from an increase of zero to one event per hour and are dependent on the location of the POI and the scenario.

Table 4.2-16 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1]

ID	Description	No Action Alternative		Alternative 2 Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
		NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]
Parks													
P01	Joseph Whidbey State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)
P02	Deception Pass State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)
P03	Dugualla State Park	7	2	9 (+2)	2 (0)	9 (+2)	2 (0)	10 (+3)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
P04	Ebey's Landing – Rhododendron Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
P05	Ebey's Landing – Ebey's Prairie	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	3 (+1)	1 (+1)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
P06	Fort Casey State Park	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	2 (+1)	- (0)
P07	Cama Beach State Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	- (0)	5 (+2)	1 (+1)	4 (+1)	1 (+1)
P08	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
P09	Moran State Park	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P10	San Juan Island National Monument	7	1	8 (+1)	2 (+1)	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	2 (+1)
P11	San Juan Island Visitors Center	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P12	Cap Sante Park	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
P13	Lake Campbell	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)

Table 4.2-16 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1]

		No Action Alternative		*Alternative 2*									
		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*
ID	*Description*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*
P14	Spencer Spit State Park	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P15	Pioneer Park	4	1	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	1 (0)
P16	Marrowstone Island (Fort Flagler)	-	-	1 (+1)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	1 (+1)	1 (+1)	- (0)
P17	Reuble Farm	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
P18	Ferry House	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	- (0)
Residences													
R01	Sullivan Road	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	2 (0)
R02	Salal Street and N. Northgate Drive	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	2 (0)
R03	Central Whidbey	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
R04	Pull and Be Damned Point	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
R05	Snee-Oosh Point	7	1	8 (+1)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	2 (+1)
R06	Admirals Drive and Byrd Drive	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	- (0)
R07	Race Lagoon	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
R08	Pratts Bluff	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	- (0)

Table 4.2-16 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1]

		No Action Alternative		*Alternative 2*									
		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*
ID	*Description*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*
R09	Cox Road and Island Ridge Way	1	-	2 (+1)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
R10	Skyline	4	1	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)
R11	Sequim	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R12	Port Angeles	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
R13	Beverly Beach, Freeland	-	-	1 (+1)	- (0)	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R14	E. Sleeper Road and Slumber Lane	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	2 (0)
R15	Long Point Manor	7	1	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+2)	2 (+1)
R16	Rocky Point Heights	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	2 (+1)	5 (+1)	1 (0)	5 (+1)	2 (+1)
R17	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	- (0)	- (-1)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	3	1	5 (+2)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
R20	South Lopez Island (Agate Beach)	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
Schools													
S01	Oak Harbor High School	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)

Table 4.2-16 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)[1]

		No Action Alternative		*Alternative 2*									
		Scenario A		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*			
		Annual Average Outdoor Daily Events per Hour											
		Daytime	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*
ID	*Description*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*
S02	Crescent Harbor Elementary School	7	2	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
S03	Coupeville Elementary School	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
S04	Anacortes High School	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)
S09	La Conner Elementary School	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
S10	Elger Bay Elementary School	-	-	1 (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)

Notes:

[1] The difference between the No Action Alternative and Alternative 2 is noted in parentheses. A hyphen (-) indicates the result equals zero.

[2] Number of events at or above an outdoor maximum single event sound level (L_{max}) of 50 dB; this reflects potential for outdoor speech interference.

Key:

dB = decibel

L_{max} = maximum A-weighted sound level

NA50 = Number of Events above an L_{max} of 50 dB

4.2.3.2.6 Potential Hearing Loss, Alternative 2

The underlying analytical methodology and metric for hearing loss are explained in Section 4.2.2.2.6. Table 4.2-17 presents the potentially affected populations in and near Ault Field and OLF Coupeville under Alternative 2, by 1 dB increments of $L_{eq(24)}$, as compared to the No Action Alternative numbers presented in Section 3.2.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable (USEPA, 1974). Therefore, using the data provided in Table 4.2-17 for the population with average sensitivity to noise, the level at which there may be a noticeable NIPTS would be at the 84 to 85 dB $L_{eq(24)}$ range and above. There is an increase in the population within the 80 dB DNL noise contour (i.e., potential at-risk population) under Alternative 2 at both Ault Field and OLF Coupeville. The largest increase in the potential at-risk population in the vicinity of Ault Field would be under Scenario C (48 additional people) and for OLF Coupeville would be under Scenario A (29 additional people). The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville. The potential NIPTS values presented in Table 4.2-17 are only applicable in the extreme case of continuous outdoor exposure at one's residence to all aircraft events occurring over a period of 40 years. Because it is highly unlikely for any individuals to meet all those criteria, the actual potential NIPTS for individuals would be far less than the values reported here.

In addition, the actual value of NIPTS for any given person will depend on his or her physical sensitivity to noise; some could experience more hearing loss than others (DNWG, 2013). This noise-sensitive population could be considered the young, the elderly, or those predisposed to hearing sensitivity for other reasons. Therefore, to capture this, the USEPA guidelines provided information on the estimated NIPTS exceeded by the 10 percent of the population most sensitive to noise. Using the same 1 dB incremental data in Table 4.2-17 and the column identified as the 10^{th} Percentile NIPTS, those individuals are vulnerable to noticeable NIPTS at the 77 to 78 dB $L_{eq(24)}$ range and above. Using this even more conservative estimate, the range of potential NIPTS could be up to 18.0 dB for the population most sensitive to noise around Ault Field and up to 12.0 dB for the population most sensitive to noise around OLF Coupeville. As noted previously, it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period; therefore, the actual potential NIPTS for individuals would be far less than the values reported here.

Table 4.2-17 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 2 at NAS Whidbey Island Complex (Average Year)

Band of $L_{eq(24)}$ (dB)[1]	Avg NIPTS (dB)[2,3]	10th Pct NIPTS (dB)[2,]	Estimated Population[4,5,6]											
			Ault Field						OLF Coupeville					
			No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E	No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E
75-76	1.0	4.0	0	0 (0)	1 (+1)	9 (+9)	0 (0)	5 (+5)	31	102 (+71)	47 (+16)	24 (-7)	83 (+52)	31 (0)
76-77	1.0	4.5	123	127 (+4)	319[7] (+196)	411[8] (+288)	165[9] (+42)	355 (+232)	45	164 (+119)	90 (+45)	58 (+13)	160 (+115)	63 (+18)
77-78	1.5	5.0	233	263 (+30)	336 (+103)	402 (+169)	310 (+77)	354 (+121)	47	127 (+80)	75 (+28)	88 (+41)	100 (+53)	57 (+10)
78-79	2.0	5.5	145	148 (+3)	243 (+98)	296 (+151)	175 (+30)	295 (+150)	24	92 (+68)	65 (+41)	5 (-19)	78 (+54)	61 (+37)
79-80	2.5	6.0	92	135 (+43)	163 (+71)	241 (+149)	141 (+49)	211 (+119)	7	75 (+68)	59 (+52)	0 (-7)	70 (+63)	76 (+69)
80-81	3.0	7.0	73	78 (+5)	97 (+24)	130 (+57)	85 (+12)	119 (+46)	0	66 (+66)	59 (+59)	0 (0)	62 (+62)	3 (+3)
81-82	3.5	8.0	51	63 (+12)	72 (+21)	80 (+29)	68 (+17)	77 (+26)	0	58 (+58)	84 (+84)	0 (0)	55 (+55)	0 (0)
82-83	4.0	9.0	37	48 (+11)	58 (+21)	63 (+26)	48 (+11)	61 (+24)	0	58 (+58)	4 (+4)	0 (0)	64 (+64)	0 (0)
83-84	4.5	10.0	34	35 (+1)	36 (+2)	38 (+4)	35 (+1)	37 (+3)	0	69 (+69)	0 (0)	0 (0)	56 (+56)	0 (0)
84-85	5.5	11.0	11	27 (+16)	26 (+15)	29 (+18)	29 (+18)	28 (+17)	0	28 (+28)	0 (0)	0 (0)	1 (+1)	0 (0)
85-86	6.0	12.0	9	10 (+1)	22 (+13)	26 (+17)	10 (+1)	24 (+15)	0	1 (+1)	0 (0)	0 (0)	0 (0)	0 (0)
86-87	7.0	13.5	6	9 (+3)	9 (+3)	10 (+4)	9 (+3)	10 (+4)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
87-88	7.5	15.0	4	6 (+2)	6 (+2)	8 (+4)	6 (+2)	7 (+3)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
88-89	8.5	16.5	2	4 (+2)	4 (+2)	5 (+3)	4 (+2)	5 (+3)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
89-90	9.5	18.0	0	1 (+1)	2 (+2)	2 (+2)	1 (+1)	2 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-17 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 2 at NAS Whidbey Island Complex (Average Year)

Band of $L_{eq(24)}$ (dB)[1]	Avg NIPTS (dB)[2,3]	10th Pct NIPTS (dB)[2,]	Estimated Population[4,5,6]											
			Ault Field						OLF Coupeville					
			No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E	No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E
90-91	10.5	19.5	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Notes:

1 L_{eq} bands with no population were omitted from table.

2 NIPTS values rounded to nearest 0.5 dB.

3 NIPTS below 5 dB are generally not considered noticeable.

4 This analysis assumes the population is outdoors at one's residence and exposed to all aircraft noise events for 40 years. Given the amount of time spent indoors and the intermittent occurrence of aircraft noise events, it is highly unlikely that individuals would meet all those criteria, and the actual potential for hearing loss would be far less than the values reported here.

5 Estimated Population was determined by those living within the 80 dB DNL noise contour around each airfield, including those living on-base at Ault Field (there is no on-base population at OLF Coupeville).

6 Population counts of people within the DNL contours were computed using 2010 census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). In addition, per guidance on potential hearing loss, on-base populations at Ault Field have been included in the analysis. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.

7 Of this estimated population, 25 are military personnel living on base at Ault Field.

8 Of this estimated population, 70 are military personnel living on base at Ault Field.

9 Of this estimated population, 24 are military personnel living on base at Ault Field.

Key:
dB = decibel
$L_{eq(24)}$ = 24-hour Equivalent Sound Level
NIPTS = Noise Induced Permanent Threshold Shift

4.2.3.3 Nonauditory Health Effects, Alternative 2

Per studies noted and evaluated in Section 3.2.3, the data and research are inconclusive with respect to the linkage between potential nonauditory health effects of aircraft noise exposure. As outlined within the analysis of DNL contours and supplemental metrics presented within this section, the data show that the Proposed Action would result in both an increase in the number of people exposed to noise as well as those individuals exposed to higher levels of noise. However, research conducted to date has not made a definitive connection between intermittent military aircraft noise and nonauditory health effects. The results of most cited studies are inconclusive and cannot identify a causal link between aircraft noise exposure and the various types of nonauditory health effects that were studied. An individual's health is greatly influenced by many factors known to cause health issues, such as hereditary factors, medical history, and life style choices regarding smoking, diet, and exercise. Research has demonstrated that these factors have a larger and more direct effect on a person's health than aircraft noise.

Based upon public comments received on the Draft EIS, the Navy has expanded its nonauditory health effects literature review, using journals and published articles referred to by the Washington State Department of Health, the USEPA, and public comment submittals. Additional topics discussed included, but were not limited to, hypertension and cardiovascular health, lack of sleep, stress, and anxiety, and details can be found in Appendix A1 of the Aircraft Noise Study (Appendix A).

4.2.3.4 Vibration Effects from Aircraft Operations, Alternative 2

In addition to the noise effects on the population outlined above, noticeable structural vibration may result from certain aircraft operations at either Ault Field or OLF Coupeville. Depending on the aircraft operation, altitude, heading, power settings, and the structure, certain vibration effects may be observed. Typically, the structural elements that are most susceptible to vibration from aircraft noise are windows and sometimes walls or ceilings. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (CHABA, 1977). Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. See Appendix A, Aircraft Noise Study, and the Noise and Vibration Associated with Operational Impacts discussion in Section 4.6.2.1 for additional details on noise-induced vibration effects.

The data show that the Proposed Action would result in both an increase in the number of aircraft operations and area/structures exposed to noise. Therefore, there could be an increase in vibration effects due to the Proposed Action. However, as shown in Table 4.2-3, for the representative POIs analyzed, the highest L_{max} value was 117 dB, and, therefore, sound levels damaging to structural components of buildings are not likely to occur.

4.2.3.5 Noise Conclusion, Alternative 2

Overall, Alternative 2 would have significant noise impacts in the communities surrounding Ault Field and OLF Coupeville. Both the total number of acres and the total number of individuals within the DNL noise contours would increase for all scenarios analyzed. There would be a larger impact to the communities around Ault Field under Scenario C, while there would be a larger impact for the communities around OLF Coupeville under Scenario A.

The number of incidents of indoor and outdoor speech interference and classroom interference would increase slightly. There would also be a higher probability of awakening under all scenarios, especially for POIs located closer to the airfields. In addition, depending on the scenario, the population potentially at risk for PHL would increase. The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville for the population with average noise sensitivity and up to 18.0 dB at Ault Field and 12.0 dB at OLF Coupeville for the population highly sensitive to noise (the 10 percent of the population with the most sensitive hearing). As it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period, the actual potential NIPTS for individuals would be far less than the values reported here.

4.2.4 Noise, Alternative 3

This section outlines the noise environment as modeled for Alternative 3 and describes the noise conditions associated with aircraft activity at Ault Field and OLF Coupeville using DNL and several supplemental noise metrics outlined in Section 3.2, including L_{eq}, SEL, L_{max}, and NA, which are used to evaluate such noise effects as community noise exposure, indoor and outdoor speech interference, sleep disturbance, classroom/learning interference, and PHL. Additional information on the noise metrics is also available in Appendix A, Aircraft Noise Study.

The following sections detail potential impacts using projected DNL contours (the federally approved noise metric) and several supplemental metrics (to more fully describe the noise effects).

4.2.4.1 Projected DNL Contours, Alternative 3

As part of the noise analysis and as discussed in Section 3.2.1.1, the DNL noise contours for the alternatives were modeled for an "average year" at Ault Field and OLF Coupeville. An average year represents conditions that are projected to occur on an annual basis, a typical operating tempo at the NAS Whidbey Island complex. In addition, the five scenarios, which present the optional FCLP allocations, were modeled individually to provide a comparative presentation of the potential noise levels.

Figure 4.2-23 presents the projected DNL noise contours for all scenarios under Alternative 3. This overview figure of the NAS Whidbey Island complex (both Ault Field and OLF Coupeville) presents the 65 dB DNL contour under all scenarios for comparison.

Figures 4.2-24 through 4.2-28 present the five scenarios separately for Ault Field, and Figures 4.2-29 through 4.2-33 present the five scenarios separately for OLF Coupeville[28]. In these sets of figures, the projected 60 dB, 65 dB, 70 dB, and greater than 75 dB DNL contours for Alternative 3 are compared to the No Action Alternative DNL contours. The 65 dB DNL contour at Ault Field extends approximately 10 miles from the four runway endpoints. Under Alternative 3, the length of these contour lobes is primarily due to the Growler on the approach portion of the GCA patterns (described in Section 3.1),

[28] In addition, as discussed further in Section 3.2.2.1, 65 dB DNL is the established federal standard for determining potential for high annoyance. This level has been identified in both the FAA's Part 150 Program and the DoD's AICUZ Program (including the individual Air Force and Navy programs) as a threshold for land use recommendations. Consistent with this guidance, 65 dB DNL is used to show areas with potential for high annoyance in this analysis. However, aircraft noise does occur outside the 65 dB DNL contour. In order to more fully reflect the noise environment, the Draft EIS included noise contours of 60 dB DNL as well as detailed noise analysis for specific POIs. In response to public comments, the Navy has expanded the analysis in the Final EIS to show geographic areas subject to greater than 55 dB DNL and has analyzed 18 additional POIs.

where the aircraft generally descends on a 3-degree glide slope through 3,000 feet AGL 10 miles from the runway.

Similar to the No Action Alternative and other alternatives, the DNL contour at OLF Coupeville would be driven by the FCLPs conducted at the airfield. The 65 to less than 70 dB DNL contour range takes the shape of two ovals, one on each side of OLF Coupeville's runway, which correspond to the FCLP flight tracks. Generally speaking, around Ault Field, the 65 dB DNL contours associated with Scenario C extend the farthest from the airfield and cover the most land area (13,766 acres, compared to 13,133 acres under Scenario A). Conversely, around OLF Coupeville, the 65 dB DNL contours associated with Scenario A extend the farthest from the airfield and cover the most land area (10,132 acres, compared to 7,998 acres under Scenario C). The differences in DNL contours between the scenarios at the two airfields are sometimes small (nearly overlapping) and at other times can differ by approximately one mile. The overall difference in the size of the noise contours between the scenarios is more pronounced at OLF Coupeville than at Ault Field due to the larger proportional difference of operations at OLF Coupeville than at Ault Field.

Table 4.2-18 presents an overall comparison of the number of land acres and population in each of the DNL contour ranges, as well as the difference between the No Action Alternative and Alternative 3 under all scenarios. As indicated in the table, the total change in population within the entire 65 dB DNL contour increases from the No Action Alternative by between 109 and 1,136 at Ault Field (primarily in and around Oak Harbor), depending on the scenario, and for OLF Coupeville (primarily in and around Coupeville) increases from the No Action Alternative by between 517 and 1,203, also depending on the scenario.

As also presented within Table 4.2-18, under several of the alternatives/scenarios, the majority of the increase in population is located within the greater than 75 dB DNL noise contour, especially at OLF Coupeville. The greater than 75 dB DNL noise contour is the area where there is the highest level of community annoyance associated with aircraft noise. Therefore, these populations would be significantly impacted.

For purposes of comparison and to be fully transparent regarding the possible range of impacts that could arise from the Proposed Action, DNL noise contours were also modeled for a high-tempo FCLP year, which represents conditions when pre-deployment training for multiple units overlaps and, therefore, FCLP activity would be expected to increase over average conditions. The high-tempo FCLP year data are depicted on the same figures noted previously, as well as included in Appendix A, Aircraft Noise Study. Figures 4.2-24 through 4.2-33 present both the average year and high-tempo FCLP year DNL noise contours on the same figures for the airfields to illustrate the relatively small differences in the overall noise environment, with many of the areas where they diverge occurring over water.

In addition, Table 4.2-19 shows the percentage change in acreage and population between the average year DNL contour ranges and the high-tempo FCLP year DNL contour ranges. The higher the percent change, the larger the deviation between the average year DNL noise contours and the high-tempo FCLP year DNL noise contours; however, most changes are within +/- 5 percent of zero.

Table 4.2-18 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 3 (Average Year)[2,3]

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
	Area (acres)	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*
Ault Field								
No Action Alternative								
Average Year	3,596	3,279	3,269	2,283	5,549	3,379	12,414	8,941
Alternative 3								
Scenario A (20/80 FCLP split)	4,005 (+409)	3,690 (+411)	3,262 (-7)	1,874 (-409)	5,866 (+317)	3,486 (+107)	13,133 (+719)	9,050 (+109)
Scenario B (50/50 FCLP split)	3,907 (+311)	3,591 (+312)	3,271 (+2)	2,415 (+132)	6,357 (+808)	3,756 (+377)	13,535 (+1,121)	9,762 (+821)
Scenario C (80/20 FCLP split)	3,897 (+301)	3,698 (+419)	3,129 (-140)	2,466 (+183)	6,740 (+1,191)	3,913 (+534)	13,766 (+1,352)	10,077 (+1,136)
Scenario D (30/70 FCLP split)	3,958 (+362)	3,695 (+416)	3,233 (-36)	2,182 (-101)	6,109 (+560)	3,597 (+218)	13,300 (+886)	9,474 (+533)
Scenario E (70/30 FCLP split)	3,875 (+279)	3,661 (+382)	3,151 (-118)	2,430 (+147)	6,643 (+1,094)	3,869 (+490)	13,669 (+1,255)	9,960 (+1,019)
OLF Coupeville								
No Action Alternative								
Average Year	3,681	861	3,088	786	638	583	7,407	2,230
Alternative 3								
Scenario A (20/80 FCLP split)	1,563 (-2,118)	554 (-307)	3,323 (+235)	965 (+179)	5,246 (+4,608)	1,914 (+1,331)	10,132 (+2,725)	3,433 (+1,203)
Scenario B (50/50 FCLP split)	2,058 (-1,623)	559 (-302)	3,458 (+370)	1,059 (+273)	3,931 (+3,293)	1,500 (+917)	9,447 (+2,040)	3,118 (+888)
Scenario C (80/20 FCLP split)	3,432 (-249)	1,045 (+184)	3,168 (+80)	1,030 (+244)	1,398 (+760)	672 (+89)	7,998 (+591)	2,747 (+517)
Scenario D (30/70 FCLP split)	1,582 (-2,099)	515 (-346)	3,467 (+379)	1,023 (+237)	4,890 (+4,252)	1,805 (+1,222)	9,939 (+2,532)	3,343 (+1,113)
Scenario E (70/30 FCLP split)	3,063 (-618)	871 (+10)	3,178 (+90)	1,053 (+267)	2,518 (+1,880)	1,000 (+417)	8,759 (+1,352)	2,924 (+694)

Table 4.2-18 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 3 (Average Year)[2,3]

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
	Area (acres)	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*
NAS Whidbey Island Complex								
No Action Alternative								
Average Year	7,277	4,140	6,357	3,069	6,187	3,962	19,821	11,171
Alternative 3								
Scenario A (20/80 FCLP split)	5,568 (-1,709)	4,244 (+104)	6,585 (+228)	2,839 (-230)	11,112 (+4,925)	5,400 (+1,438)	23,265 (+3,444)	12,483 (+1,312)
Scenario B (50/50 FCLP split)	5,965 (-1,312)	4,150 (+10)	6,729 (+372)	3,474 (+405)	10,288 (+4,101)	5,256 (+1,294)	22,982 (+3,161)	12,880 (+1,709)
Scenario C (80/20 FCLP split)	7,329 (+52)	4,743 (+603)	6,297 (-60)	3,496 (+427)	8,138 (+1,951)	4,585 (+623)	21,764 (+1,943)	12,824 (+1,653)
Scenario D (30/70 FCLP split)	5,540 (-1,737)	4,210 (+70)	6,700 (+343)	3,205 (+136)	10,999 (+4,812)	5,402 (+1,440)	23,239 (+3,418)	12,817 (+1,646)
Scenario E (70/30 FCLP split)	6,938 (-339)	4,532 (+392)	6,329 (-28)	3,483 (+414)	9,161 (+2,974)	4,869 (+907)	22,428 (+2,607)	12,884 (+1,713)

Table 4.2-18 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 3 (Average Year)[2,3]

	DNL Contour Ranges							
	65 to <70 dB DNL		*70 to <75 dB DNL*		*Greater than or equal to 75 dB DNL*		*Total*	
	Area (acres)	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*	*Area (acres)*	*Pop[4]*

Notes:

[1] All five scenarios are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[2] Acreage presented does not include areas over water or areas over the NAS Whidbey Island complex.

[3] The difference between the No Action Alternative and Alternative 1 is noted in parentheses.

[4] Population counts of people within the DNL contour ranges were computed using 2010 Census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour range, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the DNL contour ranges (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville). A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.

[5] Numbers have been rounded to ensure totals sum.

Key:

dB = decibel

DNL = day-night average sound level

FCLP = Field Carrier Landing Practice

Table 4.2-19 Percent Difference in the Estimated Acreage and Population within the Average and High-Tempo FCLP Year DNL Contour Ranges for the NAS Whidbey Island Complex, Alternative 3

DNL Contours	DNL Contour Ranges[1]							
	65 to <70 dB DNL		70 to <75 dB DNL		Greater than or equal to 75 dB DNL		Total	
	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop
Ault Field								
Scenario A	0.5%	-0.1%	0.0%	2.5%	1.0%	0.8%	0.6%	0.8%
Scenario B	0.7%	1.1%	0.0%	1.9%	1.4%	1.0%	0.8%	1.3%
Scenario C	1.3%	1.1%	0.0%	1.3%	1.0%	0.8%	0.9%	1.0%
Scenario D	1.0%	-0.6%	0.8%	1.9%	0.9%	1.8%	0.9%	0.9%
Scenario E	1.7%	1.3%	2.1%	4.6%	0.3%	1.1%	1.1%	2.0%
OLF Coupeville								
Scenario A	0.6%	7.8%	-5.8%	-7.4%	6.6%	5.5%	1.6%	2.2%
Scenario B	-8.3%	-11.8%	0.1%	2.0%	8.0%	6.9%	1.6%	1.9%
Scenario C	0.5%	-1.4%	0.8%	1.5%	13.5%	7.8%	2.9%	1.9%
Scenario D	-2.0%	4.3%	-4.5%	-6.1%	7.1%	6.3%	1.6%	2.2%
Scenario E	-4.6%	-5.2%	1.1%	-0.5%	7.7%	7.5%	1.0%	0.8%
NAS Whidbey Island Complex								
Scenario A	0.6%	0.9%	-2.9%	-0.8%	3.6%	2.4%	1.0%	1.2%
Scenario B	-2.4%	-0.6%	0.0%	1.9%	3.9%	2.7%	1.1%	1.4%
Scenario C	0.9%	0.5%	0.4%	1.4%	3.2%	1.9%	1.6%	1.2%
Scenario D	0.1%	0.0%	-2.0%	-0.7%	3.7%	3.3%	1.2%	1.2%
Scenario E	-1.1%	0.1%	1.6%	3.1%	2.4%	2.4%	1.1%	1.8%

Key:
dB = decibel
DNL = day-night average sound level
NAS = Naval Air Station
OLF = outlying landing field

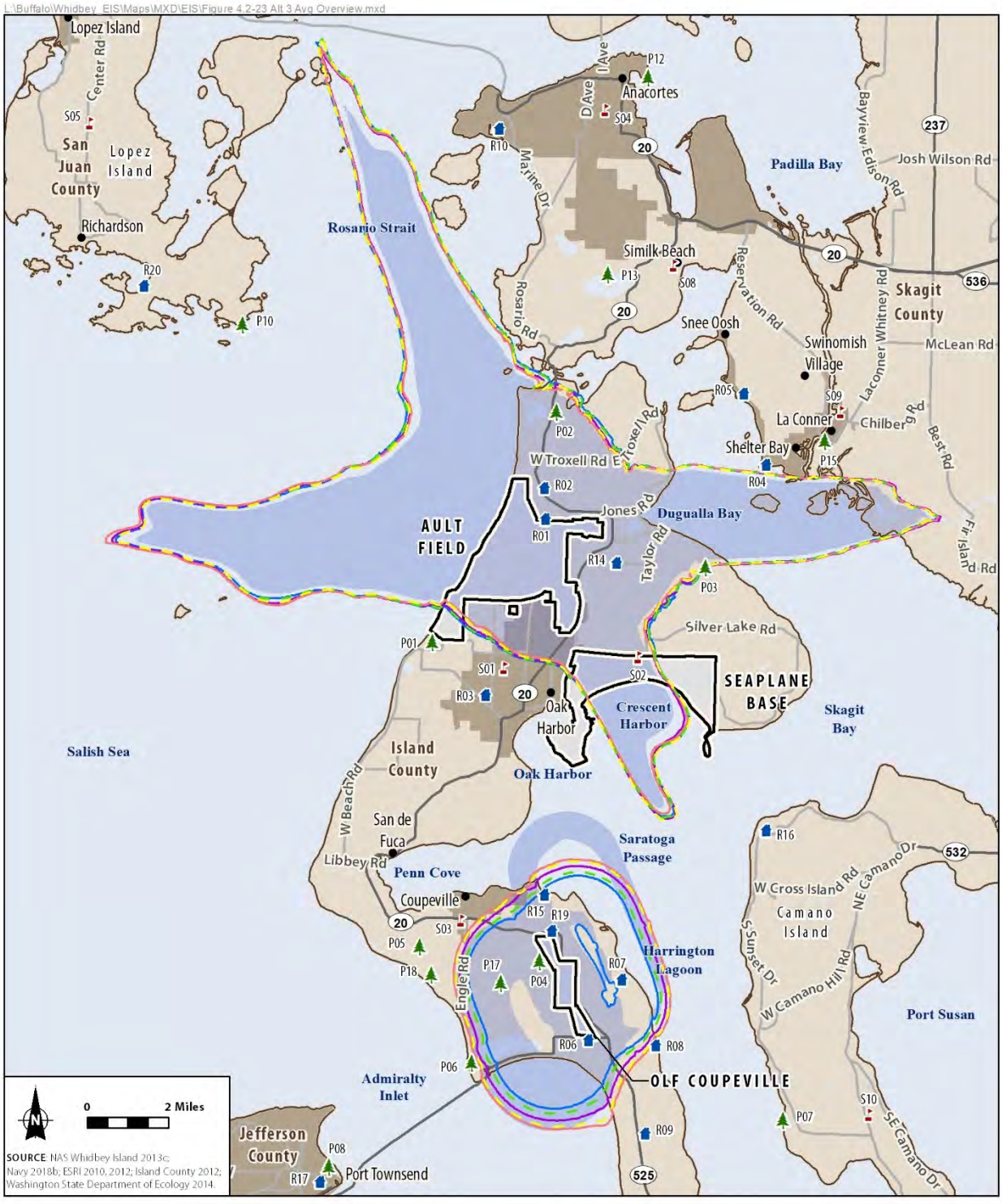

Figure 4.2-23
Alternative 3 Overview of the 65 dB DNL Noise Contours for the NAS Whidbey Island Complex
Whidbey Island, Island County, WA

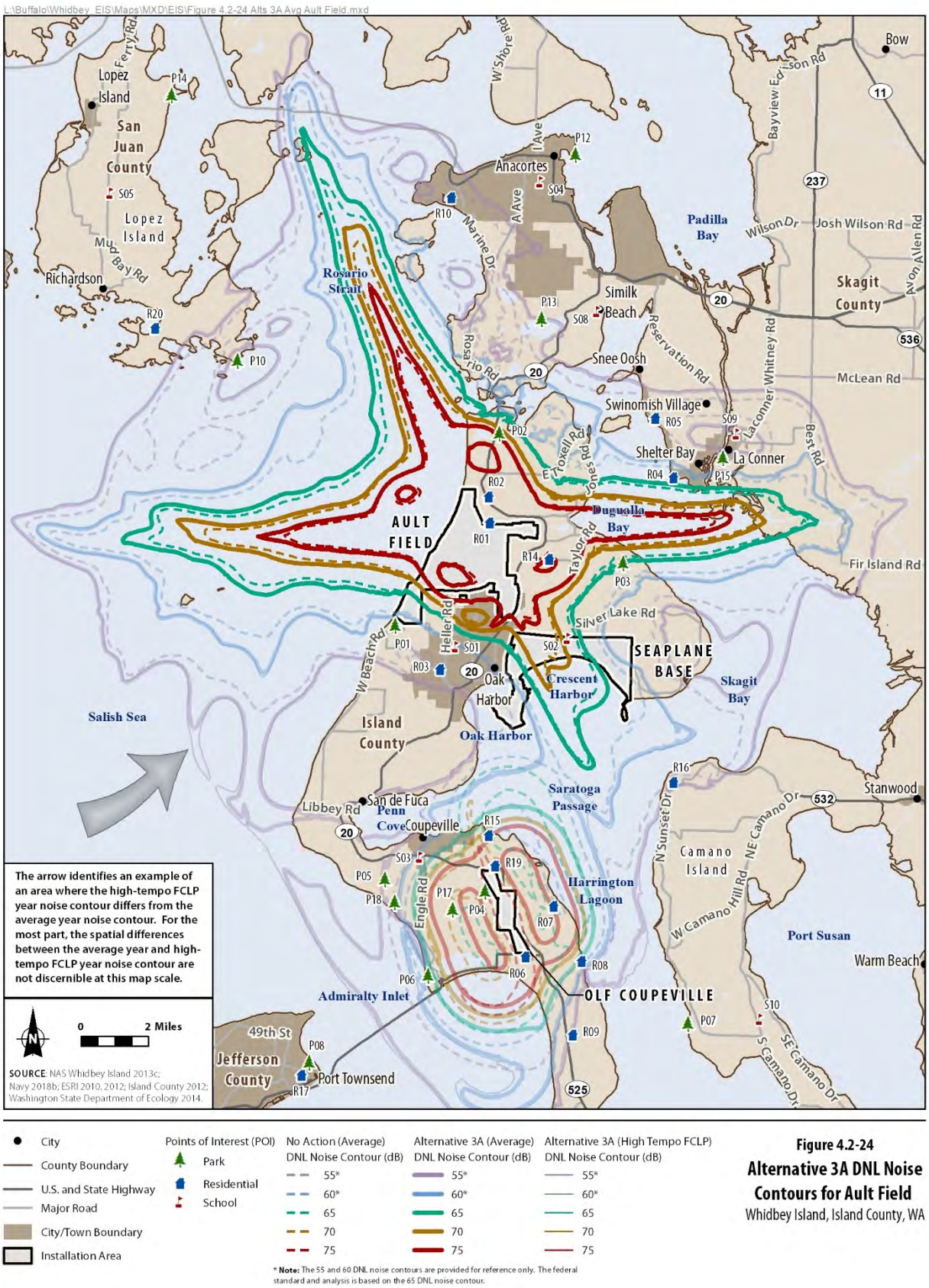

Figure 4.2-24
Alternative 3A DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

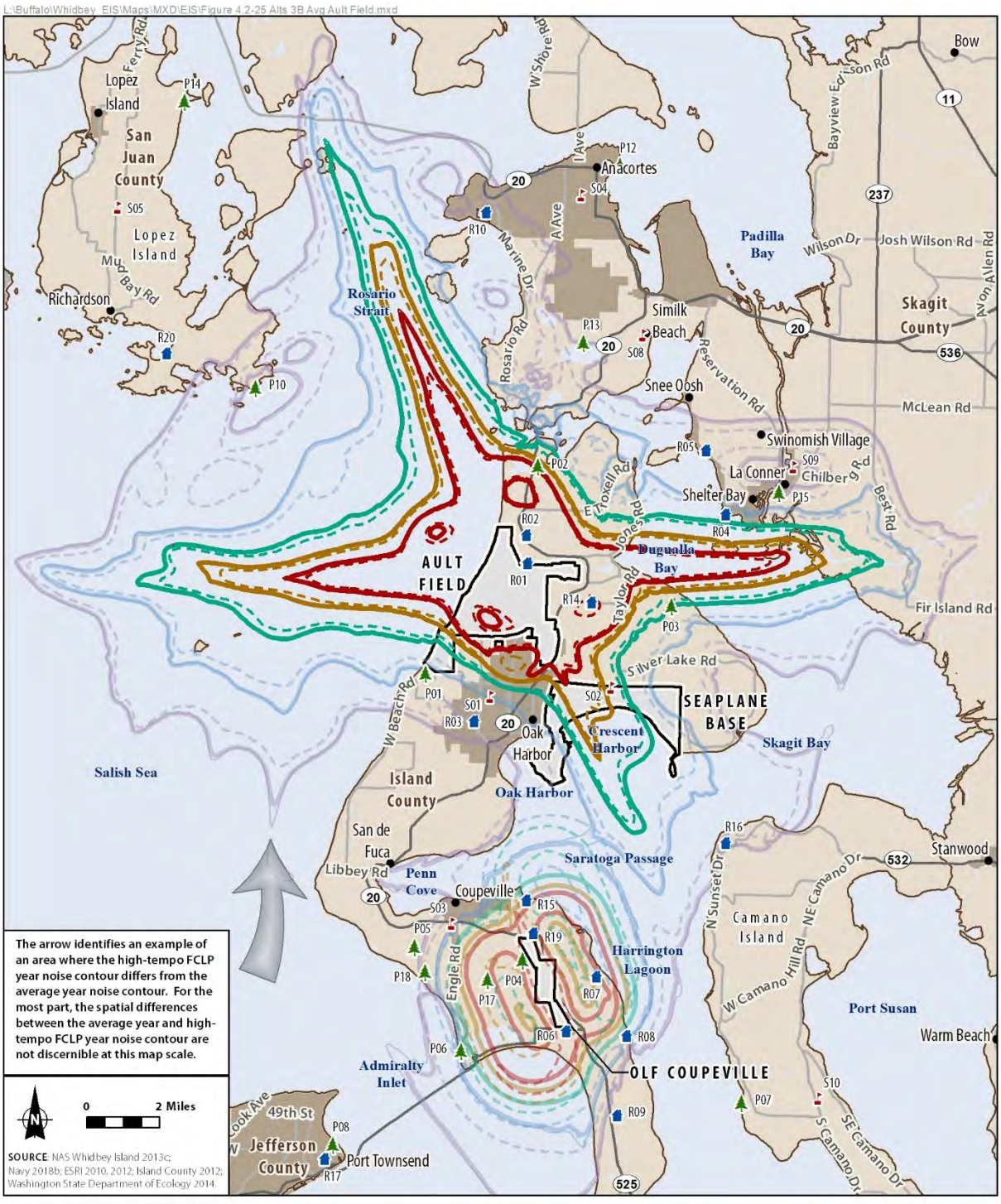

Figure 4.2-25
Alternative 3B DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

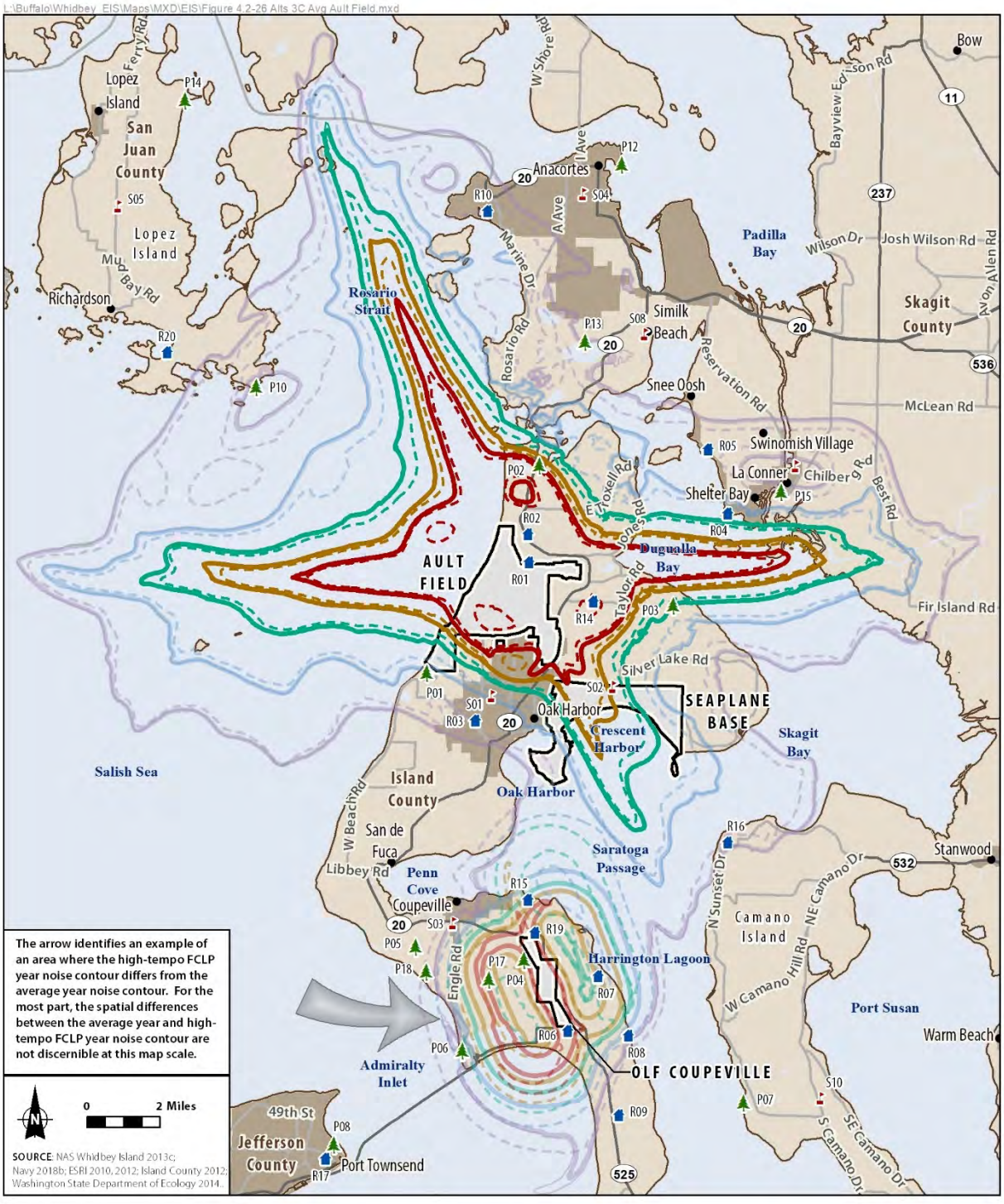

Figure 4.2-26
Alternative 3C DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

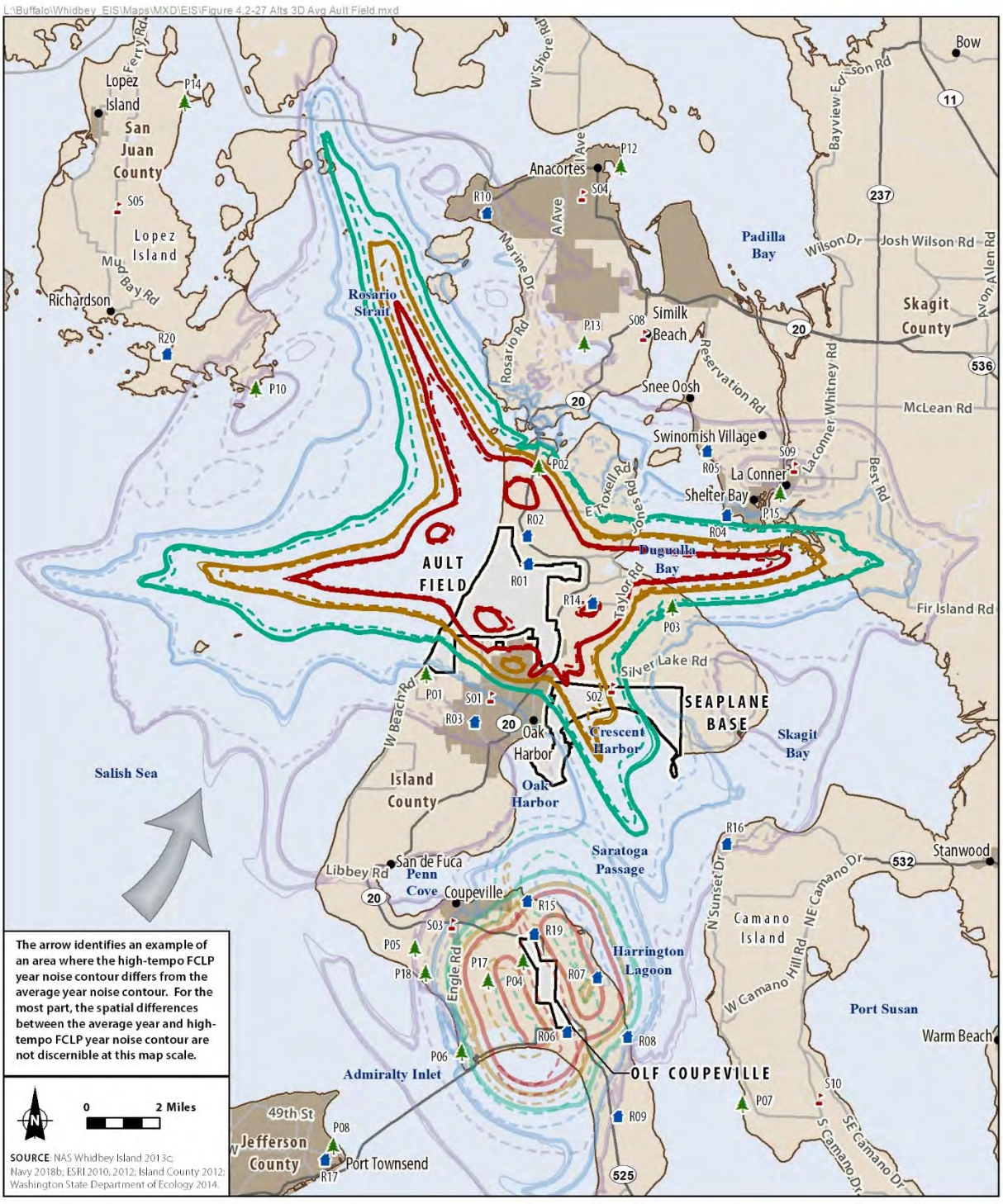

Figure 4.2-27
Alternative 3D DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

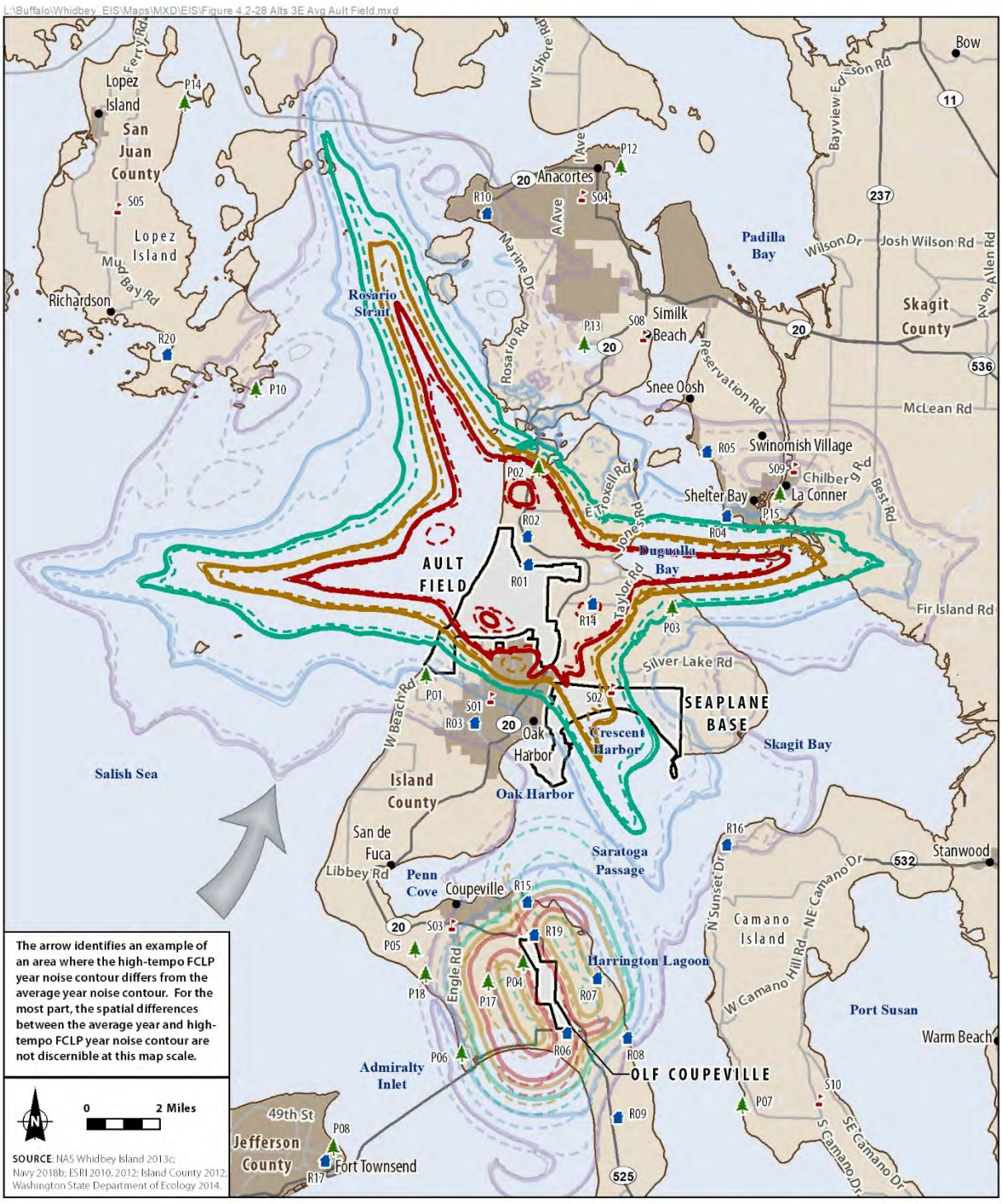

Figure 4.2-28
Alternative 3E DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

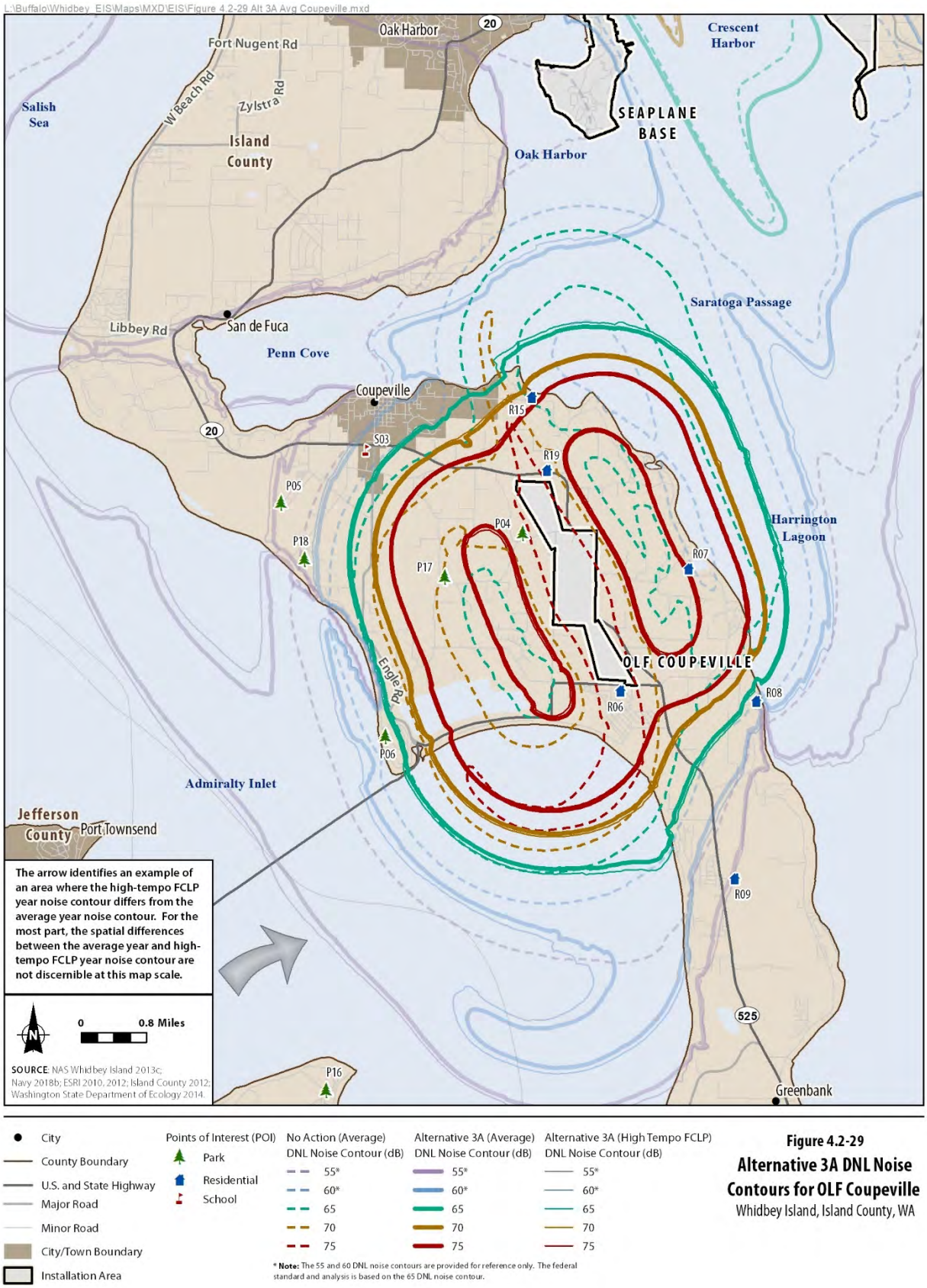

Figure 4.2-29
Alternative 3A DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

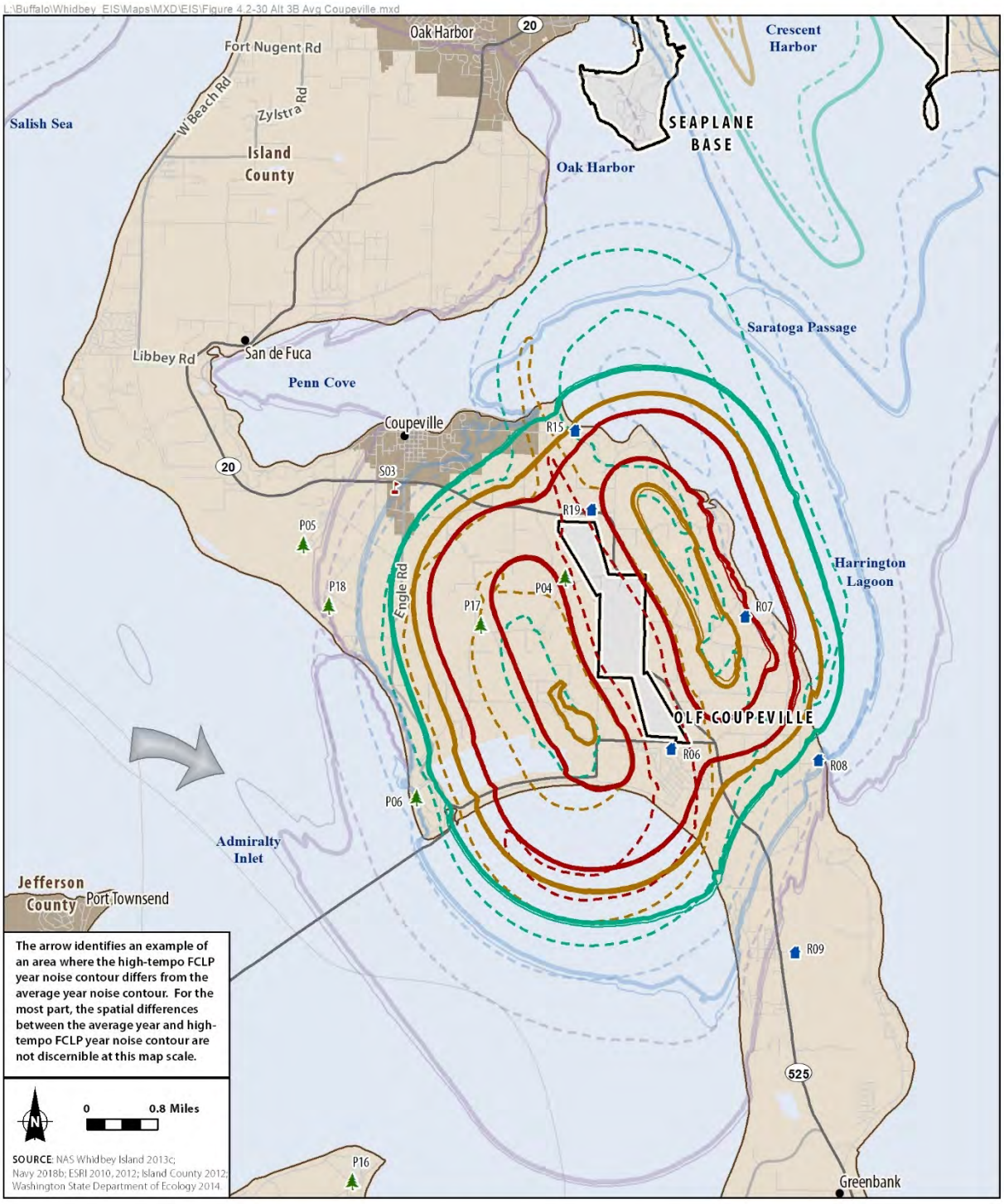

Figure 4.2-30
Alternative 3B DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

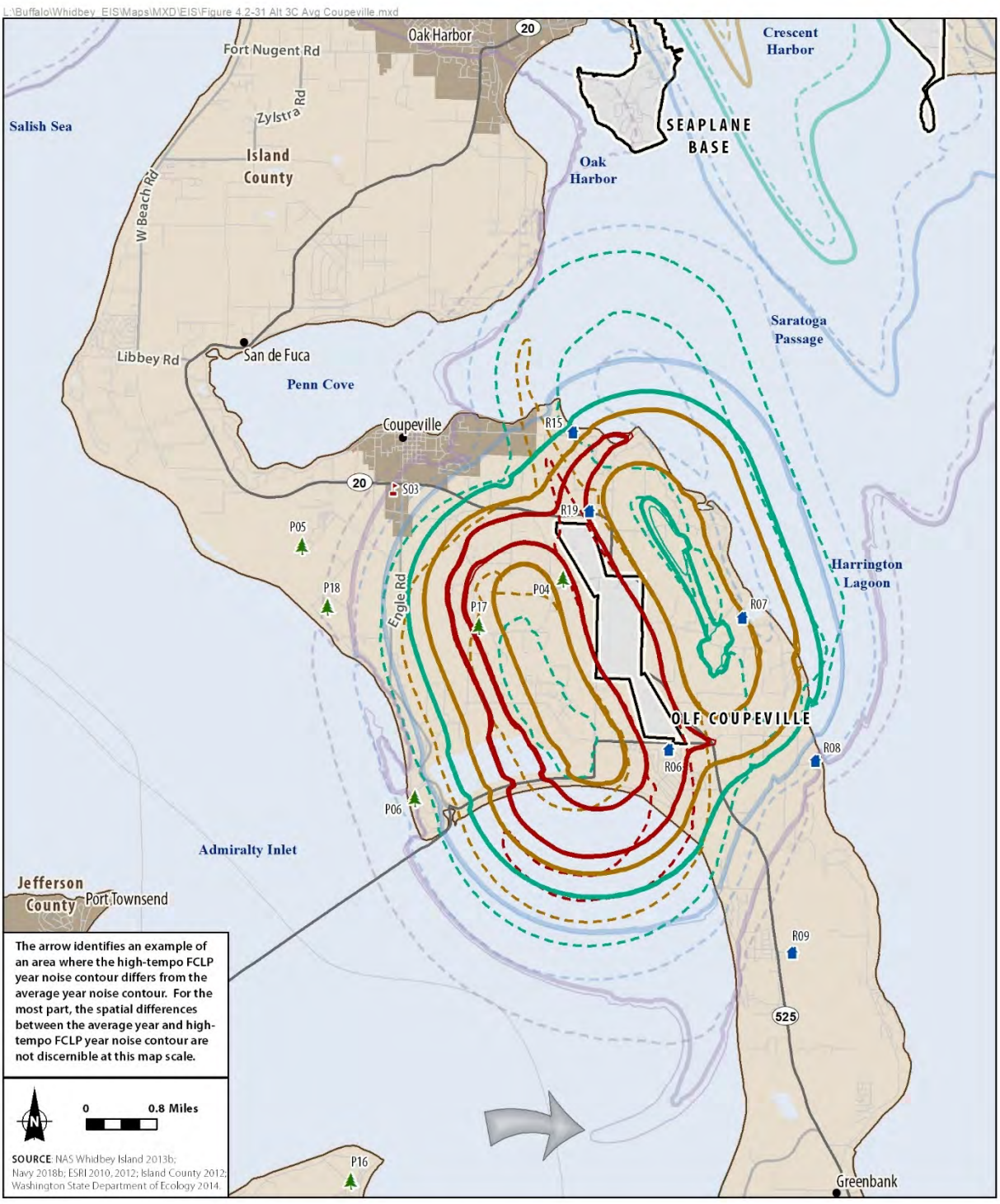

Figure 4.2-31
Alternative 3C DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

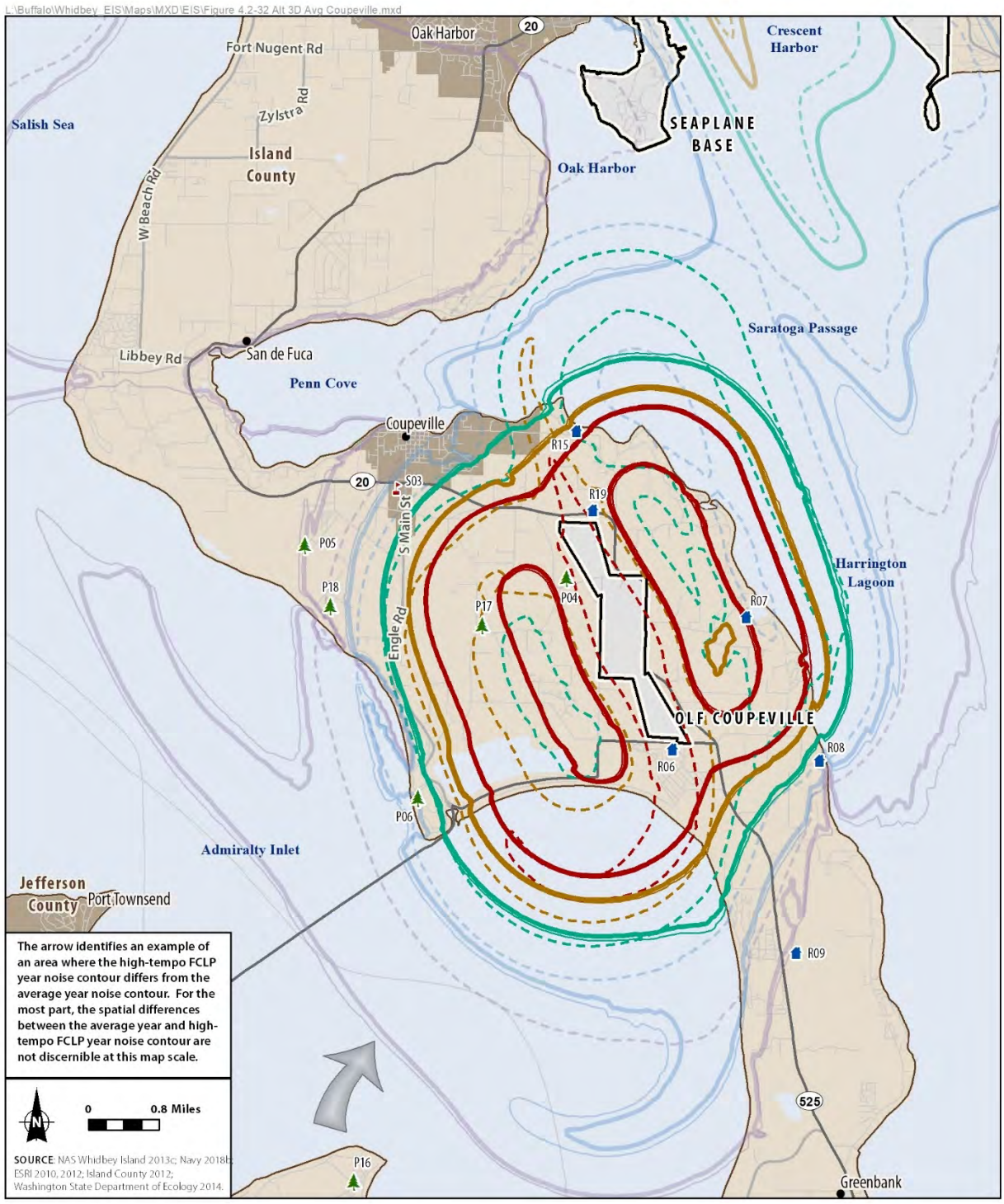

Figure 4.2-32
Alternative 3D DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

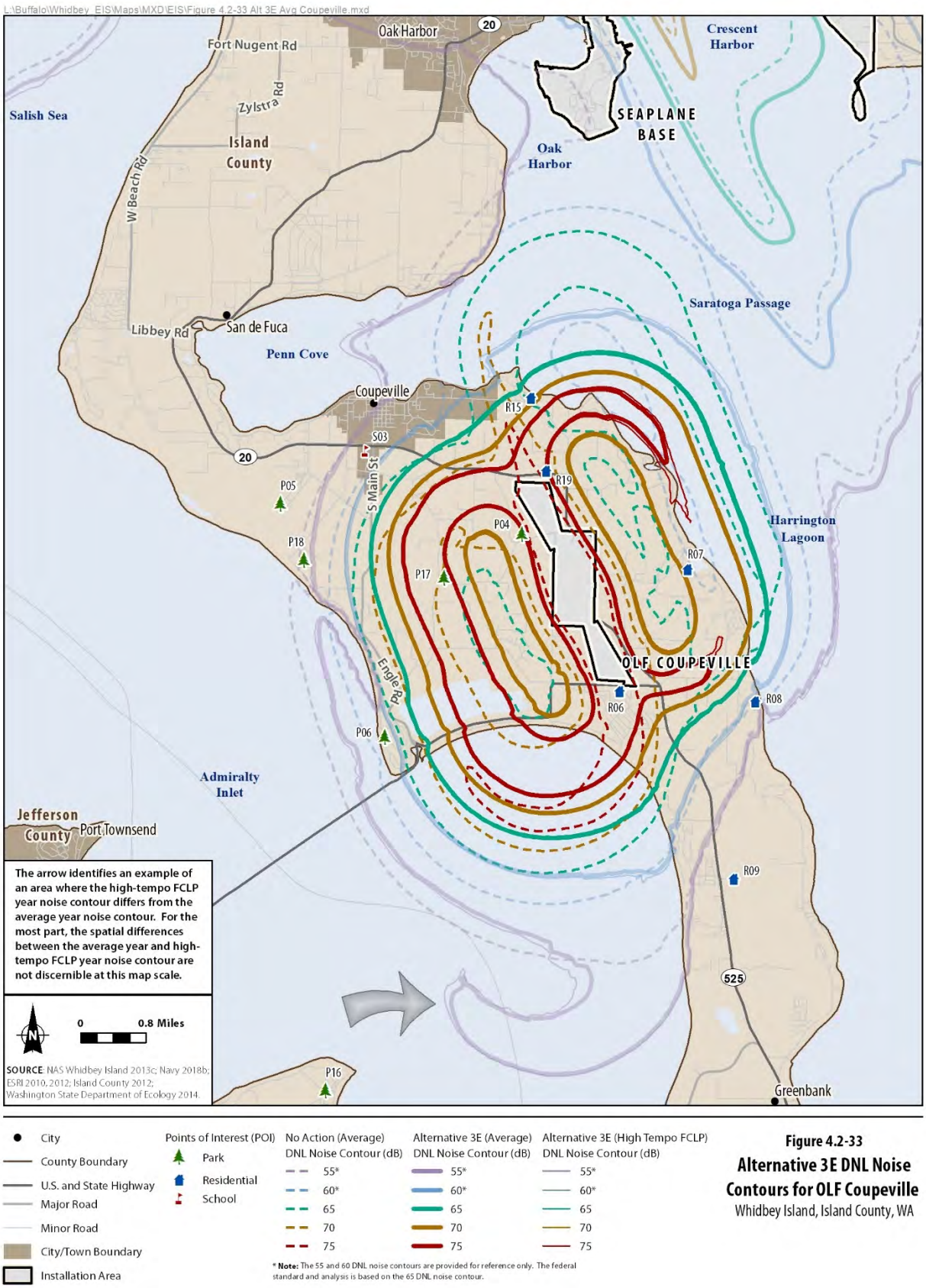

Figure 4.2-33
Alternative 3E DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

4.2.4.2 Supplemental Noise Analyses, Alternative 3

Additional supplemental noise analyses were conducted for a variety of representative POIs identified in the communities surrounding Ault Field and OLF Coupeville. The wide geographic distribution of POIs provides broad coverage and context to compare the noise effects under each of the alternatives with the noise effects for the No Action Alternative. These supplemental analyses include single event noise, indoor speech interference, classroom/learning interference, sleep disturbance, outdoor speech interference, and PHL. The POIs chosen for this analysis are presented in Section 3.2 and are depicted on Figure 3.2-6. Not all POIs are used for each analysis because the location and type of POI dictates whether the particular analysis would apply; however, for the Final EIS, an analysis of outdoor speech interference was also included for all POIs, including residential areas and schools, as individuals would spend time outdoors at both of those types of locations. In addition, between the Draft EIS and Final EIS, an additional 18 POIs were added to the analysis to provide the public and decision makers with more data to compare. These included additional residential areas, schools, and parks, as well as two points from the NPS's acoustical monitoring report. The two points from that report (designated as EBLA001 [Reuble Farmstead] and EBLA002 [Ferry House]), correspond, respectively, to POIs P17 and P18.

In general, the POIs were chosen based upon several factors, including their geographic dispersal from the airfields and being located under flight operations, major or identifiable landmarks, and areas that have had a history of noise impacts. It should be noted that for POIs located close to one another (i.e., within about 0.25 mile, depending on topography), the results will most likely be the same or very similar and thus not add value to the analysis.

4.2.4.2.1 Single Event Noise, Alternative 3

As noted in Section 3.2.4.3.1, several types of metrics are presented in this subsection that address the question of "how loud" the aircraft are and "how often" someone will hear them. To understand the "how loud" question, certain single noise events may be relative to the 48 POIs, and two different noise metrics are utilized: SEL and L_{max}. The SEL metric is a composite metric that represents both the intensity of a sound and its duration. SEL provides a measure of total sound energy of an entire acoustic event (i.e., arrival, departure, or T&G). The L_{max} metric is the maximum, instantaneous level of noise that a particular event produces, and it is most closely related to what an individual would hear. The SEL and L_{max} provide the noise level of a single aircraft event. These events are intermittent in nature, and, therefore, the noise levels do not represent a continuous source of noise. For more details on SEL or L_{max}, see Section 3.2.2 as well as Appendix A, Aircraft Noise Study.

The SEL and L_{max} values for the loudest single event (i.e., arrival, departure, or T&G) for each POI under Alternative 3 at Ault Field and OLF Coupeville are identical to those presented under Alternative 1 in Table 4.2-3. As with Alternative 1, under Alternative 3, the maximum SEL/L_{max} values vary depending on the location of the POI and its proximity to the airfields and flight tracks. These noise level measurements under Alternative 3 are compared to the noise level measurements that were modeled under the No Action Alternative, and the difference is noted in the table.

As shown in the data, many of the maximum SEL and L_{max} values modeled under Alternative 1 are identical to those modeled in the No Action Alternative analysis. Measurements at 12 of the 48 POIs changed from the No Action Alternative to Alternative 3. These include increases at R06 and R07, and decreases at R08, R15, R19, S03, P04, P05, P06, P16, and P18, while at R09, the SEL decreased slightly and the L_{max} increased slightly. In addition, the SEL and L_{max} values for the representative POIs are all

identical under all of the scenarios analyzed; therefore, they are not broken down and presented individually.

To answer the "how often" question, a separate analysis was conducted to estimate the number of events above a maximum noise level threshold (NAXXL_{max}) (see Section 3.2.2.5 for a description of this metric). For the purposes of this analysis, three L_{max} noise levels were chosen: 1) number of events above 80 dB L_{max} (NA80L_{max}), 2) number of events above 90 dB L_{max} (NA90L_{max}), and 3) number of events above 100 dB L_{max} (NA100L_{max}). This provides context for the frequency of noise events an individual may experience at that POI at three different noise levels and that may be considered disruptive. See Figure 3.2-1 for sound levels from typical sources.

Table 4.2-20 presents the number of events above the three identified thresholds for the POIs analyzed (note, for 21 of the 48 POIs analyzed, the noise model indicated there would be zero events above the 80 dB L_{max}; therefore, they were omitted from the table).

As presented in the table, there is a large range in the number of events based upon the location of the POI. Under certain scenarios, some POIs would experience an increase in the range of 10,000 to over 15,000 annual events above 80 dB L_{max} (i.e., the sound of a garbage disposal). This would be approximately 27 to 41 events per day when averaged. Other POIs would experience some degree less than these numbers. The POIs with the highest number of events above these thresholds were very close to Ault Field. In addition, the results show that as the L_{max} threshold is increased, the number of events decrease, as would be expected. Therefore, when looking at the number of events above a threshold of 100 dB L_{max}, the highest increase is 11,476 at R01 over the No Action Alternative conditions.

What this combined analysis shows is that while there may not be a substantive difference in the loudest event (i.e., SEL or L_{max}) at a particular POI, there may be a substantial increase in the number of loud or disruptive events that occur between alternatives and scenarios when compared to the No Action Alternative.

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1,2]

ID	Description	Lmax (dB)	Number of Annual Events					
			No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D	Alt 3 E
Residences								
R01	Sullivan Rd.	Above 80 dB	48,311	57,033 (+8,722)	60,474 (+12,163)	63,606 (+15,295)	58,172 (+9,861)	62,471 (+14,160)
		Above 90 dB	43,603	51,152 (+7,549)	54,770 (+11,167)	57,952 (+14,349)	52,347 (+8,744)	56,790 (+13,187)
		Above 100 dB	30,199	34,249 (+4,050)	38,148 (+7,949)	41,675 (+11,476)	35,332 (+5,133)	40,381 (+10,182)
R02	Salal St. and N. Northgate Dr.	Above 80 dB	38,892	45,917 (+7,025)	49,088 (+10,196)	53,064 (+14,172)	47,324 (+8,432)	51,881 (+12,989)
		Above 90 dB	36,058	42,044 (+5,986)	45,667 (+9,609)	49,849 (+13,791)	43,663 (+7,605)	48,580 (+12,552)
		Above 100 dB	4,771	6,201 (+1,430)	5,856 (+1,085)	6,363 (+1,592)	6,805 (+2,034)	6,443 (+1,672)
R04	Pull and Be Damned Point	Above 80 dB	4,985	6,330 (+1,345)	6,267 (+1,282)	5,985 (+1,000)	6,010 (+1,025)	5,985 (+1,000)
		Above 90 dB	370	443 (+73)	417 (+47)	414 (+44)	416 (+46)	414 (+44)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R05	Snee-Oosh Point	Above 80 dB	2,767	3,638 (+871)	3,638 (+871)	3,475 (+708)	3,475 (+708)	3,475 (+708)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R06	Admirals Dr. and Byrd Dr.	Above 80 dB	3,101	12,176 (+9,075)	7,623 (+4,522)	3,051 (-50)	10,664 (+7,563)	4,579 (+1,478)
		Above 90 dB	2,451	10,771 (+8,320)	6,754 (+4,303)	2,700 (+249)	9,438 (+6,987)	4,052 (+1,601)
		Above 100 dB	2,227	7,693 (+5,466)	4,691 (+2,464)	1,902 (-325)	6,648 (+4,421)	2,854 (+627)
R07	Race Lagoon	Above 80 dB	938	4,691 (+3,753)	3,101 (+2,163)	1,237 (+299)	4,211 (+3,273)	1,835 (+897)
		Above 90 dB	230	3,240 (+3,010)	2,165 (+1,935)	839 (+609)	2,934 (+2,704)	1,259 (+1,029)
		Above 100 dB	183	2,516 (+2,333)	1,679 (+1,496)	651 (+468)	2,277 (+2,094)	977 (+794)
R08	Pratts Bluff	Above 80 dB	368	3,655 (+3,287)	2,442 (+2,074)	947 (+579)	3,309 (+2,941)	1,421 (+1,053)
		Above 90 dB	223	903 (+680)	605 (+382)	234 (+11)	819 (+596)	351 (+128)
		Above 100 dB	65	0 (-65)	0 (-65)	0 (-65)	0 (-65)	0 (-65)

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1,2]

			Number of Annual Events					
ID	Description	Lmax (dB)	No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D	Alt 3 E
R10	Skyline	Above 80 dB	1,548	2,172 (+624)	2,101 (+553)	2,347 (+799)	2,349 (+801)	2,347 (+799)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R14	E. Sleeper Road and Slumber Lane	Above 80 dB	40,516	47,015 (+6,499)	51,241 (+10,725)	54,124 (+13,608)	48,209 (+7,693)	52,903 (+12,387)
		Above 90 dB	10,220	10,991 (+771)	13,569 (+3,349)	15,975 (+5,755)	11,519 (+1,299)	15,080 (+4,860)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R15	Long Point Manor	Above 80 dB	2,524	4,852 (+2,328)	3,323 (+799)	1,663 (-861)	4,419 (+1,895)	2,216 (-308)
		Above 90 dB	847	4,305 (+3,458)	2,812 (+1,965)	1,103 (+256)	3,854 (+3,007)	1,656 (+809)
		Above 100 dB	41	2,175 (+2,134)	1,457 (+1,416)	564 (+523)	1,971 (+1,930)	846 (+805)
R16	Rocky Point Heights	Above 80 dB	1,525	1,970 (+445)	1,900 (+375)	2,025 (+500)	2,040 (+515)	2,025 (+500)
		Above 90 dB	69	65 (-4)	81 (+12)	65 (-4)	65 (-4)	65 (-4)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R19	Island Transit Offices, Coupeville	Above 80 dB	3,172	12,241 (+9,069)	7,704 (+4,532)	3,116 (-56)	10,729 (+7,557)	4,644 (+1,472)
		Above 90 dB	2,412	11,827 (+9,415)	7,426 (+5,014)	3,008 (+596)	10,353 (+7,941)	4,482 (+2,070)
		Above 100 dB	847	4,305 (+3,458)	2,812 (+1,965)	1,103 (+256)	3,854 (+3,007)	1,656 (+809)
R20	South Lopez Island (Agate Beach)	Above 80 dB	112	146 (+34)	136 (+24)	156 (+44)	156 (+44)	156 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Schools								
S01	Oak Harbor High School	Above 80 dB	997	633 (-364)	948 (-49)	992 (-5)	793 (-204)	952 (-45)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1,2]

			Number of Annual Events					
ID	Description	Lmax (dB)	No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D	Alt 3 E
S02	Crescent Harbor Elementary School	Above 80 dB	4,436	5,667 (+1,231)	5,465 (+1,029)	5,864 (+1,428)	5,904 (+1,468)	5,864 (+1,428)
		Above 90 dB	3,957	5,244 (+1,287)	4,925 (+968)	5,387 (+1,430)	5,427 (+1,470)	5,387 (+1,430)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S03	Coupeville Elementary School	Above 80 dB	1,852	2,929 (+1,077)	1,781 (-71)	723 (-1,129)	2,529 (+677)	1,087 (-765)
		Above 90 dB	316	0 (-316)	0 (-316)	0 (-316)	0 (-316)	0 (-316)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S04	Anacortes High School	Above 80 dB	112	146 (+34)	136 (+24)	156 (+44)	156 (+44)	156 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S09	La Conner Elementary School	Above 80 dB	352	399 (+47)	412 (+60)	389 (+37)	390 (+38)	389 (+37)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parks								
P02	Deception Pass State Park	Above 80 dB	8,950	9,708 (+758)	10,758 (+1,808)	13,149 (+4,199)	10,713 (+1,763)	12,656 (+3,706)
		Above 90 dB	5,479	5,721 (+242)	6,682 (+1,203)	8,892 (+3,413)	6,599 (+1,120)	8,428 (+2,949)
		Above 100 dB	5,449	5,539 (+90)	6,560 (+1,111)	8,845 (+3,396)	6,434 (+985)	8,357 (+2,908)
P03	Dugualla State Park	Above 80 dB	16,278	18,523 (+2,245)	21,153 (+4,875)	22,280 (+6,002)	18,976 (+2,698)	21,603 (+5,325)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P04	Ebey's Landing – Rhododendron Park	Above 80 dB	3,172	12,241 (+9,069)	7,704 (+4,532)	3,116 (-56)	10,729 (+7,557)	4,644 (+1,472)
		Above 90 dB	3,103	12,176 (+9,073)	7,623 (+4,520)	3,051 (-52)	10,664 (+7,561)	4,579 (+1,476)
		Above 100 dB	2,720	4,305 (+1,585)	2,812 (+92)	1,103 (-1,617)	3,854 (+1,134)	1,656 (-1,064)

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1,2]

			Number of Annual Events					
ID	Description	Lmax (dB)	No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D	Alt 3 E
P06	Fort Casey State Park	Above 80 dB	2,189	7,457 (+5,268)	4,533 (+2,344)	1,841 (-348)	6,434 (+4,245)	2,762 (+573)
		Above 90 dB	547	0 (-547)	0 (-547)	0 (-547)	0 (-547)	0 (-547)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P10	San Juan Island National Monument	Above 80 dB	481	566 (+85)	557 (+76)	649 (+168)	651 (+170)	649 (+168)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P13	Lake Campbell	Above 80 dB	254	182 (-72)	243 (-11)	301 (+47)	304 (+50)	301 (+47)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P15	Pioneer Park	Above 80 dB	370	443 (+73)	417 (+47)	414 (+44)	416 (+46)	414 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P17	Reuble Farm	Above 80 dB	3,061	11,836 (+8,775)	7,401 (+4,340)	2,963 (-98)	10,358 (+7,297)	4,448 (+1,387)
		Above 90 dB	1,641	7,457 (+5,816)	4,533 (+2,892)	1,841 (+200)	6,434 (+4,793)	2,762 (+1,121)
		Above 100 dB	693	5,593 (+4,900)	3,400 (+2,707)	1,380 (+687)	4,826 (+4,133)	2,071 (+1,378)
P18	Ferry House	Above 80 dB	1,180	1,864 (+684)	1,133 (-47)	460 (-720)	1,609 (+429)	691 (-489)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1,2]

ID	Description	Lmax (dB)	Number of Annual Events					
			No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D	Alt 3 E

Notes:

[1] The difference between the No Action Alternative and Alternative 3 is noted in parentheses for the number of events above the specified noise.

[2] POIs that had zero events above an L_{max} of 80 dB, 90 dB, and 100 dB were omitted from the table. These included POIs R03, R09, R11, R12, R13, R17, R18, S05, S06, S07, S08, S10, P01, P05, P07, P08, P09, P11, P12, P14, and P16.

Key:
dB = decibel
L_{max} = maximum sound level

4.2.4.2.2 Speech Interference (Indoor), Alternative 3

Conversation or indoor speech is assumed to be interrupted when a single aircraft event exceeds the maximum sound level, or L_{max}, of 50 dB indoors (Sharp et al, 2009). Normal conversation is about 60 dB; therefore, the use of a 50 dB indoor level is a very conservative threshold such that a soft speaking voice could be heard. For this analysis, the model calculated the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level, or L_{max}, of 50 dB at the 20 residential POIs and the 10 schools, since they are commonly located in residential areas. Because the individual is assumed to be indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis was conducted assuming both windows-open and windows-closed conditions. Table 4.2-21 presents the average daily (7:00 a.m. to 10:00 p.m.) events per hour that exceed an L_{max} of 50 dB indoors at these POIs under Alternative 3, all scenarios.

Compared to the No Action Alternative, Alternative 3 would result in between zero and two additional events per hour at representative POIs during which conversations or indoor speech would be interrupted. The largest change (with two additional events per daytime hour) would occur at several POIs, including R01, R02, R06, R07, R08, R14, and R15 under various scenarios. However, at several POIs, no change would occur under any of the scenarios compared to the No Action Alternative.

Table 4.2-21 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Average Number of Events per Daytime Hour[2]											
ID	*Description*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*
Residences													
R01	Sullivan Rd.	8	8	9 (+1)	9 (+1)	10 (+2)	10 (+2)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R02	Salal St. and N. Northgate Dr.	8	8	9 (+1)	9 (+1)	10 (+2)	10 (+2)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R03	Central Whidbey	5	-	5 (0)	- (0)	6 (+1)	- (0)	6 (+1)	- (0)	5 (0)	- (0)	6 (+1)	- (0)
R04	Pull and Be Damned Point	2	1	3 (+1)	1 (0)	3 (+1)	2 (+1)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)
R05	Snee-Oosh Point	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R06	Admirals Dr. and Byrd Dr.	-	-	2 (+2)	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	2 (+2)	2 (+2)	1 (+1)	1 (+1)
R07	Race Lagoon	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	1 (+1)	- (0)	2 (+2)	1 (+1)	1 (+1)	- (0)
R08	Pratts Bluff	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	2 (+2)	1 (+1)	1 (+1)	- (0)
R09	Cox Rd and Island Ridge	-	-	1 (+1)	- (0)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R10	Skyline	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R11	Sequim	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R12	Port Angeles	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R13	Beverly Beach, Freeland	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R14	E. Sleeper Rd. and Slumber Ln.	8	7	9 (+1)	8 (+1)	9 (+1)	9 (+2)	10 (+2)	9 (+2)	9 (+1)	8 (+1)	10 (+2)	9 (+2)

Table 4.2-21 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Average Number of Events per Daytime Hour[2]											
ID	*Description*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*
R15	Long Point Manor	1	1	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R16	Rocky Point Heights	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R17	Port Townsend	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	1	1	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R20	South Lopez Island (Agate Beach)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Schools													
S01	Oak Harbor High School	6	2	6 (0)	2 (0)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	7 (+1)	3 (+1)
S02	Crescent Harbor Elementary	5	2	5 (0)	2 (0)	6 (+1)	2 (0)	6 (+1)	3 (+1)	6 (+1)	2 (0)	6 (+1)	3 (+1)
S03	Coupeville Elementary	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
S04	Anacortes High School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Table 4.2-21 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Average Number of Events per Daytime Hour[2]											
ID	*Description*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*	*Windows Open[3]*	*Windows Closed[3]*
S09	La Conner Elementary School	1	-	1 (0)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S10	Elger Bay Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Notes:

[1] The difference between the No Action Alternative and Alternative 3 is noted in parentheses. Hyphens (-) indicate result equals zero.

[2] Number of annual average daily daytime (7:00 a.m. to 10:00 p.m.) events at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 decibels (dB). See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as "quiet urban daytime" at 40 dB and a garbage disposal at 80 dB.

[3] Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation and other building features that reduce the noise levels inside (FICON, 1992).

4.2.4.2.3 Classroom/learning Interference, Alternative 3

Two metrics were analyzed to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights: interior $L_{eq(8)}$ during an 8-hour school day (8:00 a.m. to 4:00 p.m.), and the average number of interfering aircraft events per hour during that time period. Single aircraft events that generate interior sound levels (L_{max}) greater than 50 dB have the potential to interfere with student and teacher interaction by affecting conversation and comprehension (Sharp et al., 2009). Because the classroom interaction occurs indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis considered both windows-open and windows-closed conditions. Table 4.2-22 presents the $L_{eq(8)}$ and the number of events that exceed an L_{max} of 50 dB indoors under Alternative 3, all scenarios, at the representative POIs that are schools (and the two residential POIs located in the vicinity of schools). It is important to note that Table 4.2-22 presents average values, and there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all and therefore have no potential for classroom/learning interference.

Most schools would experience interior $L_{eq(8)}$ due to Navy aircraft operations close to ambient levels of 45 dB or less, which would not impact learning and conversation. Crescent Harbor Elementary School (S02) would experience the highest $L_{eq(8)}$ (52 dB) for the No Action Alternative and the highest under Scenario C of 54 dB when windows are open. When windows are closed, the $L_{eq(8)}$ at Crescent Harbor Elementary School (S02) would drop to less than 45 dB. Given the relatively cool climate in the area, it is likely that windows at schools would be closed a majority of the time.

The potential for classroom interference from single aircraft events generating sound levels inside classrooms greater than 50 dB L_{max} would increase under Alternative 3 by up to two events per hour (at S01, S02, and S03, as well as school surrogate R03) compared to the No Action Alternative; that is, on average, no school would experience an increase of more than two learning-disrupting events per hour under any scenario under Alternative 3 compared to the No Action Alternative. The highest increase of an additional two events is shown for Oak Harbor High School (S01) under Scenarios B, C, and E with windows open. Crescent Harbor Elementary School shows an increase in classroom/learning interference by an average of an additional two events per hour (with windows open) under Scenarios B and C. Under Scenarios A and D, the Coupeville Elementary School (S03) also shows an increase in classroom/learning interference by an average of an additional two events per hour (with windows open). In addition, school surrogate Central Whidbey (R03) could expect an average increase of two additional events per hour (with windows open) under Scenarios C and E. All other schools either show no change from the No Action Alternative or an increase of one event per daytime hour during the school day, primarily under the windows-open condition. Under the windows-closed condition, nearly all of the schools would be expected to experience an increase of no more than one event per hour of classroom/learning interference, with most being unchanged from the No Action Alternative. Many modern schools have central air conditioning and heating systems; therefore, it is more likely that classroom windows would remain closed the majority of the time.

Table 4.2-22 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1]

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]	
ID	Description	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]
School Surrogates																									
R03	Central Whidbey	<45	4	<45	-	<45	5 (+1)	<45	- (0)	<45	5 (+1)	<45	- (0)	<45	6 (+2)	<45	- (0)	<45	5 (+1)	<45	- (0)	<45	6 (+2)	<45	- (0)
R11	Sequim	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
Schools																									
S01	Oak Harbor High School	<45	5	<45	2	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)	<45	7 (+2)	<45	3 (+1)	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)
S02	Crescent Harbor Elementary	52	4	<45	2	53	5 (+1)	<45	2 (0)	53	6 (+2)	<45	2 (0)	54	6 (+2)	<45	3 (+1)	50	5 (+1)	<45	2 (0)	50	6 (+1)	<45	2 (0)
S03	Coupeville Elementary	<45	-	<45	-	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	- (0)	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	- (0)
S04	Anacortes High School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S05	Lopez Island School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S06	Friday Harbor Elementary	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S07	Sir James Douglas Elementary	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S08	Fidalgo Elementary School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
S09	La Conner Elementary School	<45	1	<45	-	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)	<45	1 (0)	<45	- (0)
S10	Elger Bay Elementary School	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)

Table 4.2-22 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1]

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]		Windows Open[2]		Windows Closed[2]	
ID	Description	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]	$L_{eq(8)}$[3] (dB)	Events per Hour[4]

Notes:

[1] The difference between the No Action Alternative and Alternative 3 is noted in parentheses. Hyphens (-) indicate result equals zero.

[2] Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).

[3] For this metric, daily classroom hours are assumed to be 8:00 a.m. to 4:00 p.m.

[4] Number of average school-day events per hour during an 8-hour school day (8:00 a.m. to 4:00 p.m.) at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 dB. See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as "quiet urban daytime" at 40 dB and a garbage disposal at 80 dB.

Key:

dB = decibel

$L_{eq(8)}$ = 8-hour sound level equivalent

L_{max} = maximum A-weighted sound level

Work and homework disturbance were not quantified in the analysis. Generally, the number of work and homework disturbance events can be assumed to be similar to the number of speech interference events or classroom learning interference events. While increased noise will likely lead to increased work and homework disturbance, it is important to note that the data listed in classroom learning interference tables present average values. This means there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all, thereby creating no potential for classroom learning interference.

4.2.4.2.4 Sleep Disturbance, Alternative 3

The analysis of sleep disturbance is a calculation of the probability of awakening from aircraft overflights. Thus, it is based on the outdoor SEL at each of the residential POIs being converted to an indoor SEL. Events that were considered are those that occur between 10:00 p.m. and 7:00 a.m. Although individuals sleep outside of these hours, these are considered typical sleeping hours for this type of analysis. Table 4.2-23 presents the results of the sleep disturbance analysis for the 20 POI locations that are in the residential category, as well as the 10 schools, which are commonly located in residential areas.

Under Alternative 3, the majority of the POIs analyzed show an increase in the percent probability of awakening for all scenarios during nights of average aircraft activity. The highest percent increase is for R06 (Admirals Drive and Byrd Drive), where there would be an increase of 31 percent under Scenario A with windows open, meaning that there is a 31-percent greater probability or chance of awakening at least once under windows-open conditions compared to the No Action Alternative. Generally, the POIs around OLF Coupeville had a higher percent probability of awakening under Scenario A than under the other scenarios, and, for the POIs around Ault Field, there was a larger increase in the percent probability of awakening under Scenario C than under the other scenarios.

Table 4.2-23 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[3]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
ID	*Description*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*
Residences													
R01	Sullivan Rd.	58%	43%	67% (+9%)	51% (+8%)	70% (+12%)	54% (+11%)	74% (+16%)	58% (+15%)	68% (+10%)	52% (+9%)	73% (+15%)	57% (+14%)
R02	Salal St. and N. Northgate Dr.	41%	29%	49% (+8%)	35% (+6%)	52% (+11%)	37% (+8%)	56% (+15%)	41% (+12%)	50% (+9%)	36% (+7%)	55% (+14%)	40% (+11%)
R03	Central Whidbey	16%	8%	19% (+3%)	10% (+2%)	21% (+5%)	11% (+3%)	23% (+7%)	12% (+4%)	20% (+5%)	11% (+3%)	23% (+7%)	12% (+4%)
R04	Pull and Be Damned Point	19%	9%	25% (+6%)	12% (+3%)	26% (+7%)	12% (+3%)	27% (+8%)	12% (+3%)	25% (+6%)	12% (+3%)	27% (+8%)	12% (+3%)
R05	Snee-Oosh Point	15%	5%	20% (+5%)	7% (+2%)	21% (+6%)	7% (+2%)	22% (+7%)	7% (+2%)	20% (+5%)	7% (+2%)	22% (+7%)	7% (+2%)
R06	Admirals Dr. and Byrd Dr.	9%	6%	40% (+31%)	28% (+22%)	27% (+18%)	18% (+12%)	12% (+3%)	8% (+2%)	36% (+27%)	25% (+19%)	17% (+8%)	11% (+5%)
R07	Race Lagoon	5%	2%	19% (+14%)	8% (+6%)	13% (+8%)	6% (+4%)	7% (+2%)	4% (+2%)	17% (+12%)	8% (+6%)	9% (+4%)	3% (+1%)
R08	Pratts Bluff	4%	2%	14% (+10%)	9% (+7%)	9% (+5%)	6% (+4%)	4% (0%)	2% (0%)	13% (+9%)	8% (+6%)	6% (+2%)	3% (+1%)
R09	Cox Rd and Island Ridge Way	3%	2%	12% (+9%)	8% (+6%)	7% (+4%)	5% (+3%)	3% (0%)	2% (0%)	10% (+7%)	7% (+5%)	4% (+1%)	3% (+1%)
R10	Skyline	5%	2%	7% (+1%)	3% (+1%)	8% (+3%)	3% (+1%)	9% (+4%)	3% (+1%)	8% (+3%)	3% (+1%)	9% (+4%)	3% (+1%)
R11	Sequim	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R12	Port Angeles	0%	0%	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)
R13	Beverly Beach, Freeland	2%	0%	6% (+4%)	0% (0%)	4% (+2%)	0% (0%)	2% (0%)	0% (0%)	5% (+3%)	0% (0%)	2% (0%)	0% (0%)
R14	E. Sleeper Rd. and Slumber Ln.	37%	25%	43% (+6%)	30% (+5%)	47% (+10%)	33% (+8%)	51% (+14%)	37% (+12%)	44% (+7%)	31% (+6%)	50% (+13%)	36% (+11%)
R15	Long Point Manor	11%	4%	23% (+112%)	12% (+8%)	18% (+7%)	8% (+4%)	14% (+3%)	4% (0%)	22% (+11%)	11% (+7%)	15% (+4%)	5% (+1%)

Table 4.2-23 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[3]

		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
ID	*Description*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*	*Windows Open[4]*	*Windows Closed[4]*
R16	Rocky Point Heights	9%	3%	11% (+2%)	4% (+1%)	12% (+3%)	4% (+1%)	13% (+4%)	4% (+1%)	12% (+3%)	4% (+1%)	13% (+4%)	4% (+1%)
R17	Port Townsend	1%	0%	1% (0%)	0% (0%)	1% (0%)	0% (0%)	0% (-1%)	0% (0%)	1% (0%)	0% (0%)	1% (0%)	0% (0%)
R18	Marrowstone Island (Nordland)	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R19	Island Transit Offices, Coupeville	10%	5%	32% (+22%)	21% (+16%)	23% (+13%)	14% (+9%)	12% (+2%)	6% (+1%)	30% (+20%)	18% (+13%)	16% (+6%)	8% (+3%)
R20	South Lopez Island (Agate Beach)	3%	1%	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)
Schools (near residential areas)[5]													
S01	Oak Harbor High School	20%	12%	25% (+5%)	14% (+2%)	27% (+7%)	16% (+4%)	29% (+9%)	18% (+6%)	26% (+6%)	15% (+3%)	29% (+9%)	17% (+5%)
S02	Crescent Harbor Elementary	21%	12%	26% (+5%)	15% (+3%)	28% (+7%)	17% (+5%)	31% (+10%)	19% (+7%)	27% (+6%)	16% (+4%)	30% (+9%)	18% (+6%)
S03	Coupeville Elementary	5%	3%	17% (+12%)	10% (+7%)	11% (+6%)	7% (+4%)	6% (+1%)	3% (0%)	15% (+10%)	9% (+6%)	7% (+2%)	4% (+1%)
S04	Anacortes High School	2%	1%	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)
S05	Lopez Island School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S06	Friday Harbor Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S07	Sir James Douglas Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S08	Fidalgo Elementary School	6%	2%	9% (+3%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)
S09	La Conner Elementary School	8%	3%	11% (+3%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)
S10	Elger Bay Elementary School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)

Table 4.2-23 Average Indoor Nightly[1] Probability of Awakening[2] for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[3]

		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
ID	Description	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]	Windows Open[4]	Windows Closed[4]

Notes:

1 For this metric, nightly sleeping hours are assumed to be 10:00 p.m. to 7:00 a.m.

2 This metric represents the probability of awakening at least once during a night of average aircraft noise activities.

3 The difference between the No Action Alternative and Alternative 3 is noted in parentheses.

4 Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).

5 All school points of interest were included in the potential sleep disturbance analysis because of their typical proximity to residential areas.

4.2.4.2.5 Outdoor Speech Interference: Potential Noise Effects on Recreation and Outdoor Activities, Alternative 3

The analysis of outdoor speech interference is based on the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). Details on the analysis of outdoor speech interference are available in Section 3.2, as well as Appendix A, Aircraft Noise Study. Table 4.2-24 presents the results of the analysis for Alternative 3 for all 48 of the POIs because individuals could experience outdoor speech interference when outside in their yard (residential), outside at school for recess or outdoor learning (schools,) and recreating at a park or recreational center (parks).

Under Alternative 3, the table shows a slight increase for several POIs where there would be potential for up to an average of two additional DNL daytime events per hour during which individuals may experience outdoor speech interference while outside their home or school, or recreating at a park. For many of the POIs, there is no change from the No Action Alternative. As the table indicates and as expected, when the POI is closer to OLF Coupeville, there would be more events under Scenario A, whereas if the POI is located closer to Ault Field, there would be more events under Scenario C. Section 4.5 has additional discussion on parks and recreation in the vicinity of the airfields. The data show that there is a range of potential outdoor speech interference that may disturb individuals participating in outdoor activities depending on the location of the POI in relation to the airfields and flight tracks. The average number of events is mostly consistent with those expected under the No Action Alternative conditions; however, some POIs may experience an increase in the average daily events. These increases range from zero to an increase of two events per hour, depending on the scenario.

In addition, the number of events per hour that could cause nighttime outdoor speech interference, which would give an estimation of how much an individual tent-camping or sleeping outdoors may be disturbed during the night, was also analyzed. This number ranges from an increase of zero to one event per hour, and it is dependent on the location of the POI and the scenario.

Table 4.2-24 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1]

		No Action Alternative		*Alternative 3*									
		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*
ID	*Description*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*
Parks													
P01	Joseph Whidbey State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)
P02	Deception Pass State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)
P03	Dugualla State Park	7	2	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
P04	Ebey's Landing – Rhododendron Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
P05	Ebey's Landing – Ebey's Prairie	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	3 (+1)	1 (+1)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
P06	Fort Casey State Park	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	2 (+1)	- (0)
P07	Cama Beach State Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	5 (+2)	1 (+1)	4 (+1)	1 (+1)
P08	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
P09	Moran State Park	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P10	San Juan Island National Monument	7	1	8 (+1)	2 (+1)	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	2 (+1)
P11	San Juan Island Visitors Center	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P12	Cap Sante Park	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
P13	Lake Campbell	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)

Table 4.2-24 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1]

		No Action Alternative		Alternative 3									
				Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
ID	Description	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]	NA50 L_{max}[2]
P14	Spencer Spit State Park	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P15	Pioneer Park	4	1	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	1 (0)
P16	Marrowstone Island (Fort Flagler)	-	-	1 (+1)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	1 (+1)	1 (+1)	- (0)
P17	Reuble Farm	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
P18	Ferry House	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
Residences													
R01	Sullivan Road	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	2 (0)
R02	Salal Street and N. Northgate Drive	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	2 (0)
R03	Central Whidbey	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
R04	Pull and Be Damned Point	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
R05	Snee-Oosh Point	7	1	8 (+1)	2 (+1)	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	2 (+1)
R06	Admirals Drive and Byrd Drive	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	- (0)
R07	Race Lagoon	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
R08	Pratts Bluff	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	- (0)

Table 4.2-24 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1]

		No Action Alternative		*Alternative 3*									
		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*
ID	*Description*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*
R09	Cox Road and Island Ridge Way	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
R10	Skyline	4	1	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)
R11	Sequim	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R12	Port Angeles	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
R13	Beverly Beach, Freeland	-	-	1 (+1)	- (0)	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R14	E. Sleeper Road and Slumber Lane	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	2 (0)
R15	Long Point Manor	7	1	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	8 (+1)	2 (+1)	8 (+1)	2 (+1)
R16	Rocky Point Heights	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	2 (+1)	5 (+1)	1 (0)	5 (+1)	2 (+1)
R17	Port Townsend	1	-	1 (0)	1 (+1)	1 (0)	- (0)	- (-1)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	3	1	5 (+2)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)
R20	South Lopez Island (Agate Beach)	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
Schools													
S01	Oak Harbor High School	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)

Table 4.2-24 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)[1]

		No Action Alternative		*Alternative 3*									
		No Action Alternative		*Scenario A*		*Scenario B*		*Scenario C*		*Scenario D*		*Scenario E*	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*	*Daytime*	*Nighttime*
ID	*Description*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*	*NA50 L_{max}[2]*
S02	Crescent Harbor Elementary School	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
S03	Coupeville Elementary School	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
S04	Anacortes High School	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)
S09	La Conner Elementary School	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
S10	Elger Bay Elementary School	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)

Notes:

[1] The difference between the No Action Alternative and Alternative 3 is noted in parentheses. A hyphen (-) indicates the result equals zero.

[2] Number of events at or above an outdoor maximum single event sound level (L_{max}) of 50 dB; this reflects potential for outdoor speech interference.

Key:

dB = decibel

L_{max} = maximum A-weighted sound level

NA50 = Number of Events above an L_{max} of 50 dB

4.2.4.2.6 Potential Hearing Loss, Alternative 3

The underlying analytical methodology and metric for hearing loss are explained in Section 4.2.2.2.6. Table 4.2-25 presents the potentially affected populations in and near Ault Field and OLF Coupeville under Alternative 3, by 1 dB increments of the $L_{eq(24)}$, as compared to the No Action Alternative numbers presented in Section 3.2.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable (USEPA, 1974). Therefore, using the data provided in Table 4.2-25, for the population with average sensitivity to noise, the level at which there may be a noticeable NIPTS would be at the 84 to 85 dB $L_{eq(24)}$ range and above. There is an increase in the population within the 80 dB DNL noise contour (i.e., potential at-risk population) under Alternative 3 at both Ault Field and OLF Coupeville. The largest increase in the potential at-risk population in the vicinity of Ault Field would be under Scenario C (47 additional people) and for OLF Coupeville would be under Scenario A (28 additional people). The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville. The potential NIPTS values presented in Table 4.2-25 are only applicable in the extreme case of continuous outdoor exposure at one's residence to all aircraft events occurring over a period of 40 years. Because it is highly unlikely for any individuals to meet all those criteria, the actual potential NIPTS for individuals would be far less than the values reported here.

In addition, the actual value of NIPTS for any given person will depend on his or her physical sensitivity to noise; some could experience more hearing loss than others (DNWG, 2013). This noise-sensitive population could be considered the young, the elderly, or those predisposed to hearing sensitivity for other reasons. Therefore, to capture this, the USEPA guidelines provided information on the estimated NIPTS exceeded by the 10 percent of the population most sensitive to noise. Using the same 1 dB incremental data in Table 4.2-25 and the column identified as the 10^{th} Percentile NIPTS, those individuals are vulnerable to noticeable NIPTS at the 77 to 78 dB $L_{eq(24)}$ range and above. Using this even more conservative estimate, the range of potential NIPTS could be up to 18.0 dB for the population most sensitive to noise around Ault Field and up to 12.0 dB for the population most sensitive to noise around OLF Coupeville. As noted previously, it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period; therefore, the actual potential NIPTS for individuals would be far less than the values reported here.

Table 4.2-25 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 3 at NAS Whidbey Island Complex (Average Year)

Band of $L_{eq(24)}$ (dB)[1]	Avg NIPTS (dB)[2,3]	10th Pct NIPTS (dB)[2,]	Estimated Population[4,5,6]											
			Ault Field						OLF Coupeville					
			No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E
75-76	1.0	4.0	0	0 (0)	0 (0)	6 (+6)	0 (0)	3 (+3)	31	143 (+112)	74 (+43)	35 (+4)	116 (+85)	46 (+15)
76-77	1.0	4.5	123	126 (+3)	308[7] (+185)	406[8] (+283)	140 (+17)	371[9] (+248)	45	164 (+119)	90 (+45)	59 (+14)	159 (+114)	63 (+18)
77-78	1.5	5.0	233	259 (+26)	337 (+104)	398 (+165)	307 (+74)	352 (+119)	47	126 (+79)	75 (+28)	87 (+40)	100 (+53)	56 (+9)
78-79	2.0	5.5	145	147 (+2)	241 (+96)	296 (+151)	173 (+28)	295 (+150)	24	92 (+68)	65 (+41)	4 (-20)	78 (+45)	61 (+37)
79-80	2.5	6.0	92	134 (+42)	162 (+70)	239 (+147)	141 (+49)	209 (+117)	7	75 (+68)	58 (+51)	0 (0)	70 (+63)	75 (+68)
80-81	3.0	7.0	73	78 (+5)	97 (+24)	129 (+56)	84 (+11)	118 (+45)	0	66 (+66)	59 (+59)	0 (0)	62 (+62)	3 (+3)
81-82	3.5	8.0	51	62 (+11)	72 (+21)	79 (+28)	67 (+16)	76 (+25)	0	58 (+58)	83 (+83)	0 (0)	55 (+55)	0 (0)
82-83	4.0	9.0	37	48 (+11)	58 (+21)	63 (+26)	48 (+11)	60 (+23)	0	58 (+58)	4 (+4)	0 (0)	64 (+64)	0 (0)
83-84	4.5	10.0	34	35 (+1)	37 (+3)	38 (+4)	35 (+1)	37 (+3)	0	69 (+69)	0 (0)	0 (0)	55 (+55)	0 (0)
84-85	5.5	11.0	11	27 (+16)	26 (+15)	29 (+18)	29 (+18)	28 (+17)	0	27 (+27)	0 (0)	0 (0)	1 (+1)	0 (0)
85-86	6.0	12.0	9	9 (0)	22 (+13)	26 (+17)	10 (+1)	24 (+15)	0	1 (+1)	0 (0)	0 (0)	0 (0)	0 (0)
86-87	7.0	13.5	6	9 (+3)	9 (+3)	10 (+4)	9 (+3)	10 (+4)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
87-88	7.5	15.0	4	6 (+2)	7 (+3)	7 (+3)	6 (+2)	7 (+3)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
88-89	8.5	16.5	2	4 (+2)	4 (+2)	5 (+3)	4 (+2)	4 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
89-90	9.5	18.0	0	1 (+1)	2 (+2)	2 (+2)	1 (+1)	2 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-25 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 3 at NAS Whidbey Island Complex (Average Year)

Band of $L_{eq(24)}$ (dB)[1]	Avg NIPTS (dB)[2,3]	10th Pct NIPTS (dB)[2,]	Estimated Population[4,5,6]											
			Ault Field						OLF Coupeville					
			No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E
90-91	10.5	19.5	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Notes:

1 L_{eq} bands with no population were omitted from table.

2 NIPTS values rounded to nearest 0.5 dB.

3 NIPTS below 5 dB are generally not considered noticeable.

4 This analysis assumes the population is outdoors at one's residence and exposed to all aircraft noise events for 40 years. Given the amount of time spent indoors and the intermittent occurrence of aircraft noise events, it is highly unlikely that individuals would meet all those criteria, and the actual potential for hearing loss would be far less than the values reported here.

5 Estimated Population was determined by those living within the 80 dB DNL noise contour around each airfield, including those living on-base at Ault Field (there is no on-base population at OLF Coupeville).

6 Population counts of people within the DNL contours were computed using 2010 census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). In addition, per guidance on potential hearing loss, on-base populations at Ault Field have been included in the analysis. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.

7 Of this estimated population, 23 are a military service member living on base at Ault Field.

8 Of this estimated population, 68 are military personnel living on base at Ault Field.

9 Of this estimated population, 23 are military personnel living on base at Ault Field.

Key:
dB = decibel
$L_{eq(24)}$ = 24-hour Equivalent Sound Level
NIPTS = Noise Induced Permanent Threshold Shift

4.2.4.3 Nonauditory Health Effects, Alternative 3

Per studies noted and evaluated in Section 3.2.3, the data and research are inconclusive with respect to the linkage between potential nonauditory health effects of aircraft noise exposure. As outlined within the analysis of DNL contours and supplemental metrics presented within this section, the data show that the Proposed Action would result in both an increase in the number of people exposed to noise as well as those individuals exposed to higher levels of noise. However, research conducted to date has not made a definitive connection between intermittent military aircraft noise and nonauditory health effects. The results of most cited studies are inconclusive and cannot identify a causal link between aircraft noise exposure and the various types of nonauditory health effects that were studied. An individual's health is greatly influenced by many factors known to cause health issues, such as hereditary factors, medical history, and life style choices regarding smoking, diet, and exercise. Research has demonstrated that these factors have a larger and more direct effect on a person's health than aircraft noise.

Based upon public comments received on the Draft EIS, the Navy has expanded its nonauditory health effects literature review, using journals and published articles referred to by the Washington State Department of Health, the USEPA, and public comment submittals. Additional topics discussed included, but were not limited to, hypertension and cardiovascular health, lack of sleep, stress, and anxiety, and details can be found in Appendix A1 of the Aircraft Noise Study (Appendix A).

4.2.4.4 Vibration Effects from Aircraft Operations, Alternative 3

In addition to the noise effects on the population outlined above, noticeable structural vibration may result from certain aircraft operations at either Ault Field or OLF Coupeville. Depending on the aircraft operation, altitude, heading, power settings, and the structure, certain vibration effects may be observed. Typically, the structural elements that are most susceptible to vibration from aircraft noise are windows and sometimes walls or ceilings. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (CHABA, 1977). Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. See Appendix A, Aircraft Noise Study, and the Noise and Vibration Associated with Operational Impacts discussion in Section 4.6.2.1 for additional details on noise-induced vibration effects.

The data show that the Proposed Action would result in both an increase in the number of aircraft operations and area/structures exposed to noise. Therefore, there could be an increase in vibration effects due to the Proposed Action. However, as shown in Table 4.2-3, for the representative POIs analyzed, the highest L_{max} value was 117 dB, and, therefore, sound levels damaging to structural components of buildings are not likely to occur.

4.2.4.5 Noise Conclusion, Alternative 3

Overall, Alternative 3 would have significant noise impacts in the communities surrounding Ault Field and OLF Coupeville. Both the total number of acres and the total number of individuals within the DNL noise contours would increase for all scenarios analyzed at Ault Field, and the total number of individuals within the DNL noise contours would increase for all scenarios analyzed at OLF Coupeville. There would be a larger impact to the communities around Ault Field under Scenario C, while there would be a larger impact for the communities around OLF Coupeville under Scenario A.

There would be a slight increase in the number of incidents of indoor and outdoor speech interference, and classroom interference. There would also be a higher probability of awakening under all scenarios, especially at POIs located closer to the airfields. In addition, depending on the scenario, the population potentially at risk for PHL would increase. The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville for the population with average noise sensitivity and up to 18.0 dB at Ault Field and 12.0 dB at OLF Coupeville for the population highly sensitive to noise (the 10 percent of the population with the most sensitive hearing). As it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period, the actual potential NIPTS for individuals would be far less than the values reported here.

4.2.5 Noise Impact Comparison, Alternatives 1 through 3

This summary provides a comparison of the three alternatives discussed in the preceding sections using the noise metrics provided within the discussion.

4.2.5.1 Noise Impact Comparison, Alternatives 1 through 3, Acreage and Population

The most appropriate means of differentiating between the impacts caused by the different alternatives and scenarios is by comparing the total estimated population within the DNL noise contours between the alternatives and scenarios. The alternative/scenario noise contour that covers the largest land area would also have the highest estimated population within that noise contour. For example, under Alternative 1, the most acreage within the noise contour at Ault Field is under Alternative 1, Scenario C, which also corresponds to the highest estimated population. However, when looking at the total NAS Whidbey Island complex, the alternative/scenario with the highest land area within its noise contour does not always correspond to the same alternative/scenario for the highest population. Therefore, the estimated population numbers presented below are discussed both in terms of the total NAS Whidbey Island complex and each individual airfield.

The DNL noise contour that covered the highest estimated population for the NAS Whidbey Island complex was Alternative 1, Scenario E, with a total of 13,050 (an increase of 1,879). However, the range of population potentially within the 65 dB DNL noise contour did not vary drastically between alternatives. The lowest estimated population was under Alternative 3, Scenario A, with a total of 12,483 (an addition of 1,312 people and an approximately 4.5-percent difference from the high range). Comparing the five scenarios under each alternative, Scenario A always resulted in the highest estimated population within the 65 dB DNL noise contour associated with OLF Coupeville, while the highest estimated population associated with Ault Field was always in Scenario C. This would be expected and is consistent with the proportion of FCLPs assigned to those airfields under the five scenarios.

In addition, the estimated population within the greater than 75 dB DNL noise contour increases under every scenario of each alternative at both Ault Field and OLF Coupeville. Around Ault Field, this ranges from a high of 598 more people under Alternative 1, Scenario C, to a low of 107 more people under Alternative 3, Scenario A. For OLF Coupeville, specific to the greater than 75 dB DNL noise contour, the largest increase in the number of people would be 1,374 under Alternative 1, Scenario A, to a low of 59 more people under Alternative 2, Scenario C. Table 4.2-26 shows a DNL noise comparison, by alternative and scenario, of the overall increase in the number of people within the 65 dB DNL noise contour.

Table 4.2-26 DNL Noise Contour Comparison - Overall Increase in the Number of People within the 65 dB DNL Noise Contour

	Ault Field	*OLF Coupeville*	*NAS Whidbey Island*
No Action Alternative	8,941 people	2,230 people	11,171 people
Alternative 1			
Alternative 1 – Scenario A	Additional 169 people (+1.9%)	Additional 1,236 people (+55.4%)	Additional 1,405 people (+12.6%)
Alternative 1 – Scenario B	Additional 914 people (+10.2%)	Additional 904 people (+40.5%)	Additional 1,818 people (+16.6%)
Alternative 1 – Scenario C	Additional 1,312 people (+14.7%)	Additional 538 people (+24.1%)	Additional 1,850 people (+16.5%)
Alternative 1 – Scenario D	Additional 621 people (+7.0%)	Additional 1,143 people (+51.3%)	Additional 1,764 people (+16.2%)
Alternative 1 – Scenario E	Additional 1,178 people (+13.2%)	Additional 701 people (+31.4%)	Additional 1,879 people (+17.3%)
Alternative 2			
Alternative 2 – Scenario A	Additional 133 people (+1.5%)	Additional 1,179 people (+52.9%)	Additional 1,316 people (+11.8%)
Alternative 2 – Scenario B	Additional 823 people (+9.2%)	Additional 865 people (+38.8%)	Additional 1,705 people (+15.3%)
Alternative 2 – Scenario C	Additional 1,128 people (+12.6%)	Additional 489 people (+21.9%)	Additional 1,643 people (+14.7%)
Alternative 2 – Scenario D	Additional 546 people (+6.1%)	Additional 1,089 people (+48.8%)	Additional 1,646 people (+14.7%)
Alternative 2 – Scenario E	Additional 1,016 people (+11.4%)	Additional 681 people (+30.5%)	Additional 1,718 people (+15.4%)
Alternative 3			
Alternative 3 – Scenario A	Additional 109 people (+1.2%)	Additional 1,203 people (+53.9%)	Additional 1,312 people (+11.7%)
Alternative 3 – Scenario B	Additional 821 people (+9.2%)	Additional 888 people (+39.8%)	Additional 1,709 people (+15.3%)
Alternative 3 – Scenario C	Additional 1,136 people (+12.7%)	Additional 517 people (+23.2%)	Additional 1,653 people (+14.8%)
Alternative 3 – Scenario D	Additional 533 people (+6.0%)	Additional 1,113 people (+49.9%)	Additional 1,646 people (+14.7%)
Alternative 3 – Scenario E	Additional 1,019 people (+11.4%)	Additional 694 people (+31.1%)	Additional 1,713 people (+15.3%)

Key:
NAS = Naval Air Station
OLF = Outlying Landing Field

4.2.5.2 Noise Impact Comparison, Alternatives 1 through 3, Supplemental Metrics

The supplemental metric analyses for the three alternatives are associated with the 48 POIs that were identified as part of this project (the 30 original POIs presented in the Draft EIS as well as the 18 additional POIs added for the Final EIS). Their individual locations cover a wide geographic area in many directions from the two airfields. Therefore, the results are more dependent on the location/distance of the POI with respect to Ault Field or OLF Coupeville than the specific alternative. However, as discussed within the context of each metric, the noise effects on those POIs that are closer to Ault Field are generally higher (i.e., more events) under Scenario C, while the noise effects on those POIs that are closer to OLF Coupeville are generally higher under Scenario A. Similar to the conclusions reached with respect to acreage and population, this would be expected and is consistent with the proportion of FCLPs assigned to those airfields under the five scenarios.

With respect to the evaluation of PHL, the 80 dB DNL contour around Ault Field would include a higher at-risk population under the Proposed Action than under the No Action Alternative, which may increase their vulnerability to experience a greater than or equal to 5 dB potential threshold shift in their hearing under all alternatives and scenarios. The largest increases in population potentially vulnerable around Ault Field would occur under Scenario C, which corresponds to 80 percent of the FCLPs being conducted at Ault Field.

At OLF Coupeville, the analysis also showed a higher population in the 80 dB DNL contour than under the No Action Alternative, which may increase their vulnerability to experience a greater than or equal to 5 dB potential threshold shift in their hearing under most alternatives and scenarios. The largest increases in population potentially vulnerable around OLF Coupeville would occur under Scenario A, which corresponds to 80 percent of the FCLPs being conducted at OLF Coupeville.

4.2.5.3 Noise Conclusion, Alternatives 1 through 3

The Proposed Action and alternatives would have a significant impact on the noise environment as it relates to aircraft operations at Ault Field and OLF Coupeville. The number of persons exposed to noise levels 65 dB and above would increase under all alternatives and scenarios. In addition, the population that may be vulnerable to PHL would increase under all alternatives and scenarios, with the largest population increases under Scenario C for each of the alternatives, as this scenario assigns 80 percent of the FCLP to Ault Field where there is a higher surrounding residential population density. However, the analysis used to assess the population that may be vulnerable to PHL is based upon an extremely conservative set of parameters, including being outdoors at one's residence and exposed to all aircraft events over a 40-year period. Therefore, since it is highly unlikely that an individual would meet those criteria, the actual potential NIPTS for individuals would be far less than the values reported, and hearing loss is not expected.

4.2.6 Noise Mitigation

The section below outlines several elements that the Navy either has implemented, is planning to implement, or is considering for future implementation as part of its expansive noise abatement and noise mitigation program. In addition, a technical appendix has been added to the EIS providing an expanded discussion of this topic; see Appendix H, Noise Mitigation.

4.2.6.1 Fifteen Action Alternatives

In addition to the force-structure alternatives, the Navy analyzed five sub-alternatives (Scenarios A through E) to provide a total of 15 action alternatives. The Secretary of the Navy will be able to select a final alternative/scenario combination from the range of 15 analyzed in this EIS. From a purely operational perspective, the Navy would prefer to use OLF Coupeville for all FCLPs because it more closely replicates the pattern and conditions at sea, and therefore provides superior training. In response to public comments regarding noise at OLF Coupeville, the Navy analyzed whether different operational scenarios would mitigate noise at OLF Coupeville. Therefore, in the Draft EIS as well as the Final EIS, the Navy considered conducting just 20 percent of FCLPs at the OLF and 80 percent at Ault Field; however, the Navy also recognizes this sub-alternative has the consequence of increasing operations, and therefore noise impacts, at Ault Field, which is more densely populated than Coupeville. Between the Draft EIS and the Final EIS, two additional scenarios were included in the noise model and overall analysis, including a scenario combination dividing the FCLPs between Ault Field and OLF Coupeville in a 30-percent/70-percent split in both directions (newly analyzed Scenarios D and E).

4.2.6.2 Noise-reduction Measures

The Navy is also considering other noise-reduction measures, such as construction and operation of a noise-suppression facility for engine maintenance (also known as a "hush house") at NAS Whidbey Island and actively researching engine design solutions to reduce overall sound emissions from the engines of the FA-18E/F "Super Hornet" and Growler as well as other measures that may reduce the number of FCLPs required in the future. These measures include the following:

- **Chevrons.** Chevrons are specially designed shapes added to the end of a jet engine exhaust nozzle for sound reduction. Testing confirmed that chevron technology has some positive effect on noise output; however, it also demonstrated that redesign and additional testing are necessary to fully assess any noise-reduction benefits and potential drawbacks of chevrons. Therefore, while the Navy continues to pursue research and testing of chevrons, their potential as a noise-mitigation measure remains uncertain. The Navy is continuing to explore different technologies to reduce noise impacts from aircraft.
- **Precision Landing Mode.** Also known as MAGIC CARPET (for Maritime Augmented Guidance with Integrated Controls for Carrier Approach and Recovery Precision Enabling Technologies), Precision Landing Mode (PLM) is a flight control system that automates some controls to assist pilots with landing on aircraft carriers, making flight deck operations aboard the carrier safer and more efficient. In addition, the technology potentially reduces the workload and training required for pilots to develop and maintain proficiency for shipboard landings. This technology could eventually result in a decrease of future training requirements, resulting in fewer FCLPs at locations such as the NAS Whidbey Island complex. While this system's impact on future training has not been fully realized, it has the potential to significantly reduce training requirements for FCLP. Initial capabilities of PLM completed its first shore-based flight on the Super Hornet and the Growler on February 6, 2015. It has already been successfully demonstrated on the F-35C Joint Strike Fighter during operational testing. PLM introduction into the Fleet began in late 2017, and a more robust version offering full capabilities is expected to be complete in the 2020 timeframe.

The Navy is moving forward with an aggressive schedule to incorporate this technology into the Fleet, and the Navy expects that this will reduce FCLP training requirements in the next several years.

To that end, it is anticipated that by the time the Proposed Action is fully implemented at NAS Whidbey Island, the full capability PLM technology will be rolled out into the various operating squadrons. Therefore, as a change from the Draft EIS to the Final EIS, this assumption has been applied to the noise analysis for not only the No Action Alternative (CY 21) but also for all of the proposed alternative/scenario combinations. The introduction of PLM technology will reduce the number of required FCLPs by 20 percent, which leads to a reduction in the total number of FCLP operations. PLM technology is not specific to this Proposed Action and will be implemented regardless of which alternative/scenario is chosen for the Proposed Action at NAS Whidbey Island.

- **Hush House.** Specifically related to a potential noise suppression facility/hush house, the noise study analyzed the proposed hush house operations (656 annual events under the average year conditions) and demonstrated the effect the hush house would have on noise from high-power run-ups by the Growler, in terms of single events (L_{max}) and DNL (see Appendix A, Aircraft Noise Study [Section 9.0, Effect of Proposed Hush House]).

From a single-event perspective, the noise study compared the L_{max} contours of 60 to 90 A-weighted sound level (dBA), in 10-dB increments, for the Growler at minimum afterburner (AB) power at the current (unsuppressed) outdoor high-power location/orientation and at a potential hush house location/orientation (suppressed). The unsuppressed run-ups' 60 dB L_{max} contour extends as far as 3.3 miles from the NAS Whidbey Island boundary (primarily to the east), whereas the hush house's 60 dB L_{max} contour is wholly within the installation boundary. The L_{max} contour results from the noise generated while the aircraft engine is at AB power, typically 3 minutes per maintenance event. The average year analysis incudes 665 annual events, meaning the average time spent at AB power during Growler maintenance run-ups would be approximately 5 minutes per day. For the average annual noise environment, using the DNL metric, the results showed that the hush house's effect would mostly be on station with the 85 dB DNL contour, and there would be between a 0.2 dB and 0.3 dB reduction estimated to occur off station south of West Sleeper Road. This small change is primarily due to the engine maintenance activities not being a major contributor to the overall noise environment.

Beyond those mentioned above, the Navy has other policies, programs, and procedures to assist in mitigating the potential existing and future noise impacts from aircraft activities.

4.2.6.3 Noise Abatement Policy

It is Navy policy to conduct required training and operational flights with as minimal impact as practicable on surrounding communities. Commanding Officer, NAS Whidbey Island implements this policy to ensure all aircrews using Ault Field, OLF Coupeville, NWSTF Boardman, and the numerous northwest IR and VR MTRs throughout the Pacific Northwest are responsible for the safe conduct of their mission while complying with published course rules, established noise-abatement procedures, and good common sense. Each aircrew must be familiar with the noise profiles of its aircraft and is expected to minimize noise impacts without compromising operational and safety requirements.

The Navy must follow governing FAA rules and regulations when flying. Arrival and departure corridors into and out of NAS Whidbey Island have been developed in conjunction with the FAA over decades with

an emphasis on flying over water and to avoid more densely populated areas. Additionally, these corridors are designed to deconflict military, commercial, and general aviation routes.

NAS Whidbey Island has noise-abatement procedures for assigned and transient aircraft to minimize aircraft noise. Airfield procedures used to minimize/abate noise for operations conducted at the NAS Whidbey Island airfields include restricting maintenance run-up hours, runway optimization, and other procedures as provided in NASWHIDBEYINST 3710.1AA as noted below. Additionally, aircrews are directed, to the maximum extent practicable, to employ prudent airmanship techniques to reduce aircraft noise impacts and to avoid sensitive areas except when operational safety dictates otherwise.

Noise sensitivity awareness is practiced at all levels of the chain of command and is discussed at the daily Airfield Operations briefing, monthly Commanding Officer's Tenant Command meeting, bi-weekly Instrument Ground School Aircrew refresher training, monthly Aviation Safety Council meetings, and quarterly Noise working group meetings.

Some examples of the full list of noise-abatement procedures in the NAS Whidbey Island Air Operations Manual (NASWHIDBEYINST 3710.1AA, Jan 10, 2017), which is included in Section 2.3 of Appendix H, are included below. These noise-abatement procedures are reviewed periodically and subject to change in future revisions to the air operations manual.

- Aircrews shall, to the maximum extent possible, employ prudent airmanship techniques to reduce aircraft noise impacts and to avoid noise-sensitive areas except when being vectored by radar ATC or specifically directed by the control tower.
- Sunday Operations: From 7:30 a.m. to noon local on Sundays, noise-abatement procedures require arrivals, except scheduled FCLP/CCA aircraft, VR-61 drilling reservists, and VP-69 drilling reservists, to make full-stop landings.
- High-power turn-ups should not be conducted prior to noon on Sundays or between the hours of 10:00 p.m. to 7:30 a.m. for jets and midnight to 7:30 a.m. for turboprops. For specific operational necessity requirements, defined as preparation for missions other than routine local training and functional check flights terminating at NAS Whidbey Island, high-power turn-ups may be authorized outside these established hours.
- Wind component and traffic permitting, morning departures prior to 8:00 a.m. shall use Runway 25, and evening arrivals after 10:00 p.m. shall use Runway 7 to maximize flight over open water.
- Make smooth power changes. Large, abrupt changes in power result in large, abrupt changes in sound level on the ground.
- The maximum number of aircraft in the FCLP flight pattern is five. This is so the FCLP pattern stays within the 5-mile radius of the class "Charlie" airspace, aircraft do not get extended creating additional noise impacts, and allowances may be made for non-FCLP aircraft to operate concurrently.
- Avoiding noise-sensitive areas by flying at altitudes of no less than 3,000 feet AGL except when in compliance with an approved traffic or approach pattern, military training route, or within Special Use Airspace.

NAS Whidbey Island has historically worked with elected officials from surrounding communities to best minimize impacts where practicable, including not flying at the OLF on weekends and minimizing flight

activity during major school testing dates and major community events. The Navy will continue to minimize impacts as much as practicable.

4.2.6.4 Noise Complaint Process

NAS Whidbey Island's Commanding Officer takes public concerns seriously and has processes in place that allow members of the public to comment about and seek answers to questions about operations at the base, and ensure those comments are reviewed by appropriate members in his command.

It is the policy of NAS Whidbey Island to investigate complaints to determine compliance with FAA regulations and base standard operating procedures. These investigations ensure that both Navy and public interests are protected and provide ongoing communication between the base and the local communities. Persons with complaints or comments may call a recorded complaint hotline at (360) 257-6665 or email: comments.NASWI@navy.mil. The information from these comments is gathered by the Operations Duty Officer, who records pertinent information such as the location, time, and description of the noise-generating event. Callers may also request a response or feedback, and should provide their name and contact information.

The Operations Duty Officer provides copies of the complaints to the Commanding Officer, Executive Officer, Operations Officer, Community Planning and Liaison Officer, and Public Affairs Officer the following day, and each complaint receives a thorough analysis and a recommendation to address it. Routinely, a playback of audio and video recordings from ATC is reviewed to verify that all FAA and local procedures were followed and to determine the probable causes of the complaint. When necessary, the base officials may communicate directly with the complainant. The Community Planning and Liaison Officer maintains a file of noise complaints for historical and trend data.

NAS Whidbey Island has an active public relations process to inform members of the public of upcoming FCLPs so that individuals have the ability to plan their personal activities. Information on FCLP schedules is shared every week with the media in the Puget Sound region and is posted on the command's Facebook and webpage sites every week. Members of the public also have the option to obtain these releases directly by signing up for them on the command's webpage news section. The command uses the same process to tell the public about other events that may increase noise, or have more impacts on specific areas for short periods of time.

4.2.6.5 Air Installations Compatible Use Zones Program

The Navy also has an active AICUZ program at NAS Whidbey Island that informs the public about its aircraft noise environment and recommends specific actions for the local jurisdictions with planning and zoning authority that can enhance the health, safety, and welfare of those living near Ault Field and OLF Coupeville (see Section 3.5.2.2). The current version of the AICUZ plan for NAS Whidbey Island was published in 2005. The Navy's official land use recommendations will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish land use controls and to adopt zoning restrictions taking into account a wide range of land-use factors, including the Navy's recommendations (see Sections 4.3.2.3 and 4.5.2.1 for more details on the AICUZ study and land use compatibility)

4.3 Public Health and Safety

This section addresses potential impacts to safety at Ault Field and OLF Coupeville as it relates to flight safety, Bird/Animal Aircraft Strike Hazard (BASH), Accident Potential Zones (APZs), and safety risks to children.

Public Health and Safety

Increased operations increase the potential for flight incidents and BASH, but existing management strategies would minimize this risk.

Scenarios with high operations at OLF Coupeville may require the development of APZs through the AICUZ Update process.

There would be an increase in the number of children under the noise contours under all alternatives and scenarios. Noise impacts on children are discussed in Section 4.2.

4.3.1 Public Health and Safety, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to safety related to flight safety, BASH, changes to APZs/Clear Zones at Ault Field or OLF Coupeville (see Figures 3.3-2 and 3.3-3), or environmental health and safety risks to children. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

4.3.2 Public Health and Safety Potential Impacts, Alternatives 1 through 3

4.3.2.1 Flight Safety

There is no generally recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce potential for a mishap through a number of measures. These include, but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace. When these measures are implemented, risks are minimized, even though they can never be eliminated. To complement airspace management measures, all Navy pilots use state-of-the-art simulators. Simulator training includes flight operations and comprehensive emergency procedures, which minimizes risk associated with pilot error. Additionally, highly trained maintenance crews perform inspections on each aircraft in accordance with Navy regulations, and maintenance activities are monitored to ensure that aircraft are equipped to withstand the rigors of operational and training events safely. Analysis of flight risks correlates Class A mishap rates and BASH with projected airfield utilization. The Proposed Action would add 35 or 36 Growler aircraft and increase overall airfield flight operations at the NAS Whidbey Island complex, thereby increasing the risk of a mishap. However, current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and airfield flight operations would adhere to established safety procedures. While it is generally difficult to project future safety/mishap rates for any aircraft, the Growler has a well-documented and established safety record as a reliable aircraft, as was outlined in Section 3.3.2.1.

Potential aircraft mishaps are the primary safety concern with regard to military training flights. NAS Whidbey Island maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to mishaps, whether on or off the installation. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoD Instruction [DoDI] 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*) (DoD, 2011).

4.3.2.2 Bird/Animal Aircraft Strike Hazard

No aspect of the alternatives would create attractants with the potential to increase the concentration of birds in the vicinity of the airfields. While there is an increase in air operations proposed under each of the alternatives, there is no proposed change planned to existing flight procedures for Ault Field or OLF Coupeville. With an increase in operations, the potential for BASH increases slightly; however, the risk is managed through continued application of BASH measures, and the risk of BASH would be expected to remain similar to existing levels (see Sections 3.3.1.2, 3.3.2.1.1, and 3.3.2.2 for more details on BASH measures and risks under the affected environment, and see Section 4.8.2.1.3.2 for additional details on potential impacts to birds from aircraft operations).

4.3.2.3 Clear Zones and Accident Potential Zones

Much like civilian airports, Clear Zones are always established at the ends of active runways at military airfields and were generated at Ault Field and OLF Coupeville. APZs are created based on projected operations for approach, departure, and flight tracks. APZs are based on historical accident and operations data throughout the military and the specific areas (which have been determined to be potential impact areas) if an accident were to occur. Ault Field has had established APZs since 1986, and the APZs were re-confirmed during the 2005 AICUZ Update process. The runways associated with Ault Field have both Clear Zones and APZs that follow predominant flight tracks at the airfield. It is not expected that these APZs would change regardless of alternative selected under this Proposed Action; however, this would be confirmed through the Navy's subsequent AICUZ Update process (see Figure 3.3-2 for 2005 AICUZ Clear Zones and APZs at Ault Field).

OLF Coupeville also had APZs recommended as part of the 1986 AICUZ that reflected the FCLP patterns of the time; however, the recommended APZs were never adopted by the local municipality. During the 2005 AICUZ process, it was determined that additional APZ coverage was not warranted at that time because operational numbers were below the threshold (approximately 5,000 operations per approach or departure flight track) for the establishment of APZs at that location. Therefore, only Clear Zones are currently present at OLF Coupeville runways. Based on proposed airfield operations under the three alternatives, APZs could be warranted at OLF Coupeville (see Table 4.3-1) under some operational scenarios. APZ development would depend on the alternative selected, and the APZs could resemble the conceptual APZ depicted in Figure 4.3-1, based on operational numbers as described above. They would follow a standard FCLP pattern (typically, APZ-II is extended to connect along the entire FCLP pattern). The conceptual APZs depicted on the figure below (Figure 4.3-1) were developed to support the analysis in this document. New APZs specific to OLF Coupeville would be recommended through the AICUZ study process and would depend on the alternative selected.

Conceptual APZs are presented for the purpose of analyzing potential land use impacts of the Proposed Action. At this time, no decision has been made with regard to additional APZs. At the conclusion of this EIS, a Record of Decision (ROD) will be issued. At which time, the Navy will prepare an AICUZ Update and share official recommendations with the community.

As part of this analysis, the flight operations for each alternative were combined where they generally utilized the same arrival, departure, or pattern flight tracks to determine whether the 5,000 operations threshold was met, thereby identifying where potential new APZs would be needed. Table 4.3-1 shows the results of this evaluation and where the threshold for new APZs would be met at OLF Coupeville. The No Action Alternative is included and it would not meet the threshold for additional APZs. However, under most alternative scenarios (particularly Scenario A [80 percent of FCLPs at OLF Coupeville], Scenario B [50 percent of FCLPs at OLF Coupeville]), and Scenario D [70 percent of FCLPs at OLF Coupeville]), Runway 32 would meet the APZ threshold defined in the Office of the Chief of Naval Operations Instruction (OPNAVINST) 11010.36C. Using average year operations, Runway 14 does not meet the operational threshold requirement to warrant an APZ under any alternative or scenario. The Navy's official recommendation for APZs at OLF Coupeville will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish an APZ for OLF Coupeville and to adopt zoning to enhance public safety. It is the municipality's action that will influence future land use decisions. In fact, the municipality has a choice on the degree to which it implements the Navy's land use recommendations; for instance, it could decide to establish an APZ for Runway 14 even though the current or proposed number of operations does not warrant one under Navy policy. See Section 4.5.2 for an analysis of land use under conceptual APZs.

Table 4.3-1 Existing Clear Zones and Conceptual APZ Develoment based on Projected Operations at OLF Coupeville

Alternatives	*Existing Clear Zones and Conceptual APZs*		
	Existing Clear Zone	*Runway 32 Conceptual APZ*	*Runway 14 Conceptual APZ[3]*
Existing 2005 AICUZ	⦿[1]	-	-
Alternative 1, Scenario A	⦿[1]	⦿[2]	-
Alternative 1, Scenario B	⦿[1]	⦿[2]	-
Alternative 1, Scenario C	⦿[1]	-	-
Alternative 1, Scenario D	⦿[1]	⦿[2]	-
Alternative 1, Scenario E	⦿[1]	-	-
Alternative 2, Scenario A	⦿[1]	⦿[2]	-
Alternative 2, Scenario B	⦿[1]	⦿[2]	-
Alternative 2, Scenario C	⦿[1]	-	-
Alternative 2, Scenario D	⦿[1]	⦿[2]	-
Alternative 2, Scenario E	⦿[1]	-	-
Alternative 3, Scenario A	⦿[1]	⦿[2]	-
Alternative 3, Scenario B	⦿[1]	⦿[2]	-
Alternative 3, Scenario C	⦿[1]	-	-
Alternative 3, Scenario D	⦿[1]	⦿[2]	-
Alternative 3, Scenario E	⦿[1]	-	-
No Action Alternative	⦿[1]	-	-

Source: Wyle, 2017

Notes:

[1] Presently, Clear Zones have existed since 1986 for Runway 32 and Runway 14, and no change is expected.

[2] Conceptual depiction of APZs for Runway 32; if this alternative is selected, it is likely the Navy would recommend establishing an APZ for this runway.

[3] Under neither average year nor high-tempo FCLP year operations does Runway 14 meet the operational threshold requirement to warrant an APZ.

Key:

⦿ = Symbol indicates a continued Clear Zone or potential for new APZs based on alternative selected

AICUZ = Air Installations Compatible Use Zone

APZ = Accident Potential Zone

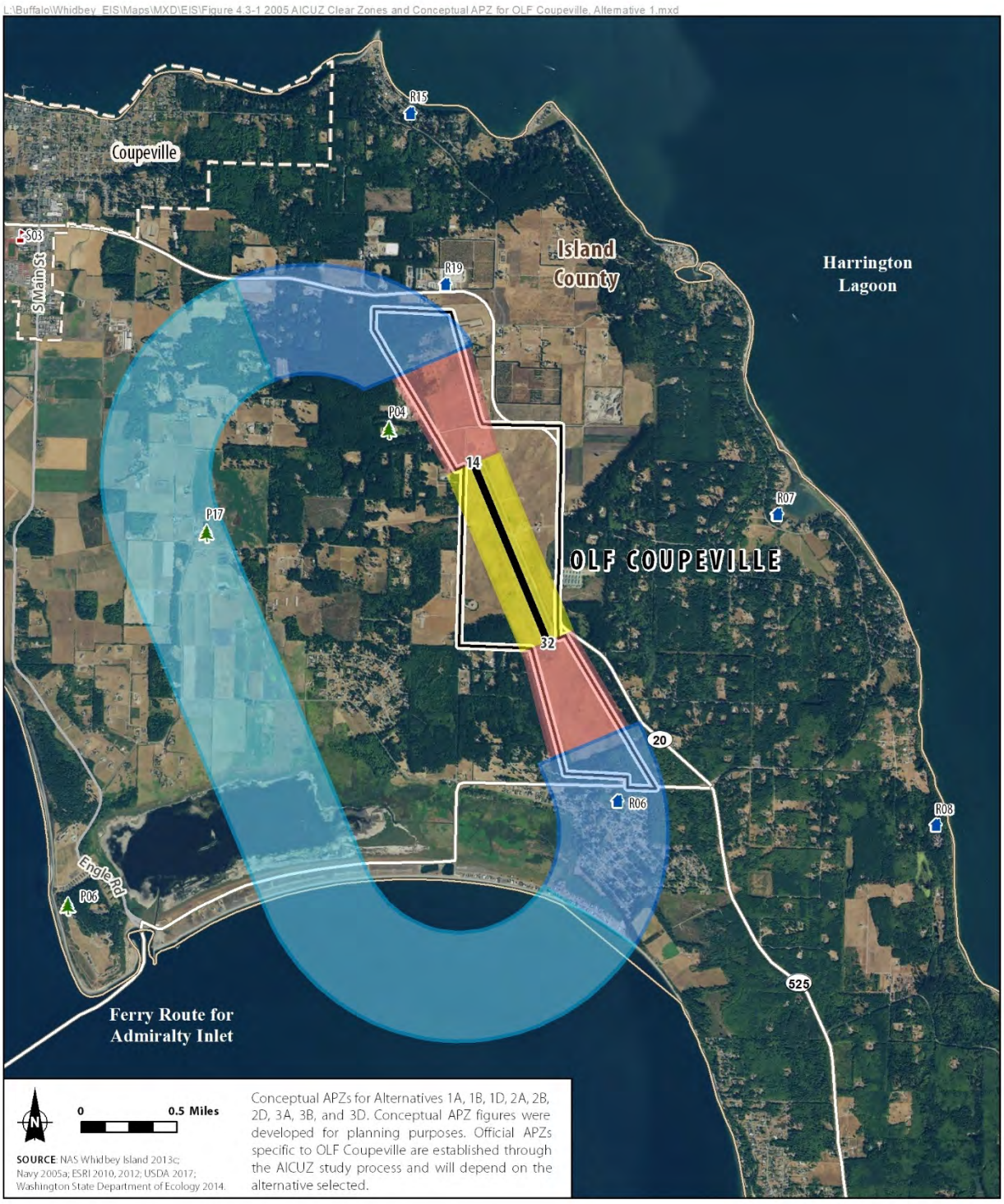

Figure 4.3-1
Existing 2005 AICUZ Clear Zones and Conceptual APZs for OLF Coupeville
Whidbey Island, Island County, WA

4.3.2.4 Environmental Health Risks and Safety Risks to Children

In accordance with the requirements of Executive Order (EO) 13045, this section also evaluates the potential for disproportionate impacts on children near Ault Field and OLF Coupeville. Tables 4.3-2 through 4.3-4 present information on the number of children who are likely affected by the alternatives and scenarios during the average year, while Tables 4.3-5 through 4.3-7 present the same information for alternatives and scenarios during high-tempo FCLP years.

As shown on the tables, the total number of children likely to be affected would range from a low of 3,029 children under Alternative 3, Scenario A, to a high of 3,239 children under Alternative 1, Scenario C, under the average year. Under the high-tempo FCLP year, these figures would range from a low of 3,062 children under Alternative 3, Scenario A, to a high of 3,303 children under Alternative 1, Scenario C.

When compared to the No Action Alternative, this would equate to from 230 additional children being affected under Alternative 3, Scenario A, to 440 additional children being affected under Alternative 1, Scenario C, in the average year (see Tables 4.3-2 through 4.3-7). Under the high-tempo FCLP year, these figures would equate to from 89 additional children being affected under Alternative 3, Scenario A, to 330 additional children being affected under Alternative 1, Scenario C.

Under each of the alternatives and for each of the scenarios in the average year, additional children would be impacted by noise over the No Action Alternative. Total additional children affected by noise would range between 230 and 440 children (or a percent increase of between 8.2 percent and 15.7 percent, respectively) under all alternatives and scenarios under the average year compared to the No Action Alternative. An estimated 89 to 330 additional children (or a percent increase of between 3.0 percent and 14.8 percent, respectively) would be affected under all alternatives and scenarios under the high-tempo FCLP year compared to the No Action Alternative.

Table 4.3-9 identifies the schools and licensed daycare facilities that are likely to fall within the greater than 65 db DNL contours by the alternatives and scenarios for both the average year and high-tempo FCLP year. The table also shows total enrollment for each school and daycare center as well as the expected number of students who would be impacted under each alternative and scenario. As shown in the table, Crescent Harbor Elementary, Home Connection/Parent Partnership School, and Olympic View Elementary would be affected under all action alternatives and scenarios under the average and high-tempo FCLP years. Total impacted students would range from 1,469 to 2,027 children depending on the alternative and scenario considered. Under the No Action Alternative, 1,251 children attend schools or daycare centers that fall within the greater than 65 dB DNL noise contour (see Table 4.3-9).

Children within the greater than 65 db DNL contours have the potential to be impacted by aircraft noise and mishaps. Section 3.2, Section 4.2, and Appendix A provide a detailed discussion of the health and learning impacts on the community associated with aircraft noise. As stated in Section 3.2.3, a review of the scientific literature (see Appendix A, Aircraft Noise Study) indicated that there has been limited research in the area of aircraft noise effects on children and classroom/learning interference. Research suggests that environments with sustained high background noise can have a variety of effects on children, including effects on learning and cognitive abilities and various noise-related physiological changes. Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that aircraft noise can affect the academic performance of school children. Physiological effects in children exposed to aircraft noise and the potential for health effects have been the focus of limited investigation. Two

studies that have been conducted, both in Germany, examined potential physiological effects on children from noise. One examined the relationship between stress hormone levels and elevated blood pressure in children residing around the Munich airport. The other study was conducted in diverse geographic regions and evaluated potential physiological changes (e.g., change in heart rate and muscle tension) related to noise. The studies showed that there may be some relationship between noise and these health factors; however, the researchers noted that further study is needed in order to differentiate the specific cause and effect to understand the relationship (DNWG, 2013).

Based on the limited scientific literature available, there is no proven positive correlation between noise-related events and physiological changes in children. Additionally, the aircraft noise associated with the alternatives is intermittent; therefore, the Navy does not anticipate any significant disproportionate health impacts to children caused by aircraft noise.

As shown on Table 4.3-8, a total of 337 children would reside in the APZs for Ault Field and OLF Coupeville under Alternative 1, Scenario C; Alternative 1, Scenario E; Alternative 2, Scenario C; Alternative 2, Scenario E; Alternative 3, Scenario C; and Alternative 3, Scenario E. In all other alternatives and scenarios, a total of 478 children would reside in the Clear Zones/conceptual APZs for Ault Field and OLF Coupeville. However, as described in Section 3.3.2.4, unless there is a place where children congregate within an APZ, such as a school, there would not be a disproportionate safety risk to children. There are no schools or daycare centers within the existing Clear Zones, existing APZs or conceptual APZs at Ault Field and OLF Coupeville under any of the alternatives or scenarios. A small portion of Rhododendron Park falls within the Clear Zone and within the conceptual APZs at OLF Coupeville. However, this area of the park is used for passive recreation and is not expected to be an area where children congregate. Therefore, there are no disproportionate environmental health and safety risks to children as a result of possible aircraft mishaps under any alternative or scenario for both the average year and high-tempo FCLP year.

Table 4.3-2 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 1, All Scenarios, Average Year

DNL Contours	Total Affected Populations			Population Change from No Action Alternative	
	Total Affected Population	Total Population Aged 19 Years or Younger	Percent Population Aged 19 Years or Younger	Total Population Aged 19 Years or Younger	Percent Population Aged 19 Years or Younger
No Action Alternative					
65-70 DNL	4,140	1,044	25.2%	-	-
70-75 DNL	3,069	777	25.3%	-	-
75+ DNL	3,962	978	24.7%	-	-
Total Affected Population	**11,171**	**2,799**	**25.1%**	**-**	**-**
Alternative 1, Scenario A					
65-70 DNL	4,257	1,094	25.7%	50	-
70-75 DNL	2,844	686	24.1%	-91	-
75+ DNL	5,475	1,271	23.2%	293	-
Total Affected Population	**12,576**	**3,051**	**24.3%**	**252**	**17.9%**
Alternative 1, Scenario B					
65-70 DNL	4,161	1,066	25.6%	22	-
70-75 DNL	3,511	871	24.8%	94	-
75+ DNL	5,317	1,261	23.7%	283	-
Total Affected Population	**12,989**	**3,198**	**24.6%**	**399**	**22.0%**
Alternative 1, Scenario C					
65-70 DNL	4,802	1,205	25.1%	161	-
70-75 DNL	3,551	884	24.9%	107	-
75+ DNL	4,668	1,150	24.6%	172	-
Total Affected Population	**13,021**	**3,239**	**24.9%**	**440**	**23.8%**
Alternative 1, Scenario D					
65-70 DNL	4,243	1,092	25.7%	48	-
70-75 DNL	3,163	775	24.5%	-2	-
75+ DNL	5,529	1,293	23.4%	315	-
Total Affected Population	**12,935**	**3,160**	**24.4%**	**361**	**20.5%**
Alternative 1, Scenario E					
65-70 DNL	4,568	1,155	25.3%	111	-
70-75 DNL	3,545	878	24.8%	101	-
75+ DNL	4,937	1,199	24.3%	221	-
Total Affected Population	**13,050**	**3,232**	**24.8%**	**433**	**23.0%**

Table 4.3-2 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 1, All Scenarios, Average Year

	Total Affected Populations			*Population Change from No Action Alternative*	
DNL Contours	*Total Affected Population*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*

Sources: USCB, 2012d.

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:
DNL = day-night average sound level

Table 4.3-3 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 2, All Scenarios, Average Year

DNL Contours	Total Affected Populations			Population Change from No Action Alternative	
	Total Affected Population	Total Population Aged 19 Years or Younger	Percent Population Aged 19 Years or Younger	Total Population Aged 19 Years or Younger	Percent Population Aged 19 Years or Younger
No Action Alternative					
65-70 DNL	4,140	1,044	25.2%	-	-
70-75 DNL	3,069	777	25.3%	-	-
75+ DNL	3,962	978	24.7%	-	-
Total Affected Population	**11,171**	**2,799**	**25.1%**	**-**	**-**
Alternative 2, Scenario A					
65-70 DNL	4,238	1,092	25.8%	48	-
70-75 DNL	2,873	689	24.0%	-88	-
75+ DNL	5,376	1,251	23.3%	273	-
Total Affected Population	**12,487**	**3,032**	**24.3%**	**233**	**17.7%**
Alternative 2, Scenario B					
65-70 DNL	4,178	1,068	25.6%	24	-
70-75 DNL	3,488	864	24.8%	87	-
75+ DNL	5,210	1,239	23.8%	261	-
Total Affected Population	**12,876**	**3,171**	**24.6%**	**372**	**21.8%**
Alternative 2, Scenario C					
65-70 DNL	4,760	1,192	25.0%	148	-
70-75 DNL	3,490	869	24.9%	92	-
75+ DNL	4,564	1,126	24.7%	148	-
Total Affected Population	**12,814**	**3,187**	**24.9%**	**388**	**23.6%**
Alternative 2, Scenario D					
65-70 DNL	4,221	1,087	25.8%	43	-
70-75 DNL	3,216	786	24.4%	9	-
75+ DNL	5,380	1,259	23.4%	281	-
Total Affected Population	**12,817**	**3,132**	**24.4%**	**333**	**20.2%**
Alternative 2, Scenario E					
65-70 DNL	4,563	1,150	25.2%	106	-
70-75 DNL	3,482	862	24.8%	85	-
75+ DNL	4,844	1,178	24.3%	200	-
Total Affected Population	**12,889**	**3,190**	**24.7%**	**391**	**22.8%**

Table 4.3-3 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 2, All Scenarios, Average Year

	Total Affected Populations			*Population Change from No Action Alternative*	
DNL Contours	*Total Affected Population*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*

Sources: USCB, 2012d

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:
DNL = day-night average sound level

Table 4.3-4 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 3, All Scenarios, Average Year

DNL Contours	Total Affected Populations			Population Change from No Action Alternative	
	Total Affected Population	Total Population Aged 19 Years or Younger	Percent Population Aged 19 Years or Younger	Total Population Aged 19 Years or Younger	Total Population Aged 19 Years or Younger
No Action Alternative					
65-70 DNL	4,140	1,044	25.2%	-	-
70-75 DNL	3,069	777	25.3%	-	-
75+ DNL	3,962	978	24.7%	-	-
Total Affected Population	**11,171**	**2,799**	**25.1%**	**-**	**-**
Alternative 3, Scenario A					
65-70 DNL	4,244	1,093	25.8%	49	-
70-75 DNL	2,839	681	24.0%	-96	-
75+ DNL	5,400	1,255	23.2%	277	-
Total Affected Population	**12,483**	**3,029**	**24.3%**	**230**	**17.5%**
Alternative 3, Scenario B					
65-70 DNL	4,150	1,062	25.6%	18	-
70-75 DNL	3,474	860	24.8%	84	-
75+ DNL	5,256	1,247	23.7%	269	-
Total Affected Population	**12,880**	**3,169**	**24.6%**	**370**	**21.7%**
Alternative 3, Scenario C					
65-70 DNL	4,743	1,188	25.0%	144	-
70-75 DNL	3,496	869	24.9%	92	-
75+ DNL	4,585	1,130	24.6%	152	-
Total Affected Population	**12,824**	**3,187**	**24.9%**	**388**	**23.5%**
Alternative 3, Scenario D					
65-70 DNL	4,210	1,085	25.8%	41	-
70-75 DNL	3,205	783	24.4%	6	-
75+ DNL	5,402	1,263	23.4%	285	-
Total Affected Population	**12,817**	**3,131**	**24.4%**	**332**	**20.2%**
Alternative 3, Scenario E					
65-70 DNL	4,532	1,143	25.2%	99	-
70-75 DNL	3,483	861	24.7%	84	-
75+ DNL	4,869	1,183	24.3%	205	-
Total Affected Population	**12,884**	**3,187**	**24.7%**	**388**	**22.7%**

Table 4.3-4 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 3, All Scenarios, Average Year

	Total Affected Populations			*Population Change from No Action Alternative*	
DNL Contours	*Total Affected Population*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*	*Total Population Aged 19 Years or Younger*	*Total Population Aged 19 Years or Younger*

Sources: USCB, 2012d

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:
DNL = day-night average sound level

Table 4.3-5 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 1, All Scenarios, High-Tempo FCLP

	Total Affected Populations			*Population Change from No Action Alternative*	
DNL Contours	*Total Affected Population*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*
No Action Alternative					
65-70 DNL	4,228	1,063	25.1%	-	-
70-75 DNL	3,463	892	25.8%	-	-
75+ DNL	4,113	1,018	24.8%	-	-
Total Affected Population	**11,804**	**2,973**	**25.2%**	-	-
Alternative 1, Scenario A					
65-70 DNL	4,303	1,102	25.6%	39	-
70-75 DNL	2,844	692	24.3%	-200	-
75+ DNL	5,602	1,297	23.2%	279	-
Total Affected Population	**12,749**	**3,091**	**24.2%**	**118**	**12.5%**
Alternative 1, Scenario B					
65-70 DNL	4,159	1,068	25.7%	5	-
70-75 DNL	3,587	891	24.8%	-1	-
75+ DNL	5,420	1,283	23.7%	265	-
Total Affected Population	**13,166**	**3,242**	**24.6%**	**269**	**19.8%**
Alternative 1, Scenario C					
65-70 DNL	4,893	1,229	25.1%	166	-
70-75 DNL	3,604	899	24.9%	7	-
75+ DNL	4,764	1,175	24.7%	157	-
Total Affected Population	**13,261**	**3,303**	**24.9%**	**330**	**22.6%**
Alternative 1, Scenario D					
65-70 DNL	4,291	1,102	25.7%	39	-
70-75 DNL	3,171	782	24.7%	-110	-
75+ DNL	5,660	1,320	23.3%	302	-
Total Affected Population	**13,122**	**3,204**	**24.4%**	**231**	**17.5%**
Alternative 1, Scenario E					
65-70 DNL	4,640	1,175	25.3%	112	-
70-75 DNL	3,593	893	24.9%	1	-
75+ DNL	5,029	1,221	24.3%	203	-
Total Affected Population	**13,262**	**3,289**	**24.8%**	**316**	**21.7%**

Table 4.3-5 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 1, All Scenarios, High-Tempo FCLP

	Total Affected Populations			*Population Change from No Action Alternative*	
DNL Contours	*Total Affected Population*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*

Sources: USCB, 2012d.

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:
DNL = day-night average sound level

Table 4.3-6 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 2, All Scenarios, High-Tempo FCLP

	Total Affected Populations			*Change from No Action Alternative*	
DNL Contours	*Total Affected Population*	*Total Population Aged 19 or Younger*	*Percent Population Aged 19 or Younger*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 or Younger*
No Action Alternative					
65-70 DNL	4,228	1,063	25.1%	-	-
70-75 DNL	3,463	892	25.8%	-	-
75+ DNL	4,113	1,018	24.8%	-	-
Total Affected Population	**11,804**	**2,973**	**25.2%**	**-**	**-**
Alternative 2, Scenario A					
65-70 DNL	4,300	1,105	25.7%	42	-
70-75 DNL	2,879	694	24.1%	-198	-
75+ DNL	5,454	1,267	23.2%	249	-
Total Affected Population	**12,633**	**3,066**	**24.3%**	**93**	**11.2%**
Alternative 2, Scenario B					
65-70 DNL	4,222	1,081	25.6%	18	-
70-75 DNL	3,551	882	24.8%	-10	-
75+ DNL	5,310	1,262	23.8%	244	-
Total Affected Population	**13,083**	**3,225**	**24.7%**	**252**	**19.7%**
Alternative 2, Scenario C					
65-70 DNL	4,793	1,202	25.1%	139	-
70-75 DNL	3,559	885	24.9%	-7	-
75+ DNL	4,698	1,155	24.6%	137	-
Total Affected Population	**13,050**	**3,242**	**24.8%**	**269**	**21.6%**
Alternative 2, Scenario D					
65-70 DNL	4,280	1,101	25.7%	38	-
70-75 DNL	3,231	792	24.5%	-100	-
75+ DNL	5,460	1,276	23.4%	258	-
Total Affected Population	**12,971**	**3,169**	**24.4%**	**196**	**16.8%**
Alternative 2, Scenario E					
65-70 DNL	4,546	1,150	25.3%	87	-
70-75 DNL	3,538	877	24.8%	-15	-
75+ DNL	4,982	1,206	24.2%	188	-
Total Affected Population	**13,066**	**3,233**	**24.7%**	**260**	**20.6%**

Table 4.3-6 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 2, All Scenarios, High-Tempo FCLP

	Total Affected Populations			*Change from No Action Alternative*	
DNL Contours	*Total Affected Population*	*Total Population Aged 19 or Younger*	*Percent Population Aged 19 or Younger*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 or Younger*

Sources: USCB, 2012d.

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:
DNL = day-night average sound level

Table 4.3-7 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 3, All Scenarios, High-Tempo FCLP

	Total Affected Populations			*Change from No Action Alternative*	
DNL Contours	*Total Affected Population*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years and Younger*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*
No Action Alternative					
65-70 DNL	4,228	1,063	25.1%	-	-
70-75 DNL	3,463	892	25.8%	-	-
75+ DNL	4,113	1,018	24.8%	-	-
Total Affected Population	**11,804**	**2,973**	**25.2%**	**-**	**-**
Alternative 3, Scenario A					
65-70 DNL	4,283	1,098	25.6%	35	-
70-75 DNL	2,816	682	24.2%	-210	-
75+ DNL	5,531	1,282	23.2%	264	-
Total Affected Population	**12,630**	**3,062**	**24.2%**	**89**	**10.8%**
Alternative 3, Scenario B					
65-70 DNL	4,125	1,059	25.7%	-4	-
70-75 DNL	3,541	879	24.8%	-13	-
75+ DNL	5,396	1,276	23.6%	258	-
Total Affected Population	**13,062**	**3,214**	**24.6%**	**241**	**19.2%**
Alternative 3, Scenario C					
65-70 DNL	4,767	1,196	25.1%	133	-
70-75 DNL	3,544	881	24.9%	-11	-
75+ DNL	4,671	1,149	24.6%	131	-
Total Affected Population	**12,982**	**3,226**	**24.8%**	**253**	**21.5%**
Alternative 3, Scenario D					
65-70 DNL	4,209	1,082	25.7%	19	-
70-75 DNL	3,184	784	24.6%	-108	-
75+ DNL	5,579	1,301	23.3%	283	-
Total Affected Population	**12,972**	**3,167**	**24.4%**	**194**	**16.6%**
Alternative 3, Scenario E					
65-70 DNL	4,536	1,149	25.3%	86	-
70-75 DNL	3,590	892	24.8%	0	-
75+ DNL	4,985	1,208	24.2%	190	-
Total Affected Population	**13,111**	**3,249**	**24.8%**	**276**	**21.1%**

Table 4.3-7 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 3, All Scenarios, High-Tempo FCLP

	Total Affected Populations			*Change from No Action Alternative*	
DNL Contours	*Total Affected Population*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years and Younger*	*Total Population Aged 19 Years or Younger*	*Percent Population Aged 19 Years or Younger*

Sources: USCB, 2012d.

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:
DNL = day-night average sound level

Table 4.3-8 Number of Children Residing within APZs for Ault Field and OLF Coupeville under Each Alternative/Scenario

APZ	*Total Affected Population**	*Total Population 19 Years of Age or Younger*	*Percent of Total Population 19 Years of Age or Younger*
Alternatives 1C, 1E, 2C, 2E, 3C, and 3E[1]			
Ault Field Existing Clear Zones and APZs	1,860	320	17.2%
OLF Coupeville Existing Clear Zones	96	17	17.7%
Total Population for Alternatives 1C, 1E, 2C, 2E, 3C, and 3E[1]	**2,284**	**337**	**17.2%**
Alternatives 1A, 1B, 1D, 2A, 2B, 2D, 3A, 3B, and 3D[2]			
Ault Field Existing Clear Zones and APZs	1,860	320	17.2%
OLF Coupeville Existing Clear Zones	96	17	17.7%
OLF Coupeville Conceptual APZs – Option 1	677	141	20.8%
Total Population for Alternatives 1A, 1B, 1D, 2A, 2B, 2D, 3A, 3B, and 3D[2]	**2,633**	**478**	**18.2%**

Source: USCB, 2012d.

Notes:

[1] Under Alternative 1, Scenario C; Alternative 1, Scenario E; Alternative 2, Scenario C; Alternative 2, Scenario E; Alternative 3, Scenario C; and Alternative 3, Scenario E; no new APZs would be required at OLF Coupeville. There would be no change in the APZs at Ault Field compared to existing conditions.

[2] Under Alternative 1, Scenario A; Alternative 1, Scenario B; Alternative 1, Scenario D; Alternative 2, Scenario A; Alternative 2, Scenario B; Alternative 2, Scenario D; Alternative 3, Scenario A; Alternative 3, Scenario B; and Alternative 3, Scenario D; OLF Coupeville Conceptual APZs – Option 1 would be required. There would be no change in APZs at Ault Field compared to existing conditions.

* All population estimates for areas within the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Table 4.3-9 Schools and Licensed Daycare Centers within 65+ DNL under all Alternatives, All Scenarios, Average and High-Tempo FCLP

Alternatives	*Schools*				*Licensed Daycares*		
	Coupeville High School/ Coupeville Middle School	*Crescent Harbor Elementary*	*Home Connection /Parent Partnership School*	*Olympic View Elementary*	*Ebey Academy*	*Regatta CDC*	*Total Enrollment*
Enrollment	**504**	**493**	**302**	**456**	**54**	**218**	-
Alternative 1, Scenario A	⦿	⦿	⦿	⦿	⦿	-	1,809
Alternative 1, Scenario B	-	⦿	⦿	⦿	-	⦿	1,469
Alternative 1, Scenario C	-	⦿	⦿	⦿	-	⦿	1,469
Alternative 1, Scenario D	⦿	⦿	⦿	⦿	⦿[1]	⦿	2,027
Alternative 1, Scenario E	-	⦿	⦿	⦿	-	⦿	1,469
Alternative 2, Scenario A	⦿	⦿	⦿	⦿	⦿	⦿[1]	2,027
Alternative 2, Scenario B	-	⦿	⦿	⦿	-	⦿	1,469
Alternative 2, Scenario C	-	⦿	⦿	⦿	-	⦿	1,469
Alternative 2, Scenario D	⦿	⦿	⦿	⦿	-	⦿	1,973
Alternative 2, Scenario E	-	⦿	⦿	⦿	-	⦿	1,469
Alternative 3, Scenario A	⦿	⦿	⦿	⦿	⦿	-	1,809
Alternative 3, Scenario B	-	⦿	⦿	⦿	-	⦿	1,469
Alternative 3, Scenario C	-	⦿	⦿	⦿	-	⦿	1,469
Alternative 3, Scenario D	⦿	⦿	⦿	⦿	⦿[1]	⦿	2,027
Alternative 3, Scenario E	-	⦿	⦿	⦿	-	⦿	1,469
No Action Alternative	-	⦿	⦿	⦿[1]	-	-	1,251

Sources: Washington State Office of the Superintendent of Public Instruction, 2018; Child Care Center, 2018a, 2018b

Note:
[1] High-Tempo FCLP only

Key:
⦿ = Symbol indicates presence of a School or a Licensed Daycare Center
DNL = day-night average sound level

4.3.3 Public Health and Safety Conclusion, Alternatives 1 through 3

In summary, the Navy would continue to meet the primary goal of the AICUZ program, which is to protect the public's health, safety, and welfare through collaboration with the local community. Following completion of this EIS and the ROD, the Navy would review the need for changes to the APZs. If warranted, the APZs could be updated by completing an AICUZ Update and coordinating with local communities to provide appropriate new land use recommendations as necessary.

The Proposed Action would increase the volume of air operations; however, it would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield. Therefore, no significant impact to safety related to flight safety or BASH is expected under any of the alternatives as part of the Proposed Action.

There would be an increase in the number of children within the noise contours under all alternatives and scenarios (8.5 percent to 15.8 percent). Noise impacts on children are discussed in Section 4.2.

4.4 Air Quality

Air Quality

Construction impacts would be temporary and minor, and would not result in significant impacts on air quality.

Operations would result in an increase in stationary and mobile sources. Increased stationary sources would not require revisions to the NAS Whidbey Island Air Permit and would have no significant impact. Increases in mobile emissions should not affect compliance with NAAQS.

Effects on air quality are based on the estimated changes in direct and indirect emissions associated with the alternatives and the impact of the projected changes in emissions on local and regional air quality. The Proposed Action is located within Island County and the Olympic-Northwest Washington Intrastate Air Quality Control Region. Air quality in Island, Whacom, and Skagit Counties is under the jurisdiction of the Northwest Clean Air Agency (NWCAA). Permit reporting requirements for greenhouse gas (GHG) emissions are addressed, and additional GHG information is included in Section 4.16, Climate Change and GHG Emissions. The General Conformity Rule does not apply to the Proposed Action because the region is in attainment for all National Ambient Air Quality Standards (NAAQS). Therefore, the analysis that follows is pursuant to NEPA. The analysis of a Navy action under NEPA must identify and evaluate any federal, state, or local air quality requirements that apply to the project.

As discussed in Section 1.13, four changes were applied to the noise analysis between release of the Draft EIS and the Final EIS: 1) rerunning the noise analysis using the updated, NOISEMAP Version 7.3 model; 2) applying refinements to certain flight profiles/aircraft operating assumptions; 3) incorporation of PLM, also known as MAGIC CARPET, into the noise analysis; and 4) updating the number of pilots per squadron.

4.4.1 Air Quality, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No new stationary sources would be installed, and no existing stationary sources would have an increase in emissions. There would be no significant change in aircraft operations and resulting aircraft emissions. Therefore, no significant impacts to air quality or air resources would occur with implementation of the No Action Alternative.

4.4.2 Air Quality, Alternative 1

Alternative 1 would expand carrier capabilities by adding three additional aircraft to each existing carrier squadron and augmenting the FRS with eight additional aircraft (a net increase of 35 aircraft). While no new squadrons would be created, this expansion would require new buildings and the renovation of space for maintenance hangars, armament storage and classroom space. The Navy would also construct additional paved areas for vehicle parking and aircraft runway improvements and parking areas. The expansion of Growler operations would require an increase of 335 personnel at the NAS Whidbey Island complex. Alternative 1 represents the largest increase in aircraft operations of the three alternatives. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 1.

4.4.2.1 Air Quality Potential Impacts, Alternative 1

Under Alternative 1, the Proposed Action would result in temporary, direct emissions of criteria air pollutants during construction. Changes in operations after implementation of the Proposed Action

would also result in an increase in direct and indirect stationary emissions from new building energy use and increased maintenance and fuel use. Mobile emissions from aircraft operations and the commuting of new personnel in personally owned vehicles (POVs) and other equipment would also increase. Refer to Appendix B for detailed assumptions, emission factors, and calculations used to provide emissions estimates.

4.4.2.1.1 Construction-related Emissions, Alternative 1

Construction would result in temporary and minor increases in air emissions from the combustion of fossil fuels in mobile source equipment and vehicles, volatile organic compound (VOC) emissions from paving and painting, and emissions of fugitive dust and dirt during site ground disturbance. Construction emissions would be temporary.

This analysis assumes the same construction activities under all alternatives and scenarios. The Navy will construct 130,000 square feet of hangar and storage space and 43,000 square feet of temporary hangar space, which will be removed after permanent hangar space is constructed. Expanded vehicle parking and taxiways will require 5.6 acres of paving. Construction activities are conservatively assumed to be conducted within 1 year, prior to the change in operations. Emission factors for vehicles and equipment were obtained from the USEPA's Motor Vehicle Emission Simulator (MOVES2014) (USEPA, 2015c). Appendix B provides the assumptions and calculations used to estimate the total emissions. Table 4.4-1 shows estimated criteria pollutant emissions from construction activities for Alternative 1.

Table 4.4-1 NAS Whidbey Island Complex Emissions from Construction, All Alternatives

	Total Emissions (tons per year [TPY])						*Metric tons per year*
Activity	***NO_X***	***VOC***	***CO***	***SO_2***	***PM_{10}***	***$PM_{2.5}$***	***CO_2***
Alternative 1							
Construction equipment	5.89	0.79	3.54	0.011	0.53	0.52	1,838
VOCs from paving and painting		4.55					
PM from grading and demolition					0.31	0.03	
Worker Commute and Deliveries	0.30	0.02	0.67	0.005	0.84	0.10	112
Total, All Alternatives	**6.19**	**5.36**	**4.21**	**0.016**	**1.68**	**0.65**	**1,950**

Key:
CO = carbon monoxide
CO_2 = carbon dioxide
NO_x = nitrogen oxides
PM = particulate matter
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide
VOC = volatile organic compound

Based on the projected total construction emissions summarized in Table 4.4-1, the impact on air quality in the region would be minor and temporary and would not result in any significant impacts, and would occur before the completion of this action. Construction equipment emissions should not require revisions to NAS Whidbey Island's Air Operating Permit (AOP) (NWCAA, 2013) and therefore do not require Prevention of Significant Deterioration or New Source review. However, final selection of

construction equipment will include a review of permitting requirements, and changes to the AOP will be made if required.

Construction emissions would be reduced using Best Management Practices (BMPs). Exhaust emissions from construction vehicles can be reduced by using fuel-efficient vehicles with emission controls and ensuring that all equipment is properly maintained. Dust emissions from ground disturbance and road traffic should be controlled by spraying water on soil piles and graded areas and keeping roadways clean.

4.4.2.1.2 Stationary Operation-related Emissions, Alternative 1

This analysis assumed that changes to facilities and the maintenance of more aircraft would result in increases in stationary source emissions at NAS Whidbey Island, and these changes would be the same under all scenarios and alternatives. These emissions are subject to the AOP; however, because they are below permit revision requirement thresholds, they are not likely to result in changes to the AOP and therefore do not require Prevention of Significant Deterioration or New Source review. Final selection of building systems will include a review of permitting requirements, and changes to the AOP will be made if required.

New buildings would require additional direct (natural gas) and indirect (electricity) energy use that would result in an increase in direct and indirect emissions. Emissions from electricity use are estimated using the Energy Information Administration's average emission factors for the State of Washington (EIA, 2015). Direct emissions from natural gas combustion are estimated using emission factors provided in the NAS Whidbey Island AOP (NWCAA, 2013). Increased maintenance and operations of aircraft may also result in an increase in painting, solvent, and fueling operations and fuel storage, which could increase reported emissions (VOCs) from these permitted sources. The increased emissions have been estimated based on emissions from existing Growler maintenance operations and a ratio based on the increase in the number of aircraft associated with this action. Fuel storage increases are estimated based on the increase in personnel. New VOC emissions from the painting, solvent and fueling operations would not trigger a required change to the AOP. The Growler's F414-GE-400 engines would not be tested in the test cells, and, therefore, there would be no changes to this stationary source (NAS Whidbey Island Operations Command, 2016).

In order to mitigate noise from in-frame engine testing, The Navy is considering the construction of a "hush house," which would be equipped with ventilation equipment and would be therefore considered a new stationary source of emissions and may require New Source review and changes to the AOP. This is not considered as part of this action. For the purposes of this environmental review, all potential emissions from in-frame testing have been quantified and are included below in the discussion of mobile emissions. A hush house would not necessarily reduce potential emissions from in-frame testing; however, emissions generated within the hush house would be reporting and managed as a stationary source under the AOP.

Table 4.4-2 provides a summary of the estimated increase in direct and indirect emissions that would result from the Proposed Action. There are no plans to change any additional facilities that support these activities as a part of the Proposed Action. New Stationary emissions should not require revisions to NAS Whidbey Island's AOP (NWCAA, 2013) and therefore do not require Prevention of Significant Deterioration or New Source review. However, final selection of construction equipment will include a review of permitting requirements, and changes to the AOP will be made if required.

Table 4.4-2 Stationary Direct and Indirect Criteria Pollutant Emissions, All Alternatives

Operations	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
New Building Electricity Use (Indirect)	0.25	N/A	N/A	0.165	N/A	N/A
New Building Natural Gas Use (Direct)	0.10	0.01	0.21	0.002	0.02	0.02
Painting, Solvent, and Gas Station Use (Direct)		3.57				
Total Change in Stationary Emissions	**0.35**	**3.58**	**0.21**	**0.166**	**0.02**	**0.02**

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
PM = particulate matter
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide
tpy = tons per year
VOC = volatile organic compound

4.4.2.1.3 Mobile Operation-related Emissions, Alternative 1

Under Alternative 1, changes to aircraft operations and personnel commuting would result in an increase in annual emissions. Mobile emissions are not covered by the NAS Whidbey Island AOP or stationary source reporting or permitting thresholds; however, these emissions contribute to regional emission totals and can affect compliance with NAAQS. Each of the five scenarios would have different numbers of different types of operations at OLF Coupeville and Ault Field, resulting in different levels of emissions from each scenario.

Emissions estimates were developed using the Navy's Aircraft Environmental Support Office (AESO) emission factors for aircraft emissions (AESO 2015, 2017a, 2017b) and the USEPA's Motor Vehicle Emission Simulator (MOVES2014) (USEPA, 2015c) emission factors for Island County for personnel commuting emissions. NAS Whidbey Island does not collect an inventory of ground support equipment operations; therefore, ground support equipment emissions at NAS Whidbey Island were estimated using a ratio of aircraft landing and takeoff operations to reported ground support equipment at NAS Lemoore in Appendix 1D of the Navy's F-35C West Coast Homebasing EIS (Navy, 2014d). Since air emissions calculations require specific operation counts by type, the operations data used for these calculations were consistent with the detailed operations count and type estimates used in the noise analysis (see Appendix A, Aircraft Noise Study). The AESO estimates a 30-second maximum setting (with AB) time-in-mode for Growler take off; however, emission factors have been adjusted to account for a more specific estimate at NAS Whidbey Island of 20 seconds at this setting (NAS Whidbey Island Operations Command, 2016).

Total emissions presented below have been estimated using projected average Growler flight and in-frame maintenance operations, and increases in personnel. As discussed in Chapter 3, the use of chaff and fuel dumping are rare occurrences and not part of training activities at Ault Field or OLF Coupeville; therefore, there would be no impacts to air quality from chaff or fuel dumping as a result of the Proposed Action. Hazardous Air Pollutant (HAP) emissions identified in Mobile Source Air Toxics (MSAT) regulations represent 24 percent of the reported aircraft VOC emissions (FAA, 2009) and also one-third of POV VOC emissions (AWMA, 2017). Criteria pollutant emissions from the mobile operations associated with the Proposed Action under Alternative 1, Scenario A, are provided in Table 4.4-3; Scenario B emissions are provided in Table 4.4-4; Scenario C emissions are provided in Table 4.4-5;

Scenario D emissions are provided in Table 4.4-6; and Scenario E emissions are provided in Table 4.4-7. Detailed assumptions, emission factors, and calculations, as well as additional emissions estimates based on high-tempo Growler operations, have been presented in Appendix B.

Table 4.4-3 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action, Alternative 1, Scenario A

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Mobile Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 1, Scenario A						
Alternative 1A Emissions						
Ault Field Growler Aircraft	466.73	734.73	1958.05	41.10	212.35	212.35
OLF Growler Aircraft	184.26	4.28	93.04	12.08	51.14	51.14
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.39	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Mobile Operation Emissions	**708.57**	**885.79**	**2,771.16**	**59.22**	**387.85**	**302.66**
Change in Emissions between No Action and Alternative 1A						
Ault Field Growler Aircraft	74.95	140.05	372.87	6.91	36.50	36.50
OLF Growler Aircraft	138.74	3.14	67.78	9.08	38.49	38.49
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.07	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Mobile Operation Emissions	**228.73**	**186.71**	**637.86**	**17.79**	**90.76**	**84.33**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-4 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action, Alternative 1, Scenario B

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 1, Scenario B						
Alternative 1B Emissions						
Ault Field Growler Aircraft	490.02	705.80	1881.75	42.15	215.39	215.39
OLF Growler Aircraft	115.23	2.68	58.30	7.55	31.99	31.99
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.37	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Operation Emissions	**662.81**	**855.27**	**2,660.10**	**55.75**	**371.73**	**286.55**
Change in Emissions between No Action Alternative and Alternative 1B						
Ault Field Growler Aircraft	98.24	111.13	296.56	7.96	39.54	39.54
OLF Growler Aircraft	69.72	1.54	33.03	4.56	19.33	19.33
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.06	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Operation Emissions	**182.98**	**156.18**	**526.80**	**14.32**	**74.65**	**68.22**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-5 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 1, Scenario C

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 1, Scenario C						
Alternative 1C Emissions						
Ault Field Growler Aircraft	515.45	683.49	1823.06	43.45	219.81	219.81
OLF Growler Aircraft	46.16	1.08	23.39	3.03	12.81	12.81
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.36	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Operation Emissions	**619.18**	**831.36**	**2,566.61**	**52.52**	**356.98**	**271.80**
Change in Emissions between No Action Alternative and Alternative 1C						
Ault Field Growler Aircraft	123.67	88.82	237.87	9.26	43.96	43.96
OLF Growler Aircraft	0.67	-0.06	-1.77	0.04	0.16	0.16
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.05	0.00	0.03	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Operation Emissions	**139.35**	**132.27**	**433.30**	**11.09**	**59.89**	**53.47**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-6 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 1, Scenario D

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 1, Scenario D						
Alternative 1D Emissions						
Ault Field Growler Aircraft	475.02	727.07	1937.89	41.52	213.74	213.74
OLF Growler Aircraft	161.24	3.75	81.46	10.57	44.76	44.76
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.38	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Operation Emissions	**693.83**	**877.60**	**2,739.41**	**58.13**	**382.85**	**297.67**
Change in Emissions between No Action Alternative and Alternative 1D						
Ault Field Growler Aircraft	83.24	132.39	352.70	7.33	37.89	37.89
OLF Growler Aircraft	115.73	2.61	56.19	7.58	32.10	32.10
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.07	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Operation Emissions	**214.00**	**178.51**	**606.11**	**16.70**	**85.76**	**79.34**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-7 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 1, Scenario E

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 1, Scenario E						
Alternative 1E Emissions						
Ault Field Growler Aircraft	507.11	691.31	1843.64	43.03	218.42	218.42
OLF Growler Aircraft	65.70	1.60	35.07	4.31	18.25	18.25
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.37	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Operation Emissions	**630.36**	**839.69**	**2,598.76**	**53.39**	**361.03**	**275.84**
Change in Emissions between No Action Alternative and Alternative 1E						
Ault Field Growler Aircraft	115.33	96.64	258.45	8.84	42.57	42.57
OLF Growler Aircraft	20.18	0.46	9.81	1.32	5.60	5.60
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.05	0.00	0.03	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Operation Emissions	**150.52**	**140.60**	**465.46**	**11.96**	**63.94**	**57.51**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

4.4.3 Air Quality, Alternative 2

Alternative 2 would expand expeditionary and carrier capabilities by establishing two new expeditionary squadrons, adding two additional aircraft to each existing carrier squadron, and augmenting the FRS with eight additional aircraft (a net increase of 36 aircraft). The expansion of Growler operations would require an increase of 628 personnel at the NAS Whidbey Island complex. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 2.

4.4.3.1 Air Quality Potential Impacts, Alternative 2

Under Alternative 2, the Proposed Action would result in temporary, direct emissions of criteria air pollutants during construction. Changes in operations after implementation of the Proposed Action would also result in an increase in direct and indirect stationary emissions from new building energy use and increased maintenance and fuel use. Mobile emissions from aircraft operations and the commuting of new personnel in POVs and other equipment would also increase. Refer to Appendix B for detailed assumptions, emission factors, and calculations used to provide emissions estimates.

4.4.3.1.1 Construction-related Emissions, Alternative 2

As described in Section 4.4.2, construction would result in temporary and minor increases in air emissions from the combustion of fossil fuels in equipment and vehicles, VOC emissions from paving and painting, and emissions of fugitive dust and dirt during site ground disturbance. Each of the five scenarios considered under Alternative 2 would result in the same construction activities as described for Alternative 1.

4.4.3.1.2 Stationary Operation-related Emissions, Alternative 2

Under Alternative 2, changes to facilities and the maintenance of more aircraft would result in increases in stationary source emissions at NAS Whidbey Island as described under Alternative 1.

4.4.3.1.3 Mobile Operation-related Emissions, Alternative 2

Under Alternative 2, changes to aircraft operations and personnel commuting would result in an increase in annual emissions. Mobile emissions are not covered by the AOP or stationary source reporting or permitting thresholds; however, these emissions contribute to regional emission totals and can affect compliance with NAAQS. Each of the five scenarios would have different numbers of different types of operations at OLF Coupeville and Ault Field, resulting in different levels of emissions from each scenario. Emissions estimation methods and assumptions are the same as described in Section 4.4.2.1.3. As discussed in Chapter 3, the use of chaff and fuel dumping are rare occurrences and not part of training activities at Ault Field or OLF Coupeville; therefore, there would be no impacts to air quality from chaff or fuel dumping as a result of the Proposed Action. HAP emissions identified in MSAT regulations represent 24 percent of the reported aircraft VOC emissions (FAA, 2009) and also one-third of POV VOC emissions (AWMA, 2017).

Criteria pollutant emissions from the operations associated with the Proposed Action under Alternative 2, Scenario A, are provided in Table 4.4-8; Scenario B emissions are provided in Table 4.4-9; Scenario C emissions are provided in Table 4.4-10; Scenario D emissions are provided in Table 4.4-11; and Scenario E emissions are provided in Table 4.4-12. Total emissions presented below have been estimated using projected average Growler flight operations and increases in personnel. Detailed assumptions, emission factors, and calculations, as well as additional emissions estimates based on high-tempo Growler operations, have been presented in Appendix B.

Table 4.4-8 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 2, Scenario A

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 2, Scenario A						
Alternative 2A Emissions						
Ault Field Growler Aircraft	472.40	752.23	2004.61	41.74	215.95	215.95
OLF Growler Aircraft	175.92	4.09	88.84	11.53	48.83	48.83
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.40	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	**706.95**	**904.45**	**2,824.34**	**59.37**	**395.70**	**304.90**
Change in Emissions between No Action Alternative and Alternative 2A						
Ault Field Growler Aircraft	80.62	157.55	419.42	7.55	40.10	40.10
OLF Growler Aircraft	130.41	2.95	63.58	8.54	36.18	36.18
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.08	0.00	0.05	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	**227.11**	**205.37**	**691.03**	**17.94**	**98.62**	**86.57**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-9 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 2, Scenario B

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.32	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 2, Scenario B						
Alternative 2B Emissions						
Ault Field Growler Aircraft	494.26	724.28	1930.88	42.71	218.72	218.72
OLF Growler Aircraft	110.01	2.56	55.61	7.21	30.54	30.54
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.38	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	**662.88**	**874.98**	**2,717.36**	**56.03**	**380.18**	**289.37**
Change in Emissions between No Action Alternative and Alternative 2B						
Ault Field Growler Aircraft	102.48	129.60	345.69	8.53	42.87	42.87
OLF Growler Aircraft	64.50	1.42	30.34	4.22	17.88	17.88
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.07	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	**183.05**	**175.89**	**584.06**	**14.59**	**83.09**	**71.04**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-10 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 2, Scenario C

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 2, Scenario C						
Alternative 2C Emissions						
Ault Field Growler Aircraft	518.41	702.56	1873.72	43.93	222.86	222.86
OLF Growler Aircraft	44.06	1.02	22.26	2.89	12.23	12.23
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.37	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	**621.08**	**851.72**	**2,626.84**	**52.92**	**366.01**	**275.21**
Change in Emissions between No Action Alternative and Alternative 2C						
Ault Field Growler Aircraft	126.63	107.88	288.53	9.75	47.01	47.01
OLF Growler Aircraft	-1.45	-0.12	-3.01	-0.10	-0.42	-0.42
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.06	0.00	0.03	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	**141.24**	**152.63**	**493.54**	**11.49**	**68.92**	**56.87**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-11 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 2, Scenario D

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 2, Scenario D						
Alternative 2D Emissions						
Ault Field Growler Aircraft	480.44	744.92	1985.38	42.14	217.32	217.32
OLF Growler Aircraft	153.96	3.58	77.80	10.09	42.74	42.74
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.39	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	**693.02**	**896.64**	**2,794.07**	**58.33**	**390.97**	**300.17**
Change in Emissions between No Action Alternative and Alternative 2D						
Ault Field Growler Aircraft	88.66	150.24	400.20	7.95	41.47	41.47
OLF Growler Aircraft	108.45	2.44	52.53	7.10	30.08	30.08
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.08	0.00	0.05	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	**213.19**	**197.55**	**660.77**	**16.90**	**93.89**	**81.84**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-12 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 2, Scenario E

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 2, Scenario E						
Alternative 2E Emissions						
Ault Field Growler Aircraft	510.43	710.02	1893.37	43.54	221.53	221.53
OLF Growler Aircraft	66.18	1.55	33.64	4.34	18.37	18.37
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.37	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	**635.22**	**859.70**	**2,657.88**	**53.98**	**370.82**	**280.02**
Change in Emissions between No Action Alternative and Alternative 2E						
Ault Field Growler Aircraft	118.65	115.34	308.18	9.35	45.68	45.68
OLF Growler Aircraft	20.67	0.41	8.37	1.35	5.72	5.72
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.06	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	**155.39**	**160.62**	**524.57**	**12.54**	**73.74**	**61.69**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

4.4.4 Air Quality, Alternative 3

Alternative 3 would expand expeditionary and carrier capabilities by adding three additional aircraft to each existing expeditionary squadron, adding two additional aircraft to each existing carrier squadron, and augmenting the FRS with nine additional aircraft (a net increase of 36 aircraft). The expansion of the Growler community would require an increase of 341 personnel at the NAS Whidbey Island complex. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 3.

4.4.4.1 Air Quality Potential Impacts, Alternative 3

Under Alternative 3, the Proposed Action would result in temporary direct emissions of criteria air pollutants during construction. Changes in operations after implementation of the Proposed Action would also result in an increase in direct and indirect stationary emissions from new building energy use and increased maintenance and fuel use. Mobile emissions from aircraft operations and the commuting of new personnel in POVs and other equipment would also increase. Refer to Appendix B for detailed assumptions, emission factors, and calculations used to provide emissions estimates.

4.4.4.1.1 Construction-related Emissions, Alternative 3

As described in Section 4.4.2, construction would result in temporary and minor increases in air emissions from the combustion of fossil fuels in equipment and vehicles, VOC emissions from paving and painting, and emissions of fugitive dust and dirt during site ground disturbance. Each of the five scenarios considered under Alternative 2 would result in the same construction activities described under Alternative 1.

4.4.4.1.2 Stationary Operation-related Emissions, Alternative 3

Under Alternative 3, changes to facilities and the maintenance of more aircraft would result in increases in stationary source emissions at NAS Whidbey Island, as described under Alternative 1.

4.4.4.1.3 Mobile Operation-related Emissions, Alternative 3

Under Alternative 3, changes to aircraft operations and personnel commuting would result in an increase in annual emissions. Mobile emissions are not covered by the NAS Whidbey Island AOP or stationary source reporting or permitting thresholds; however, these emissions contribute to regional emission totals and can affect compliance with NAAQS. Each of the five scenarios would have different numbers of different types of operations at OLF Coupeville and Ault Field, resulting in different levels of emissions from each scenario. Emissions estimation methods and assumptions are the same as described in Section 4.4.2.1.3. As discussed in Chapter 3, the use of chaff and fuel dumping are rare occurrences and not part of training activities at Ault Field or OLF Coupeville; therefore, there would be no impacts to air quality from chaff or fuel dumping as a result of the Proposed Action. HAP emissions identified in MSAT regulations represent 24 percent of the reported aircraft VOC emissions (FAA, 2009)and also one-third of POV VOC emissions (AWMA, 2017).

Criteria pollutant emissions from the operations associated with the Proposed Action under Alternative 3, Scenario A, are provided in Table 4.4-13; Scenario B emissions are provided in Table 4.4-14; Scenario C emissions are provided in Table 4.4-15; Scenario D emissions are provided in Table 4.4-16; and Scenario E emissions are provided in Table 4.4-17. Total emissions presented below have been estimated using projected average Growler flight operations and increases in personnel. Detailed assumptions, emission factors, and calculations, as well as emissions estimates based on high-tempo Growler operations, have been presented in Appendix B.

Table 4.4-13 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 3, Scenario A

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 3, Scenario A						
Alternative 3A Emissions						
Ault Field Growler Aircraft	471.05	749.76	1998.04	41.62	215.30	215.30
OLF Growler Aircraft	175.52	4.08	88.72	11.50	48.72	48.72
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.40	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	**704.58**	**901.87**	**2,812.39**	**59.21**	**388.74**	**303.45**
Change in Emissions between No Action Alternative and Alternative 3A						
Ault Field Growler Aircraft	79.27	155.08	412.85	7.43	39.45	39.45
OLF Growler Aircraft	130.01	2.94	63.45	8.51	36.06	36.06
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.08	0.00	0.05	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	**224.74**	**202.78**	**679.09**	**17.78**	**91.66**	**85.12**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-14 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 3, Scenario B

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 3, Scenario B						
Alternative 3B Emissions						
Ault Field Growler Aircraft	495.30	728.58	1942.29	42.84	219.49	219.49
OLF Growler Aircraft	109.75	2.55	55.49	7.19	30.46	30.46
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.38	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	**663.04**	**879.15**	**2,723.41**	**56.13**	**374.68**	**289.39**
Change in Emissions between No Action Alternative and Alternative 3B						
Ault Field Growler Aircraft	103.52	133.90	357.11	8.66	43.65	43.65
OLF Growler Aircraft	64.24	1.41	30.22	4.20	17.81	17.81
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.07	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	**183.21**	**180.07**	**590.11**	**14.70**	**77.60**	**71.06**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-15 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 3, Scenario C

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 3, Scenario C						
Alternative 3C Emissions						
Ault Field Growler Aircraft	517.22	701.00	1869.57	43.83	222.36	222.36
OLF Growler Aircraft	43.93	1.02	22.20	2.88	12.19	12.19
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.37	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	**619.13**	**850.04**	**2,617.39**	**52.81**	**359.28**	**273.98**
Change in Emissions between No Action Alternative and Alternative 3C						
Ault Field Growler Aircraft	125.44	106.32	284.38	9.65	46.51	46.51
OLF Growler Aircraft	-1.58	-0.12	-3.07	-0.11	-0.46	-0.46
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.06	0.00	0.03	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	**139.29**	**150.96**	**484.08**	**11.38**	**62.19**	**55.65**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-16 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 3, Scenario D

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.312	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 3, Scenario D						
Alternative 3D Emissions						
Ault Field Growler Aircraft	479.10	742.54	1979.03	42.02	216.67	216.67
OLF Growler Aircraft	153.59	3.57	77.68	10.07	42.63	42.63
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.40	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	**690.69**	**894.13**	**2,782.34**	**58.18**	**384.03**	**298.74**
Change in Emissions between No Action Alternative and Alternative 3D						
Ault Field Growler Aircraft	87.32	147.86	393.84	7.83	40.83	40.83
OLF Growler Aircraft	108.08	2.43	52.41	7.08	29.98	29.98
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.08	0.00	0.05	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	**210.86**	**195.05**	**649.04**	**16.75**	**86.95**	**80.40**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 4.4-17 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 3, Scenario E

Operations	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
No Action Alternative Emissions						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**479.84**	**699.09**	**2,133.30**	**41.43**	**297.09**	**218.33**
Alternative 3, Scenario E						
Alternative 3E Emissions						
Ault Field Growler Aircraft	509.25	708.38	1889.01	43.44	221.02	221.02
OLF Growler Aircraft	65.93	1.53	33.35	4.32	18.30	18.30
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.38	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	**633.17**	**857.94**	**2,647.98**	**53.85**	**364.05**	**278.75**
Change in Emissions between No Action Alternative and Alternative 3E						
Ault Field Growler Aircraft	117.47	113.71	303.82	9.25	45.17	45.17
OLF Growler Aircraft	20.42	0.39	8.08	1.33	5.65	5.65
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.06	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	**153.33**	**158.85**	**514.67**	**12.42**	**66.96**	**60.42**

Note: all measurements in tons per year

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = Outlying Landing Field Coupeville
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
VOC = volatile organic compound

4.4.5 Air Quality Conclusions, Alternatives 1 through 3

4.4.5.1 Air Quality Conclusions, Average Operations

Total changes in ongoing annual emissions from changes to aircraft, POV, and stationary sources related to each of the alternatives have been summarized in Table 4.4-18. Construction emissions would occur before the Proposed Action is implemented and would be temporary; therefore, they are not included in these ongoing annual totals. Potential impacts to air quality from implementation of the Proposed Action when compared to the No Action Alternative would be similar between all three alternatives and scenarios but greatest under Alternative 2, Scenario A (see Table 4.4-10). For air emissions, the difference in aircraft emissions between the scenarios within each alternative is more distinctive than the differences between the alternatives (see Table 4.4-18).

Table 4.4-18 Total Change in Criteria Pollutant and GHG Emissions, All Alternatives

	Emissions (tpy)[2]						$MTCO_2e$
Alternative	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Alternative 1							
Scenario A	229.1	190.3	638.1	18.0	90.8	84.4	39,405
Scenario B	183.3	159.8	527.0	14.5	74.7	68.2	31,923
Scenario C	139.7	135.9	433.5	11.3	59.9	53.5	24,941
Scenario D	214.3	182.1	606.3	16.9	85.8	79.4	37,044
Scenario E	150.9	144.2	465.7	12.1	64.0	57.5	26,807
Alternative 2							
Scenario A	227.5	209.0	691.2	18.1	98.6	86.6	40,284
Scenario B	183.4	179.5	584.3	14.8	83.1	71.1	33,078
Scenario C	141.6	156.2	493.8	11.7	68.9	56.9	26,380
Scenario D	213.5	201.1	661.0	17.1	93.9	81.9	38,051
Scenario E	155.7	164.2	524.8	12.7	73.8	61.7	28,652
Alternative 3							
Scenario A	225.1	206.4	679.3	17.9	91.7	85.1	39,329
Scenario B	183.6	183.7	590.3	14.9	77.6	71.1	32,675
Scenario C	139.6	154.5	484.3	11.5	62.2	55.7	25,513
Scenario D	211.2	198.6	649.2	16.9	87.0	80.4	37,102
Scenario E	153.7	162.4	514.9	12.6	67.0	60.4	27,766

Key:
CO = carbon monoxide
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MT = metric tons
NO_x = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide
tpy = tons per year
VOC = volatile organic compound

For all three alternatives, Scenario A, the option to conduct 80 percent of FCLPs at OLF Coupeville and 20 percent of FCLPs at Ault Field, would result in the greater increase in emissions. Since air emissions calculations require specific operation counts by type, the data used for these calculations were obtained from the noise analysis (see Appendix A). Differences are less a result of the number of operations as they are due to the different type of operations (e.g., more Landing and Take-off Operations (LTOs) may be conducted at Ault Field if FCLPs are relocated to OLF Coupeville, and LTOs produce more emissions per operation than FCLPs. A smaller increase is a result of the transit back and forth from the OLF.

The majority of total emissions from all alternatives as well as the increase in emissions under Alternatives 1 and 2 would occur at Ault Field, occurring on or over the aircraft runways and taxiways. While the increased operations at OLF Coupeville would result in a three-fold increase in emissions at the OLF under Scenario A (See Table 4.4-3), operations at OLF Coupeville do not include many ground-level flight modes or have frequent AB use. Therefore, the total emissions at OLF Coupeville are low compared to the emissions at Ault Field. For example, the emissions of carbon monoxide and VOCs at

OLF Coupeville are 4 percent and 1 percent of total emissions of these pollutants and represent 10 percent and 2 percent of the total change in emissions, respectively.

Changes in construction and stationary source emissions would not be significant. Changes in mobile emissions are not subject to permit requirements or emission thresholds. These emissions contribute to regional emission totals and can affect compliance with NAAQS. The region is currently in attainment for all NAAQS, and the Northwest Clean Air Agency continues to monitor ambient air emission levels to confirm continued compliance. The Northwest Clean Air Agency has reviewed this air quality analysis and has not provided comments to the Navy (Buford, 2017). The annual emissions quantified for this analysis would be dispersed over a large area at two different sites, and most emissions would occur on Ault Field. Therefore, these emissions would not be likely to cause exceedances of the NAAQS and HAPs are not likely to be significant.

Air Quality within the NWCAA Jurisdiction is considered good. In 2016, Washington's DOE submitted recommended designation information for the 2015 eight-hour ozone NAAQS (70 ppb), noting that 2013-2015 ambient air data collected at Anacortes established a design value of 42 ppb, the lowest level in the state and significantly lower than the standard. (Bellon, 2016).

The DoD, Navy, and NAS Whidbey Island have implemented policies and programs to reduce energy and GHG emissions, which have also reduced criterial pollutant emissions. NAS Whidbey Island has implemented strategies and programs to reduce emissions from the NAS Whidbey Island complex. Improved energy efficiency through implementation of several building renovation projects has reduced overall facility energy usage by 40 percent between 2003 and 2015. NAS Whidbey Island will continue to work toward the achievement of DoD's GHG and energy reduction goals (NAS Whidbey Island, 2016).

Further discussion of the impacts of GHG emissions and climate change are provided in Section 4.16. Cumulative impacts to air quality are discussed in Chapter 5.

4.4.5.2 Air Quality Conclusions, High-Tempo Operations

Emissions would also be higher under the high-tempo FCLP year conditions across all three alternatives, although the difference varies depending on the type of emissions (see Table 4.4-19 and Appendix B for details). High-tempo FCLP year conditions would produce 2 to 9 percent more emissions under Alternative 2, compared to average conditions. Under Alternatives 1 and 3, high-tempo FCLP year conditions would produce 3 to 7 percent more emissions of nitrogen oxides, sulfur dioxide, particulate matter greater than 10 microns in diameter, and particulate matter greater than 2.5 microns in diameter, while VOC and carbon monoxide emissions would be the same or 1 to 3 percent less than average conditions. The variation in increases by type of emission is a result of not only changes in the number of operations but also in the type of operation. There would be no difference in stationary or construction emissions compared to average operations.

Table 4.4-19 Total Change in Criteria Pollutant and GHG Emissions, High-Tempo, All Alternatives

	Emissions (tpy)[2]						$MTCO_2e$
Alternative/Scenario	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Alternative 1							
Scenario A	239.7	187.6	639.0	18.6	93.4	87.0	40,858
Scenario B	190.0	156.6	523.4	14.9	76.1	69.7	32,795
Scenario C	142.8	132.2	425.8	11.4	60.3	53.9	25,273
Scenario D	223.7	178.6	604.1	17.4	87.9	81.5	38,283
Scenario E	159.0	141.3	461.1	12.6	65.8	59.4	27,875
Alternative 2							
Scenario A	241.6	218.1	723.3	19.2	103.6	91.5	42,575
Scenario B	193.4	185.4	604.9	15.5	86.5	74.5	34,683
Scenario C	148.0	161.4	509.5	12.1	71.3	59.2	27,432
Scenario D	226.0	209.5	690.0	18.0	98.3	86.2	40,082
Scenario E	163.5	170.1	543.3	13.3	76.5	64.5	29,916
Alternative 3							
Scenario A	235.4	204.7	682.9	18.6	94.2	87.7	40,734
Scenario B	191.0	182.8	593.2	15.3	79.6	73.0	33,720
Scenario C	143.3	153.2	482.9	11.8	63.1	56.5	26,005
Scenario D	219.8	196.0	649.3	17.4	89.0	82.4	38,239
Scenario E	158.8	161.9	516.5	12.9	68.3	61.8	28,488

Key:
CO = carbon monoxide
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MT = metric tons
NO_x = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide
tpy = tons per year
VOC = volatile organic compound

4.5 Land Use

The location and extent of a Proposed Action needs to be evaluated for its potential effects on a project site and adjacent land uses. The foremost factor affecting a Proposed Action in terms of land use is its compatibility with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a Proposed Action, the duration of a proposed activity, and its permanence.

The study area for analysis of potential impacts to land use compatibility and recreation and wilderness is land within the DNL contours and conceptual APZs for the No Action Alternative and each action alternative. Areas of water within DNL contours were not included in the study area or analysis. Small gaps in the land use data used in this analysis exist (i.e., land use data did not cover wetlands), and these gaps are represented as "Other" in the analysis below. These gaps do not represent a significant gap in data and do not impact the analysis presented in this section.

4.5.1 Land Use, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to land use. Therefore, no impacts would occur with implementation of the No Action Alternative.

4.5.2 Land Use, Alternatives 1 through 3

The analysis was conducted to compare land use between the DNL contours and within conceptual APZs under each alternative with the No Action Alternative in terms of on-station land use, regional land use, land use controls, and land use compatibility in Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville. The assessment for potential impacts to recreation and wilderness areas under the Proposed Action considers the potential for aircraft noise resulting from the proposed changes in operations under the alternatives and scenarios to noticeably affect the recreational experiences of visitors to these areas. The impacts assessment also considers the potential for the Proposed Action to impact the implementation of park management plans. No activities are proposed that would occur directly within the property boundaries of parks or recreation areas.

Land Use

Land Use Compatibility
The Proposed Action would result in an increase in the land area within the projected greater than 65 dB DNL noise contours (range of 9 to 18 percent).

Under all action alternatives and scenarios, the Proposed Action would have no impact to on-station land use, on-station land use controls or regional land use.

For the purposes of this analysis, conceptual APZs for OLF Coupeville are proposed for some action alternatives. Land within the conceptual APZs associated with OLF Coupeville would increase under each action alternative. The Navy's official recommendation for APZs at OLF Coupeville will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish an APZ for OLF Coupeville and to adopt zoning restrictions taking into account a wide range of land-use factors, including the Navy's recommendations (see Sections 4.3.2.3 and 4.5.2.1 for more details on the AICUZ study and land use compatibility).

Recreation and Wilderness
All alternatives would have localized significant impacts to recreation at Ebey's Landing National Historical Reserve, various county and municipal parks, and private recreational facilities as a result of increased annual average noise levels. There would be no significant impacts to recreation as a result of increased demand and no significant impacts to wilderness areas.

As noted in Section 3.1, this analysis is concentrated on the average year; however, for purposes of comparison, the high-tempo FCLP year is included in Appendix E, Land Use Data, High-tempo FCLP Year.

4.5.2.1 Potential Impacts, Land Use Compatibility

4.5.2.1.1 On-station Land Use

Primary construction projects associated with all alternatives would occur at Ault Field. New construction under all alternatives to support new Growler aircraft and personnel would include additional armament storage, hangar facilities, mobile maintenance facility storage area, and expanded personnel parking areas. The three alternatives would require repairs to inactive taxiways for aircraft parking, in addition to expanded hangar space. Under Alternative 2, a two-squadron hangar would be constructed on the flight line either adjacent to Hangar 5 or at the site of existing Hangar 1. For the three alternatives, Hangar 12 would be expanded to accommodate additional training squadron aircraft. The locations of the proposed construction projects are shown in Figure 2.3-1.

Most of the new construction would occur at the north end of Ault Field, on or adjacent to areas currently developed to support airfield operations. Construction of new facilities in this area would be consistent with existing land uses, and no impacts to on-station land use at the NAS Whidbey Island complex would occur. No construction would be required at OLF Coupeville; therefore, no impacts to on-station land use would occur at the OLF.

4.5.2.1.1.1 On-station Land Use Controls

The NAS Whidbey Island Installation Development Plan provides a comprehensive framework for the orderly physical development of the installation and reflects the NAS Whidbey Island complex's official direction on facility and site development planning. The installation development plan establishes a vision for the installation's physical infrastructure and places intentional emphasis on mission requirements, developmental constraints and opportunities, and courses of action that will lead to the optimal use of lands, facilities, and resources that elevate the installation's long-range (25-year) performance. The Proposed Action would meet the needs of a changing mission, and, therefore, implementation of the Proposed Action under all alternatives would be consistent with the goals and objectives of the NAS Whidbey Island Installation Development Plan and therefore a beneficial impact.

The Proposed Action would have no effect on management practices currently implemented under the Integrated Natural Resources Management Plan or the Integrated Cultural Resources Management Plan. The Navy would coordinate construction occurring within any sites listed in the Land Use Controls Implementation Plan with the USEPA to ensure institutional controls would remain in place.

4.5.2.1.2 Regional Land Use

The impact analysis for regional land use focuses on the changes in personnel, DNL noise contours, and land area within conceptual APZs at OLF Coupeville, as well as growth-induced development related to the Proposed Action. A land use analysis comparing the proposed DNL noise contours and conceptual APZs to the No Action Alternative is included later in this section.

The Proposed Action would increase total population in Island County by less than 1.5 percent and total population in Skagit County by approximately 0.2 percent across all alternatives. See Section 4.10.2.1 for more details. The Proposed Action would not result in indirect growth-induced development in Island County or Skagit County. The slight increase in personnel that would occur under the alternatives would not be anticipated to result in any growth-induced impacts or change existing land use patterns. Consequently, regional land use would not be adversely impacted by the Proposed Action.

The Proposed Action may have a long-term impact on the character of communities. The Proposed Action would result in a larger area of land within the DNL noise contours and APZs, thereby affecting a larger portion of the population and the community character for those populations. While impacts are expected, the determination of whether impacts are positive or negative cannot be made. Change would occur in the affected communities, but how this change is viewed is subjective and would vary from individual to individual. This section, therefore, seeks to identify expected changes that could occur to the community character of the impacted communities within the 65 dB DNL noise contour. The analysis does not make a judgement as to whether such change is beneficial or harmful to the local community character.

Community character is constantly in a state of flux; a community's sense of place is changeable and adapts as social, demographic, and economic conditions change. When these changes are gradual, residents are given time to adapt and acclimate to new conditions. When these changes are abrupt and dramatic, residents are more likely to be affected negatively by the changes. The Navy has been operating at the NAS Whidbey Island complex for more than 75 years, and the complex has served as the home base location for the Navy's tactical Electronic Warfare community for more than 45 years. Since the 1960s, the Navy has continuously used OLF Coupeville for FCLP, with periods of lower and higher activity, depending on Navy mission requirements. For each alternative and scenario, total airfield operations would increase but levels would be similar to historical levels of operations between the late 1970s and the 1990s. Therefore, while the Proposed Action may have a long-term impact on the character of communities, this impact would not be significant.

4.5.2.1.2.1 Regional (Off-station) Land Use Controls

The Proposed Action would result in larger DNL noise contours and noise exposure, encompassing a larger land area. The Navy's AICUZ guidance recommends lower-density land uses within 65 dB DNL noise contours (see Table 3.5-1). With the changes in the DNL noise contours associated with the Proposed Action, land uses previously considered compatible may become incompatible per AICUZ recommendations; therefore, off-station land use controls may be impacted as a result.

The Navy has encouraged Island County to establish Accident Potential Zones (APZs) around OLF Coupeville and to establish land use controls and building standards appropriate for high noise areas. The Navy would continue to work with Island County, the City of Oak Harbor, and the Town of Coupeville as needed to plan for compatible use development within the projected DNL contours and conceptual APZs under all alternatives. As discussed in Section 3.5.2.2, Regional Land Use and Land Use Controls, the Navy has made positive changes through the Readiness and Environmental Protection Integration (REPI) Program, conservation easements, and navigation easements to ensure conservation and minimize the potential for incompatibility. In addition, the establishment of Ebey's Reserve (of which the Navy is one of the many land owners) as well as the Navy's REPI program have help to ensure compatible land use and development around OLF Coupeville. The Navy would also refer to the

Washington Department of Commerce's December 2016 Civilian-Military Land Use Study to identify ways, if needed, to address potential land use conflicts with local jurisdictions.

Pursuant to the federal Coastal Zone Management Act and the state's Washington Coastal Zone Management Program, concurrence was received from Joe Burear, section manager of the Shorelands and Environmental Assistance Program of the State of Washington Department of Ecology, on September 20, 2017. Results of consultation with the State of Washington are included in Appendix C.

4.5.2.1.3 Land Use in the Noise Environment

4.5.2.1.3.1 DNL Noise Contours

Aircraft operations associated with home basing 35 or 36 additional Growler aircraft at the NAS Whidbey Island complex would result in an increase in the land area within the greater than 65 dB DNL noise contours when compared to the No Action Alternative. An analysis was conducted to compare projected DNL noise contours with the No Action Alternative in terms of compatibility with land uses in Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville. This was accomplished by comparing projected DNL contours and land use within Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville (see Figure 3.5-1).

Tables 4.5-1 through 4.5-15 show the changes in land use acreage around the NAS Whidbey Island complex under Alternatives 1 through 3 resulting from the addition of 35 or 36 Growler aircraft when compared to the No Action Alternative. Figures 4.5-1 through 4.5-6 show existing land use overlain with the noise contours associated with each alternative and scenario.

When compared with the No Action Alternative, the alternatives would result in an overall 9-percent to 18-percent increase in the acreage of land within the projected greater than 65 dB DNL noise contours.

- The largest increases in land use impacted by the greater than 65 dB DNL noise contours occur under Scenarios A and D across all alternatives.
- The smallest increases in land use impacted by the greater than 65 dB DNL noise contours occur under Scenario C (80 percent of operations at Ault Field and 20 percent at OLF Coupeville).
- Across all alternatives and scenarios surrounding Ault Field, agricultural land, parks, and other land categories experience the greatest increase in acreage within the greater than 65 dB DNL noise contours.
- Across all alternatives for Scenarios A and B surrounding OLF Coupeville, open space/forest and residential land categories experience the greatest increase in acreage within the greater than 65 dB DNL noise contours.
- Across all alternatives for Scenario C surrounding OLF Coupeville, the residential land category experiences the greatest increase, while park land decreases, in acreage within the greater than 65 dB DNL noise contours.
- Across all alternatives under Scenarios D and E surrounding OLF Coupeville, open space/forest, residential, rural, and transportation land categories experience the greatest increase, while agriculture and commercial land decrease, in acreage within the greater than 65 dB DNL noise contours.

Table 4.5-1 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario A, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	495 (+180)	234 (-76)	590 (+84)	1,319 (+17%)
Commercial	78	170	90	338	93 (+15)	155 (-15)	92 (+2)	340 (+1%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	64 (+8)	300 (-22)	197 (+13)	561 (0%)
Open Space/Forest	597	323	172	1,092	477 (-120)	414 (+91)	247 (+75)	1,138 (+4%)
Parks	471	185	245	901	617 (+146)	234 (+49)	250 (+5)	1,101 (+22%)
Residential[4]	1,585	1,330	2,648	5,563	1,750 (+165)	1,313 (-17)	2,775 (+127)	5,838 (+5%)
Rural[5]	361	517	1,350	2,228	369 (+8)	507 (-10)	1,415 (+65)	2,291 (+3%)
Transportation[6]	121	112	342	575	133 (+12)	102 (-10)	356 (+14)	591 (+3%)
Other[7]	11	0	0	11	34 (+23)	0 (0)	0 (0)	34 (+209%)
Subtotal	3,596	3,269	5,549	12,414	4,033 (+437)	3,259 (-10)	5,934 (+385)	13,226 (+7%)
OLF Coupeville								
Agriculture	837	705	30	1,572	326 (-511)	477 (-228)	1,081 (+1,051)	1,884 (+20%)
Commercial	1	0	0	1	2 (+1)	0 (0)	0 (0)	2 (+100%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	315 (-57)	420 (+114)	441 (+343)	1,176 (+52%)
Parks	47	7	0	54	59 (+12)	4 (-3)	0 (0)	63 (+17%)
Residential[4]	1,388	1,019	229	2,636	442 (-946)	1,444 (+425)	2,100 (+1,871)	3,986 (+51%)
Rural[5]	896	954	215	2,065	340 (-556)	816 (-138)	1,511 (+1,296)	2,667 (+29%)
Transportation[6]	135	80	47	262	78 (-57)	87 (+7)	212 (+165)	377 (+44%)
Other[7]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-1 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario A, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	1,562 (-2,119)	3,248 (+160)	5,387 (+4,749)	10,197 (+38%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**5,595 (-1,682)**	**6,507 (+150)**	**11,321 (+5,134)**	**23,423 (+18%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-2 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario B, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario B (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	504 (+189)	227 (-83)	626 (+120)	1,357 (+20%)
Commercial	78	170	90	338	43 (-35)	202 (+32)	102 (+12)	347 (+3%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	316 (-6)	242 (+58)	562 (0%)
Open Space/Forest	597	323	172	1,092	447 (-150)	442 (+119)	262 (+90)	1,151 (+5%)
Parks	471	185	245	901	677 (+206)	228 (+43)	288 (+43)	1,193 (+32%)
Residential[4]	1,585	1,330	2,648	5,563	1,711 (+126)	1,253 (-77)	3,044 (+396)	6,008 (+8%)
Rural[5]	361	517	1,350	2,228	377 (+16)	501 (-16)	1,470 (+120)	2,348 (+5%)
Transportation[6]	121	112	342	575	128 (+7)	102 (-10)	377 (+35)	607 (+6%)
Other[7]	11	0	0	11	30 (+19)	0 (0)	0 (0)	30 (+173%)
Subtotal	3,596	3,269	5,549	12,414	3,922 (+326)	3,271 (+2)	6,423 (+874)	13,616 (+10%)
OLF Coupeville								
Agriculture	837	705	30	1,572	391 (-446)	514 (-191)	820 (+790)	1,725 (+10%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	315 (-57)	398 (+92)	326 (+228)	1,039 (+34%)
Parks	47	7	0	54	19 (-28)	0 (-7)	0 (0)	19 (-65%)
Residential[4]	1,388	1,019	229	2,636	763 (-625)	1,581 (+562)	1,460 (+1,231)	3,804 (+44%)
Rural[5]	896	954	215	2,065	461 (-435)	849 (-105)	1,212 (+997)	2,522 (+22%)
Transportation[6]	135	80	47	262	65 (-70)	109 (+29)	165 (+118)	339 (+29%)
Other[7]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-2 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario B, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario B (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	2,015 (-1,666)	3,451 (+363)	4,025 (+3,387)	9,491 (+28%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**5,937 (-1,340)**	**6,722 (+365)**	**10,448 (+4,261)**	**23,107 (+17%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-3 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario C, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario C (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	438 (+123)	186 (-124)	690 (+184)	1,314 (+16%)
Commercial	78	170	90	338	50 (-28)	194 (+24)	114 (+24)	358 (+6%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	1 (-55)	289 (-33)	270 (+86)	560 (0%)
Open Space/Forest	597	323	172	1,092	456 (-141)	423 (+100)	272 (+100)	1,151 (+5%)
Parks	471	185	245	901	719 (+248)	255 (+70)	332 (+87)	1,306 (+45%)
Residential[4]	1,585	1,330	2,648	5,563	1,734 (+149)	1,197 (-133)	3,238 (+590)	6,169 (+11%)
Rural[5]	361	517	1,350	2,228	383 (+22)	468 (-49)	1,542 (+192)	2,393 (+7%)
Transportation[6]	121	112	342	575	125 (+4)	103 (-9)	390 (+48)	618 (+7%)
Other[7]	11	0	0	11	40 (+29)	0 (0)	0 (0)	40 (+264%)
Subtotal	3,596	3,269	5,549	12,414	3,947 (+351)	3,115 (-154)	6,860 (+1,311)	13,922 (+12%)
OLF Coupeville								
Agriculture	837	705	30	1,572	496 (-341)	716 (+11)	226 (+196)	1,438 (-9%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal[3]	0	2	7	9	0 (0)	1 (-1)	9 (+2)	10 (+11%)
Industrial	0	15	12	27	0 (0)	4 (-11)	23 (+11)	27 (0%)
Open Space/Forest	372	306	98	776	407 (+35)	245 (-61)	133 (+35)	785 (+1%)
Parks	47	7	0	54	1 (-46)	0 (-7)	0 (0)	1 (-98%)
Residential[4]	1,388	1,019	229	2,636	1,577 (+189)	1,260 (+241)	484 (+255)	3,321 (+26%)
Rural[5]	896	954	215	2,065	866 (-30)	829 (-125)	523 (+308)	2,218 (+7%)
Transportation[6]	135	80	47	262	100 (-35)	120 (+40)	67 (+20)	287 (+10%)
Other[7]	5	0	0	5	0 (-5)	5 (+5)	0 (0)	5 (0%)

Table 4.5-3 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario C, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario C (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	3,447 (-234)	3,180 (+92)	1,465 (+827)	8,092 (+9%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**7,394 (+117)**	**6,295 (-62)**	**8,325 (+2,138)**	**22,014 (+11%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-4 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario D, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario D (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	473 (+158)	210 (-100)	628 (+122)	1,311 (+16%)
Commercial	78	170	90	338	66 (-12)	180 (+10)	99 (+9)	345 (+2%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	29 (-27)	318 (-4)	215 (+31)	562 (0%)
Open Space/Forest	597	323	172	1,092	478 (-119)	406 (+83)	254 (+82)	1,138 (+4%)
Parks	471	185	245	901	640 (+169)	229 (+44)	280 (+35)	1,149 (+28%)
Residential[4]	1,585	1,330	2,648	5,563	1,738 (+153)	1,261 (-69)	2,924 (+276)	5,923 (+6%)
Rural[5]	361	517	1,350	2,228	376 (+15)	483 (-34)	1,453 (+103)	2,312 (+4%)
Transportation[6]	121	112	342	575	135 (+14)	97 (-15)	370 (+28)	602 (+5%)
Other[7]	11	0	0	11	40 (+29)	0 (0)	0 (0)	40 (+264%)
Subtotal	3,596	3,269	5,549	12,414	3,976 (+380)	3,184 (-85)	6,235 (+686)	13,395 (+8%)
OLF Coupeville								
Agriculture	837	705	30	1,572	327 (-510)	496 (-209)	1,013 (+983)	1,836 (+17%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	306 (-66)	425 (+119)	409 (+311)	1,140 (+47%)
Parks	47	7	0	54	49 (+2)	2 (-5)	0 (0)	51 (-6%)
Residential[4]	1,388	1,019	229	2,636	490 (-898)	1,525 (+506)	1,933 (+1,704)	3,948 (+50%)
Rural[5]	896	954	215	2,065	342 (-554)	845 (-109)	1,434 (+1,219)	2,621 (+27%)
Transportation[6]	135	80	47	262	73 (-62)	94 (+14)	201 (+154)	368 (+40%)
Other[7]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-4 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario D, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario D (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	1,588 (-2,093)	3,387 (+299)	5,032 (+4,394)	10,007 (+35%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**5,564 (-1,713)**	**6,571 (+214)**	**11,267 (+5,080)**	**23,402 (+18%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-5 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario E, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario E (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	443 (+128)	189 (-121)	682 (+176)	1,314 (+16%)
Commercial	78	170	90	338	48 (-30)	196 (+26)	110 (+20)	354 (+5%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	2 (-54)	298 (-24)	261 (+77)	561 (0%)
Open Space/Forest	597	323	172	1,092	457 (-140)	422 (+99)	268 (+96)	1,147 (+5%)
Parks	471	185	245	901	713 (+242)	245 (+60)	325 (+80)	1,283 (+42%)
Residential[4]	1,585	1,330	2,648	5,563	1,720 (+135)	1,212 (-118)	3,188 (+540)	6,120 (+10%)
Rural[5]	361	517	1,350	2,228	375 (+14)	474 (-43)	1,523 (+173)	2,372 (+6%)
Transportation[6]	121	112	342	575	125 (+4)	103 (-9)	386 (+44)	614 (+7%)
Other[7]	11	0	0	11	40 (+29)	0 (0)	0 (0)	40 (+264%)
Subtotal	3,596	3,269	5,549	12,414	3,924 (+328)	3,139 (-130)	6,755 (+1,206)	13,818 (+11%)
OLF Coupeville								
Agriculture	837	705	30	1,572	455 (-382)	598 (-107)	542 (+512)	1,595 (+1%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (+11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	413 (+41)	279 (-27)	200 (+102)	892 (+15%)
Parks	47	7	0	54	5 (-42)	0 (-7)	0 (0)	4 (-91%)
Residential[4]	1,388	1,019	229	2,636	1,303 (-85)	1,464 (+445)	819 (+590)	3,586 (+36%)
Rural[5]	896	954	215	2,065	759 (-137)	734 (-220)	874 (+659)	2,367 (+15%)
Transportation[6]	135	80	47	262	79 (-56)	119 (+39)	107 (+60)	305 (+16%)
Other[7]	5	0	0	5	0 (-5)	4 (+4)	1 (1)	5 (0%)

Table 4.5-5 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1, Scenario E, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario E (dB DNL)*			
Land Use	***65-<70***	***70-<75***	***>=75***	***Total***	***65-<70***	***70-<75***	***>=75***	***Total (% change from NAA)***
Subtotal	3,681	3,088	638	7,407	3,014 (-667)	3,198 (+110)	2,580 (+1,942)	8,792 (+19%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**6,938 (-339)**	**6,337 (-20)**	**9,335 (+3,148)**	**22,610 (+14%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-6 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario A, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	490 (+175)	226 (-84)	595 (+89)	1,311 (+16%)
Commercial	78	170	90	338	97 (+19)	151 (-19)	91 (+1)	339 (0%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	68 (+12)	299 (-23)	194 (+10)	561 (0%)
Open Space/Forest	597	323	172	1,092	482 (-115)	413 (+90)	241 (+69)	1,136 (+4%)
Parks	471	185	245	901	593 (+122)	231 (+46)	246 (+1)	1,070 (+19%)
Residential[4]	1,585	1,330	2,648	5,563	1,754 (+169)	1,330 (0)	2,747 (+99)	5,831 (+5%)
Rural[5]	361	517	1,350	2,228	368 (+7)	510 (-7)	1,406 (+56)	2,284 (+3%)
Transportation[6]	121	112	342	575	133 (+12)	103 (-9)	354 (+12)	590 (+3%)
Other[7]	11	0	0	11	29 (+18)	0 (0)	0 (0)	29 (+164%)
Subtotal	3,596	3,269	5,549	12,414	4,015 (+419)	3,263 (-6)	5,886 (+337)	13,164 (+6%)
OLF Coupeville								
Agriculture	837	705	30	1,572	326 (-511)	490 (-215)	1,040 (+1,010)	1,856 (+18%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	308 (-64)	425 (+119)	420 (+322)	1,153 (+49%)
Parks	47	7	0	54	53 (+6)	3 (-4)	0 (0)	56 (+4%)
Residential[4]	1,388	1,019	229	2,636	450 (-938)	1,531 (+512)	1,984 (+1,755)	3,965 (+50%)
Rural[5]	896	954	215	2,065	340 (-556)	839 (-115)	1,459 (+1,244)	2,638 (+28%)
Transportation[6]	135	80	47	262	75 (-60)	92 (+12)	204 (+157)	371 (+42%)
Other[7]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-6 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario A, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	1,553 (-2,128)	3,380 (+292)	5,149 (+4,511)	10,082 (+36%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**5,568 (-1,709)**	**6,643 (+286)**	**11,035 (+4,848)**	**23,246 (+17%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-7 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario B, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario B (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	489 (+174)	224 (-86)	626 (+120)	1,339 (+18%)
Commercial	78	170	90	338	43 (-35)	203 (+33)	101 (+11)	347 (+3%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	321 (-1)	237 (+53)	562 (0%)
Open Space/Forest	597	323	172	1,092	462 (-135)	427 (+104)	257 (+85)	1,146 (+5%)
Parks	471	185	245	901	661 (+190)	225 (+40)	284 (+39)	1,170 (+30%)
Residential[4]	1,585	1,330	2,648	5,563	1,706 (+121)	1,264 (-66)	3,016 (+368)	5,986 (+8%)
Rural[5]	361	517	1,350	2,228	379 (+18)	500 (-17)	1,462 (+112)	2,341 (+5%)
Transportation[6]	121	112	342	575	128 (+7)	102 (-10)	375 (+33)	605 (+5%)
Other[7]	11	0	0	11	26 (+15)	0 (0)	0 (0)	26 (+136%)
Subtotal	3,596	3,269	5,549	12,414	3,899 (+303)	3,266 (-3)	6,370 (+821)	13,535 (+9%)
OLF Coupeville								
Agriculture	837	705	30	1,572	407 (-430)	526 (-179)	775 (+745)	1,708 (+9%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	316 (-56)	395 (+89)	308 (+210)	1,019 (+31%)
Parks	47	7	0	54	14 (-33)	0 (-7)	0 (0)	14 (-74%)
Residential[4]	1,388	1,019	229	2,636	829 (-559)	1,589 (+570)	1,342 (+1,113)	3,760 (+43%)
Rural[5]	896	954	215	2,065	492 (-404)	847 (-107)	1,162 (+947)	2,501 (+21%)
Transportation[6]	135	80	47	262	65 (-70)	112 (+32)	155 (+108)	332 (+27%)
Other[7]	5	0	0	5	0 (-5)	1 (+1)	5 (+5)	6 (20%)

Table 4.5-7 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario B, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario B (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	2,124 (-1,557)	3,470 (+382)	3,784 (+3,146)	9,378 (+27%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**6,023 (-1,254)**	**6,736 (+379)**	**10,154 (+3,967)**	**22,913 (+16%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-8 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario C, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario C (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	436 (+121)	186 (-124)	685 (+179)	1,307 (+16%)
Commercial	78	170	90	338	48 (-30)	196 (+26)	110 (+20)	354 (+5%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	3 (-53)	298 (-24)	261 (+77)	562 (0%)
Open Space/Forest	597	323	172	1,092	463 (-134)	418 (+95)	265 (+93)	1,146 (+5%)
Parks	471	185	245	901	700 (+229)	243 (+58)	326 (+81)	1,269 (+41%)
Residential[4]	1,585	1,330	2,648	5,563	1,716 (+131)	1,213 (-117)	3,187 (+539)	6,116 (+10%)
Rural[5]	361	517	1,350	2,228	377 (+16)	473 (-44)	1,523 (+173)	2,373 (+7%)
Transportation[6]	121	112	342	575	124 (+3)	103 (-9)	386 (+44)	613 (+7%)
Other[7]	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,903 (+307)	3,130 (-139)	6,755 (+1,206)	13,788 (+11%)
OLF Coupeville								
Agriculture	837	705	30	1,572	499 (-338)	728 (+23)	175 (+145)	1,402 (-11%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal[3]	0	2	7	9	0 (0)	1 (-1)	9 (+2)	10 (+11%)
Industrial	0	15	12	27	0 (0)	4 (-11)	23 (+11)	27 (0%)
Open Space/Forest	372	306	98	776	400 (+28)	236 (-70)	124 (+26)	760 (-2%)
Parks	47	7	0	54	0 (-47)	0 (-7)	0 (0)	0 (-100%)
Residential[4]	1,388	1,019	229	2,636	1,576 (+188)	1,203 (+184)	441 (+212)	3,220 (+22%)
Rural[5]	896	954	215	2,065	863 (-33)	851 (-103)	455 (+240)	2,169 (+5%)
Transportation[6]	135	80	47	262	104 (-31)	120 (+40)	60 (+13)	284 (+8%)
Other[7]	5	0	0	5	0 (-5)	5 (+5)	0 (0)	5 (0%)

Table 4.5-8 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario C, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario C (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	3,442 (-239)	3,148 (+60)	1,287 (+649)	7,877 (+6%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**7,345 (+68)**	**6,278 (-79)**	**8,042 (+1,855)**	**21,665 (+9%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-9 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario D, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario D (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	468 (+153)	201 (-109)	633 (+127)	1,302 (+15%)
Commercial	78	170	90	338	71 (-7)	175 (+5)	98 (+8)	344 (+2%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	34 (-22)	316 (-6)	211 (+27)	561 (0%)
Open Space/Forest	597	323	172	1,092	485 (-112)	403 (+80)	249 (+77)	1,137 (+4%)
Parks	471	185	245	901	619 (+148)	225 (+40)	275 (+30)	1,119 (+24%)
Residential[4]	1,585	1,330	2,648	5,563	1,744 (+159)	1,328 (-2)	2,842 (+194)	5,914 (+6%)
Rural[5]	361	517	1,350	2,228	374 (+13)	486 (-31)	1,444 (+94)	2,304 (+3%)
Transportation[6]	121	112	342	575	135 (+14)	100 (-12)	365 (+23)	600 (+4%)
Other[7]	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,966 (+370)	3,234 (-35)	6,129 (+580)	13,329 (+7%)
OLF Coupeville								
Agriculture	837	705	30	1,572	337 (-500)	499 (-206)	970 (+940)	1,806 (+15%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (+11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	306 (-66)	419 (+113)	390 (+292)	1,115 (+58%)
Parks	47	7	0	54	42 (-5)	1 (-6)	0 (0)	43 (-20%)
Residential[4]	1,388	1,019	229	2,636	542 (-846)	1,564 (+545)	1,815 (+1,586)	3,921 (+49%)
Rural[5]	896	954	215	2,065	351 (-545)	862 (-92)	1,384 (+1,169)	2,597 (+26%)
Transportation[6]	135	80	47	262	72 (-63)	98 (+18)	192 (+145)	362 (+38%)
Other[7]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-9 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario D, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario D (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	1,651 (-2,030)	3,443 (+355)	4,793 (+4,155)	9,887 (+33%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**5,617 (-1,660)**	**6,677 (+320)**	**10,922 (+4,735)**	**23,216 (+17%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-10 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario E, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario E (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	442 (+127)	190 (-120)	676 (+170)	1,308 (+16%)
Commercial	78	170	90	338	46 (-32)	197 (+27)	107 (+17)	350 (+4%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	306 (-16)	252 (+68)	562 (0%)
Open Space/Forest	597	323	172	1,092	466 (-131)	418 (+95)	262 (+90)	1,146 (+5%)
Parks	471	185	245	901	693 (+222)	236 (+51)	318 (+73)	1,247 (+38%)
Residential[4]	1,585	1,330	2,648	5,563	1,708 (+123)	1,226 (-104)	3,140 (+492)	6,074 (+9%)
Rural[5]	361	517	1,350	2,228	378 (+17)	476 (-41)	1,507 (+157)	2,361 (+6%)
Transportation[6]	121	112	342	575	125 (+4)	103 (-9)	383 (+41)	611 (+6%)
Other[7]	11	0	0	11	35 (+24)	0 (0)	0 (+0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,898 (+302)	3,152 (-117)	6,657 (+1,108)	13,707 (+10%)
OLF Coupeville								
Agriculture	837	705	30	1,572	465 (-372)	609 (-96)	497 (+467)	1,571 (0%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (-11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	417 (+45)	273 (-33)	185 (+87)	875 (+13%)
Parks	47	7	0	54	5 (-42)	0 (-7)	0 (0)	5 (-91%)
Residential[4]	1,388	1,019	229	2,636	1,375 (-13)	1,422 (+403)	769 (+540)	3,566 (+35%)
Rural[5]	896	954	215	2,065	791 (-105)	731 (-223)	823 (+608)	2,345 (+14%)
Transportation[6]	135	80	47	262	83 (-52)	117 (+37)	102 (+55)	302 (+15%)
Other[7]	5	0	0	5	0 (-5)	5 (+5)	0 (0)	5 (0%)

Table 4.5-10 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2, Scenario E, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario E (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	3,136 (-545)	3,157 (+69)	2,413 (+1,775)	8,706 (+18%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**7,034 (-243)**	**6,309 (-48)**	**9,070 (+2,883)**	**22,413 (+13%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-11 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario A, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	483 (+168)	230 (-80)	590 (+84)	1,303 (+15%)
Commercial	78	170	90	338	98 (+20)	150 (-20)	91 (+1)	339 (0%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	69 (+13)	299 (-23)	193 (+9)	561 (0%)
Open Space/Forest	597	323	172	1,092	487 (-110)	409 (+86)	239 (+67)	1,135 (+4%)
Parks	471	185	245	901	587 (+116)	231 (+46)	245 (0)	1,063 (+18%)
Residential[4]	1,585	1,330	2,648	5,563	1,751 (+166)	1,328 (-2)	2,740 (+92)	5,819 (+5%)
Rural[5]	361	517	1,350	2,228	368 (+7)	512 (-5)	1,403 (+53)	2,283 (+2%)
Transportation[6]	121	112	342	575	133 (+12)	103 (-9)	353 (+11)	589 (+2%)
Other[7]	11	0	0	11	28 (+17)	0 (0)	0 (0)	28 (+155%)
Subtotal	3,596	3,269	5,549	12,414	4,005 (+409)	3,262 (-7)	5,866 (+317)	13,133 (+6%)
OLF Coupeville								
Agriculture	837	705	30	1,572	329 (-508)	483 (-222)	1,057 (+1,027)	1,869 (+19%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	312 (-60)	423 (+117)	428 (+330)	1,163 (+50%)
Parks	47	7	0	54	55 (+8)	4 (-3)	0 (0)	59 (+9%)
Residential[4]	1,388	1,019	229	2,636	448 (-940)	1,494 (+475)	2,031 (+1,802)	3,973 (+51%)
Rural[5]	896	954	215	2,065	341 (-555)	829 (-125)	1,480 (+1,265)	2,650 (+28%)
Transportation[6]	135	80	47	262	77 (-58)	90 (+10)	208 (+161)	375 (+43%)
Other[7]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-11 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario A, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	1,563 (-2,118)	3,323 (+235)	5,246 (+4,608)	10,132 (+37%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**5,568 (-1,709)**	**6,585 (+228)**	**11,112 (+4,925)**	**23,265 (+17%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-12 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario B, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario B (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	496 (+181)	223 (-87)	626 (+120)	1,345 (+19%)
Commercial	78	170	90	338	43 (-35)	203 (+33)	100 (+10)	346 (+2%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	322 (0)	235 (+51)	561 (0%)
Open Space/Forest	597	323	172	1,092	462 (-135)	429 (+106)	257 (+85)	1,148 (+5%)
Parks	471	185	245	901	661 (+190)	225 (+40)	282 (+37)	1,168 (+30%)
Residential[4]	1,585	1,330	2,648	5,563	1,707 (+122)	1,267 (-63)	3,010 (+362)	5,984 (+8%)
Rural[5]	361	517	1,350	2,228	379 (+18)	500 (-17)	1,460 (+110)	2,339 (+5%)
Transportation[6]	121	112	342	575	128 (+7)	102 (-10)	375 (+33)	605 (+5%)
Other[7]	11	0	0	11	26 (+15)	0 (0)	0 (0)	26 (+136%)
Subtotal	3,596	3,269	5,549	12,414	3,907 (+311)	3,271 (+2)	6,357 (+808)	13,535 (+9%)
OLF Coupeville								
Agriculture	837	705	30	1,572	397 (-440)	519 (-186)	802 (+772)	1,718 (90%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	316 (+56)	396 (+90)	319 (+221)	1,031 (+33%)
Parks	47	7	0	54	17 (-30)	0 (-7)	0 (0)	17 (-69%)
Residential[4]	1,388	1,019	229	2,636	788 (-600)	1,585 (+566)	1,415 (+1,186)	3,788 (+44%)
Rural[5]	896	954	215	2,065	474 (-422)	848 (-106)	1,192 (+977)	2,514 (+22%)
Transportation[6]	135	80	47	262	65 (-70)	110 (+30)	161 (+114)	336 (+28%)
Other[7]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-12 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario B, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario B (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	2,058 (-1,623)	3,458 (+370)	3,931 (+3,293)	9,447 (+28%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**5,965 (-1,312)**	**6,729 (+372)**	**10,288 (+4,101)**	**22,982 (+16%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-13 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario C, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario C (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	431 (+116)	183 (-127)	687 (+181)	1,301 (+15%)
Commercial	78	170	90	338	48 (-30)	197 (+27)	109 (+19)	354 (+5%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	3 (-53)	299 (-23)	259 (+75)	561 (0%)
Open Space/Forest	597	323	172	1,092	467 (-130)	415 (+92)	264 (+92)	1,146 (+5%)
Parks	471	185	245	901	698 (+227)	241 (+56)	324 (+79)	1,263 (+40%)
Residential[4]	1,585	1,330	2,648	5,563	1,713 (+128)	1,218 (-112)	3,181 (+533)	6,112 (+10%)
Rural[5]	361	517	1,350	2,228	377 (+16)	473 (-44)	1,519 (+169)	2,369 (+6%)
Transportation[6]	121	112	342	575	124 (+3)	103 (-9)	385 (+43)	612 (+6%)
Other[7]	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,897 (+301)	3,129 (-140)	6,740 (+1,191)	13,766 (+11%)
OLF Coupeville								
Agriculture	837	705	30	1,572	497 (-340)	719 (+14)	208 (+178)	1,424 (-9%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal[3]	0	2	7	9	0 (0)	1 (-1)	9 (+2)	10 (11%)
Industrial	0	15	12	27	0 (0)	4 (-11)	23 (+11)	27 (0%)
Open Space/Forest	372	306	98	776	404 (+32)	242 (-64)	129 (+31)	775 (0%)
Parks	47	7	0	54	0 (-47)	0 (-7)	0 (0)	0 (-100%)
Residential[4]	1,388	1,019	229	2,636	1,570 (+182)	1,238 (+219)	468 (+239)	3,276 (+24%)
Rural[5]	896	954	215	2,065	860 (-36)	838 (-116)	497 (+282)	2,195 (+6%)
Transportation[6]	135	80	47	262	101 (-34)	121 (+41)	64 (+17)	286 (+9%)
Other[7]	5	0	0	5	0 (-4)	5 (+4)	0 (0)	5 (0%)

Table 4.5-13 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario C, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario C (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	3,432 (-249)	3,168 (+80)	1,398 (+760)	7,998 (+8%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**7,329 (+52)**	**6,297 (-60)**	**8,138 (+1,951)**	**21, 764 (+10%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-14 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario D, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario D (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	462 (+147)	205 (-105)	628 (+122)	1,295 (+15%)
Commercial	78	170	90	338	71 (-7)	175 (+5)	98 (+8)	344 (+2%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	36 (-20)	316 (-6)	210 (+26)	562 (0%)
Open Space/Forest	597	323	172	1,092	489 (-108)	399 (+76)	248 (+76)	1,136 (+4%)
Parks	471	185	245	901	616 (+145)	225 (+40)	273 (+28)	1,114 (+24%)
Residential[4]	1,585	1,330	2,648	5,563	1,738 (+153)	1,326 (-4)	2,835 (+187)	5,899 (+6%)
Rural[5]	361	517	1,350	2,228	375 (+14)	486 (-31)	1,441 (+91)	2,302 (+3%)
Transportation[6]	121	112	342	575	135 (+14)	101 (-11)	364 (+22)	600 (+4%)
Other[7]	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,958 (+362)	3,233 (-36)	6,109 (+560)	13,300 (+7%)
OLF Coupeville								
Agriculture	837	705	30	1,572	319 (-518)	511 (-194)	988 (+958)	1,818 (+16%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	302 (-70)	428 (+122)	398 (+300)	1,128 (+45)
Parks	47	7	0	54	45 (-2)	2 (-5)	0 (0)	47 (-13%)
Residential[4]	1,388	1,019	229	2,636	499 (-889)	1,570 (+551)	1,862 (+1,633)	3,931 (+49%)
Rural[5]	896	954	215	2,065	343 (-553)	859 (-95)	1,404 (+1,189)	2,606 (+26%)
Transportation[6]	135	80	47	262	73 (-62)	97 (+17)	196 (+149)	366 (+40%)
Other[7]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-14 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario D, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario D (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	1,582 (-2,099)	3,467 (+379)	4,890 (+4,252)	9,939 (+34%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**5,540 (-1,737)**	**6,700 (+343)**	**10,999 (+4,812**	**23,239 (+17%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

Table 4.5-15 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario E, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario E (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Ault Field								
Agriculture	315	310	506	1,131	436 (+121)	187 (-123)	678 (+172)	1,301 (+15%)
Commercial	78	170	90	338	45 (-33)	198 (+28)	107 (+17)	350 (+4%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	307 (-15)	251 (+67)	562 (0%)
Open Space/Forest	597	323	172	1,092	470 (-127)	415 (+92)	261 (+89)	1,146 (+5%)
Parks	471	185	245	901	676 (+205)	235 (+50)	317 (+72)	1,228 (+36%)
Residential[4]	1,585	1,330	2,648	5,563	1,704 (+119)	1,230 (-100)	3,130 (+482)	6,064 (+9%)
Rural[5]	361	517	1,350	2,228	379 (+18)	476 (-41)	1,505 (+155)	2,360 (+6%)
Transportation[6]	121	112	342	575	125 (+4)	103 (-9)	382 (+40)	610 (+6%)
Other[7]	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,875 (+279)	3,151 (-118)	6,643 (+1,094)	13,669 (+10%)
OLF Coupeville								
Agriculture	837	705	30	1,572	459 (-378)	601 (-104)	526 (+496)	1,586 (+1%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal[3]	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	415 (+43)	276 (-30)	195 (+97)	886 (+14%)
Parks	47	7	0	54	5 (-42)	0 (-7)	0 (0)	5 (-91%)
Residential[4]	1,388	1,019	229	2,636	1,332 (-56)	1,447 (+428)	799 (+570)	3,578 (+36%)
Rural[5]	896	954	215	2,065	772 (-124)	732 (-222)	855 (+640)	2,359 (+14%)
Transportation[6]	135	80	47	262	80 (-55)	118 (+38)	105 (+58)	303 (+16%)
Other[7]	5	0	0	5	0 (-5)	4 (+4)	1 (+1)	5 (0%)

Table 4.5-15 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3, Scenario E, during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario E (dB DNL)*			
Land Use	*65-<70*	*70-<75*	*>=75*	*Total*	*65-<70*	*70-<75*	*>=75*	*Total (% change from NAA)*
Subtotal	3,681	3,088	638	7,407	3,063 (-618)	3,178 (+90)	2,518 (+1,880)	8,759 (+18%)
TOTAL[8]	**7,277**	**6,357**	**6,187**	**19,821**	**6,938 (-339)**	**6,329 (-28)**	**9,161 (+2,974)**	**22,428 (+13%)**

Notes:

[1] The difference between No Action Alternative and Alternative 1 is noted in parentheses.

[2] Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).

[3] "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

[4] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[5] "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[6] The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

[7] "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

[8] Acreages have been rounded to ensure totals sum.

Key:
dB = decibel
DNL = day-night average sound level

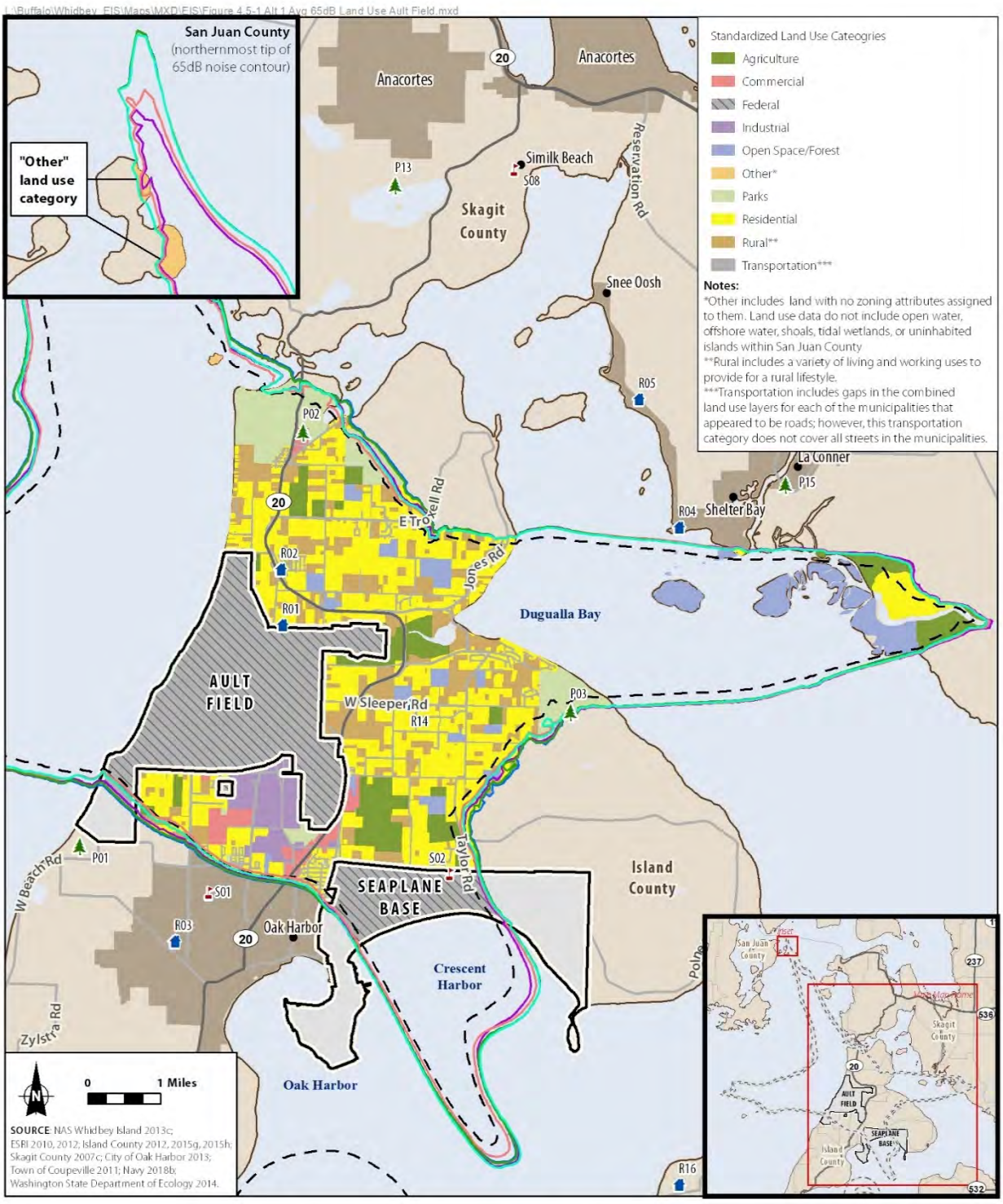

Figure 4.5-1
Alternative 1 Overview of the 65 dB DNL Noise Contours and Land Use for Ault Field
Whidbey Island, Island County, WA

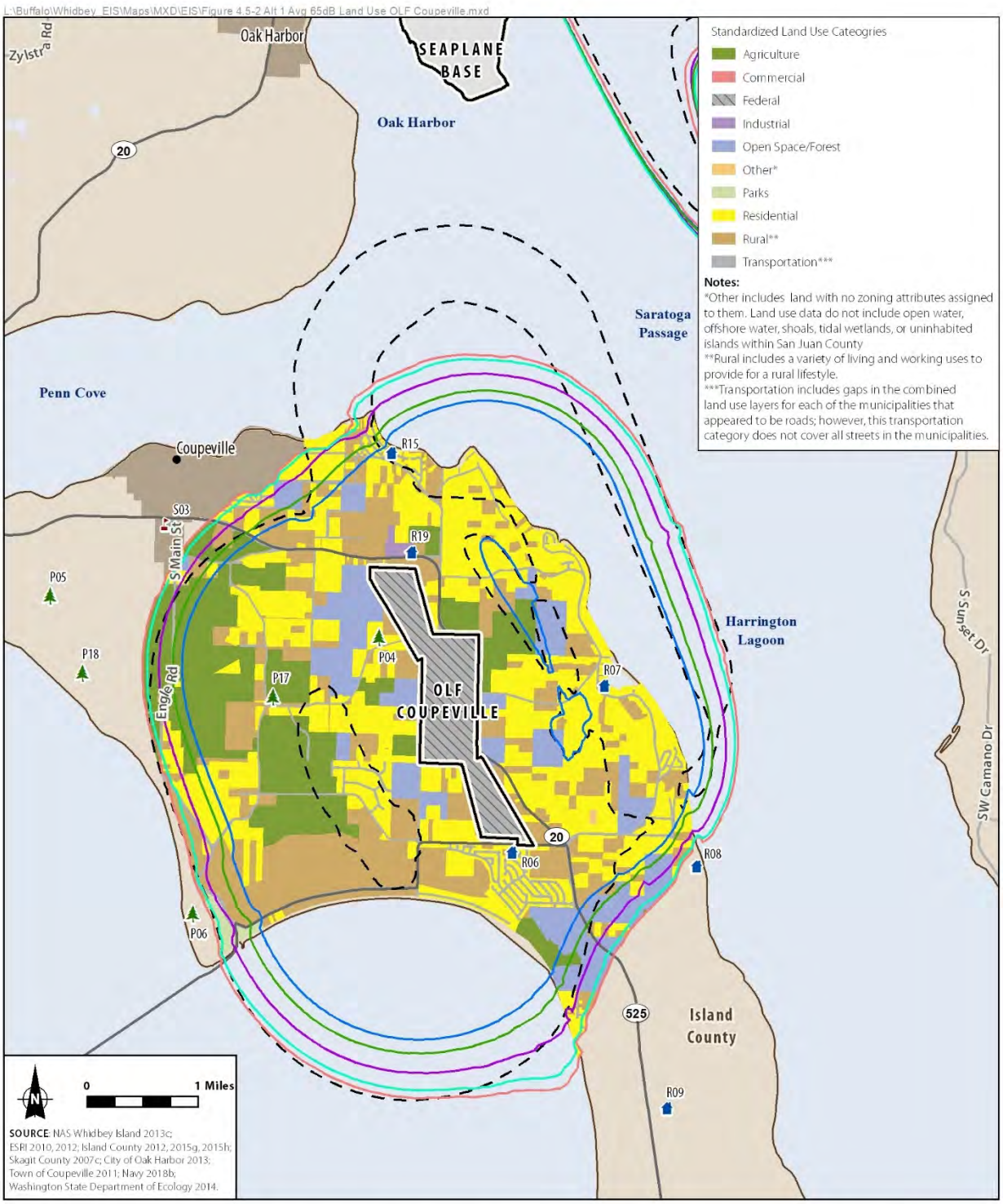

Figure 4.5-2
Alternative 1 Overview of the 65 dB DNL Noise Contours and Land Use for OLF Coupeville
Whidbey Island, Island County, WA

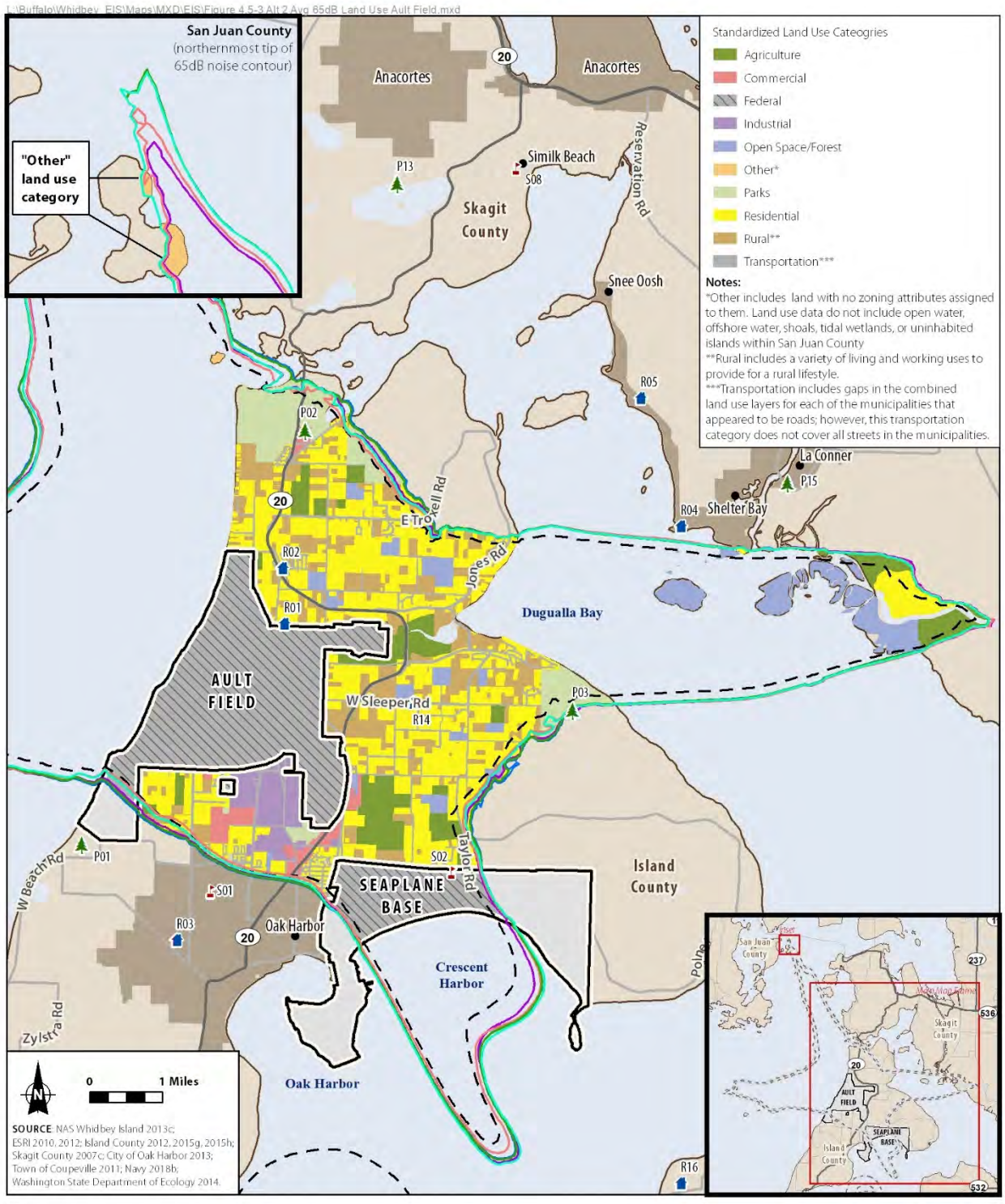

Figure 4.5-3
Alternative 2 Overview of the 65 dB DNL Noise Contours and Land Use for Ault Field
Whidbey Island, Island County, WA

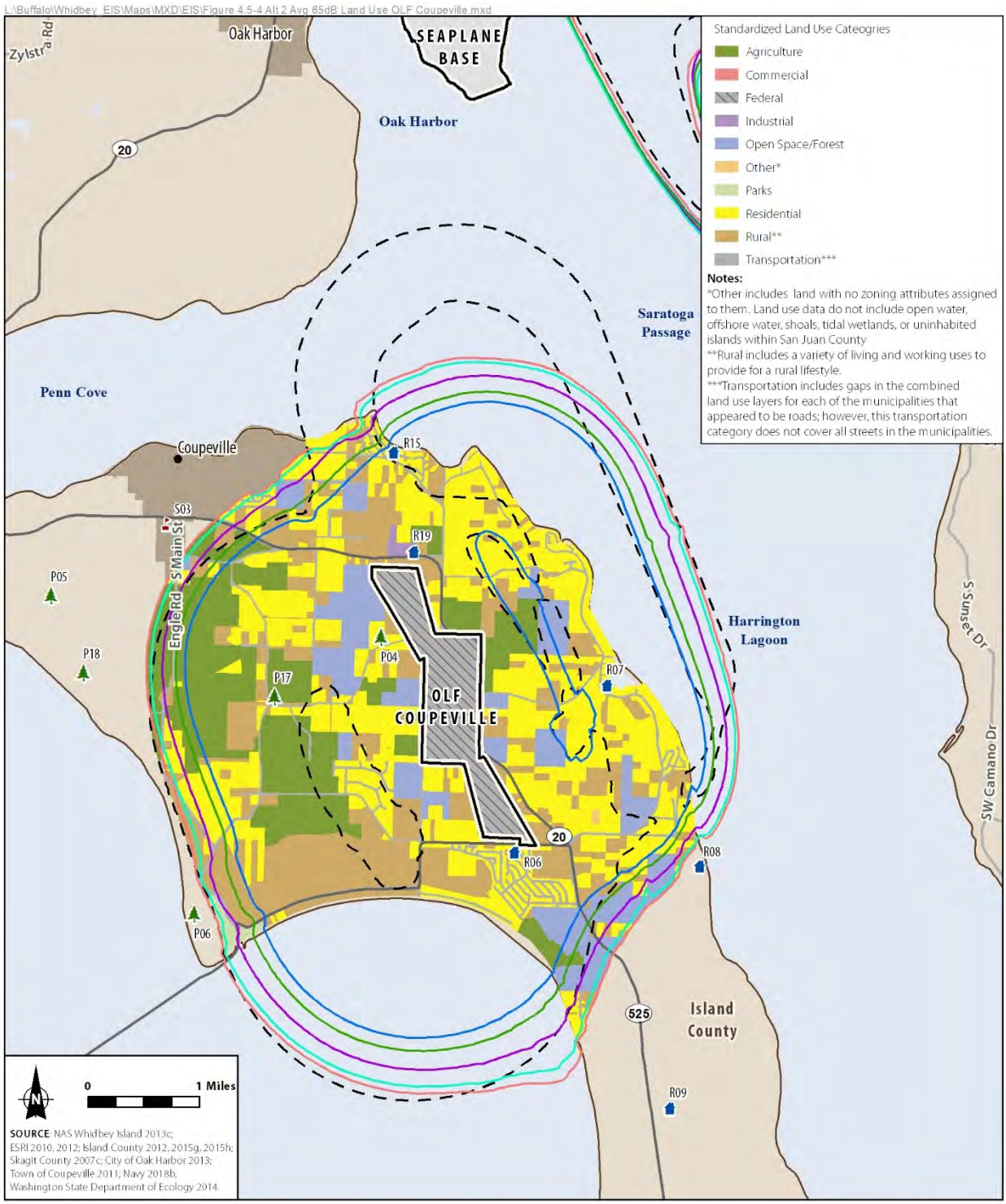

Figure 4.5-4
Alternative 2 Overview of the 65 dB DNL Noise Contours and Land Use for OLF Coupeville
Whidbey Island, Island County, WA

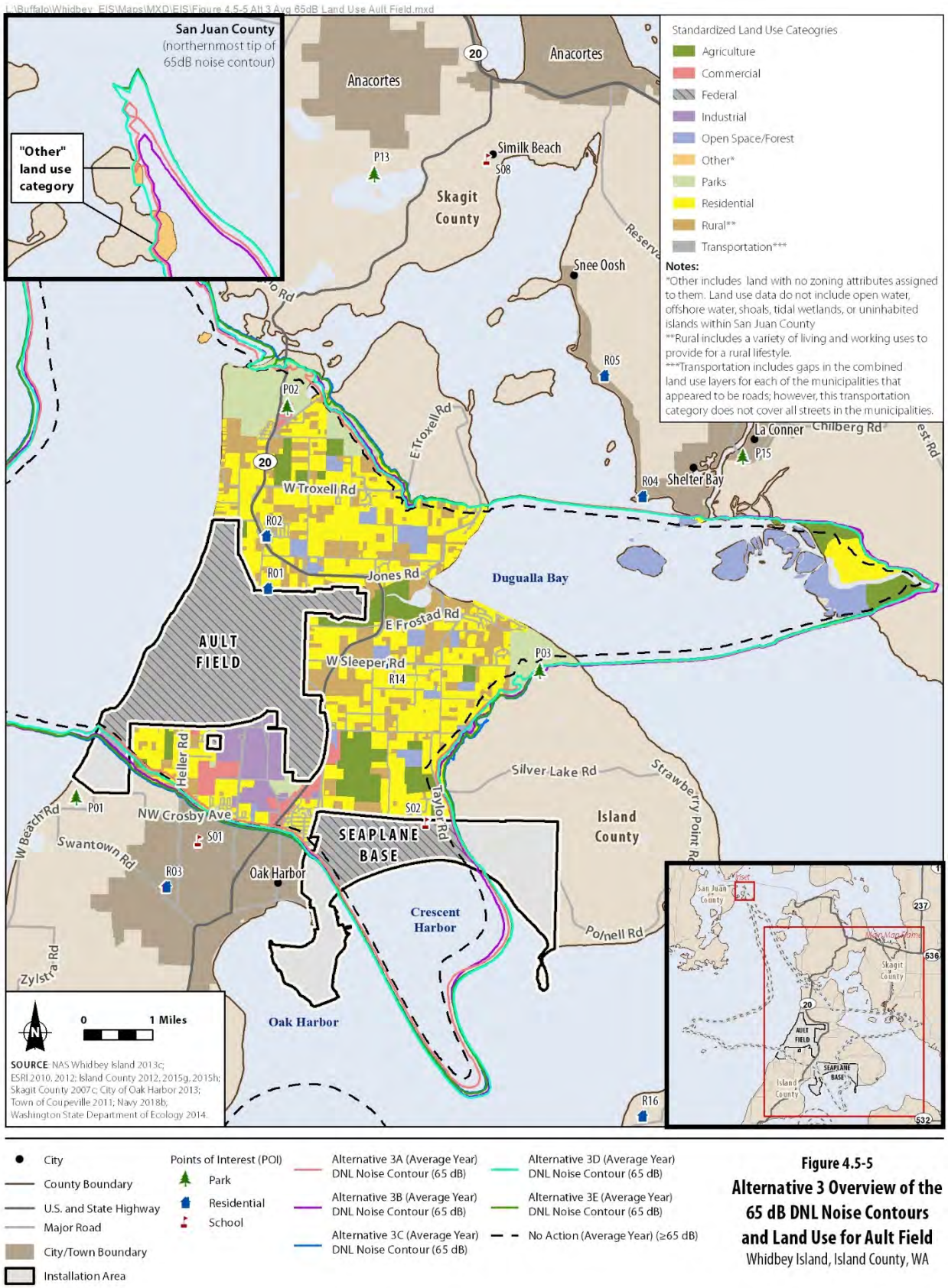

Figure 4.5-5
Alternative 3 Overview of the 65 dB DNL Noise Contours and Land Use for Ault Field
Whidbey Island, Island County, WA

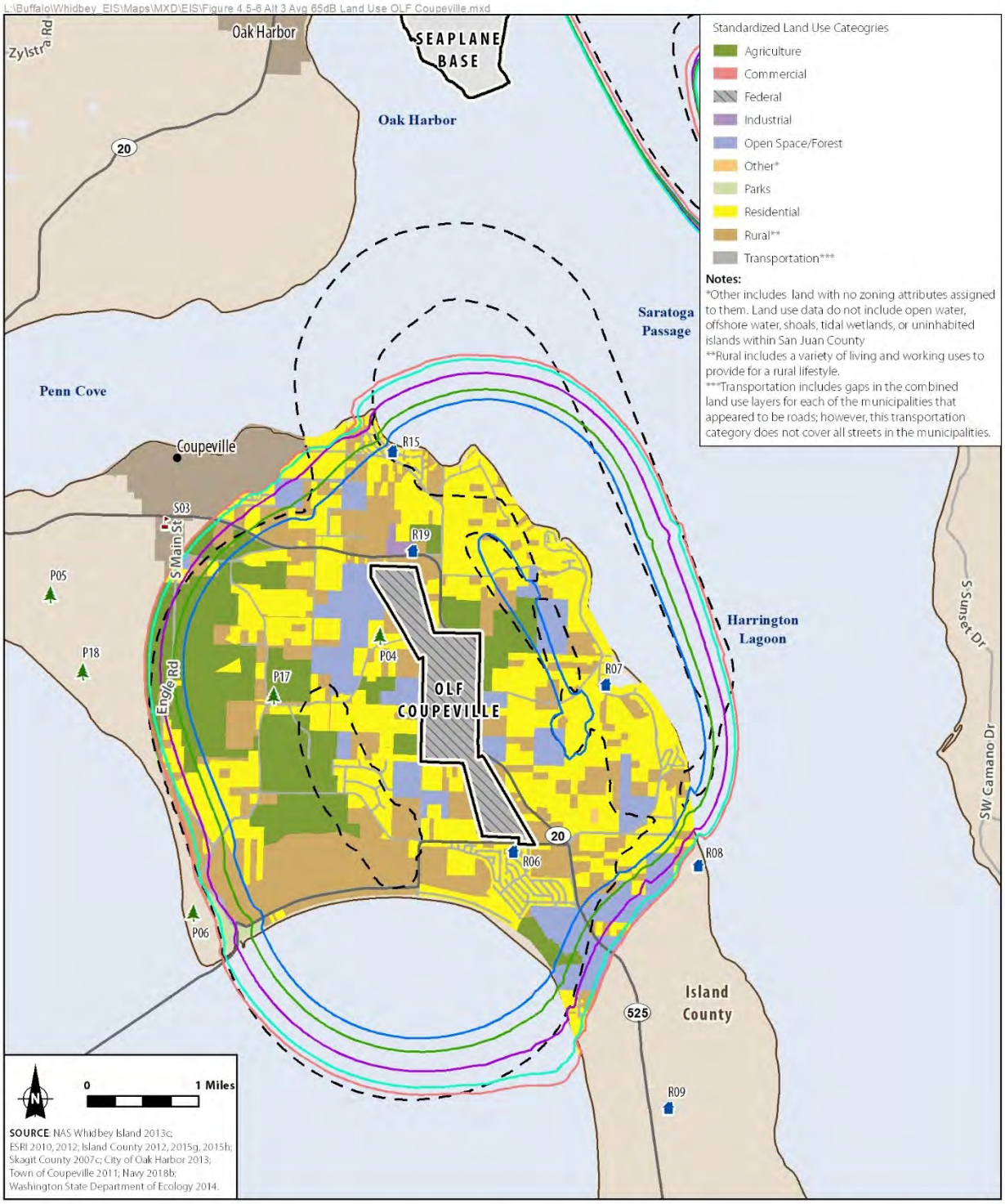

Figure 4.5-6
Alternative 3 Overview of the 65 dB DNL Noise Contours and Land Use for OLF Coupeville
Whidbey Island, Island County, WA

- Per OPNAVINST 11010.36C (AICUZ program), residential land use is not recommended within the greater than 65 dB DNL noise contour (see Table 3.5-1). Further, as described in Section 3.5.2.2.3, Island County has implemented an airport and aviation safety overlay district that applies additional standards to properties located within underlying zoning districts. These standards include noise-level reduction requirements ranging between 25 dB and 30 dB, depending on structure type, location within DNL contours, and disclosure. The Navy's official land use recommendations will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish land use controls and to adopt zoning restrictions taking into account a wide range of land-use factors, including the Navy's recommendations (see Sections 4.3.2.3 and 4.5.2.1 for more details on the AICUZ study and land use compatibility). Residential land use would exist within each DNL noise contour and under each alternative and scenario.
- Compared to the No Action Alternative, the largest increases in residential land use impacted by the greater than 65 dB DNL noise contours surrounding Ault Field occur under Alternative 1, Scenarios C and E; Alternative 2, Scenario C; and Alternative 3, Scenario C.
- Under Alternative 1, Scenario C, residential land use within the projected greater than 65 dB DNL noise contours surrounding Ault Field would experience the greatest increase.
- Compared to the No Action Alternative, the largest increases in residential land use impacted by the greater than 65 dB DNL contours surrounding OLF Coupeville occur under Scenarios A and D under all alternatives.

4.5.2.1.3.2 Accident Potential Zones

There would be no change in APZs at Ault Field under any of the alternatives. No impacts to land use would occur under the current APZs at Ault Field.

Regarding OLF Coupeville, Alternative 1, Scenarios A, B, and D; Alternative 2, Scenarios A, B, and D; and Alternative 3, Scenarios A, B, and D would have conceptual APZs for Runway 32 only (see Table 4.3-1 and Figure 4.3-1). The land use acreages within the conceptual APZs for Runway 32 are shown below in Table 4.5-16; these acreages represent the change from the No Action Alternative. Generally, the majority of impacted land within APZ-I is residential and rural land, and the majority of impacted land within APZ-II is agricultural and rural land.

Per OPNAVINST 11010.36C, single residential units at a maximum density of one to two dwelling units per acre and cluster housing development to achieve this density are compatible with APZ-II (see Table 3.5-1). Planned Unit Developments of single-family detached units where clustered housing may increase density, provided the amount of surface area covered by structures does not exceed 20 percent of the Planned Unit Development total area, thus resulting in large open areas, are compatible with APZ-II. All other residential land use is incompatible. Further details regarding land use impacts would be analyzed under a follow-on AICUZ study process and recommendations made to the municipality and/or county, as land use designations fall under their responsibility.

Because there would be no change in APZs at OLF Coupeville under Scenario C and E for all alternatives, no impacts to land use would occur due to the designation of new APZs.

There would be no change in Clear Zones at Ault Field or OLF Coupeville under any of the alternatives and, therefore, no impacts to land use would occur in the current Clear Zones.

Table 4.5-16 Land Use Acreage within Conceptual APZs for Runway 32 at OLF Coupeville

	APZ- I	*APZ- II*	*TOTAL*
Land Use			
Agriculture	8	555	563
Commercial	0	0	0
Federal[1]	4	0	4
Industrial	1	0	1
Open Space/Forest	90	0	90
Parks	0	0	0
Residential[2]	267	236	503
Rural[3]	147	376	523
Transportation[4]	50	24	74
Other[5]	2	650	652
Total	**569**	**1,841**	**2,410**

Notes:

1 "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

2 "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

3 "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres

4 The transportation land use category includes gaps in land use data that appeared to be roads; however this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.

5 "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

Key:
APZ = Accident Potential Zone

4.5.2.2 Potential Impacts, Recreation and Wilderness

As noted in Section 3.2, Noise, annoyance is a primary human response to recurring high noise levels, and the level of annoyance experienced by a human noise receptor tends to vary based on activity. Noise may detract from the experience and enjoyment of visitors to parks and their perception of a landscape, particularly if the type of noise is not perceived to "fit" with the setting (i.e., a technological noise in a natural setting) (Krog, Engdahl, and Tambs, 2010a; Reid and Olson, 2013; Mace et al., 1999; Miller, 1999). Studies of the effects of aircraft noise on outdoor recreation are limited. However, recurring, intrusive aircraft noise has been found to be a primary environmental factor causing visitors to parks to become annoyed and may detract from their overall experience of a park or recreational activity (Krog, Engdahl, and Tambs, 2010a; Reid and Olson, 2013; Mace et al., 1999). Noticing an aircraft, visually or audibly, in a national park or wilderness area may disrupt the feeling that the area is

"pristine" or in its natural state and affect visitors' perceptions of their experience and the naturalness of the area (Mace et al., 1999).

One study of aircraft noise effects on outdoor recreationists showed that reported annoyance by outdoor recreationists or changes in their use of parks and other outdoor recreation areas depend upon multiple factors such as their frequency of use of the recreation area, the recreation activities in which they are engaged, and the degree of change in noise exposure (Krog, Engdahl, and Tambs, 2010b). People who use a park less frequently are more likely to change their patterns of use in response to changes in noise exposure. The type of activity also plays a role in response to noise, with outdoor recreationists who value natural experiences more likely to change their patterns of use in response to aircraft operations (Krog, Engdahl, and Tambs, 2010b).

The effects discussed above may be experienced by people engaged in outdoor recreational activities in other areas outside of parks and designated recreational land, such as in urban centers or rural areas. While these areas may be exposed to other technological sound sources, such as automobiles or stationary equipment, and additional noise from human activity, recurring, intrusive aircraft noise may still affect the perceptions of people using these areas for recreation and affect experiences of soundscapes that may be typically associated with that type of environment.

Users of parks and recreational areas in northern and central Whidbey Island have reported the need to wear hearing protection while outdoors during sporting events or other activities (see Appendix M). Sections 4.2.2.1.2, 4.2.3.1.2, and 4.2.4.1.2 note that because of the intermittent nature of aircraft operations and the amount of time most people spend indoors, it is highly unlikely for individuals living or recreating around Ault Field or OLF Coupeville to experience noise exposure that would lead to hearing loss. In addition, as noted in Section 3.2.3 and Appendix A, no studies have shown a definitive causal and significant relationship between aircraft noise and health. While available data suggest that wearing hearing protection equipment while engaged in outdoor activities near Ault Field and OLF Coupeville would not be required to protect hearing or nonauditory health, individuals who are more sensitive to noise or individuals exposed to L_{max} above 110 dBA may find that wearing hearing protection allows them to participate in outdoor activities more comfortably.

NAS Whidbey Island has an active public relations process to inform members of the public of upcoming FCLPs so that individuals have the ability to plan outdoor activities. Information on FCLP schedules is shared with the media in the Puget Sound region and is posted on the command's Facebook page and website every week. Members of the public also have the option to obtain these releases directly by signing up for them on the command's webpage news section. The command uses the same process to tell the public about other events that may increase noise or have more impacts on specific areas for short periods of time.

Section 3.5 discusses the different types of outdoor recreational opportunities that exist within the study area. This section includes an analysis of the effects of the Proposed Action on outdoor recreation, primarily as a result of noise effects on the visitor experience and park management. Noise effects on outdoor recreation are discussed generally. Aircraft noise may result in more or less of an impact on outdoor recreation, depending on the activity. As noted above, when people are engaged in activities during which they expect or desire a more natural soundscape, such as hiking, beachcombing, or camping, they may be more annoyed by aircraft noise than when they are engaged in noisier activities or activities in more urban settings with other sources of transportation or technological noise. For the purposes of the analysis, a maximum sound level of 50 dB outdoors is used to capture occurrences of

outdoor speech interference, which is used as an indicator for potential annoyance for people engaged in all types of outdoor recreational activities.

Regardless of the alternative chosen, the additional Growler aircraft have the same noise signature and would generally use the same operating procedures, flight routes, and altitudes used by Growler aircraft currently home based at Ault Field. The types of aircraft operations at Ault Field and OLF Coupeville would not change. The discussion below focuses on potential changes resulting from differences in the number of average annual operations and the overall numbers of noise events per DNL daytime hour that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). For parks and recreation areas for which the annual average number of noise events greater than 50 dB outdoors has not been modeled, potential changes in annual average DNL at that location were assessed. Changes in the annual numbers of noise events with L_{max} over 100 dB are discussed for parks and recreational areas within the study area for which this supplemental analysis was conducted (see Section 4.2 for additional discussion). The alternatives are compared to conditions under the No Action Alternative, which do not vary to a significant degree from affected environment conditions. The data referenced below also are presented in Section 4.2.

4.5.2.2.1 Wilderness

Potential Impacts on Wilderness Recreation

An exposed bedrock formation within the San Juan Islands Wilderness, Williamson Rocks, would be within or partially within the 65 dB to 70 dB DNL contour range under all alternatives and scenarios. Williamson Rocks is closed to public entry to protect sensitive wildlife species and habitat, and recreational opportunities associated with this wilderness area are limited to wildlife and scenic viewing primarily from boats and kayaks offshore. Growler operations currently affect visitors' experience of the wilderness character of the rocks when aircraft are operating in the vicinity.

Implementation of the Proposed Action would increase average annual noise levels (DNL) at Williamson Rocks under all alternatives and would result in reduced opportunities for visitors to experience natural soundscapes associated with the rocks and surrounding waters. Based on the increase in average noise levels and the continued impact on visitor experience as a result of Growler operations, the Proposed Action would have moderate long-term impacts on recreation near wilderness designated at Williamson Rocks. These impacts would be intermittent and occur only when Growlers are operating in the area.

Potential Impacts on Wilderness Management

Growler operations currently affect and would continue to affect the U.S. Fish and Wildlife Service's (USFWS's) ability to preserve visitors' experience of predominantly natural sights and sounds in the Williamson Rocks wilderness area. This preservation of the visitor experience is an objective in the USFWS's Comprehensive Conservation Plan and Wilderness Stewardship Plan addressing the San Juan Islands Wilderness (USFWS, 2010c). The Proposed Action also would impact the USFWS's ability to manage Williamson Rocks to protect wilderness values. The Proposed Action's increase in Growler operations would increase annual average noise levels at and near this wilderness area. Aircraft operations would continue to affect visitors' experience of solitude and primitive recreation activities and would likely negatively affect visitors' perceptions of the area as retaining its primeval, natural character. Impacts to the visitor experience and wilderness character would be intermittent over the long term, occurring only when aircraft are transiting the area. When aircraft are operating in the area,

they would be momentarily overhead, and ambient noise levels would be restored as the aircraft continues to its destination.

Section 4.8.2.1 discusses potential impacts of the Proposed Action on birds, including waterfowl. In general, aircraft noise disturbances may cause startle and other behavioral responses that may last one to several hours after the event, depending on the species, but are not likely to disrupt major behavior patterns. The Proposed Action is not expected to have an adverse impact at the population level and would not result in significant impacts on the USFWS's ability to protect and manage wildlife populations. Williamson Rocks is located approximately 5.5 miles northwest of Ault Field. Growler aircraft transit at altitudes higher than 2,500 feet above MSL at this distance from the airfield, as directed by ATC procedures (FAA, 2016; OPNAVINST 3770.21, Airspace Procedures and Planning Manual), which would comply with the USFWS's recommended 2,000-foot aircraft ceiling over wilderness islands and 1,000-foot avoidance area around nesting seabird colonies (USFWS, 2010c).

The Proposed Action under all alternatives would result in moderate, long-term impacts on management of Williamson Rocks as wilderness. Potential impacts would not be significant because noise impacts would be intermittent over the long term and similar to affected environment conditions, and aircraft operations would comply with recommended USFWS avoidance areas around Williamson Rocks.

No Bureau of Land Management (BLM)-owned lands with wilderness characteristics are located in any of the areas beneath the 65 DNL contour in any alternative or scenario, including the No Action Alternative; therefore, no significant impacts would occur to these BLM-owned areas.

4.5.2.2.2 Parks and Recreation Areas Potential Noise Impacts

4.5.2.2.2.1 San Juan Islands National Monument

Potential Impacts on Recreation

None of the BLM-administered lands constituting the San Juan Islands National Monument would be located within the greater than 65 dB DNL average year noise contours under any of the proposed alternatives. Between 10,588 acres of water (under Alternative 2, Scenario B) and 11,399 acres of water (under Alternative 1, Scenario C) within the San Juan National Conservation Area Boundary that encompasses the national monument lands would be within the greater than 65 dB DNL noise contours, depending on the alternative selected. While no water areas are included in the national monument, visitors to national monument lands may access those lands by water—i.e., by kayak, boat, or ferry.

Table 4.5-17 provides the approximate water acreages within the San Juan National Conservation Area Boundary that would be in the noise contour ranges under each alternative and scenario, compared to conditions under the No Action Alternative. As shown in the table, each of the alternatives and scenarios would increase the water area within the greater than 65 dB DNL noise contours, compared to conditions under the No Action Alternative. This increase would range from a 26.9-percent increase in the acres of water area under Alternative 2, Scenario B, to a 36.6-percent increase under Alternative 1, Scenario C. Based on the increased water area within the San Juan National Conservation Area Boundary that would be intermittently exposed to intrusive noise levels, which would be over 2,000 acres regardless of alternative or scenario selected, the Proposed Action would have a long-term moderate impact on water-based recreation at the San Juan Islands National Monument when aircraft are

operating in the area. Because of the distance of the impacted area from the majority of lands within the national monument, this impact would not be significant.

Table 4.5-17 Estimated San Juan National Conservation Area Waters (Acres) within the Noise Contours under Each Alternative and Scenario (Average Year)[1]

dB DNL Noise Contour Range	*Alternative 1 (Change from No Action Alternative)*	*Alternative 2 (Change from No Action Alternative)*	*Alternative 3 (Change from No Action Alternative)*
	Acres[2]		
No Action Alternative Conditions			
65 – 70 dB DNL	4,236	4,236	4,236
70 – 75 dB DNL	2,690	2,690	2,690
> 75 dB DNL	1,442	1,442	1,442
Total	**8,368**	**8,368**	**8,368**
Scenario A			
65 – 70 dB DNL	5,321 (1,085 [25.6])	5,260 (1,024 [24.2])	5,227 (991 [23.4])
70 – 75 dB DNL	3,241 (551 [20.4])	3,223 (533 [19.8])	3,216 (526 [19.6])
> 75 dB DNL	2,307 (865 [60.0])	2,334 (892 [61.9])	2,220 (778 [54.0])
Total	**10,869 (2,501 [29.9])**	**10,717 (2,349 [28.1])**	**10,662 (2,294 [27.4])**
Scenario B			
65 – 70 dB DNL	5,309 (1,073 [25.3])	5,220 (984 [23.2])	5,221 (985 [23.3])
70 – 75 dB DNL	3,234 (544 [20.2])	3,208 (518 [19.2])	3,210 (520 [19.3])
> 75 dB DNL	2,269 (827 [57.4])	2,186 (744 [51.6])	2,190 (748 [51.9])
Total	**10,814 (2,446 [29.2])**	**10,615 (2,247 [26.9])**	**10,521 (2,153 [25.7])**
Scenario C			
65 – 70 dB DNL	5,562 (1,326 [31.3])	5,445 (1,209 [28.5])	5,442 (1,193 [28.2])
70 – 75 dB DNL	3,335 (645 [24.0])	3,306 (616 [22.9])	3,303 (612 [22.8])
> 75 dB DNL	2,535 (1,093 [75.8])	2,453 (1,011 [70.1])	2,441 (998 [69.2])
Total	**11,432 (3,064 [36.6])**	**11,204 (2,836 [33.9])**	**11,186 (2,803 [33.5])**
Scenario D			
65 – 70 dB DNL	5,432 (1,196 [28.2])	5,376 (1,132)	5,334 (1,206 [28.5])
70 – 75 dB DNL	3,299 (609 [22.6])	3,281 (591)	3,272 (582 [21.6])
> 75 dB DNL	2,452 (1,010 [70.0])	2,376 (934)	2,363 (921 [63.9])
Total	**11,208 (2,840 [33.9])**	**11,033 (2,656 [31.7])**	**10,969 (2,601 [31.1])**
Scenario E			
65 – 70 dB DNL	5,543 (1,307 [30.9])	5,402 (1,140 [26.9])	5,428 (1,192 [28.1])
70 – 75 dB DNL	3,328 (638 [23.7])	3,297 (607 [22.6])	3,297 (607 [22.6])
> 75 dB DNL	2,520 (1,078 [74.7])	2,438 (996 [69.0])	2,427 (985 [68.3])
Total	**11,390 (3,022 [36.1])**	**11,137 (2,769 [33.1])**	**11,152 (2,784 [33.3])**

Notes:

[1] Totals may not sum exactly due to rounding.

[2] The difference in acreage between the No Action Alternative and the alternatives is shown in parentheses.

Key:

dB = decibel

DNL = day-night average sound level

Potential Impacts on Recreation Management

BLM currently is preparing the San Juan Islands National Monument Resource Management Plan, which is expected to be completed and approved in the winter of 2019 (BLM, n.d.[b], BLM, 2018). The designation of the national monument does not restrict safe and efficient aircraft operations by the Armed Forces (White House Office of the Press Secretary, 2013). According to BLM policy for managing National Land Conservation System units, including national monuments, land use planning decisions and BLM activities pertaining to these lands must be consistent with the applicable designating legislation or proclamation (BLM, 2012a, 2012b). No national monument lands would be within the greater than 65 dB DNL noise contours under any of the alternatives (see Figure 4.5-7). (Note: Reservation Bay Rocks appear to be within the noise contours on this figure but are located east of and outside the noise contours.)

The 2013 presidential proclamation creating the national monument mentions the "historical and cultural significance" and "unique and varied natural and scientific resources" of the lands included in the national monument (White House Office of the Press Secretary, 2013). Aircraft operations at Ault Field under the Proposed Action, regardless of alternative or scenario selected, are not expected to directly impact management of the national monument by impacting the ability of the BLM to manage its cultural and natural resources, specifically as these resources are used or enjoyed by people visiting the national monument for recreation. Recreational values were not specifically noted in the 2013 presidential proclamation; however, BLM Manual 6220 – National Monuments, National Conservation Areas, and Similar Designations notes that "monuments…will be available for a variety of recreation purposes," including "hunting and fishing, consistent with the designating authority" (BLM, 2012b). Regardless of alternative or scenario selected, Growler aircraft would continue to be intermittently visible and audible from national monument lands as they fly along flight tracks that pass over or near the national monument (see Figures 3.1-2, 3.1-3, and 3.1-4). In addition, from 10,588 acres (under Alternative 2, Scenario B) to 11,399 acres (under Alternative 1, Scenario C) of the waters southeast of Lopez Island and east of Decatur Island would be within the greater than 65 dB DNL noise contours. Aircraft overflights would not directly impact, or restrict, use of this area for fishing but may result in indirect impacts, primarily annoyance. Because the vast majority of the national monument and the surrounding waters is located outside of the greater than 65 dB DNL noise contours, the Proposed Action, regardless of alternative or scenario selected, would have long-term, minor, indirect impacts on management of the San Juan Islands National Monument for recreation.

Based on the above, no significant impacts on recreational use or recreation management of the national monument as a result of the Proposed Action are expected.

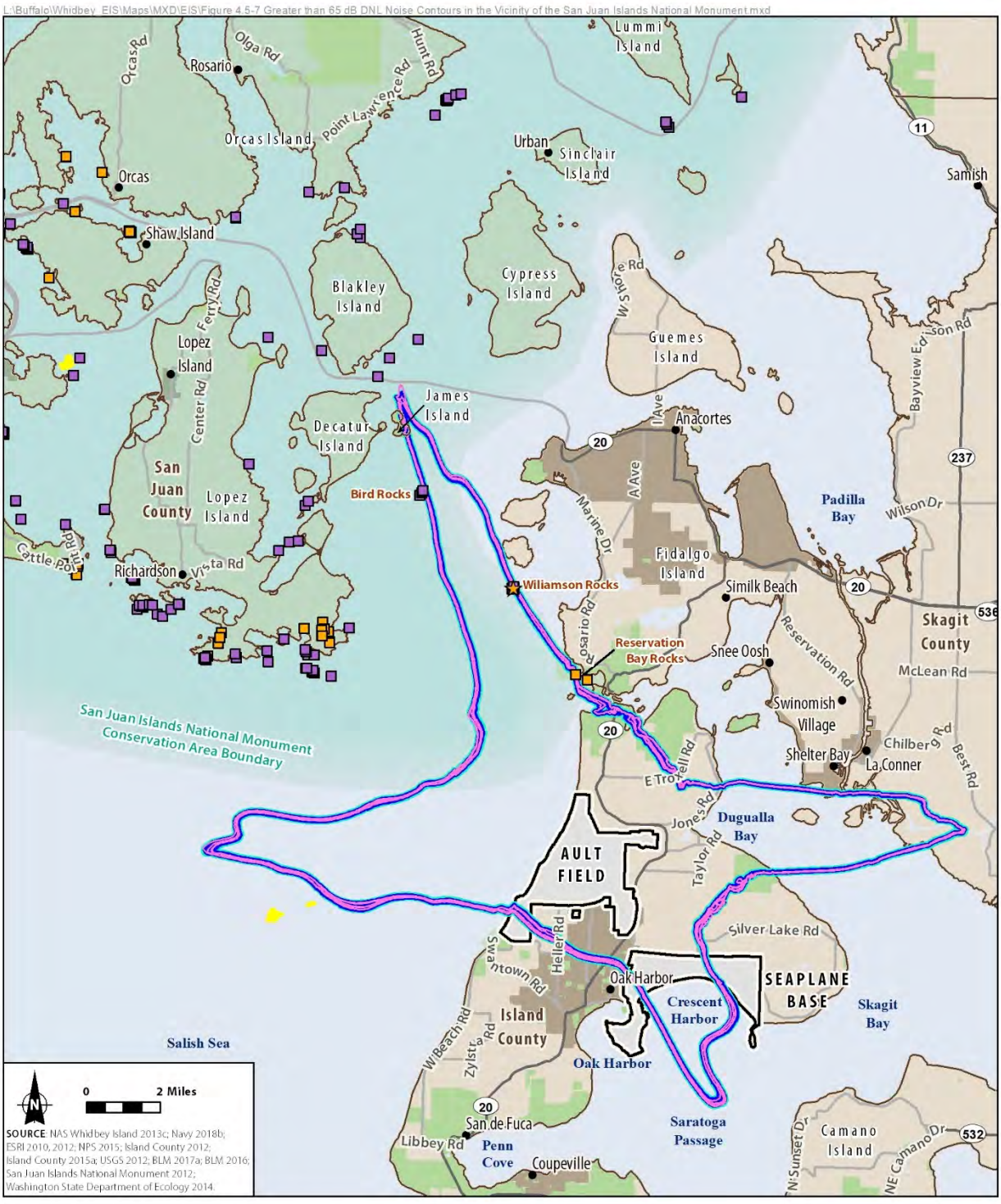

Figure 4.5-7
Greater than 65 dB DNL Noise Contours in the Vicinity of the San Juan Islands
Whidbey Island, Island County, WA

4.5.2.2.2.2 San Juan Islands National Wildlife Refuge

Potential Impacts on Recreation

Williamson Rocks is the only area of the San Juan Islands National Wildlife Refuge (NWR) that would be within the greater than 65 dB DNL noise contours under the Proposed Action. This area is just outside of the 65 dB DNL noise contour line under affected environment conditions and would continue to be outside the contours under the No Action Alternative. Williamson Rocks would be within the 65 dB to 70 dB DNL contour range under all alternatives and scenarios.

Regardless of the alternative chosen, aircraft would continue to be visible and audible by recreational users in the waters surrounding the rocks. As noted in the discussion of wilderness at the beginning of this section, increased Growler operations under the Proposed Action would result in reduced opportunities for visitors to experience natural soundscapes associated with the rocks and surrounding waters, affect individual experience of the wilderness values associated with the rocks, and may temporarily affect wildlife behaviors during and for up to several hours after an intrusive noise event. Given the increase in annual average noise exposure at Williamson Rocks, the Proposed Action would have moderate impacts on the San Juan Islands NWR under all alternatives. No significant impacts on recreation at the NWR would result from the Proposed Action because of the small area of the NWR that would be affected, an area that is already exposed to aircraft noise under affected environment conditions.

Potential Impacts on Recreation Management

The USFWS manages Williamson Rocks to preserve wilderness values and allow recreational activities that are compatible with the wilderness character of the rocks. Impacts on the USFWS's ability to manage these areas for wilderness and recreational use are discussed at the beginning of this section. As noted, the Proposed Action would result in moderate, long-term impacts on management of Williamson Rocks as wilderness. These impacts would not be significant because noise impacts would be intermittent over the long term and similar to affected environment conditions, and aircraft operations would comply with recommended USFWS avoidance areas around Williamson Rocks.

4.5.2.2.2.3 Ebey's Landing National Historical Reserve

Potential Impacts on Recreation

With implementation of the Proposed Action, between approximately 30 percent and 41 percent of the 17,000-acre Ebey's Landing National Historical Reserve would be within the greater than 65 dB DNL contours, depending on the alternative selected. Noise contours under each alternative and scenario provide a means of assessing relative impacts on all types of outdoor recreation at Ebey's Landing National Historical Reserve.

As shown in Table 4.5-18, the scenario selected would affect the degree of intermittent noise exposure at Ebey's Landing National Historical Reserve more than the alternative. Under the No Action Alternative, approximately 6,000 acres would be within the noise contours. All three alternatives with either Scenario A, B, or D would result in an increase in land area within the noise contours of between approximately 4 percent (Alternative 2, Scenario B) and 16 percent (Alternative 1, Scenario A) and, therefore, a greater degree of noise impact on recreation than the No Action Alternative. These scenarios would increase the total area of Ebey's Landing National Historical Reserve exposed to annual average noise levels above 65 dB DNL, and this increase primarily would result from expansion of the greater than 75 dB DNL noise contour range. Scenarios C and E would result in a decrease in the area of Ebey's Landing National Historical Reserve exposed to annual average noise levels above 65 dB DNL (an approximately 4- to 13-percent decrease in land area compared to conditions under the No Action Alternative). Scenario C would result in a much smaller increase in the greater than 75 dB DNL noise contour range compared to the other scenarios. While Scenario C would result in less impact on Ebey's Landing National Historical Reserve, it is important to note that the projected annual number of aircraft operations at OLF Coupeville would still increase under all three alternatives with Scenario C, compared to projected annual aircraft operations under the No Action Alternative (see Table 4.1-5). Alternative 1, Scenario A, would result in the largest area encompassed by the greater than 65 dB DNL noise contours, while Alternative 2, Scenario C, would result in the smallest.

Depending on the alternative and scenario selected, annual aircraft operations would increase approximately 29 percent to 33 percent over No Action Alternative conditions. These operational conditions would be similar to historic operational levels in the 1970s, 1980s, and 1990s for the NAS Whidbey Island complex and, thus, similar to operational conditions that would have occurred at the time Ebey's Landing National Historical Reserve was created in 1978 and over most of the reserve's existence.

Five outdoor locations within Ebey's Landing National Historical Reserve were included as POIs in the supplemental noise analysis: Rhododendron Park northwest of OLF Coupeville, Ebey's Prairie west of the OLF, the Admiralty Head Lighthouse at Fort Casey State Park in the southwestern corner of Ebey's Landing National Historical Reserve, the Reuble Farm site, and the Ferry House (Wyle, 2017). The following section assesses the potential impacts of the Proposed Action on these POIs by alternative, compared to conditions under the No Action Alternative, as a result of increases in noise events.

Table 4.5-18 Area of Ebey's Landing National Historical Reserve Encompassed by the Greater than 65 dB DNL Noise Contours under the Proposed Action (Acres)[1]

dB DNL Noise Contour Range	*Alternative 1 (Change from No Action Alternative [Percentage Change])* *Acres[2]*	*Alternative 2 (Change from No Action Alternative [Percentage Change])*	*Alternative 3 (Change from No Action Alternative [Percentage Change])*
No Action Alternative Conditions			
65 – 70 dB DNL	3,001	3,001	3,001
70 – 75 dB DNL	2,623	2,623	2,623
> 75 dB DNL	377	377	377
Total	**6,002**	**6,002**	**6,002**
Scenario A			
65 – 70 dB DNL	1,328 (-1,646 [-54.8])	1,315 (-1,686 [-56.2])	1,326 (-1,675 [-55.8])
70 – 75 dB DNL	1,942 (-446 [-17.0])	1,999 (-624 [-23.8])	1,973 (-650 [-24.8])
> 75 dB DNL	3,665 (3,020 [801.1])	3,518 (3,141 [833.2])	3,577 (3,200 [848.8])
Total	**6,935 (933 [15.5])**	**6,832 (830 [13.8])**	**6,877 (875 [14.6])**
Scenario B			
65 – 70 dB DNL	1,317 (-1,684 [-56.1])	1,352 (-1,649 [-54.9])	1,331 (-1,670 [-55.6])
70 – 75 dB DNL	2,142 (-481 [-18.3])	2,135 (-488 [-18.6])	2,139 (-484 [-18.5])
> 75 dB DNL	2,870 (2,493 [661.3])	2,747 (2,370 [628.6])	2,822 (2,505 [664.5])
Total	**6,328 (326 [5.4])**	**6,234 (232 [3.9])**	**6,292 (290 [4.8])**
Scenario C			
65 – 70 dB DNL	2,112 (-889 [-29.6])	2,142 (-859 [-28.6])	2,123 (-878 [-29.3])
70 – 75 dB DNL	1,991 (-632 [-24.1])	2,087 (-536 [-20.4])	2,005 (-618 [-23.6])
> 75 dB DNL	1,223 (846 [224.4])	1,065 (688 [182.5])	1,164 (787 [208.8])
Total	**5,325 (-677 [-11.3])**	**5,241 (-761 [-12.7])**	**5,292 (-710 [-11.8])**
Scenario D			
65 – 70 dB DNL	1,303 (-1,671 [-55.7])	1,281 (-1,720 [-57.3])	1,286 (-1,715 [-57.1])
70 – 75 dB DNL	2,029 (-347 [-13.2])	2,087 (-536 [-20.4])	2,069 (-554 [-21.1])
> 75 dB DNL	3,436 (2,771 [735.0])	3,297 (2.920 [774.5])	3,353 (2,976 [789.4])
Total	**6,768 (753 [12.5])**	**6,664 (662 [11.0])**	**6,708 (706 [11.8])**
Scenario E			
65 – 70 dB DNL	1,839 (-1,162 [-38.7])	1,898 (-1,103 [-36.8])	1,863 (-1,138 [-37.9])
70 – 75 dB DNL	1,802 (-821 [-31.3])	1,793 (-830 [-31.6])	1,795 (-828 [-31.6])
> 75 dB DNL	2,099 (1,722 [456.8])	1,977 (1,600 [424.4])	2,054 (1,677 [444.8])
Total	**5,740 (-262 [-4.4])**	**5,667 (-335 [-5.6])**	**5,712 (-290 [-4.8])**

Notes:

[1] Totals may not sum exactly due to rounding.

[2] The difference in acreage between the No Action Alternative and the alternatives is shown in parentheses.

Key:

dB = decibel

DNL = day-night average sound level

As shown in Table 4.5-19, each of the alternatives would result in the same increases in the annual average number of outdoor noise events over 50 dB at most POIs under most scenarios. Scenario A would result in the greatest impacts, with an increase of two noise events per hour at each POI under each alternative. Scenario D would result in similar impacts. Under Scenarios A and D, visitors to these areas of Ebey's Landing National Historical Reserve would experience up to approximately five intrusive noise events per daytime hour, compared to three or fewer intrusive noise events per daytime hour under the No Action Alternative. Any of the alternatives with Scenarios B, C, or E would result in no change or an increase of one noise event per hour, depending on the location. As an example, depending on the alternative and scenario selected, visitors may experience an average of 10 intrusive noise events over a 2-hour visit to Rhododendron Park (Scenario A under all three alternatives) compared to six intrusive noise events over a 2-hour visit under the No Action Alternative, when Growlers are operating in the vicinity.

Recreational users of these areas already experience disruptions and annoyance that may affect recreational experiences as a result of current operations at OLF Coupeville. The Proposed Action, particularly under Scenarios A and D, would increase the rate of intrusive noise events at Ebey's Landing National Historical Reserve but would not change the types of operations at OLF Coupeville or other factors that would affect the characteristics of individual noise events. Increases in the rate of intrusive noise events under the alternatives and scenarios noted above and in Table 4.5-19 would result in direct impacts on all types of outdoor recreation at Ebey's Landing National Historical Reserve, including hiking, biking, nature-watching, and beachcombing, as well as interpretive programs and social events conducted by the NPS and other organizations. The primary impact, as noted throughout this section, would be annoyance that may adversely affect visitor experience and perceptions of the natural and cultural landscape of Ebey's Landing National Historical Reserve. Interruptions in park programming and social events also would increase under most alternatives and scenarios at these locations, as discussed further below.

Table 4.5-19 Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest at Ebey's Landing National Historical Reserve (Average Year Daytime)

Point of Interest	*No Action Alternative Conditions*	*Alternative 1 (Change from No Action Alternative)*	*Alternative 2 (Change from No Action Alternative)*	*Alternative 3 (Change from No Action Alternative)*
		Annual Average Outdoor Daily DNL Daytime Events per Hour (NA50 L_{max})[1]		
Scenario A				
Ebey's Landing National Historical Reserve (Rhododendron Park)	3	5 (+2)	5 (+2)	5 (+2)
Ebey's Landing State Park (Ebey's Prairie)	2	4 (+2)	4 (+2)	4 (+2)
Fort Casey State Park	1	3 (+2)	3 (+2)	3 (+2)
Reuble Farm	2	4 (+2)	4 (+2)	4 (+2)
Ferry House	2	4 (+2)	4 (+2)	4 (+2)

Table 4.5-19 Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest at Ebey's Landing National Historical Reserve (Average Year Daytime)

Point of Interest	*No Action Alternative Conditions*	*Alternative 1 (Change from No Action Alternative)*	*Alternative 2 (Change from No Action Alternative)*	*Alternative 3 (Change from No Action Alternative)*
		Annual Average Outdoor Daily DNL Daytime Events per Hour (NA50 L_{max})[1]		
Scenario B				
Ebey's Landing National Historical Reserve (Rhododendron Park)	3	4 (+1)	4 (+1)	4 (+1)
Ebey's Landing State Park (Ebey's Prairie)	2	3 (+1)	3 (+1)	3 (+1)
Fort Casey State Park	1	2 (+1)	2 (+1)	2 (+1)
Reuble Farm	2	3 (+1)	3 (+1)	3 (+1)
Ferry House	2	3 (+1)	3 (+1)	3 (+1)
Scenario C				
Ebey's Landing National Historical Reserve (Rhododendron Park)	3	3 (0)	3 (0)	3 (0)
Ebey's Landing State Park (Ebey's Prairie)	2	3 (+1)	3 (+1)	3 (+1)
Fort Casey State Park	1	1 (0)	1 (0)	1 (0)
Reuble Farm	2	2 (0)	2 (0)	2 (0)
Ferry House	2	2 (0)	2 (0)	2 (0)
Scenario D				
Ebey's Landing National Historical Reserve (Rhododendron Park)	3	4 (+1)	4 (+1)	4 (+1)
Ebey's Landing State Park (Ebey's Prairie)	2	4 (+2)	4 (+2)	4 (+2)
Fort Casey State Park	1	3 (+2)	2 (+1)	2 (+1)
Reuble Farm	2	4 (+2)	4 (+2)	4 (+2)
Ferry House	2	4 (+2)	4 (+2)	4 (+2)
Scenario E				
Ebey's Landing National Historical Reserve (Rhododendron Park)	3	3 (0)	3 (0)	3 (0)
Ebey's Landing State Park (Ebey's Prairie)	2	3 (+1)	3 (+1)	3 (+1)
Fort Casey State Park	1	2 (+1)	2 (+1)	2 (+1)
Reuble Farm	2	3 (+1)	3 (+1)	3 (+1)
Ferry House	2	3 (+1)	3 (+1)	3 (+1)

Notes:
[1] The difference between the No Action Alternative and the alternatives is shown in parentheses.

Key:
dB = decibel
DNL = day-night average sound level

Tables 4.5-20 through 4.5-22 show the maximum L_{max} and the number of annual aircraft noise events with an L_{max} of 100 dB at POIs within Ebey's Landing National Historical Reserve under each alternative and scenario (see Sections 3.2 and 4.2 for additional discussion). As shown in the table, L_{max} would decrease or remain the same at each of these POIs under the Proposed Action, compared to No Action Alternative conditions. L_{max} above 100 dB would approach levels that may cause physical discomfort at Rhododendron Park and the Reuble Farm site. The number of events with L_{max} above 100 dB at two POIs, Rhododendron Park and the Reuble Farm site, would increase under most alternatives and scenarios. The increase in these noise events at Rhododendron Park would range between 1,103 under Alternative 3, Scenario C, and 4,522 under Alternative 1, Scenario A. The increase in these noise events at the Reuble Farm site would range between 1,380 under Alternative 3, Scenario C, and 5,593 under Alternative 3, Scenario A.

Section 4.6.2.1, Noise and Vibration Associated with Operational Impacts, addresses the potential for noise and vibration during aircraft operations to affect historic architectural resources in Ebey's Landing National Historical Preserve. Based on existing studies, the analysis concludes that noise and vibrations from Growler aircraft operating in the vicinity of Ebey's Landing National Historical Reserve are below the threshold that may result in damage to structures. Visitors to Ebey's Landing National Historical Reserve may notice and be annoyed by vibration along with intrusive noise levels; however, vibration would not result in different or notably increased impacts on recreation compared with the potential impacts described earlier in this section.

Based on the above, impacts on Ebey's Landing National Historical Reserve would be greatest under all alternatives with Scenario A, which would result in long-term, intermittent, significant impacts on recreation because of the greater than 10 percent increase in the area within the greater than 65 dB DNL noise contours and the increase in the number of noise events with L_{max} approaching levels of physical discomfort (rarely) at the Rhododendron Park and Reuble Farm site POIs. All alternatives with Scenarios B, D, and E would result in less severe but still long-term, intermittent, significant impacts on recreation. Scenario D, like Scenario A, would result in a greater than 10-percent increase in the area of the reserve within the noise contours.

Any of the alternatives with Scenario C would have moderate impacts on recreation at Ebey's Landing National Historical Reserve because these alternatives would increase the area of the reserve within the greater than 75 dB DNL contour range. Scenario C would result in a smaller increase in the numbers of noise events over 50 dB (L_{max}) per daytime hour at one POI, Ebey's Prairie; would result in a smaller increase in the area within the greater than 75 dB DNL noise contour range; and would result in a decrease in the area of Ebey's Landing National Historical Reserve within the greater than 65 dB DNL noise contours compared to the other alternatives and scenarios. As noted previously in this section, operational conditions experienced at Ebey's Landing National Historical Reserve under the Proposed Action would be similar to conditions at the time of the reserve's creation and throughout much of the reserve's existence through the 1990s. Noise impacts on recreation also would be intermittent, occurring only when aircraft operate in the area.

Table 4.5-20 Number of Annual Aircraft Noise Events with Maximum Sound Level of 100 dB at Points of Interest in Ebey's Landing National Historical Reserve, Alternative 1 (Average Year)

Location	L_{max} (dB)		Number of Annual Events with L_{max} (dB) of 100 dB or more	
	No Action Alternative	Alternative 1 (Change from No Action Alternative)	No Action Alternative	Alternative 1 (Change from No Action Alternative)
Scenario A				
Ebey's Landing – Rhododendron Park	111	105 (-6)	462	4,522 (+1,802)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)
Scenario B				
Ebey's Landing – Rhododendron Park	111	105 (-6)	462	2,953 (+233)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)
Scenario C				
Ebey's Landing – Rhododendron Park	111	105 (-6)	462	1,160 (-1,560)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)
Scenario D				
Ebey's Landing – Rhododendron Park	111	105 (-6)	462	4,046 (+1,326)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)
Scenario E				
Ebey's Landing – Rhododendron Park	111	105 (-6)	462	1,742 (-978)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)

Table 4.5-21 Number of Annual Aircraft Noise Events with the Maximum Sound Exposure Level or Maximum Sound Level at Points of Interest in Ebey's Landing National Historical Reserve, Alternative 2 (Average Year)

Location	L_{max} (dB)		Number of Annual Events	
	No Action Alternative	Alternative 2 (Change from No Action Alternative)	No Action Alternative	Alternative 2 (Change from No Action Alternative)
Scenario A				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	4,315 (+1,595)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	5,606 (+4,913)
Ferry House	85	82 (-3)	0	0 (-)
Scenario B				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	2,819 (+99)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	3,408 (+2,715)
Ferry House	85	82 (-3)	0	0 (-)
Scenario C				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	1,107 (-1,613)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	1,385 (+692)
Ferry House	85	82 (-3)	0	0 (-)
Scenario D				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	3,862 (+1,142)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	4,838 (+4,145)
Ferry House	85	82 (-3)	0	0 (-)
Scenario E				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	1,661 (-1,059)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	2,078 (+1,385)
Ferry House	85	82 (-3)	0	0 (-)

Table 4.5-22 Number of Annual Aircraft Noise Events with the Maximum Sound Exposure Level or Maximum Sound Level at Points of Interest in Ebey's Landing National Historical Reserve, Alternative 3 (Average Year)

Location	L_{max} (dB)		Number of Annual Events	
	No Action Alternative	Alternative 3 (Change from No Action Alternative)	No Action Alternative	Alternative 3 (Change from No Action Alternative)
Scenario A				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	4,305 (+1,585)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	5,593 (+4,900)
Ferry House	85	82 (-3)	0	0 (-)
Scenario B				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	2,812 (+92)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	3,400 (+2,707)
Ferry House	85	82 (-3)	0	0 (-)
Scenario C				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	1,103 (-1,617)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	1,380 (+687)
Ferry House	85	82 (-3)	0	0 (-)
Scenario D				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	3,854 (+1,134)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	4,826 (+4,133)
Ferry House	85	82 (-3)	0	0 (-)
Scenario E				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	1,656 (-1,064)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	2,071 (+1,378)
Ferry House	85	82 (-3)	0	0 (-)

Potential Impacts on Recreation Management

The *Final General Management Plan and EIS for Ebey's Landing National Historical Reserve* notes that the "natural soundscape" associated with the reserve consists of "sounds traditionally associated with rural agriculture and natural quiet" (NPS, 2005). Visitors to Ebey's Landing National Historical Reserve are likely to "come with expectations of seeing, hearing, and experiencing phenomena associated with a specific natural or cultural environment" (NPS, 2014). The document notes that the majority of impacts to the soundscape of Ebey's Landing National Historical Reserve are the result of outside activities and development, including increased residential development in and near the reserve, vehicle traffic, and aircraft operations at OLF Coupeville (NPS, 2005). The document notes the potential for "significant noise impacts…on a regular, but inconsistent basis" when OLF Coupeville is in use (NPS, 2005). No formal studies have been completed to assess the impact of aircraft noise on the visitor experience at Ebey's Landing National Historical Reserve. However, the NPS's 2015 acoustic monitoring study recorded intermittent noise levels above 60 dBA from transportation sources, including Growler and other military aircraft, that can be considered to impact recreational experiences at Ebey's Landing National Historical Reserve. The monitoring recorded long periods of time between noise events during which there was no military aircraft activity. Noise events above 60 dBA occurred less than 1 percent of the time at either of the recording locations included in the study. The results of the acoustic monitoring study are summarized in Section 1.12.

Neither the Final General Management Plan nor the Long-range Interpretive Plan for Ebey's Landing National Historical Reserve include management measures that specifically address or are in response to the effects of aircraft noise on visitor experience. The final general management plan and EIS (NPS, 2006a) for Ebey's Landing National Historical Reserve notes that, "The NPS [National Park Service] and Reserve staff have no influence over…[OLF Coupeville] practice [operations]."

Intrusive noise impacts the ability of the NPS to manage natural and cultural soundscapes associated with national parks, protect park resources, preserve visitor experience, and host interpretive programming. Any of the alternatives with Scenarios A, B, D, or E would impact the ability of the NPS to accomplish these activities as a result of the increase in the area of Ebey's Landing National Historical Reserve within the greater than 65 dB DNL noise contours and the increase in the numbers of NA50 dB (L_{max}) noise events and other noise events with L_{max} above 100 dB (discussed in the previous section). While any of the alternatives with Scenario C would result in a decrease in the total area within the greater than 65 dB DNL noise contours, this scenario would increase the area within the greater than 75 dB DNL noise contours and increase the number of NA50 dB (L_{max}) noise events at one POI (Ebey's Prairie) and therefore would have similar, though less severe, impacts. Increases in the number of intrusive noise events would decrease opportunities for visitors to experience the natural and cultural soundscapes associated with the rural farming community protected by Ebey's Landing National Historical Reserve and may interrupt or result in the need to change schedules for interpretive programs. As shown in Section 3.5.2.4, aircraft operations are not audible the majority of the time in Ebey's Landing National Historical Reserve, and the Proposed Action would not result in increases in operations to the point that NPS could not accomplish interpretive programming at the reserve.

Section 4.8.2 addresses potential impacts to biological resources. The analysis found that visual and noise disturbances from increased aircraft operations under the Proposed Action would not significantly impact terrestrial wildlife. Wildlife populations in Ebey's Landing National Historical Reserve are currently exposed to a high level of long-term aircraft operations and other human-made disturbances.

While these disturbances may impact the fitness of individual animals, these impacts are not expected to result in significant effects to populations. Therefore, implementation of the Proposed Action would not significantly impact the effectiveness of NPS activities to manage habitat and protect wildlife at Ebey's Landing National Historical Reserve.

Based on the above, impacts on Ebey's Landing National Historical Reserve would be greatest under all alternatives with Scenario A, which would result in long-term, significant direct impacts on management of the reserve because of the greater than 10-percent increase in the area within the greater than 65 dB DNL noise contours and the increase in the number of noise events with L_{max} approaching levels of physical discomfort at the Rhododendron Park and Reuble Farm site POIs. All alternatives with Scenarios B, D, and E would result in less severe but still long-term, intermittent, significant impacts on recreation as a result of the increase in the number of noise events with L_{max} approaching levels of physical discomfort at these POIs. It should be noted that individual noise events that may cause physical discomfort would be rare. Based on the NPS's noise monitoring study, less than 1 percent of audible aircraft noise recorded at the two monitoring sites in the reserve were above 60 dBA, which is typical for human conversation. Under the Proposed Action, noise levels from aircraft operations high enough to cause physical discomfort would be intermittent and of very short duration. Scenario D additionally would result in a greater than 10 percent increase in the area of the reserve within the noise contours.

Alternatives 1, 2, and 3 with Scenario C would have moderate impacts on management of Ebey's Landing National Historical Reserve because these alternatives would increase the area of the reserve within the greater than 75 dB DNL contour range. Scenario C would result in a smaller increase in the numbers of noise events over 50 dB (L_{max}) per daytime hour at one POI, Ebey's Prairie; would result in a smaller increase in the area within the greater than 75 dB DNL noise contour range; and would result in a decrease in the area of Ebey's Landing National Historical Reserve within the greater than 65 dB DNL noise contours compared to the other alternatives and scenarios. Under the Proposed Action, numbers of operations would increase up to a level of operation similar to historical levels experienced over the life of OLF Coupeville. These operations would be conducted in a manner similar to current Navy aircraft training missions at the NAS Whidbey Island complex. Navy aircraft have operated at OLF Coupeville continuously for more than 75 years, including periods of significantly higher levels of operations.

4.5.2.2.2.4 Pacific Northwest National Scenic Trail

Potential Impacts on Recreation

The recreational experience of hikers and other travelers on the Pacific Northwest National Scenic Trail on Whidbey Island would continue to be affected on an intermittent basis during aircraft operations at Ault Field or OLF Coupeville. Noise impacts on recreation as a result of Prowler, Growler, and other aircraft operations at Ault Field and OLF Coupeville currently occur along an estimated 10.7 miles of the trail. This impact would occur along a section of the trail that passes through developed urban areas that are subject to noise from traffic and other human activities and not in more remote sections of the trail characterized by a greater degree of natural scenery and ambient noise.

Table 4.5-23 shows the length of trail that would fall within the greater than 65 dB DNL noise contours under each alternative and scenario. The trail segment that would be impacted under all alternatives and scenarios is the segment that travels through the northern part of Whidbey Island, generally from Deception Pass State Park to the shoreline just north of Joseph Whidbey State Park. Near OLF Coupeville, a segment of the trail along Whidbey Island's western shoreline near the Keystone Ferry

Terminal also would be within the noise contours under all three alternatives with Scenarios A or D. Under any of the alternatives with Scenario B, only the ferry terminal itself would be within the greater than 65 dB DNL noise contours. Both segments of the trail would be within the greater than 65 dB DNL noise contours under the No Action Alternative. Under Scenarios C and E, under which 80 and 70 percent of FCLPs would be conducted at Ault Field, respectively, no segments of the trail would be within the greater than 65 dB DNL noise contours for OLF Coupeville. Therefore, any of the three alternatives with Scenarios C or E would result in a slight benefit on recreation on this segment of the trail, compared to conditions under the No Action Alternative.

Table 4.5-23 Length of the Pacific Northwest National Scenic Trail Encompassed by the Greater than 65 dB DNL Noise Contours under the Proposed Action (Miles [Percentage Change])

Alternative	*Alternative 1*	*Alternative 2*	*Alternative 3*
Scenario A	11.8 (<1)	11.8 (<1)	11.8 (<1)
Scenario B	11.9 (1.7)	11.9 (1.7)	11.9 (1.7)
Scenario C	12.6 (7.7)	12.5 (6.8)	12.5 (6.8)
Scenario D	11.8 (<1)	11.8 (<1)	11.8 (<1)
Scenario E	12.5 (6.8)	12.4 (6.0)	12.0 (2.6)

Note: The length of the trail that would be impacted under No Action Alternative conditions would be 11.7 miles.

As shown in the table, each alternative with Scenarios A or D would impact a slightly longer segment of the trail than the segment impacted under the No Action Alternative (11.7 miles). Impacts under any of the alternatives with Scenario B, C, or E would result in impacts greater than those under the No Action Alternative. However, regardless of the alternative selected, the difference in the length of the trail exposed to average annual noise levels above 65 dB DNL under the Proposed Action compared to the No Action Alternative would be 0.9 mile or less.

The Proposed Action would impact hiking along approximately 1 percent of the 1,200-mile Pacific Northwest National Scenic Trail and would not significantly increase the length of trail impacted, compared to the No Action Alternative. As noted, this segment of the trail travels through urban areas, and hikers in this area are exposed to multiple sources of technological noise. Weekly FCLP notices may help inform hikers' decisions regarding when to use portions of the trail. Therefore, the Proposed Action would have a long-term, intermittent, minor or negligible impact on recreational use of the trail, depending on the alternative or scenario selected.

Potential Impacts on Recreation Management

As noted in Section 3.5, the U.S. Forest Service is preparing a comprehensive plan to guide management of the Pacific Northwest National Scenic Trail corridor. The comprehensive plan will establish a corridor route and define standards and guidelines for management of the corridor (USDA Forest Service, n.d.[a], n.d.[b]). These standards and guidelines will address the need to protect the trail experience, among other planning considerations (USDA Forest Service, 2015).

While technological noise from outside sources is intrinsically part of the trail experience in urban areas of Whidbey Island, the change in noise exposure along the trail as a result of the Proposed Action would affect the trail experience. The potential impacts of the Proposed Action cannot be assessed against the comprehensive plan for the Pacific Northwest National Scenic Trail at this time, but based on the

discussion above, the Proposed Action would have long-term, minor, or negligible direct impacts on the trail when aircraft are operating in the area, depending on the alternative and scenario selected, as a result of the changes in the length of trail exposed to average annual noise levels above 65 dB DNL compared to the No Action Alternative. The Proposed Action would have no direct physical impacts on the trail corridor or public access to the trail.

4.5.2.2.2.5 State Parks and Recreation Areas

Potential Impacts on Recreation

Table 4.5-24 shows the average NA50 dB noise events, by alternative and scenario at representative POIs at state parks, compared to conditions under the No Action Alternative. Hourly noise events would increase at most parks under each alternative and scenario (with the exception of Fort Casey State Park under all alternatives with Scenario C), and this increase would range between one and three events per hour.

Table 4.5-24 Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest at State Parks (Average Year)

Point of Interest	*No Action Alternative Conditions*	*Alternative 1 (Change from No Action Alternative)*	*Alternative 2 (Change from No Action Alternative)*	*Alternative 3 (Change from No Action Alternative)*
		Annual Average Outdoor Daily DNL Daytime Events per Hour (NA50 L_{max})[1]		
Scenario A				
Deception Pass State Park	8	9 (+1)	9 (+1)	9 (+1)
Dugualla State Park	7	8 (+1)	9 (+2)	9 (+2)
Fort Casey State Park	1	3 (+2)	3 (+2)	3 (+2)
Scenario B				
Deception Pass State Park	8	9 (+1)	9 (+1)	9 (+1)
Dugualla State Park	7	9 (+2)	9 (+2)	9 (+2)
Fort Casey State Park	1	2 (+1)	2 (+1)	2 (+1)
Scenario C				
Deception Pass State Park	8	10 (+2)	10 (+2)	10 (+2)
Dugualla State Park	7	9 (+2)	10 (+3)	9 (+2)
Fort Casey State Park	1	1 (0)	1 (0)	1 (0)
Scenario D				
Deception Pass State Park	8	9 (+1)	9 (+1)	9 (+1)
Dugualla State Park	7	9 (+2)	9 (+2)	9 (+2)
Fort Casey State Park	1	3 (+2)	2 (+1)	2 (+1)
Scenario E				
Deception Pass State Park	8	10 (+2)	10 (+2)	10 (+2)
Dugualla State Park	7	9 (+2)	9 (+2)	9 (+2)
Fort Casey State Park	1	2 (+1)	2 (+1)	2 (+1)

Notes:

[1] The difference between the No Action Alternative and the alternatives is shown in parentheses.

Key:

DNL = day-night average sound level

L_{max} = maximum A-weighted sound level

NA50 = number of events above an L_{max} of 50 dB

The Proposed Action would continue to impact field games at Fort Casey State Park. Any of the alternatives with Scenarios A, B, D, or E would increase the rate of noise events over 50 dB (L_{max}) by one or two events per daytime hour. Alternatives with Scenario C would not increase the rate of noise events per daytime hour. Therefore, all alternatives with Scenarios A, B, D, or E would result in intermittent, moderate, long-term impacts on sports at Fort Casey State Park, and all alternatives with Scenario C would result in no impacts.

Potential impacts on recreation at James Island Marine State Park, which was not included as a POI in the noise study, were assessed based on overall changes in the extent of the greater than 65 dB DNL noise contours under each alternative and scenario. Regardless of the alternative or scenario selected, a portion of the eastern shoreline of James Island Marine State Park—which would be outside the greater than 65 dB DNL noise contours under the No Action Alternative—would be encompassed by the 65 to less than 70 dB DNL contour range. As shown on Figures 4.2-1, 4.2-12, and 4.2-23, the contours in the vicinity of James Island Marine State Park are narrow, occurring primarily along the departure and arrival tracks from and to the northeast of Ault Field. Therefore, under each alternative and scenario, the 65 to less than 70 dB DNL contour range primarily would encompass the eastern shoreline of James Island, and overall differences in noise exposure under each alternative and scenario would be imperceptible to most recreational users. Each of the alternatives and scenarios would result in long-term, intermittent, moderate impacts on recreation at James Island Marine State Park when aircraft are operating in the area, as a result of the additional areas that would be exposed to average noise levels between 65 and 70 dB DNL compared to the No Action Alternative.

Section 4.2, Noise, and Section 4.10, Socioeconomics, discuss potential impacts on camping. Table 4.5-25 shows the estimated number of disruptive noise events per nighttime hour with maximum sound levels above 50 dB (L_{max}) that would potentially disturb people camping in tents at Deception Pass State Park, Rhododendron Park, and Fort Casey State Park. Most alternatives and scenarios, with the exception of Alternative 1 with Scenarios C and E, would result in no change in the average number of disruptive noise events per nighttime hour at Deception Pass State Park. Most of the alternatives and scenarios would result in an increase of one event per nighttime hour on average at Rhododendron Park and Fort Casey State Park, with the exception of Scenarios C and E under all alternatives, which would result in no change at Fort Casey State Park. With an average of one event per nighttime hour, campers at Fort Casey State Park or Rhododendron Park could experience nine NA50 dB noise events during the 9-hour period between 10 p.m. and 7 a.m. when aircraft are operating at Ault Field. It is important to note that these figures are averages, and training tempos and times may vary depending on training requirements and time of year. Section 4.10 discusses the potential economic impacts of the Proposed Action on Deception Pass State Park as a result of lost camping revenue.

Table 4.5-25 Number of Events of Outdoor Speech Interference per Nighttime Hour at Deception Pass State Park and Fort Casey State Park[1]

Point of Interest	*No Action Alternative Conditions*	*Alternative 1 (Change from No Action Alternative)*	*Alternative 2 (Change from No Action Alternative)*	*Alternative 3 (Change from No Action Alternative)*
		Annual Average Outdoor Daily DNL Daytime Events per Hour (NA50 L_{max})[1]		
Scenario A				
Deception Pass State Park	2	2 (0)	2 (0)	2 (0)
Ebey's Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	1 (+1)	1 (+1)	1 (+1)
Scenario B				
Deception Pass State Park	2	2 (0)	2 (0)	2 (0)
Ebey's Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	1 (+1)	1 (+1)	1 (+1)
Scenario C				
Deception Pass State Park	2	3 (+1)	2 (0)	2 (0)
Ebey's Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	- (0)	- (0)	- (0)
Scenario D				
Deception Pass State Park	2	2 (0)	2 (0)	2 (0)
Ebey's Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	1 (+1)	1 (+1)	1 (+1)
Scenario E				
Deception Pass State Park	2	3 (+1)	2 (0)	2 (0)
Ebey's Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	- (0)	- (0)	- (0)

Note:

[1] The supplemental metric for outdoor speech interference was used as a proxy to assess potential impacts on overnight camping. Details on the analysis of outdoor speech interference are provided in Section 3.2 and in Appendix A.

Key:

DNL = day-night average sound level

L_{max} = maximum A-weighted sound level

Tables 4.5-26 through 4.5-28 show the number of annual aircraft noise events with L_{max} above 100 dB at state park POIs in the study area under each alternative and scenario (see Sections 3.2 and 4.2 for additional discussion). As shown in the table, L_{max} would remain the same or decrease at each of these POIs under the Proposed Action, compared to No Action Alternative conditions. L_{max} would continue to approach levels that may rarely cause physical discomfort (above 110 dB) at Deception Pass State Park, and the number of events with an L_{max} above 100 dB would increase at this park under each alternative and scenario, with the annual increase ranging from 43 events under Alternative 1, Scenario A, and 3,534 events under Alternative 1, Scenario C. All alternatives and scenarios intermittently may result in the need to reschedule or cancel outdoor activities at Deception Pass State Park when aircraft are operating in the area. The public has the opportunity to make informed choices on outdoor activities based on the likelihood of more concentrated aircraft operations by referring to the weekly FCLP schedules published by NAS Whidbey Island.

Table 4.5-26 Number of Annual Aircraft Noise Events with Maximum Sound Level above 100 dB at Seleted Park Points of Interest in the Study Area, Alternative 1 (Average Year)

	L_{max} (dB)		*Number of Annual Events*	
Location	*No Action Alternative*	*Alternative 1 (Change from No Action Alternative)*	*No Action Alternative*	*Alternative 1 (Change from No Action Alternative)*
Scenario A				
Deception Pass State Park	104	104 (0)	5,449	5,492 (+43)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario B				
Deception Pass State Park	104	104 (0)	5,449	6,583 (+1,134)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario C				
Deception Pass State Park	104	104 (0)	5,449	8,983 (+3,534)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario D				
Deception Pass State Park	104	104 (0)	5,449	6,402 (+953)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario E				
Deception Pass State Park	104	104 (0)	5,449	8,471 (+3,022)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)

Table 4.5-27 Number of Annual Aircraft Noise Events with Maximum Sound Level above 100 dB at Seleted Park Points of Interest in the Study Area, Alternative 2 (Average Year)

Location	L_{max} (dB)		Number of Annual Events	
	No Action Alternative	Alternative 2 (Change from No Action Alternative)	No Action Alternative	Alternative 2 (Change from No Action Alternative)
Scenario A				
Deception Pass State Park	104	104 (0)	5,449	5,558 (+109)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario B				
Deception Pass State Park	104	104 (0)	5,449	6,587 (+1,138)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario C				
Deception Pass State Park	104	104 (0)	5,449	8,895 (+3,446)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario D				
Deception Pass State Park	104	104 (0)	5,449	6,455 (+1,006)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario E				
Deception Pass State Park	104	104 (0)	5,449	8,406 (+2,957)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)

Table 4.5-28 Number of Annual Aircraft Noise Events with Maximum Sound Level above 100 dB at Seleted Park Points of Interest in the Study Area, Alternative 3 (Average Year)

Location	L_{max} (dB)		Number of Annual Events	
	No Action Alternative	Alternative 3 (Change from No Action Alternative)	No Action Alternative	Alternative 3 (Change from No Action Alternative)
Scenario A				
Deception Pass State Park	104	104 (0)	5,449	5,539 (+90)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario B				
Deception Pass State Park	104	104 (0)	5,449	6,560 (+1,111)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario C				
Deception Pass State Park	104	104 (0)	5,449	8,845 (+3,396)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario D				
Deception Pass State Park	104	104 (0)	5,449	6,434 (+985)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario E				
Deception Pass State Park	104	104 (0)	5,449	8,357 (+2,908)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)

As described in this section, noise effects on state parks under the Proposed Action would generally depend on the location of the park and the scenario. All alternatives and scenarios would result in long-term, intermittent, moderate impacts on Deception Pass State Park, Dugualla State Park, and James Island Marine State Park as a result of noise exposure when aircraft are operating in the area. Impacts on Fort Casey State Park would be moderate under Scenarios A, B, D, or E and minor under Scenario C.

Potential Impacts on Recreation Management

The Proposed Action would not physically affect any parklands. Therefore, the ability of the Washington State Parks and Recreation Commission to implement the Centennial 2013 Plan would not be impacted. However, aircraft noise may impact visitor experience, particularly for those day visitors and campers who come to the parks with the expectation of seeing, hearing, and experiencing phenomena associated with a specific natural or cultural environment as described above.

Increased Growler operations under the Proposed Action would also impact the ability of Washington State Parks to provide educational and interpretive programming at Deception Pass and Fort Casey state parks. When Growler aircraft are operating in the vicinity, outdoor programming may be interrupted by intrusive noise events ranging from nine to 10 events per hour (or an increase of one to two events per hour above No Action Alternative conditions) at Deception Pass State Park and two to three events per hour (or an increase of one to two events per hour above No Action Alternative conditions) at Fort

Casey State Park (see Table 4.5-24). Impacts on outdoor programming would occur only when aircraft are operating in the vicinity. The No Action Alternative would result in a relatively high number of intrusive noise events per hour at Deception Pass State Park, and alternatives under the Proposed Action would result in an additional one to two events per hour. This frequency of noise events may affect the ability of Washington State Parks to provide effective outdoor programming when Growler aircraft are operating in the vicinity and result in the need for schedule or programming changes. Impacts on programming at Fort Casey State Park would be greatest under any alternative with Scenario A and Alternative 1 with Scenario D; the remaining alternatives would result in either no change or increase the number of intrusive noise events per hour by one event. The Proposed Action is not expected to result in the need to modify programming at Fort Casey State Park.

Based on the above and discussion in the previous section, all alternatives and scenarios would result in long-term, intermittent, moderate direct impacts on management of Deception Pass State Park, Dugualla State Park, and James Island Marine State Park as a result of noise exposure when aircraft are operating in the area. Direct impacts on management of Fort Casey State Park would be moderate under Scenarios A, B, D, or E and minor under Scenario C.

4.5.2.2.2.6 County and Municipal Parks and Recreation Areas

Potential Impacts on Recreation

Impacts on visitor experience at county and municipal parks and recreation areas would be similar to those impacts described above and would vary based on personal factors as well as factors such as the proximity of a park to Ault Field or OLF Coupeville, the setting of a particular park, and the recreational activities in which visitors are engaged. Visitor experience at parks in urban settings may be less affected because of the variety of existing sights and noises associated with urban environments.

Potential impacts on county and municipal parks and recreation areas in the study area are assessed based on the noise contour range encompassing the largest area of the park, for all parks wholly or partially included in the greater than 65 dB DNL noise contours. Tables 4.5-29 and 4.5-30 show the noise contour range that encompasses the largest area of each park/recreation area entirely or partially within the greater than 65 dB DNL contours under each alternative and scenario. The tables compare each alternative and scenario to projected conditions under the No Action Alternative at each park. Under each scenario and alternative, the difference in the amount of land at each park included in a particular DNL contour range compared to the No Action Alternative is indicated by a plus (+) or minus (-) sign in parentheses (i.e., more or less land would be included in the DNL contour range than the land included under the No Action Alternative). A hyphen indicates that a park or recreation area would not be encompassed by the greater than 65 dB DNL contours under a particular alternative and scenario.

As noted at the beginning of this section, recreational users' experience of, and reaction to, noise varies depending on a number of factors. The general comparison below provides a method of comparing the alternatives and scenarios and their relative noise effects on recreation while acknowledging the subjective nature of potential impacts to the user experience.

As shown in Table 4.5-29, the county parks that would be most affected by increased noise exposure under the Proposed Action include the Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, and Ika Island. Noise exposure at each of these areas under various alternatives and scenarios would increase by at least one DNL contour range (e.g., the contour range encompassing the majority of the park/recreation area would increase from the 65 to 69 dB DNL contour range to the 70 to 74 dB DNL contour range). Impacts on the following parks would be long term, intermittent, and significant due to the increase in noise exposure:

- Clover Valley Ball Park and Off-Leash Dog Park under all alternatives and scenarios, with the exception of Alternatives 1 and 3 with Scenario A
- Rocky Point Public Beach Access under all alternatives and scenarios
- Driftwood Park under all alternatives and scenarios
- Rhododendron Park under all alternatives with Scenarios A, B, D, or E
- Patmore Pit under all alternatives with Scenarios A, B, D, or E
- Ika Island under all alternatives and scenarios

Impacts on most of the other parks listed above under most alternatives and scenarios would be long term and moderate as a result of the increase in noise exposure when aircraft operate in the area, compared to the No Action Alternative. As a result of a long-term reduction in noise exposure, the Proposed Action would have no impact or a long-term beneficial impact compared to No Action Alternative conditions on the following parks and recreational areas:

- Long Point Public Beach Access under all alternatives and scenarios
- low-tide trails between Ebey's Landing Road and Keystone Jetty under all alternatives with Scenarios B, C, or E and Alternative 2 with Scenario D
- Crockett Blockhouse under all alternatives with Scenario C

Table 4.5-29 dB DNL Contour Range at County Parks and Recreation Areas under Each Alternative and Scenario

County Park or Recreation Area	*No Action Alternative Conditions*	*Alternative 1*	*Alternative 2*	*Alternative 3*
	dB DNL Contour Range			
Scenario A				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	75 – 79 (negl.)	80 – 84 (+)	75 – 79 (+)
Moran Beach (Island)	80 – 84	80 – 84 (negl.)	80 – 84 (negl.)	80 – 84 (negl.)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	65 – 69 (-)	65 –69 (-)	65 – 69 (-)
Low-Tide Trails (between Ebey's Landing Road and Keystone Jetty)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Driftwood Park (Island)	65 – 69	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crockett Blockhouse (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Rhododendron Park (Island)	70 – 74	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Patmore Pit (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Scenario B				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Moran Beach (Island)	80 – 84	80 – 84 (negl.)	80 – 84 (negl.)	80 – 84 (negl.)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Low-Tide Trails (between Ebey's Landing Road and Keystone Jetty)	65– 69	65 – 69 (-)	- (-)	65 – 69 (-)
Driftwood Park (Island)	65 – 69	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Crockett Blockhouse (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Rhododendron Park (Island)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Patmore Pit (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)

Table 4.5-29 dB DNL Contour Range at County Parks and Recreation Areas under Each Alternative and Scenario

County Park or Recreation Area	*No Action Alternative Conditions*	*Alternative 1*	*Alternative 2*	*Alternative 3*
	dB DNL Contour Range			
Scenario C				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Moran Beach (Island)	80 – 84	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	- (-)	- (-)	- (-)
Low-Tide Trails (between Ebey's Landing Road and Keystone Jetty)	65 – 69	65 – 69 (-)	- (-)	- (-)
Driftwood Park (Island)	65 – 69	70 – 74 (+)	65 – 69 (+)	65 – 69 (+)
Crockett Blockhouse (Island)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Rhododendron Park (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Patmore Pit (Island)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Scenario D				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	80 – 84 (+)	75 – 79 (+)	75 – 79 (+)
Moran Beach (Island)	80 – 84	80 – 84 (negl.)	80 – 84 (negl.)	80 – 84 (negl.)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	65 – 69 (negl.)	65 – 69 (negl.)	65 – 69 (negl.)
Low-Tide Trails (between Ebey's Landing Road and Keystone Jetty)	65 – 69	65 – 69 (+)	65 – 69 (-)	65 – 69 (negl.)
Driftwood Park (Island)	65 – 69	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crockett Blockhouse (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Rhododendron Park (Island)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Patmore Pit (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)

Table 4.5-29 dB DNL Contour Range at County Parks and Recreation Areas under Each Alternative and Scenario

County Park or Recreation Area	*No Action Alternative Conditions*	*Alternative 1*	*Alternative 2*	*Alternative 3*
	dB DNL Contour Range			
Scenario E				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Moran Beach (Island)	80 – 84	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	- (-)	- (-)	- (-)
Low-Tide Trails (between Ebey's Landing Road and Keystone Jetty)	65 – 69	- (-)	- (-)	- (-)
Driftwood Park (Island)	65 – 69	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Crockett Blockhouse (Island)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Rhododendron Park (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Patmore Pit (Island)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)

Key:
DNL = day-night average sound level
L_{max} = maximum A-weighted sound level

Contour ranges:
65 – 69 dB DNL
70 – 74 dB DNL
75 – 79 dB DNL
80 – 84 dB DNL
85 – 89 dB DNL

(+) – The area included in the DNL contour range would increase compared to the No Action Alternative, or the DNL contour range encompassing the majority of the park or recreational area would increase.
(-) – The area included in the DNL contour range would decrease compared to the No Action Alternative, or the DNL contour range encompassing the majority of the park or recreational area would decrease.
(negl.) – Negligible change in the area included in the DNL contour range compared to the No Action Alternative.
Hyphen [-] – Area is outside of the greater than 65 dB DNL contours.

The Proposed Action would continue to impact use of ball fields at Rhododendron Park as a result of the need for some individuals to wear hearing protection during outdoor sporting events. Aircraft operations would result in L_{max} of 106 dBA and a maximum SEL of 111 dBA at Rhododendron Park under all alternatives (see Sections 3.2 and 4.2 for an explanation of these metrics). The SEL estimated to occur at this POI would be slightly less than estimated under the No Action Alternative, while the L_{max} would not change from No Action Alternative conditions (see Tables 4.2-3, 4.2-11, and 4.2-19). The numbers of aircraft operations, and therefore the frequency of intrusive noise events, would vary based on alternative, as shown in Tables 4.5-20 through 4.5-22 (under Section B., Ebey's Landing National Historical Reserve, above). As shown in the tables, all alternatives with Scenario A and Alternative 2 with Scenario E may increase the amount of time hearing protection is needed for individuals using Rhododendron Park, resulting in moderate impacts. Under these alternatives, the increase in the number of noise events with the maximum SEL or L_{max} would range between six and 31 events annually and therefore would not differ significantly from No Action Alternative conditions. All alternatives with Scenarios B, C, or D and Alternatives 1 and 3 with Scenario E would result in a decrease in the number of projected operations with the maximum SEL or L_{max} compared to No Action Alternative conditions. This decrease would range from 37 events annually under Alternative 1 with Scenario D to 346 events annually under Alternatives 2 and 3 with Scenario C. Therefore, these alternatives would have a slight long-term beneficial impact on Rhododendron Park; however, people using the park would still be exposed to high noise levels on an intermittent basis.

Table 4.5-30 shows potential impacts on municipal parks and recreational facilities, including schools with outdoor recreational facilities or playgrounds, in the greater than 65 dB DNL noise contours. The Proposed Action would result in a change in noise exposure that would increase the DNL contour range at the following recreational areas listed in the table (e.g., the contour range encompassing the majority of the park/recreation area would increase from the 65 to less than 69 dB DNL contour range to the 70 to less than 74 dB DNL contour range) and result in long-term, intermittent significant impacts:

- Hand-in-Hand Early Learning under all alternatives with Scenarios B, C, D, and E
- Coupeville Middle School under all alternatives with Scenarios A or D
- Coupeville High School under all alternatives with Scenarios A or D and Alternative 1, Scenario B

Table 4.5-30 dB DNL Contour Range at Municipal Parks and Recreation Areas under Each Alternative and Scenario

Municipal Park or Recreation Area	No Action Alternative Conditions	Alternative 1	Alternative 2	Alternative 3
	dB DNL Contour Range			
Scenario A				
Technical Drive Off-leash Dog Park (Oak Harbor)	75 – 79	70 – 74 (-)	70 – 74 (-)	70 – 74 (-)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (negl.)	65 – 69 (negl.)	65 – 69 (negl.)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	70 – 74 (negl.)	70 – 74 (negl.)	70 – 74 (negl.)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Coupeville Middle School	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Coupeville High School	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Scenario B				
Technical Drive Off-Leash Dog Park (Oak Harbor)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Coupeville Middle School	-	-	-	-
Coupeville High School	-	65 – 69 (+)	-	-
Scenario C				
Technical Drive Off-leash Dog Park (Oak Harbor)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (negl.)	65 – 69 (negl.)	65 – 69 (negl.)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	-	-	-
Coupeville Middle School	-	-	-	-
Coupeville High School	-	-	-	-

Table 4.5-30 dB DNL Contour Range at Municipal Parks and Recreation Areas under Each Alternative and Scenario

Municipal Park or Recreation Area	*No Action Alternative Conditions*	*Alternative 1*	*Alternative 2*	*Alternative 3*
	dB DNL Contour Range			
Scenario D				
Technical Drive Off-leash Dog Park (Oak Harbor)	75 – 79	70 – 75 (-)	70 – 75 (-)	70 – 75 (-)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Coupeville Middle School	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Coupeville High School	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Scenario E				
Technical Drive Off-leash Dog Park (Oak Harbor)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Coupeville Middle School	-	-	-	-
Coupeville High School	-	-	-	-

Key:
DNL = day-night average sound level
L_{max} = maximum A-weighted sound level

Contour ranges:
65 – 69 dB DNL
70 – 74 dB DNL
75 – 79 dB DNL
80 – 84 dB DNL
85 – 89 dB DNL

(+) – The area included in the DNL contour range would increase compared to the No Action Alternative, or the DNL contour range encompassing the majority of the park or recreational area would increase.
(-) – The area included in the DNL contour range would decrease compared to the No Action Alternative, or the DNL contour range encompassing the majority of the park or recreational area would decrease.
(negl.) – Negligible change in the area included in the DNL contour range compared to the No Action Alternative.
Hyphen [-] – Area is outside of the greater than 65 dB DNL contours.

One recreational area in Oak Harbor, the Technical Drive Off-leash Dog Park, is within the greater than 75 to 79 dB DNL contour range and would remain within this contour range under most alternatives and scenarios, with the exception of all alternatives with Scenarios A or D. The Proposed Action would result in noise exposure that would not be significantly different from the level of noise exposure currently experienced at this park; therefore, the Proposed Action would result in long-term, intermittent, minor impacts to this park, which is already exposed to high average annual noise levels. Impacts not described above would be long-term, intermittent, and negligible or minor.

Potential impacts to local festivals in the study area resulting from increased Growler operations would be similar to the impacts described throughout this section. Intrusive noise events during festivals may result in annoyance, depending on the perceptions of people hearing the noise and activities in which these people are engaged. Impacts on festivals located near OLF Coupeville (for example, the Whidbey Island Kite Festival at Fort Casey State Park) would potentially be greater under each alternative with Scenarios A or D. Impacts on festivals located near Ault Field (for example, the Whidbey Island Marathon) would potentially be greater under each alternative with Scenarios C or E. Under each alternative, the waterfronts and downtowns of Oak Harbor and Coupeville and most of Penn Cove would be outside the greater than 65 dB DNL noise contours. Therefore, noise from Growler operations is not likely to significantly disrupt festivals at these locations. Impacts on festival locations within the greater than 65 dB DNL noise contours would be minor to moderate depending on the location; intermittent impacts would occur only when aircraft are operating in the vicinity.

Potential Impact on Recreation Management

Aircraft noise may impact the visitor experience, particularly for those visitors who come to the recreation areas with the expectation of seeing, hearing, and experiencing phenomena associated with a specific natural or cultural environment as described above. Because of the large area included in the NAS Whidbey Island complex AICUZ footprint and the shifts in noise exposure under each of the operational scenarios, the degree of impact under each alternative and scenario is highly location dependent. Therefore, long-term direct impacts on recreation management at county and municipal parks as a result of noise exposure when aircraft are operating in the area mirror the impacts discussed above and shown in Tables 4.5-29 and 4.5-30.

The Proposed Action may also result in increased demand for local parks and recreation areas near the places personnel transferring to NAS Whidbey Island would be expected to live. The Proposed Action would result in minor increases in the populations of Island and Skagit Counties (see Section 4.10). The Proposed Action is not expected to impact population in San Juan County. The potential population impacts of the Proposed Action were determined at the county level; therefore, the following discussion of demand for parks and recreation areas also is focused at the county level. Regardless of alternative selected, the Proposed Action would result in population increases of 1.5 percent or less in Island County and 0.2 percent or less in Skagit County compared to No Action conditions (see Table 4.10-2). Personnel and their families residing off station would likely rent or buy homes in different neighborhoods and communities; therefore, individual municipalities are not expected to experience substantial increased demand for recreational facilities in specific locations. In addition, some of the increased demand for recreation would be met by parks and recreational facilities on NAS Whidbey Island.

The *Island County Comprehensive Plan* assesses recreational needs through geographic analysis, information provided by county residents, and observations by county recreational staff (MIG, Inc.,

2011). A geographic analysis was used to determine areas underserved by recreational trails and water-access points. Needs for other types of recreational facilities, including boat launches, dog parks, camp sites, specialty trails, and designated hunting lands, were identified through a county-led public involvement process and through observations of recreational facility use. Therefore, a quantitative analysis of the potential increase in demand for Island County recreational facilities resulting from the Proposed Action is not possible. However, the projected increase in county population under each alternative would be small: 0.81 percent of Island County's 2013 population (117,641 people) under Alternative 1, 1.41 percent under Alternative 2, and 0.82 percent under Alternative 3. Regardless of the alternative selected, this increase would result in minor impacts from use of recreation areas in Island County as a result of increased demand.

Table 4.5-31 compares the estimated existing (2013) demand for parks and recreation areas in Skagit County to the estimated demand under each alternative. As shown in the table, the Proposed Action, regardless of alternative selected, would not add significantly to existing demand or deficits in the county's parks and recreation areas. The Proposed Action would create demand for an additional 2 acres (under Alternatives 1 and 3) to 3 acres (under Alternative 2) of regional parkland, which would add to the existing county deficit for regional parks. The Proposed Action would not create additional deficits in any other parks or recreation areas as a result of increased demand. While the Proposed Action would result in additional demand for open space, the county has an estimated surplus of open space, which would not change under the Proposed Action. Therefore, the Proposed Action, regardless of alternative selected, would not result in significant impacts on recreation in Skagit County as a result of increased demand.

Table 4.5-31 Potential Changes to Recreational Levels of Service in Skagit County as a Result of the Proposed Action

Skagit County Levels of Service (LOS) Standard for Recreation Facilities (2010)[1]		*Skagit County Estimated 2013 Demand and Deficit[2] (Acres)*	*Estimated Skagit County Demand (Acres) under the Proposed Action, by Alternative[3]*		
Park Type	*LOS Standard (acres/1,000 people)*		*Alternative 1*	*Alternative 2*	*Alternative 3*
Regional Park	11.93/1,000	1,403 (861)	1,405	1,406	1,405
Community Park	1.12/1,000	132 (83)	132	132	132
Neighborhood Park	0.19/1,000	22 (20)	22	22	22
Open Space / Undeveloped	10.41/1,000	1,225 (-345)	1,226	1,227	1,227

Source: Skagit County Parks and Recreation, 2013

Notes:

1 LOS standards for Skagit County are based on an aggregate LOS including LOS measures for Snohomish, Spokane, and Whatcom Counties.

2 Estimated deficit based on the county's 2013 population of 117,641 people, compared to the 2010 park inventory acreages provided in Skagit County Parks and Recreation, 2013. Park deficits in acres are shown in parentheses.

3 Based on Skagit County's 2013 population of 117,641 people and the estimated net population increase under each alternative (see Section 4.10).

4.5.2.2.2.7 Privately Owned and Other Recreation Areas

Community gathering places, including the Whidbey Island Nordic Lodge Hall and Camp Casey Conference Center, would be located within the greater than 65 dB DNL noise contours under the

Proposed Action. Table 4.5-32 shows changes in the DNL contour ranges at these locations under each alternative. The scenario selected would have a greater impact on noise exposure at these community gathering places than the alternative.

Table 4.5-32 dB DNL Contour Range at Community Gathering Places under Each Alternative and Scenario

County Park or Recreation Area	*No Action Alternative Conditions*	*Alternative 1*	*Alternative 2*	*Alternative 3*
	dB DNL Contour Range			
Scenario A				
Camp Casey Conference Center	65 – 69	65 – 69 (+)	65 – 69 (negl.)	65 – 69 (+)
Whidbey Island Nordic Lodge Hall	70 – 74	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Scenario B				
Camp Casey Conference Center	65 – 69	- (-)	- (-)	- (-)
Whidbey Island Nordic Lodge Hall	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Scenario C				
Camp Casey Conference Center	65 – 69	- (-)	- (-)	- (-)
Whidbey Island Nordic Lodge Hall	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Scenario D				
Camp Casey Conference Center	65 – 69	65 – 69 (negl.)	65 – 69 (negl.)	65 – 69 (negl.)
Whidbey Island Nordic Lodge Hall	70 – 74	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Scenario E				
Camp Casey Conference Center	65 – 69	- (-)	- (-)	- (-)
Whidbey Island Nordic Lodge Hall	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)

Tables 4.5-20 through 4.5-22 (above) show L_{max} and the number of annual events with L_{max} above 100 dB projected to occur at representative parks near the locations of the Camp Casey Conference Center (Fort Casey State Park) and Whidbey Island Nordic Lodge Hall (Rhododendron Park). In general, events with the maximum L_{max} at Camp Casey Conference Center (Fort Casey State Park) would not exceed 100 dB and would not approach levels that can cause physical discomfort. At Whidbey Island Nordic Lodge Hall (Rhododendron Park), all alternatives with Scenario A would result in the greatest impact, and all alternatives with Scenario C would result in the least impact. L_{max} at the two representative locations would be intrusive for outdoor activities, and L_{max} at Rhododendron Park near the Whidbey Island Nordic Lodge Hall would approach dB levels that can cause physical discomfort (rarely). On an intermittent basis, implementation of the Proposed Action may result in the need for Camp Casey Conference Center and the Whidbey Island Nordic Lodge Hall to reschedule or cancel outdoor events, particularly if Scenarios A or D are implemented and during periods of increased training tempos prior to deployment. Implementation of Scenarios B and E may result in similar impacts on a less frequent basis, and implementation of Scenario C would result in a decrease in the number of events with L_{max} above 100 dB at Rhododendron Park near the Whidbey Island Nordic Lodge Hall.

Based on the above, all alternatives with Scenario A would have long-term, intermittent, significant impacts on the Camp Casey Conference Center, and all alternatives with Scenarios B or D would have long-term, intermittent moderate to significant impacts on the center as a result of the increase in events with the maximum L_{max}. All alternatives with Scenario E would have long-term, intermittent, moderate impacts on the center as a result of a smaller increase. All alternatives with Scenario C would decrease annual average noise levels and the number of events with the maximum SEL or L_{max} at this

location and therefore would have no impact on the Camp Casey Conference Center. All alternatives with Scenarios A, B, D, or E would have long-term, intermittent, significant impacts on the Whidbey Island Nordic Lodge Hall as a result of an increase in annual average noise levels. Scenarios A, B, and D also would result in an increase in the number of events with L_{max} over 100 dB. Scenario C would result in long-term, intermittent, moderate impacts on this location because of an increase in annual average noise levels.

The Island County Historical Society Museum is not located within the study area but holds regular outdoor historical interpretive activities and walking tours in and around Coupeville that may occur in parts of the study area. The Proposed Action would have impacts similar to those described above on outdoor programs offered by the museum. Growler operations at OLF Coupeville may result in the need to reschedule or cancel outdoor activities or may result in annoyance (most likely) or physical discomfort (rarely) for people participating in these activities, depending on their location. Impacts would be moderate under Scenarios A and D, minor under Scenario B, and minor or negligible under Scenarios C and E.

Private property and public areas such as bike paths and lanes, rural roads, and wildlife viewing and hunting areas throughout the study area also are used for recreation. Because these places are not designated parks or recreation areas and are dispersed throughout the study area, the evaluation of impacts focuses on total acreages that would be within the DNL noise contours under each alternative, as shown in Table 4.5-33. The table shows that impacts would be greater around OLF Coupeville under all alternatives with Scenarios A and D and slightly greater around Ault Field under all alternatives with Scenarios C or E, as noted throughout this section. Impacts across the entire study area would be greatest under Alternative 1, Scenario A, which would result in an approximately 18-percent increase in the land area within the contours, and would be higher under all alternatives with Scenarios A and D generally.

Impacts resulting from implementation of the Proposed Action would include intrusive noise resulting in annoyance during aircraft operations. The increase in Growler operations may also induce people to change their use of private property and other public areas for recreation--i.e., by spending less time outside during Growler operations, planning outdoor activities around Growler operational schedules, or wearing hearing protection during operations.

Overall, Alternative 2 with Scenario C would result in intermittent, long-term, moderate impacts on other recreational areas as a result of the increases in acreage included within the greater than 65 dB DNL noise contours. The other alternatives, which would increase the acreage included within the greater than 65 dB DNL noise contours by more than 10 percent, would result in long-term, intermittent, significant impacts. All alternatives would result in an increase in the overall area used for recreation that would be exposed to high annual average noise levels.

Table 4.5-33 Total Acreage within the Greater than 65 dB DNL Noise Contours (Average Year [Percentage Change])

Area	*No Action Alternative*	*Alternative 1 (Difference in Acres Compared to No Action Alternative)*	*Alternative 2 (Difference in Acres Compared to No Action Alternative)*	*Alternative 3 (Difference in Acres Compared to No Action Alternative)*
Scenario A				
Ault Field	12,414	13,226 (+812 [7%])	13,164 (+750 [6%])	13,133 (+719 [6%])
OLF Coupeville	7,407	10,197 (+2,790 [38%])	10,082 (+2,675 [36%])	10,132 (+2,725 [37%])
NAS Whidbey Island Complex	19,821	23,423 (+3,602 [18%])	23,246 (+3,425 [17%])	23,265 (+3,444 [17%])
Scenario B				
Ault Field	12,411	13,616 (+1,202 [10%])	13,535 (+1,121 [9%])	13,535 (+1,121 [9%])
OLF Coupeville	7,406	9,491 (+2,084 [28%])	9,378 (+1,971 [27%])	9,447 (+2,040 [28%])
NAS Whidbey Island Complex	19,817	23,107 (+3,286 [17%])	22,913 (+3,092 [16%])	22,982 (+3,161 [16%])
Scenario C				
Ault Field	12,411	13,922 (+1,508 [12%])	13,788 (+1,374 [11%])	13,766 (+1,352 [11%])
OLF Coupeville	7,406	8,092 (+685 [9%])	7,877 (+470 [6%])	7,998 (+591 [8%])
NAS Whidbey Island Complex	19,817	22,014 (+2,193 [11%])	21,665 (+1,844 [9%])	21,764 (+1,943 [10%])
Scenario D				
Ault Field	12,411	13,395 (+981 [8%])	13,329 (+915 [7%])	13,300 (+886 [7%])
OLF Coupeville	7,406	10,007(+2,600 [35%])	9,887 (+2,480 [33%])	9,939 (+2,532 [34%])
NAS Whidbey Island Complex	19,817	23,402 (+3,581 [18%])	23,216 (+3,395 [17%])	23,239 (+3,418 [17%])
Scenario E				
Ault Field	12,411	13,818 (+1,404 [11%])	13,707 (+1,293 [10%])	13,669 (+1,255 [10%])
OLF Coupeville	7,406	8,792 (+1,385 [19%])	8,706 (+1,299 [18%])	8,759 (+1,352 [18%])
NAS Whidbey Island Complex	19,817	22,610 (+2,789 [14%])	22,413 (+2,592 [13%])	22,428 (+2,607 [13%])

Note: Numbers may not sum exactly due to rounding.

4.5.3 Land Use Conclusion, Alternatives 1 through 3

Table 4.5-34 provides a summary of potential impacts on land use and recreation under each alternative.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
1A	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 18 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Coupeville Middle School, and Coupeville High School. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Long-term, intermittent significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; moderate impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
1B	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
	• Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Long-term, intermittent, moderate to significant impacts to the Camp Casey Conference Center; significant impacts to the Whidbey Island Nordic Lodge Hall; minor impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
1C	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 11 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, moderate impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, and James Island Marine State Park. Long-term, intermittent, minor impacts to Fort Casey State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impact to the Camp Casey Conference Center; long-term, intermittent, moderate impacts to the Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
1D	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 18 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
	• An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville Middle School, and Coupeville High School. • Long-term, intermittent, moderate to significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; moderate impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
1E	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 14 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • Long-term, intermittent, moderate impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
	Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2A	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Coupeville Middle School, and Coupeville High School. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Moderate to significant impacts on community gathering places, and moderate impacts on private property and other areas used for recreation. • Long-term, intermittent, significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; moderate impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2B	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 16 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts on management of the national monument for recreation.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
	• Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Long-term, intermittent, moderate to significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor impacts to Island County Historical Society Museum; and significant impacts on private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2C	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 9 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, moderate impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impact to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, and James Island Marine State Park. Long-term, intermittent, minor impacts to Fort Casey State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball park and Off-Leash Dog Park, Driftwood Park, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impact to the Camp Casey Conference Center; long-term, intermittent moderate impacts to the Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and moderate impacts to private property and other areas used for recreation.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
	• Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2D	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville Middle School, and Coupeville High School. • Long-term, intermittent moderate to significant impacts to the Camp Casey Conference Center, Whidbey Island Nordic Lodge Hall, and Island County Historical Society Museum; significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2E	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 13 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
	• Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • Long-term, intermittent moderate impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
3A	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts on management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Coupeville Middle School, and Coupeville High School. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Moderate to significant impacts to community gathering places, and moderate impacts on private property and other areas used for recreation. • Long-term, intermittent significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; moderate impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
3B	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 16 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts on management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Long-term, intermittent, moderate to significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
3C	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 10 percent of land, and consequently an increase in people, within the greater-than-65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, moderate impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
	• Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, and James Island Marine State Park. Long-term, intermittent, minor impacts to Fort Casey State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impact to the Camp Casey Conference Center; long-term, intermittent moderate impacts to the Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
3D	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville Middle School, and Coupeville High School. • Long-term, intermittent moderate to significant impacts to the Camp Casey Conference Center, Whidbey Island Nordic Lodge Hall, and Island County Historical Society Museum; significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
3E	**Land Use:** • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 13 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
	• An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey's Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • Long-term, intermittent moderate impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.

Key:
BLM = Bureau of Land Management
DNL = day-night average sound level
L_{max} = maximum A-weighted sound level
NWR = National Wildlife Refuge

In summary, implementation of the alternatives, average and high-tempo FCLP years, at the NAS Whidbey Island complex would not result in any impact to on-station land use. Construction proposed under the alternatives would not result in direct or indirect impacts to regional land uses because all construction would be located entirely within the NAS Whidbey Island complex. The minor increase in personnel associated with the Proposed Action would result in no significant impact to regional land use.

The Proposed Action is consistent with on-station land use controls. Regarding off-station land use controls, the increase in size of the DNL noise contours associated with the Proposed Action during an average operating year would result in an increase in land area and people within the greater than 65 DNL noise contours. Off-station land use controls may be insufficient and may require update in light of new DNL contours and new APZs (at OLF Coupeville, only).

Land use compatibility surrounding the NAS Whidbey Island complex would be impacted under each alternative. The acreage of land within the projected greater than 65 dB DNL noise contours would increase by 9 percent to 18 percent during an average operating year. Incompatible land use (i.e., residential land) within the DNL noise contours would increase under all alternatives and scenarios, during average operating years.

During a high-tempo FCLP year, the Proposed Action would result in a similar increase in land, and therefore people, within the DNL noise contours relative to an average year. The acreage of land within the projected greater than 65 dB DNL noise contours would increase by 10 percent to 18 percent during a high-tempo FCLP year, relative to the No Action year. Incompatible land use (i.e., residential land) within the DNL noise contours would increase under all alternatives and scenarios during high-tempo FCLP years. Furthermore, off-station land use controls should consider the temporary impacts of the high-tempo FCLP year or designate as an area to monitor.

Land within the conceptual APZs at OLF Coupeville would increase under each alternative. If warranted, the APZs could be updated by completing an AICUZ Update and coordinating with local communities to provide appropriate new land use recommendations as necessary. The Navy would continue to work with Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville as necessary to plan for compatible land use development within current and proposed APZs under any alternative selected for implementation.

Implementation of the Proposed Action would result in moderate impacts on wilderness recreation and management at Williamson Rocks, which are included in the San Juan Island Wilderness, part of the San Juan Islands NWR. Implementation of the Proposed Action would increase average annual noise levels at Williamson Rocks under all alternatives and would result in reduced opportunities for visitors to experience natural soundscapes associated with the rocks and surrounding waters. The Proposed Action also would impact the USFWS's ability to manage Williamson Rocks to protect wilderness values. Although visitors are currently exposed to noise from existing aircraft operations, the proposed increase in Growler operations would increase the occurrence of intrusive noise at and near this area, which would result in fewer or limited opportunities for visitors to experience solitude and primitive recreation activities and would likely negatively affect visitors' perceptions of these areas as retaining their primeval, natural character. Impacts to visitor experience and wilderness character would be intermittent over the long term, occurring only when aircraft are operating in the area.

Overall, under some alternatives and scenarios, implementation of the Proposed Action at NAS Whidbey Island would result in localized significant impacts to recreation at Ebey's Landing National Historical Reserve, various county and municipal parks and recreational areas, and private recreational facilities as a result of increased noise exposure (see Table 4.5-34, above). Impacts on other parks and recreational areas would predominantly be long term and minor or moderate at individual locations as a result of increases in the area within the greater than 65 dB DNL noise contours, in the average number of NA50 dB BNL daytime noise events per hour, or in the number of annual operations with the maximum SEL or L_{max}. Noise impacts would be intermittent over the long term, occurring only when aircraft are operating in the area. It is important to note, however, that the different scenarios may result in no impacts on individual parks and recreation areas by shifting the majority of Growler operations to either Ault Field or OLF Coupeville. The Proposed Action may result in increased demand for parks and recreation areas as a result of personnel transfers; however, impacts resulting from this demand would be minor.

The Proposed Action would directly affect recreation management in the study area as a result of long-term changes in noise exposure that would affect the recreational experiences of visitors when aircraft are operating in the area.

4.6 Cultural Resources

This section evaluates the potential impacts of the Proposed Action on cultural resources, including archaeological resources, architectural or built resources, cemeteries, and traditional cultural properties (TCPs) within the area of potential effects (APE), in accordance with NEPA guidance. Measures developed by the Navy to avoid, minimize, or mitigate impacts on cultural resources were identified as part of evaluating environmental consequences.

In coordination with its NEPA analysis, the Navy also has evaluated the potential to affect cultural resources in compliance with Section 106 of the National Historic Preservation Act (NHPA), including its implementing regulations codified in 36 CFR Part 800 (Table 4.6-1). As the Proposed Action is an undertaking with the potential to affect historic properties, the Navy is required to identify historic properties within the APE, as defined in Section 3.6, and to consider the effects of a Proposed Action on these properties. The effects of the Proposed Action on historic properties within the APE were evaluated pursuant to guidance on determining effects under 36 CFR 800.4(d) and 800.5(1). The Navy is consulting with the Washington State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), American Indian tribes and nations (herein after referred to as "tribes"), and consulting parties regarding the potential to affect historic properties.

Cultural Resources

NEPA Evaluation

Archaeological Resources
Minimal to no impacts will occur to known or intact archaeological sites.

Architectural Resources
Moderate to no impacts will occur to architectural resources.

Cemeteries

Minimal to no impacts will occur to known cemeteries or human burial grounds.

Traditional Cultural Properties

No impacts will occur to known traditional cultural properties.

Section 106 Evaluation

Overall, the Navy has determined that the proposed undertaking will adversely affect historic properties and is consulting on a Memorandum of Agreement (MoA) to mitigate adverse effects as part of its NHPA Section 106 consultation.

The analysis in this EIS regarding historic properties applies criteria delineated in ACHP regulations found in 36 CFR Part 800 to assess impacts within the APE (see Section 3.6 for a further discussion of the APE).[29] A project affects a historic property when it alters the characteristics (and integrity) of a historic property that qualify it for inclusion in or eligibility for the National Register of Historic Places (NRHP) (36 CFR Section 800.16[i]). Examples of adverse effects are included in Table 4.6-1. Effects to TCPs that are attributed to American Indian tribes and nations only can be determined through consultation with the affected tribes. However, ground disturbance to prehistoric archaeological sites and graves has often been cited as an adverse impact.

[29] While cultural resources, including historic properties, may be located outside the APE, only those located within it are evaluated as part of this analysis. For consistency, the Navy used the APE defined in accordance with Section 106 of the NHPA for the NEPA analysis (See Section 3.6.1.2).

Table 4.6-1 Definitions of Effects on Historic Properties

Finding of No Historic Properties Affected (No Effect on Historic Properties)
• 36 CFR 800.4(d)(1) No historic properties affected. If the agency official finds that either there are no historic properties present or there are historic properties present but the undertaking will have no effect upon them as defined in § 800.16(i), the agency official shall provide documentation of this finding, as set forth in 36 CFR 800.11(d), to the SHPO/THPO.
Finding of No Adverse Effect
• 36 CFR 800.4(d)(2) – Historic Properties Affected If the agency official finds that there are historic properties which may be affected by the undertaking, the agency official shall notify all consulting parties, including Indian Tribes and Native Hawaiian organizations, invite their views on the effects and assess adverse effects, if any, in accordance with §800.5. • 36 CFR 800.5(b) – Finding of No Adverse Effect The agency official, in consultation with the SHPO/THPO, may propose a finding of no adverse effect when the undertakings' effects do not meet the criteria of paragraph (a)(1) or the undertaking is modified or conditions are imposed, such as the subsequent review of plans for rehabilitation by the SHPO/THPO to avoid adverse effects. • 36 CFR 800.5(d)(1) Results of Assessment. No Adverse Effect The agency official shall maintain a record of the finding of no adverse effect and provide information on the finding to the public on request consistent with the confidentiality provisions of 36 CFR 800.11(c).
Finding of Adverse Effect
• 36 CFR 800.5(a)(1) - Criteria of Adverse Effect An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, setting, design, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or cumulative.
Examples of Adverse Effect
• 36 CFR 800.5(a)(2) – Examples of Adverse Effects Adverse effects on historic properties include but are not limited to: o physical destruction of or damage to all or part of the property o alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines o removal of the property from its historic location o change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance o introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features o neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian Tribe or Native Hawaiian organization o transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

Source: Protection of Historic Properties, 36 CFR Part 800

Key:
CFR = Code of Federal Regulations
SHPO = State Historic Preservation Office
THPO = Tribal Historic Preservation Office

Analysis of potential impacts to historic properties (i.e., a cultural resource that is listed on or eligible for listing on the NRHP) considers both direct and indirect effects. Direct effects may be the result of physically altering, damaging, or destroying all or part of a resource, or neglecting the property to the extent that it deteriorates or is destroyed. Indirect impacts are those that may occur as a result of the completed project altering characteristics of the surrounding environment through the introduction of visual or audible elements that are out of character for the period the property represents. An example of an indirect effect is increased vehicular or pedestrian traffic in the vicinity of the property.

The Navy has consulted with the Washington SHPO, the ACHP, eight federally recognized tribes, and 12 consulting parties to identify the APE for the Proposed Action, to determine the NRHP eligibility of cultural resources within the APE, to determine the effects of the alternatives for future development on historic properties, and to develop measures as necessary to mitigate any adverse effects of future development on historic properties. Figure 3.6-1 shows the APE for the NAS Whidbey Island complex. As noted in Section 3.6.2.6, consultation was initiated in October 2014 with the SHPO and the following organizations:

- ACHP
- Town of Coupeville
- Citizens of Ebey's Reserve (COER)
- Trust Board of Ebey's Landing National Historical Reserve
- Island County Commissioners
- Island County Historical Society
- NPS
- City of Oak Harbor
- PBY-Naval Air Museum
- Seattle Pacific University (Camp Casey)
- Washington State Parks Northwest Region Office.

The Navy sent a second letter to the SHPO and consulting parties on June 30, 2016. The letter provided information on the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours. The SHPO acknowledged receipt of the second letter in a response dated July 6, 2016 (please note in Appendix C, the letter shows a date of July 7, 2016. The letter, however, was transmitted to the Navy via email on July 6, 2016).

Letters also were sent to the Mayor of Port Townsend, the Island County Commissioner for District 3, and the Jefferson County Historical Society on July 12, 2016. These parties are additions to the original mailing list for which letters were sent in October 2014. The letters requested comments on the proposed definition of the APE and included information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours.

In response to the request for comments on the proposed definition of the APE, letters and emails were received from the following parties:

- ACHP – The ACHP responded on August 10, 2016, indicating its comments regarding the proposed definition of the APE and its recommendations to provide information on the APE to consulting parties for review.
- City of Port Townsend – Between July 5, 2016, and August 6, 2016, the City of Port Townsend provided correspondence via email regarding the proposed definition of the APE and the noise study. The City of Port Townsend also provided a letter to the Navy on August 16, 2016, indicating its comments on the proposed definition of the APE and the use of the noise data.
- COER – In a letter dated July 22, 2016, COER requested information regarding the comment deadline, an explanation of expanded operations at Ault Field and OLF Coupeville, and additional input on the noise modeling study and files from the 2005 EA.
- Town of Coupeville – In a letter dated August 25, 2016, the Town of Coupeville provided comments on the use of particular noise data and the potential to impact historic resources, agriculture, and businesses.

The Navy sent a third letter to the consulting parties on August 31, 2016. This letter was intended to provide clarification of the Section 106 process. It included three enclosures, consisting of information on the process and strategy for the 106 process for the continuation and increase of Growler operations, a flow chart, and a copy of the implementing regulations for Section 106 codified at 36 CFR 800.

Responses were received on September 1, 2016, from COER concerning the noise data and the initial findings; on September 28, 2016, from the Trust Board of Ebey's Landing National Historical Reserve, indicating their comments on the proposed definition of the APE and the use of noise data; and on September 30, 2016, from the Washington SHPO regarding the Section 106 process, the proposed definition of the APE, the development of a public involvement plan, tribal consultation, the distinction of NEPA and the NHPA, the determination of effect, and the potential for drafting resolution documentation.

A fourth letter was sent by the Navy on November 10, 2016, indicating the use of the Draft EIS public meetings to fulfill the Section 106 requirements for public notification and consultation. The letter provided information on the dates and times of the meetings. The NPS responded to this letter on January 3, 2017, noting its concern for the use of the 65 dB DNL contour to delineate the APE, as well as its concern for evaluating impacts to the cultural landscape. The SHPO responded to information presented in the Draft EIS on January 25, 2017, noting its concern with the APE and the potential for adverse effects, especially as it pertains to long-term and cumulative effects of increased flight operations on the character and qualities of historic places and communities.

The Navy sent a fifth letter to the consulting parties on May 1, 2017. This letter provided information regarding the Navy's rationale for the use of the 65 dB DNL noise contour for the APE. The Navy also provided background information on historical flight operations. The letter contained five enclosures, including the location of NAS Whidbey Island and OLF Coupeville, a map of flight tracks to depict airfield operations, a depiction of the aggregate noise contour, a map showing the portions of the APE evaluated for potential direct effects, and a map showing the portions of the APE evaluated for potential indirect effects.

The Navy and the SHPO continued discussions regarding the APE. The Navy met with the SHPO on May 10, 2017, and received a letter of the same date. The letter noted the SHPO's disagreement with the

definition of the APE and provides recommendations for the submittal of forms for when a survey is completed. The Navy provided a response on July 14, 2017, showing additional information on the use of the 65 dB DNL contour and its intention to incorporate the whole of Ebey's Landing National Historical Reserve. The SHPO response on July 14, 2017, provided concurrence with the methodology for identifying historic properties and offered recommendations to completing the task.

An additional letter was sent by the Navy to all consulting parties on July 19, 2017. It provided an update on the Navy's effort to identify historic properties and to offer another opportunity to provide comments. Five enclosures were provided. The first four included information noting known historic properties within the 65 dB DNL contour line, the historic buildings identified in the Ebey's Landing National Historical Reserve 2016 Inventory Update, known historic properties within the 2016 Inventory Update, and all listed historic properties in the NRHP. A bibliography also was included to help provide information on the historic context.

The Navy notified the ACHP, SHPO, and consulting parties on October 2, 2017, that it was updating the noise analysis to incorporate changes to the Navy's training requirements and would consult on changes to the APE and inventory once the update was complete. The letter notified the various parties of the change in the scale and scope of the undertaking due to the inclusion of two new scenarios (Scenarios D and E), a decrease in number of pilots required in each squadron, and the updated noise analysis.

A letter continuing the Section 106 consultation was provided to the ACHP, SHPO, and consulting parties on June 25, 2018. The letter noted the Navy's adverse effect finding for the Central Whidbey Island Historic District as a result of more frequent aircraft operations affecting certain landscape components of the district. Specifically, the Navy found that the increased frequentness of noise exposure would have an adverse indirect effect on five representative locations within the district. The Navy further requested comments on this finding. An attachment documenting the finding of effects determination was included as part of the correspondence.

The SHPO responded to the Navy's letter on June 27, 2018. The SHPO acknowledged the receipt of the materials and concurred with the Navy's determination of adverse effect. The SHPO noted its anticipation of further consultation and the development of a Memorandum of Agreement (MoA) to address the adverse effect. The SHPO also requested correspondence or comments received from concerned tribes or other consulting parties.

The Navy is consulting with the Washington SHPO, the ACHP, tribes, and consulting parties regarding the MoA to mitigate adverse effects as part of its NHPA Section 106 consultation.

Documentation of the correspondence with the SHPO and other consulting parties is provided in Appendix C.

Consultation is being conducted with these organizations because they have demonstrated interests in the effects of the undertaking on historic properties. Consultation also is being conducted with individuals interested in this undertaking. As noted in Section 3.6.1.2, the APE was refined in consideration of comments received by the consulting parties; it now includes all of Ebey's Landing National Historical Reserve. Information received through the consultation also was considered by the Navy in evaluating potential effects to historic properties, particularly with regard to noise and vibration effects to off-station resources.

As mentioned previously, the Navy also has initiated Section 106 consultation with the eight federally recognized tribes regarding the Proposed Action and its effects on historic properties at NAS Whidbey Island.

The following tribes were contacted on October 10, 2014:

- Jamestown S'Klallam Tribe
- Lummi Tribe of the Lummi Reservation
- Samish Indian Nation
- Stillaguamish Tribe of Indians
- Suquamish Indian Tribe of the Port Madison Reservation
- Swinomish Indian Tribal Community
- Tulalip Tribes of Washington
- Upper Skagit Indian Tribe

The Samish Indian Nation responded on October 28, 2014, indicating that the Samish Indian Nation was not interested in consulting for cultural resources at this time.

The Navy sent a second letter to the tribes on June 30, 2016. The letter provided information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours.

The Jamestown S'Klallam Tribe responded on August 1, 2016, indicating that with respect to cultural resources, the tribe has no comments regarding the EA-18G flight operations. They requested future consultation on projects regarding renovation, demolition, and construction of facilities at NAS Whidbey Island.

The Navy sent a third letter to the tribes on August 31, 2016. This letter was intended to provide clarification of the Section 106 process. It included three enclosures, consisting of information on the process and strategy for the 106 process for the continuation and increase of Growler operations, a flow chart, and a copy of the implementing regulations for Section 106 codified at 36 CFR 800.

A fourth letter was sent by the Navy on November 10, 2016, indicating the use of the Draft EIS public meetings to fulfill the Section 106 requirements for public notification and consultation. The letter provided information on the dates and times of the meetings.

The Navy sent a fifth letter to the tribes on May 1, 2017. This letter provided information regarding the Navy's rationale for the use of the 65 dB DNL noise contour for the APE. The Navy also provided background information on historical flight operations. The letter contained five enclosures, including the location of NAS Whidbey Island and OLF Coupeville, a map of flight tracks to depict airfield operations, a depiction of the aggregate noise contour, a map showing the portions of the APE evaluated for potential direct effects, and a map showing the portions of the APE evaluated for potential indirect effects.

An additional letter was sent by the Navy to all tribes on July 19, 2017. It provided an update on the Navy's effort to identify historic properties and to offer another opportunity to provide comments. Five enclosures were provided. The first four included information noting known historic properties within the 65 dB DNL contour line, the historic buildings identified in the Ebey's Landing National Historical Reserve 2016 Inventory Update, known historic properties within the 2016 Inventory Update, and all

listed historic properties in the NRHP. A bibliography also was included to help provide information on the historic context.

The Navy notified the tribes on October 2, 2017, that it was updating the noise analysis to incorporate changes to the Navy's training requirements and would consult on changes to the APE and inventory once the update was complete. The letter notified the tribes of the change in the scale and scope of the undertaking due to the inclusion of two new scenarios (Scenarios D and E), a decrease in number of pilots required in each squadron, and the updated noise analysis.

A letter continuing the Section 106 consultation was provided to the tribes on June 25, 2018. The letter noted the Navy's adverse effect finding for the Central Whidbey Island Historic District as a result of more frequent aircraft operations affecting certain landscape components of the district. Specifically, the Navy found that the increased frequentness of noise exposure would have an adverse indirect effect on five representative locations within the district. The Navy further indicated its assurance of confidentiality for any sensitive information and requested comments on this finding. An attachment documenting the finding of effects determination was included as part of the correspondence.

No other responses have been received to date from the tribes.

4.6.1 Documentation of the correspondence with the tribes is provided in Appendix C. Cultural Resources, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no potential impacts to cultural resources. No additional Growler aircraft would be in operation, and no associated facilities would be constructed. Therefore, no new ground disturbance within the APE would occur, and no new sources of noise, vibration, or visual change would be introduced. Therefore, no new significant or adverse effects to cultural resources would occur with implementation of the No Action Alternative.

4.6.2 Cultural Resources, Alternatives 1 through 3

4.6.2.1 Cultural Resources, Potential Impacts

New construction would occur to support additional Growler aircraft and personnel, including expansion of hangar space, new armament storage, separate mobile maintenance facility storage, and expanded parking areas. As part of the planned construction activities, Building 115 also would be demolished. Construction would be limited to Ault Field (i.e., within the on-installation direct effect areas of the APE).

Operations would consist of actions at both Ault Field and OLF Coupeville. For this analysis, potential direct and indirect impacts are considered to cultural resources as a result of the construction of the new facilities and the flight operations of 35 or 36 additional Growler aircraft homebased at NAS Whidbey Island.

4.6.2.1.1 Direct Effects

Potential direct effects of the Proposed Action are evaluated under NEPA and under Section 106 of the NHPA. Consideration of potential direct effects includes whether the Proposed Action's alternatives involve direct physical damage to a resource, such as construction, renovation, or demolition activities. Therefore, this section only considers construction and demolition activities at Ault Field and thereby only within the on-installation direct effect areas of the APE (see Figure 3.6-2) (see Section 4.6.2.1.2 for a discussion of indirect and off-installation effects).

4.6.2.1.1.1 Archaeological Resources

As part of the Proposed Action, ground disturbance would occur within the north end of the flight line at Ault Field (i.e., that portion of the APE being evaluated for direct effects), which is within a previously disturbed area at NAS Whidbey Island and an area that is not considered sensitive for archaeological resources. The area was historically used as farmland and was heavily tilled and disturbed prior to the arrival of the Navy in Clover Valley.

Although proximate to the north end of the flight line, another potential location of ground disturbance includes the area along Taxiway Juliet. As it also is located within Ault Field, this taxiway is within an area not considered sensitive for archaeological resources. As discussed in Section 3.6.2.1.1.1, Ault Field was filled with gravel to allow for the stabilization of the airfield during construction of the current runways in 1957. The potential for intact archaeological resources, therefore, would be low.

Construction of armament storage, hangar facilities, storage areas, and expanded parking areas would include 10.1 acres for all alternatives. Upon completion of construction, each of the three alternatives would have a total of 2.3 acres of impervious surfaces. Some ground disturbance may occur in areas in which new impervious surfaces would be constructed either for temporary or permanent use; however, since construction is limited to areas within Ault Field, such ground disturbance would be in areas considered to have low sensitivity for archaeological resources. Additional details regarding the facility and infrastructure requirements are included in Section 2.3.3.3. The amount of acreage needed for each of the three alternatives does not vary between scenarios.

No ground disturbance is anticipated to occur in other locations of the APE during construction (i.e., off station), so no impacts would be anticipated to occur to archaeological resources located outside the on-installation direct effect area of the APE. No ground disturbance that would have the potential to impact archaeological resources would occur during operation.

Therefore, under NEPA, the Navy anticipates minimal to no impact to known or intact archaeological sites within Ault Field during the construction and operation of the Proposed Action; per its Section 106 responsibilities, the Navy has determined that no historic properties located within the on-installation direct effect areas of the APE and that are known archaeological resources would be affected.

4.6.2.1.1.2 Architectural Resources

With regard to historic architectural resources located within the on-installation direct effect areas of the APE, the Proposed Action under each of the three alternatives would require the expansion of Building 2737 (Hangar 12), and repairs to inactive taxiways for aircraft parking also would be needed. A two-squadron hangar also would be constructed on the flight line adjacent to Building 386 (Hangar 5); Building 115 also would be demolished (see Section 2.3.3.3, Facility and Infrastructure Requirements, for additional details). During the construction of armament storage, hangar facilities, storage areas, and expanded parking areas, ground disturbance would occur. Once constructed, facilities and parking would add up to 2.3 acres of new impervious surface at the installation for all alternatives. This amount of additional impervious surface would not vary between scenarios within each of the three alternatives.

Building 112 (Hangar 1) currently is positioned within an area of Ault Field where construction would occur. As noted in Section 3.6.2.2, while Building 112 (Hangar 1) is eligible for the NRHP, it is planned for demolition; the SHPO has been consulted for this action. The demolition is scheduled prior to the initiation of the Proposed Action. For this reason, no impacts (either direct or indirect) are anticipated to

occur during construction (or operation) to Building 112 (Hangar 1). Buildings 457 and 458 (Ready Lockers), which are eligible for the NRHP due to their association with Building 112 (Hangar 1), also will be demolished; the SHPO has been consulted for this action.

Building 115 was built in 1942 and is located on Midway Street, just west of Langley Boulevard. It was determined ineligible for listing in the NRHP (SHPO Log Nos. 012610-05-USN). The building was originally built as an ordnance shop and continues its function as an aviation armament shop. A new ordnance shop would be required in proximity to the flight line and would replace Building 115. Geotechnical borings within one-eighth mile of Building 115 encountered five soil types: fill, glacial marine drift, glacial till, glacial outwash, and undifferentiated glacially consolidated soils. The fill varied from 2.5 feet to 6 feet deep, and no Holocene deposits were encountered between it and the Pleistocene sediments. It is unlikely that any intact Holocene sediments exist beneath the building. The Navy has determined that archaeological monitoring of the building's demolition is not warranted.

Building 2737 (Hangar 12) would be expanded as part of each alternative to accommodate additional training squadron aircraft. This building was originally built in August 1989 in order to accommodate the EA-6B Prowler squadron (Thursby, Bryant, and Ross et al., 2013; Thursby, Bryant, and Meiser et al., 2013). Building 2737 (Hangar 12) is not associated with a significant event in the Cold War era. It was used for maintaining tactical bomber and electronic warfare aircraft while they were off of aircraft carrier rotation (Hampton and Burkett, 2010). While this resource is important to the operations at Ault Field, it is not considered historically significant due to its date of construction and lack of significance for the Cold War, and has been determined not eligible for listing in the NRHP. The Washington SHPO has concurred with this finding.

Other changes to architectural resources during construction include repairs to inactive taxiways, located to the south of Runway 7-25 (Facility 201247), that were built in the early 1950s. Similar to Building 2737 (Hangar 12), while the taxiways are important to the operations at NAS Whidbey Island, they are also not considered historically significant. While the taxiways (in conjunction with the runway) represent the post-World War II conversion of Ault Field to a Master Jet Station, the Navy has determined the taxiways to be not eligible for the NRHP and has received concurrence from the SHPO (Hampton and Burkett, 2010).

Under NEPA, moderate to no direct impacts would occur to architectural resources located within the on-installation direct effect areas of the APE. Per its Section 106 responsibilities and in consideration of direct effects, the Navy has determined that no effect would occur within the on-installation direct effect area of the APE because no historic properties are present and Buildings 112, 457, and 458 would no longer be present.

4.6.2.1.1.3 Cemeteries

As noted in Section 3.6.2.4, 27 cemeteries have been identified within the APE. However, no known cemeteries or human burial grounds are located in the on-installation direct effect areas of the APE; therefore, no known cemeteries or human burial grounds would be subject to direct effects.

As evaluated under NEPA, no direct impacts to known cemeteries would occur. As evaluated under Section 106, no effect would occur because no known historic properties are present within the on-installation direct effect areas of the APE.

4.6.2.1.1.4 Traditional Cultural Properties

In consultation with affected tribes, no known TCPs have been identified within the APE. Therefore, as evaluated under NEPA, no direct impacts would occur. Per Section 106, no effects would occur to historic properties because no known TCPs have been identified.

4.6.2.1.2 Indirect Effects

The Navy also is evaluating the potential indirect effects of the Proposed Action to archaeological resources, historic architectural resources, cemeteries, and TCPs under NEPA and under Section 106 of the NHPA.

Indirect effects associated with construction activities and equipment will occur due to the presence of increased dust, personnel, and machinery within the on-installation direct effect areas of the APE. The impacts for each of the alternatives would be anticipated to be similar in nature. These impacts generally would lessen as the distance between the construction areas and the resource would increase.

After construction is complete, indirect impacts associated with the presence of new facilities and the operation of the aircraft would occur. These types of impacts would be associated with changes to the visual, atmospheric, and auditory (noise) setting, primarily of historic architectural resources, including the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve.

4.6.2.1.2.1 Archaeological Resources

As noted in Section 3.6.2.2, 151 archaeological sites are located within the APE. Among these, seven archaeological sites have been determined eligible for the NRHP, and 15 have been determined potentially eligible. An additional 127 archaeological sites are unevaluated for their NRHP status and thereby are considered eligible for listing in the NRHP for this evaluation.

As a majority of the archaeological sites contain subsurface components, minimal to no indirect effects would occur during construction and operation because the visual, atmospheric, and auditory setting would not be altered. In addition, if impacts were to occur, they generally would be temporary and intermittent due to the nature of the activities.

Therefore, under NEPA, minimal to no indirect impacts would occur as a result of construction and operation. Per its Section 106 responsibilities, the Navy has determined that no adverse effect would occur to archaeological resources as a result of indirect effects associated with construction and operation.

4.6.2.1.2.2 Architectural Resources

For the evaluation of architectural resources, the aspect of setting is particularly important when considering potential impacts associated with visual, atmospheric, and auditory changes. Setting refers to the physical environment and the character of the place in which a resource played its historic role. Physical features of the setting may include both natural and man-made aspects, such as topography, vegetation, and the relationships between buildings or open space (Andrus, 2002).

The discussion of impacts is divided into the following sub-sections to account for the differences between on-installation and off-installation areas of the APE and the type of indirect effects. The discussion covers visual effects, atmospheric effects, and auditory (noise and vibration) effects.

4.6.2.1.2.2.1 Visual Effects

4.6.2.1.2.2.1.1 On-Installation Indirect Effect Areas

Construction activities at Ault Field have the potential to cause indirect impacts to buildings and structures located within the on-installation indirect effect areas. Building 386 (Hangar 5), which is eligible for the NRHP, is proximate to the planned location of the construction activities and would be adjacent to the two-squadron hangar. This building is eligible for the NRHP due to its unique architectural qualities (i.e., Criterion C). The physical structure of the building would not be altered during construction; however, increased dust and the presence of personnel and machinery may temporarily impact its visual setting.

Limited visual changes also would occur as a result of the changes from the construction associated with each alternative to Building 2737 (Hangar 12), new armament storage, separate maintenance facilities, and expanded parking areas, as well as from the demolition of Building 115, within Ault Field. These changes would be consistent with the operational mission of NAS Whidbey Island, in which activities associated with flight operations and maintenance would occur on a daily basis. Because physical changes to the existing buildings and facilities resulting from construction under all of the alternatives would be limited to Ault Field, no impacts are anticipated to occur at OLF Coupeville, the Seaplane Base, or other on-installation areas within the APE. Within Ault Field, the resulting facilities (and removal of facilities) would be consistent with the airfield operations and would not be anticipated to alter the overall feel of the setting. This would include impacts to NRHP-eligible facilities, such as Building 386 (Hangar 6), as well as other architectural resources within Ault Field. Building 112 (Hangar 1) and Buildings 457 and 458 (Ready Lockers) would no longer be present. Visual impacts, however, would be anticipated to occur due to the increased flight operations at Ault Field, OLF Coupeville, and the Seaplane Base. As noted in Section 2.3.3.2, annual airfield operations would increase approximately 29 percent to 33 percent (depending on the alternative and scenario selected) over the No Action Alternative, and an additional 35 or 36 Growler aircraft would be included in the community at Ault Field. Aircraft would be visible in views both to and from historic resources during take-off and landing and while in flight, and would be most noticeable for those resources located proximate to the airfields; the aircraft would be less visible as the distance from the airfields increases.

Lighting associated with the aircraft and operations at NAS Whidbey Island facilities would be visible proximate to the airfield. In general, the lighting would be similar to that already present and thereby would create a minimal change in the visual setting for resources located within the APE. Lighting within the airfields generally consists of runway, carrier deck, landing system, arrest gear, wave-off, taxiway, and obstruction lighting. A rotating beacon also is present; when the airfield is open, the beacon is operated continuously from sunset to sunrise and during daylight hours when the airfield is operating in Instrument Flight Rules (Navy, 2005a). As noted in Section 2.2, lighting for FCLPs often is low and is described as ambient in order to simulate aircraft carrier landings. Some additional lighting may be needed for the expansion of Building 2737 (Hangar 12), the parking facilities, and the armament storage under all alternatives and the two-squadron hangar.

Under NEPA, for those resources within Ault Field, OLF Coupeville, and the Seaplane Base (on-installation indirect effect areas of the APE), minimal impacts would be anticipated to occur because the existing visual setting in part accommodates aircraft and military operations. The visual presence of aircraft during take-off and landing and lighting associated with the Proposed Action generally would

cause minimal impacts because the changes would be consistent with the visual setting of historic resources located within Ault Field, OLF Coupeville, and the Seaplane Base.

As evaluated under Section 106, the Navy has determined that no adverse effect to historic properties located at Ault Field would occur, and no viewshed effects to Building 386 (Hangar 5) would occur. No historic properties are present within the APE at OLF Coupeville and the Seaplane Base.

4.6.2.1.2.2.1.2 Off-Installation Indirect Effect Areas, Central Whidbey Island Historic District, and the Ebey's Landing National Historical Reserve

For these areas of the APE, no indirect effects are anticipated to occur as a result of the construction because the construction activities and changes to the facilities would be limited to Ault Field.

During take-off and landing, however, the aircraft would be within the viewshed of historic resources outside of Ault Field and OLF Coupeville, including those within the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve. Therefore, for this analysis, these off-installation areas of the APE, those outside the installation and those within the historic district/reserve, are considered together. The presence of the additional 35 or 36 aircraft would create a temporary change in the visual setting, during the ascent and descent of the aircraft, when captured within the viewshed of a historic architectural resource. As indicated in Sections 1.4 and 2.3.3.2, the total number of flight operations within Ault Field and OLF Coupeville would increase by approximately 29 to 33 percent (depending on the alternative and scenario selected) over the No Action Alternative. For each alternative and scenario, the total airfield operations, and therefore the opportunity for a visual presence of aircraft, would be similar to historic operations between the late 1970s and the 1990s.

While the types of impacts under each of the alternatives would be similar, the difference between the five scenarios may influence the frequency of visual impacts resulting from takeoff and landing. Under Scenario C of each alternative, approximately 80 percent of the FCLPs would be conducted at Ault Field. As compared to the other scenarios, visual impacts may be experienced with greater frequency under this scenario to those resources in proximity to Ault Field. Likewise, under Scenario A of each alternative, approximately 80 percent of the FCLPs would be conducted at OLF Coupeville. As compared to the other scenarios, impacts may be experienced with greater frequency under this scenario to those resources in proximity to OLF Coupeville. During a high-tempo FCLP year in which pre-deployment training for multiple units may overlap, FCLP activity would be expected to increase over average conditions, and thus the frequency of aircraft also may increase over the course of the year.

In addition to the frequency of aircraft takeoffs and landings, distance also may influence the extent to which a visual impact is experienced. For instance, Crockett Prairie and Smith Prairie are adjacent to OLF Coupeville. Views of the ascent and descent of aircraft may be apparent from historic architectural resources within these locations to a greater extent than from those located further from the airfield. Existing vegetation may provide a slight buffer for those resources located within Crockett Prairie, which largely is characterized as woodlands. Aircraft also would be in view of historic architectural resources while in flight. Unlike take-off and landing procedures, the vertical distance to the ground surface is greater, and the duration is longer. As part of the Proposed Action, FCLPs would occur at Ault Field, as well as at OLF Coupeville. As noted in Section 1.4, a typical FCLP evolution lasts approximately 45 minutes, with three to five aircraft participating in the training. While each of the five scenarios generally would include the same total number of FCLPs, impacts occurring as a result of in-flight aircraft may be experienced more frequently under Scenario C of each alternative within proximity to Ault Field

and under Scenario A of each alternative within proximity to OLF Coupeville. During a high-tempo FCLP year, which may occur under all of the alternatives, the frequency of aircraft in flight also may increase.

Lighting associated with the aircraft and operations at NAS Whidbey Island facilities also may be visible to and from historic resources located proximate to the airfield. In general, the lighting would be similar to that already present and therefore would create a minimal change in the visual setting to resources located within the off-installation indirect effect areas of the APE and the historic district/reserve.

Considered together under NEPA, due to the temporary nature of the activities, the frequency of operations, the variable distance of historic architectural resources from the airfields, and the consistent military presence within the reserve, minimal to moderate impacts would be anticipated to occur to the visual setting of architectural resources within off-installation areas of the APE and the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve.

Under Section 106, no adverse effect would be anticipated to occur to historic properties located within the APE as a result of visual changes. While the setting may be temporarily interrupted by the visual presence of aircraft (during takeoffs, landings, and in flight) and additional lighting, these occurrences do not detract from the overall integrity of historic properties within the APE and therefore their individual significance.

When considering the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve under Section 106, the Navy accounted for the relative number, size, scale, design, and locations of components that both do and do not contribute to its significance. The operation of the aircraft would not affect the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve designation or the NRHP eligibility. The land use patterns, relationships between the individual buildings, and appearance of buildings or landscape features would be maintained. No direct or permanent on-the-ground visual intrusions would be introduced into the physical landscape. While the setting may be temporarily interrupted by the visual presence of aircraft (during takeoffs, landings, and in flight), these occurrences do not detract from the relationships of components within the district and do not interfere with the overall integrity of the district. Therefore, these effects would not detract from those characteristics that convey the significance of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve. The Navy has determined that no adverse effect would occur to this historic property, as well as the individual properties within it, as a result of visual intrusions.

4.6.2.1.2.2.2 Atmospheric Effects

As part of their operation, some aircraft may leave contrails (i.e., condensation trails), which readily evaporate but do mark their previous presence. The contrails are a visual representation of atmospheric changes. As the in-flight time would be limited to a specific range, the atmospheric changes would not create a permanent effect on the visual setting of historic resources both on and off installation.

Therefore, as considered under NEPA, only minimal impacts would occur as a result of atmospheric changes. As evaluated under Section 106, the Navy has determined that no adverse effect to historic properties would occur.

4.6.2.1.2.2.3 Noise and Vibration

Architectural resources within the APE that may be impacted by noise and vibration from the operation of the additional Growler aircraft were considered by the Navy under both NEPA and Section 106 of the NHPA.

A review of existing literature indicates that buildings may be impacted by noise and vibration, noting that some may be more impacted due to their individual ages, conditions, and location. In 1977, the National Research Council developed guidelines for evaluating potential impacts from noise in the context of Proposed Actions. These guidelines are often cited in subsequent studies as the basis for evaluating impacts even today. Per the guidelines, sounds lasting more than 1 second with a peak unweighted sound level greater than or equal to 130 dB (in the 1 to 1,000 hertz frequency range) are considered potentially damaging to structural components (NRC and NAS, 1977). This is a conservative standard for assessing all sound (NRC and NAS, 1977).

According to Hubbard (1982), a person inside a structure can sense noise through vibration of the primary components of a building, such as the floors, walls, and windows; by the rattling of objects; or by damage to secondary structures, such as plaster and tiles and/or furnishings. For these types of impacts, a structural vibration velocity of 2 inches per second (in/sec)[30] (50 millimeters per second) has commonly been used as the safe limit, such that vibrations above this value would have an adverse environmental impact (NRC and NAS, 1977). Other scholars suggest that limits between 0.006 and 0.08 in/sec for continuous vibration would not be expected to cause damage; however, when continuous vibrations exceed 0.4 or 0.6 in/sec, architectural and structural damages may occur (Nam et al., 2013). While standards are used to determine acceptable levels of noise and vibration, Konan and Schuring (1983) also note that the individual condition of the building/structure must be accounted for when determining potential impacts, as historic buildings may be in varying states of deterioration. For example, older structures may have previous settlement, and movements within the structure may have redistributed the loads and stresses into unknown patterns. If this occurs, damage from new vibration would be difficult to discern from previous or existing damage (Konan and Schuring, 1983).

With respect to the potential for aircraft noise and vibration effects on the structural components of historic structures, a number of studies have been conducted. Hershey, Kevala, and Burns (1975), for instance, examined the potential for breakage at five historic sites within the Concorde flightpath. They evaluated the impact on structural features, including windows, brick chimneys, stone bridge, and plaster ceilings. They determined that the potential for breakage was generally less than 0.001 for a year of overflights. The aircraft noise study (Appendix A, Section A1.3.11), citing this study, relays that no damage was found to a 1795 plantation house from routine departures of the Concorde aircraft 1,500 feet from the runway centerline of a major airport; the Concorde study concluded that noise exposure levels for compatible land use also should be protective of conventional historic and archaeological sites (Wyle, 2016).

As shown by these studies, recommended noise/vibration limits tend to vary within the published literature. “At one end of the range is a conservative limit of 0.10 inches/sec except in the case of ancient ruins where 0.08 inches/sec is considered appropriate by some. At the other end of the range, some would consider 0.50 inches/sec or even 2.0 inches/sec to be appropriate” (Wilson, Ihrig & Associates, Inc., ICF International, and Simpson, Gumpertz & Heger, Inc., 2012). Within the U.S., no established standard is present for determining a precise threshold for historic buildings due to the individual characteristics of buildings and the types of vibration that may occur. Therefore, research indicates a need to evaluate potential vibration impacts on a case-by-case basis or to, at minimum,

[30] Velocity of vibration is measured in peak units, such as inches per second or millimeters per second. The structural vibration velocity measurement refers to the velocity with which a measured point moves about from a rest position.

account for the particular existing conditions. An analysis was performed for NAS Whidbey Island in 2012; the standards used for this analysis, therefore, are used for the assessment of noise/vibration for the three alternatives.

The 2012 study at NAS Whidbey Island suggested that sounds lasting more than 1 second above a sound level of 130 C-weighted sound level (dBC) are potentially damaging to structural components (Kester and Czech, 2012). The study evaluated Prowlers and Growlers at NAS Whidbey Island and noted that none of the conditions evaluated for the study caused C-weighted[31] sound levels to exceed 130 dBC (i.e., the stated threshold) and that structural damage would not be expected. The authors, however, did note that takeoff conditions had C-weighted sound levels greater than 110 dBC for both types of aircraft, creating an environment conducive to noise-induced vibration (Kester and Czech, 2012).

In order to reach these conclusions, the authors of the 2012 study included a brief examination of low-frequency noise associated with Growler overflights at 1,000 feet AGL in takeoff, cruise, and approach configuration/power conditions (Kester and Czech, 2012). The study found that takeoff condition has the highest potential for damage, with unweighted sound levels of approximately 105 dB and an overall C-weighted sound level of 115 dBC. The Growler would exhibit C-weighted sound levels up to 101 dBC when cruising and 109 dBC (gear down) at approach. As these levels are much less than the 130 dB criterion, damage would not be expected for typical residential structures in the vicinity of NAS Whidbey Island. The authors further concluded that additional analysis would be needed to more accurately determine the potential for building rattle/vibration (Kester and Czech, 2012).

The NPS has accounted for the potential disruption to visitor experiences caused by overflights at its units other than Ebey's Landing National Historical Reserve (Bell et. al., 2010). In a 2010 study, the authors noted that by the time most aircraft are noted, they are high enough that they yield less noise than those that are used to specifically tour NPS units. However, the authors also noted that this may result in more noise when the unit is located either near a commercial airport or a military airfield (Bell et al., 2010).

In 2016, the NPS conducted an acoustical study utilizing two acoustic monitoring systems for 31 days on NPS property in the Ebey's Landing National Historical Reserve. The locations consisted of the Reuble Farmstead and the Ferry House. At the Reuble Farmstead, the highest recorded sound pressure level was 113 dBA during FCLP by Growlers. At the Ferry House, 85 dBA was the loudest recorded military aircraft (NPS, 2016). While these studies concerned two locations known for their historic qualities, the study did not evaluate for the potential damage to these structures caused by noise or vibration. However, when comparing the highest recorded sound pressures of 113 dBA and 85 dBA at the two POIs and conservatively converting these A-weighted measurements to C-weighted measurements (i.e. the addition of 6 dB), it is unlikely that sound pressures of 119 dBC and 91 dBC would approach a peak unweighted sound level greater than or equal to 130 dBC, which is the level that would be considered potentially damaging to structures at those locations. The study provided information on the impacts to the visitor experience and to wildlife (see Sections 4.2, Noise, and 4.5, Land Use).

[31] The C-weighting scale was originally designed to be the best predictor of the ear's sensitivity to tones at high noise levels. The C-weighting scale is quite flat, and it therefore includes much more of the low-frequency range of sounds than the A and B scales (Witt 2013). C-weighting is often used to assess the potential for structural vibration, rattle, or damage (Kester and Czech 2012).

For this analysis, potential indirect effects from a change in noise exposure were measured in two ways: 1) a change in exposure to the 65 dB DNL contour, and 2) a substantive change in dB DNL (i.e., changes in noise exposure of 5 dB DNL or greater in areas with an existing DNL of greater than or equal to 65 dB DNL, and 5 dB DNL or more in areas within Ebey's Landing National Historical Reserve, regardless of existing noise contour range). Change in exposure to the 65 dB DNL contour is represented as change in the area of the 65 dB DNL contour between the No Action Alternative and the proposed aggregate 65 dB DNL contour. This includes any resources that are located within the proposed aggregate 65 dB DNL contour but not located within the No Action Alternative's 65 dB DNL contour. Primarily, these resources are located at the edge of the APE, where the proposed 65 dB DNL contour expands beyond the No Action Alternative 65 dB DNL contour.

Substantive change in dB DNL is measured as the difference between the dB DNL for the Proposed Action, represented as an aggregate of all proposed alternatives, and the dB DNL modeled under the No Action Alternative. This difference, also called delta DNL, was modeled across the entire APE, and areas where there is a substantive increase in dB DNL were outlined. Additional information regarding this methodology is provided in Appendix C as part of the June 25, 2018, letter to consulting parties.

Due to the large number of architectural resources within the APE, only those resources that were eligible for listing or listed in the NRHP and that would experience a substantive increase in noise exposure were considered by the Navy for both the NEPA and Section 106 evaluations of potential auditory impacts.

4.6.2.1.2.2.3.1 On-Installation Indirect Effect Areas

No on-installation historic properties meet the conditions for the noise evaluation. However, no historical data are present for facilities at NAS Whidbey Island to suggest the presence of noise and vibration-related effects on historic architectural resources.

As considered under NEPA, due to the continuous operation of aircraft for more than 75 years, including periods of significantly higher levels of operation and a history of little or no damage at this location, minimal to no impacts related to noise and vibration would occur either with the operation of the additional Growler aircraft or with the results of the new construction and expansion of facilities associated with the alternatives.

While no historic properties are noted as meeting the conditions of the noise analysis for the Section 106 evaluation conducted by the Navy, and as noted in the Section 106 documentation (see Appendix C), historic properties are present. Therefore, the Navy has determined that no adverse effect will occur to historic properties located on the installation due to noise and vibration.

4.6.2.1.2.2.3.2 Off-Installation Indirect Effect Areas and the Central Whidbey Island Historic District and Ebey's Landing National Historical Reserve

Within off-installation indirect effects areas, including the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve, two historic buildings and structures, six buildings listed in the Washington Heritage Barn Register, one historic district, and 44 individual resources within the historic district[32] are eligible for listing in the NRHP and will experience a substantive increase in noise exposure.

[32] As resources may be recorded in different inventories and listings, overlap is not accounted for; therefore, some double-counting may occur.

Noise and vibration within the off-installation areas of the APE would likely vary due to the location of specific historic architectural resources in relation to the airfields. Therefore, while the types of impacts under each of the alternatives would be similar, the difference between the five scenarios may influence the frequency and intensity of noise and vibration impacts resulting from takeoff and landing. Under Scenario C of each alternative, approximately 80 percent of the FCLPs would be conducted at Ault Field. As compared to the other scenarios, noise and vibration impacts may be experienced with greater frequency and intensity under this scenario by those resources in proximity to Ault Field. Likewise, under Scenario A of each alternative, approximately 80 percent of the FCLPs would be conducted at OLF Coupeville. As compared to the other scenarios, impacts may be experienced with greater frequency and intensity under this scenario by those resources in proximity to OLF Coupeville. During a high-tempo FCLP year in which pre-deployment training for multiple units may overlap, FCLP activity would be expected to increase over average conditions, and thus the frequency of aircraft also may increase over the course of the year. No significant physical damage as a result of aircraft operations has been reported to these resources as a result of continuous operation of aircraft for over 75 years. For this reason, the Navy does not anticipate that the operation of the aircraft would cause impacts to the structural integrity of historic resources within the APE.

While indirect physical damage (i.e., to structural integrity) would not likely occur, potential impacts to perceptual qualities due to the experience of the noise and vibration were considered by the Navy for this evaluation. These qualities are relevant to the landscape character areas and their representative views located particularly within the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve. The Navy identified a substantive change in noise exposure in nine landscape areas where perceptual qualities contribute to the significance of the overall district. Potentially affected landscapes include all of the identified contributing landscape areas, except for the Fort Casey Uplands. The substantive change in noise exposure has the potential to indirectly alter the perceptual experience of the contributing cultural landscape character areas at five of the representative locations because these character areas are identified as tangible resources and character-defining features of the historic property. These locations include the following:

1. entry to Coupeville (from Ebey's Prairie into Prairie Center, and along Main Street) and Front Street in Coupeville
2. view to Crockett Prairie and Camp Casey from Wanamaker Road
3. view to Crockett Prairie and uplands from the top of Patmore Road
4. view to Crockett Prairie and uplands from Keystone Spit
5. view of Smith Prairie from Highway 20, entering the Reserve

Further detail, including a listing of all of the properties considered for the noise evaluation, is provided in Appendix C as part of the June 25, 2018, letter to consulting parties and determination document.

Therefore, under NEPA, minor to moderate, temporary impacts would be anticipated to occur; under Section 106, the Navy has determined that an adverse effect would occur as a result of the changes to the perceptual qualities of five landscape features that contribute to the significance of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve; no other adverse effects would occur as a result of noise and vibration. To address adverse effects, the Navy is consulting with the Washington SHPO, the ACHP, tribes, and consulting parties regarding a MoA to mitigate adverse effects as part of its NHPA Section 106 consultation.

4.6.2.1.2.3 Cemeteries

While no known cemeteries or human burial grounds would be subject to areas of potential ground disturbance, indirect impacts associated with visual, atmospheric, or auditory changes may occur to the setting of cemeteries or may be experienced by those visiting cemeteries located within the APE.

Therefore, as evaluated under NEPA, minimal to no impacts would occur; in accordance with Section 106, the Navy has determined that no adverse effect would occur to historic properties that are cemeteries and human burial grounds.

4.6.2.1.2.4 Traditional Cultural Properties

No known TCPs have been identified in the APE. Consultations with tribes, the SHPO, and consulting parties have resulted in no new TCPs identified within the APE.

Therefore, as evaluated under NEPA, no impacts would occur; in accordance with Section 106, the Navy has determined that no effect would occur to TCPs because no known TCPs have been identified within the APE.

Traditional resources associated with tribes and government-to-government consultation are discussed in Section 4.7.

4.6.3 Cultural Resources Conclusion, Alternatives 1 through 3

As considered under NEPA, implementation of Alternatives 1 through 3 would result in no significant impacts, direct or indirect, to archaeological or architectural resources, cemeteries, and TCPs. While adverse effects to historic properties have been identified, the intensity and context of those effects do not rise to the level of significance under NEPA. NEPA accounts for impacts to both cultural resources that are not historic properties and those that are. As part of its Section 106 responsibilities, the Navy is consulting on a MoA to resolve adverse effects to historic properties.

Minimal to no direct impacts would result to known or intact archaeological sites within Ault Field (the on-installation direct effect areas of the APE) during the construction and operation of the Proposed Action. No ground disturbance is anticipated to occur at the Seaplane Base and OLF Coupeville or other areas of the APE; therefore, no direct impacts would occur. The Navy would follow procedures in its Integrated Cultural Resources Management Plan should any inadvertent discoveries be made during construction activities. There would be no difference in impacts to archaeological resources between scenarios or between average year and high-tempo FCLP year conditions under the alternatives. Minimal to no indirect impacts would occur to on- and off-station archaeological resources as a result of the construction and subsequent operation of the Proposed Action.

Moderate to no direct impacts would result to on-installation architectural resources during construction of the Proposed Action. Building 115 would be demolished as part of the three action alternatives. On-installation resources, such as Building 2737 (Hangar 12) and the taxiways, also may be directly impacted as a result of the expansion of facilities and new structures; because these are not historically significant and are considered within their context, the impacts to these resources are anticipated to be minor. No off-station direct impacts to architectural resources are anticipated during construction because ground disturbance is limited to Ault Field.

Minor indirect impacts to on-installation architectural resources, including visual, atmospheric, and auditory changes to the setting, may result from the construction of the Proposed Action. These types of

impacts may occur in areas proximate to Ault Field, which includes NRHP-eligible Building 386 (Hangar 5). During operation, minimal to moderate visual, atmospheric, and auditory impacts would occur to architectural resources. Within NAS Whidbey Island, these impacts are anticipated to be minimal, as the presence of new and/or expanded facilities and operations would be consistent with the airfield setting. Off-station impacts would be minimal to moderate. The level of impact for off-station resources would largely be dependent upon the distance of the resource from the operations and the frequency of them. Those resources in proximity to Ault Field and OLF Coupeville would experience visual impacts to a greater extent than those that are either screened or are located further from the airfields. Under Scenario C of each alternative, approximately 80 percent of the FCLPs would be conducted at Ault Field. As compared to the other scenarios, impacts may be experienced with greater frequency and intensity under this scenario to those resources in proximity to Ault Field. Under Scenario A of each alternative, approximately 80 percent of the FCLPs would be conducted at OLF Coupeville. As compared to the other scenarios, impacts may be experienced with greater frequency and intensity under this scenario to those resources in proximity to OLF Coupeville. During a high-tempo FCLP year, training activity would be expected to increase over average conditions, and therefore, the frequency of aircraft and the potential for its associated impacts also may increase.

While no known cemeteries or human burial grounds would be within areas of potential ground disturbance, indirect impacts associated with visual, atmospheric, or auditory changes would occur to the setting of cemeteries or would be experienced by those visiting cemeteries located within the APE. Because no known TCPs have been identified within the APE, no impacts are anticipated to occur.

Under Section 106, the Navy has determined the following with regard to historic properties that are archaeological resources:

- The proposed undertaking in the on-installation direct effect areas of the APE will result in no effect to historic properties that are archaeological resources because no known archaeological sites are present; and
- No adverse effect would occur to other archaeological sites within the on- and off-installation indirect effect areas of the APE, which includes the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve.

Little likelihood exists for intact archaeological deposits to be present in the on-installation direct effect areas of the APE. Given the results of geotechnical borings and documented disturbance from airfield and flight line construction and maintenance since 1942, the Navy does not find archaeological monitoring of construction or demolition necessary.

Although it is unlikely that intact archaeological resources would be found in these areas, as noted for the NEPA evaluation, the potential for post-review discoveries of archaeological resources. In case of an inadvertent discovery of Native American human remains and/or archaeological resources during construction, the Navy would follow the current Inadvertent Discovery Plan and would notify the appropriate tribal governments and the SHPO as to the treatment of the remains and/or archaeological resources per applicable laws.

With regard to historic properties that are architectural resources, the Navy has determined that no individual NRHP-eligible buildings and structures within the on-installation direct and indirect effect areas of the APE would be adversely affected by the proposed undertaking (including a no adverse

effect finding to the viewshed of Building 386 [Hangar 5]) as a result of direct, visual, or atmospheric effects.

However, the Navy has determined "Historic Properties Adversely Affected" as a result of the potential auditory effects to representative landscape features within the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve. The increased frequency of noise exposure would indirectly damage the characteristics of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve that currently make it eligible for the NRHP. Although the indirect effects are intermittent, the proposed undertaking would result in an increased occurrence of noise exposure affecting certain cultural landscape components in the historic district/reserve—specifically, the perceptual qualities of five locations that contribute to the significance of the landscapes.

The Navy finds no effect to cemeteries within the direct effect areas of the APE because no known cemeteries or human burial grounds are present, and no adverse effects would occur to cemeteries and human burial grounds that are historic properties within all other portions of the APE from the proposed undertaking. Because no known TCPs have been identified within the APE, no effect would occur.

Per its Section 106 responsibilities, the Navy determined an adverse effect to the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve and therefore an overall finding of adverse effect to historic properties. The Navy is consulting with the Washington SHPO, the ACHP, tribes, and consulting parties regarding a MoA to mitigate adverse effects as part of its NHPA Section 106 consultation.

4.7 American Indian Traditional Resources

This section evaluates how and to what degree the Proposed Action (described in Chapter 2) could impact traditional resources within the study area as defined in Section 3.7.

As established in Section 3.7, traditional resources are "those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by or reserved by or for Indian tribes through treaties, statutes, judicial decisions, or EOs, including tribal trust resources." The term "traditional resources" will be used to encompass protected tribal resources.

Potential impacts to American Indian traditional cultural and religious properties, including traditional cultural properties (i.e., historic properties eligible for listing in the NRHP under the NHPA and other tribal resources are evaluated in Section 4.6 (Cultural Resources).

American Indian Traditional Resources

Implementation of any of the action alternatives would not result in significant impacts to American Indian traditional resources.

The Navy invited government-to-government consultation with potentially affected American Indian tribes and nations to solicit any concerns they may have so that the Navy can more fully consider the extent of any potentially significant impacts to traditional resources. Government-to-government consultation on this Proposed Action was requested by the Swinomish Indian Tribal Community on December 13, 2016; however, the tribe subsequently withdrew its request on September 27, 2017. No other tribes have requested or initiated government-to-government consultation.

4.7.1 Approach to Analyses

The evaluation of impacts on traditional resources considers whether: 1) the traditional resource itself is significantly affected (such as significant impacts to fish species or to supporting habitats), or 2) there is a significant change in access to federally secured off-reservation usual and accustomed fishing grounds and stations, or access for hunting and gathering on open and unclaimed lands. Impacts may be clearly identified, as when a known traditional resource is directly and significantly affected or access is significantly changed.

4.7.2 No Action Alternative

Under the No Action Alternative, the project would not be constructed, and overall operations would not change from current levels. NAS Whidbey Island, Ault Field, the Seaplane Base, and OLF Coupeville are restricted to authorized personnel, and the Navy would continue to accommodate access by American Indians on a case-by-case basis. The Navy would continue coordination with the Suquamish Tribe for access to the Surface Danger Zone (SDZ) in waters northwest of Ault Field for fishing activities in accordance with the 2013 memorandum of agreement. There would be no change to the Suquamish Tribe's ability to safely access the SDZ. Federally secured off-reservation hunting and gathering rights are not affected because there are no changes to current Navy access requirements to Navy property at Ault Field, the Seaplane Base, and OLF Coupeville for these activities. No Indian lands (reservations) are located within the 65 dB DNL noise contour areas.

Therefore, under the No Action Alternative, there is no potential to significantly affect American Indian traditional resources because there would be no change to current tribal access and no additional potential to impact traditional resources in the study area.

4.7.3 Alternatives 1, 2, and 3

Under each of the three alternatives and five scenarios, construction and operational activities are similar. Therefore, the potential impacts to traditional resources would largely be the same. For the purposes of this discussion, no differentiation between alternatives/scenarios is made.

NAS Whidbey Island, Ault Field, the Seaplane Base, and OLF Coupeville are restricted to authorized personnel, and the Navy would continue to accommodate access by American Indians on a case-by-case basis. The Navy would continue coordination with the Suquamish Tribe to access to the SDZ in waters northwest of Ault Field for fishing activities in accordance with the 2013 memorandum of agreement. There would be no change to the Suquamish Tribe's ability to safely access the SDZ. Federally secured off-reservation hunting and gathering rights are not affected because there are no changes to current Navy access requirements to Navy property at Ault Field, the Seaplane Base, and OLF Coupeville for these activities. No Indian lands (reservations) are located within the 65 dB DNL noise contour areas.

Terrestrial and Marine Wildlife

Under each of the three alternatives and five scenarios, minor impacts are anticipated to occur to terrestrial wildlife during construction or operation. Impacts to specific wildlife species from habitat loss, sensory disturbance, and aircraft operations are discussed in Section 4.8.2.1 for terrestrial wildlife.

Under each of the three alternatives and five scenarios, minor impacts are anticipated to occur to marine wildlife (fish and marine mammals) during construction or operation. Impacts to specific marine wildlife from habitat loss, sensory disturbance, and aircraft operations are discussed in Section 4.8.2.2 for marine wildlife.

Water Resources

Under each of the three alternatives and five scenarios, implementation of the Proposed Action at NAS Whidbey Island would not result in significant impacts to water resources. The Proposed Action would result in up to 2.3 acres of new impervious surface, but impacts to surface waters and marine waters and sediment would be minimized and avoided through implementation of BMPs, low-impact development (LID), and green infrastructure and therefore would not be significant. See Section 4.9 for the discussion of impacts anticipated to occur to water resources.

Climate Change and Greenhouse Gases

Under each of the three alternatives and five scenarios, potential changes in GHG emissions from implementation of the Proposed Action would be similar but greatest under Alternative 2, Scenario A (see Table 4.16-2, NAS Whidbey Island Complex Annual GHG Emissions, Alternative 2). See Section 4.16 for the discussion of climate change and GHG emissions.

Therefore, under Alternatives 1, 2, and 3 and the five scenarios, there is no potential to significantly affect American Indian traditional resources because there would be no change to current access and no significant impact to traditional resources in the study area.

4.7.4 American Indian Traditional Resources Conclusion, Alternatives 1 through 3

The implementation of the three alternatives at NAS Whidbey Island would not result in significant impacts to American Indian traditional resources. Construction and operational activities are similar under the three alternatives, and, therefore, the potential impacts to traditional resources would largely be the same.

The Navy has invited government-to-government consultation with potentially affected tribes to solicit any concerns they may have so that the Navy can more fully consider the extent of any potentially significant impacts to traditional resources. Government-to-government consultation on this Proposed Action was requested by the Swinomish Indian Tribal Community on December 13, 2016. The Navy responded to the Swinomish Indian Tribal Community via email on December 20, 2016, and via letter on December 21, 2016. Additional correspondence occurred in June of 2017. The tribe subsequently withdrew its request on September 27, 2017 (Appendix C includes a copy of this correspondence). The Navy will continue to consult with the Swinomish regarding their concerns for tribal resources. No other tribes have requested or initiated government-to-government consultation.

4.8 Biological Resources

This section evaluates effects of the Proposed Action that are reasonably likely to occur on the terrestrial and marine wildlife discussed in Section 3.8, Affected Environment, Biological Resources. The analysis focuses on wildlife or vegetation types that are important to the function of the ecosystem or are protected under federal or state law or statute. The impacts discussed in this section may occur during construction for the Proposed Action and/or during the proposed aircraft operations. The potential impacts on biological resources consist of three general types: habitat loss, sensory (i.e., noise and visual) disturbance, and physical impact to individuals (i.e., wildlife-aircraft collisions [NAS Whidbey Island BASH plan (NAS Whidbey Island, 2013a)]).

4.8.1 Biological Resources, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to biological resources and therefore no significant impacts to biological resources would occur through implementation of the No Action Alternative.

4.8.2 Biological Resources Potential Impacts, Alternatives 1 through 3

In light of the similarities between Alternatives 1 through 3, they are discussed collectively. Differences in the potential severity of an impact across scenarios are noted where necessary. Under Alternative 1, carrier capabilities would be expanded, resulting in a net increase of 35 aircraft. Under Alternative 2, expeditionary and carrier capabilities would be expanded, resulting in a net increase of 36 aircraft. Under Alternative 3, expeditionary and carrier capabilities would be expanded, resulting in a net increase of 36 aircraft similar to Alternative 2, but would have slightly fewer aircraft operations than Alternative 2.

Biological Resources

Minimal habitat loss from construction activities would not significantly impact terrestrial wildlife and would not impact marine habitat.

Animals in the study area are currently exposed to high levels of aircraft operations and other human disturbances, and the Proposed Action would result in some additional sensory disturbance impacts, particularly from noise.

Because large numbers of wildlife inhabit the study area throughout the year, risk of a strike is a possibility. However, with the continued implementation of a BASH plan, the Proposed Action would not significantly impact local wildlife populations.

Non ESA-listed Species:
The Proposed Action would result in some additional sensory disturbance impacts, particularly from noise. Only minor behavioral disturbances are anticipated for marine species, including fish and mammals.

Bald and Golden Eagle Protection Act:
The impacts from stressors introduced by the Proposed Action would not result in an adverse effect on bald or golden eagles.

Migratory Bird Treaty Act:
The impacts from stressors introduced by the Proposed Action would not result in a significant adverse effect on migratory bird populations.

Endangered Species Act:

The Proposed Action may affect, but is not likely to adversely affect, the bull trout, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, yelloweye rockfish, humpback whale, and Southern Resident killer whale and their critical habitat.

The Proposed Action may adversely affect the marbled murrelet.

The Proposed Action would have no effect on other ESA-listed species or critical habitat.

New construction under Alternatives 1 through 3 would include expanded hangar space and/or new hangars, armament storage, maintenance facilities, and expanded personnel parking areas. Each alternative would result in up to 2.3 acres of new impervious surface at NAS Whidbey Island. Impacts to biological resources would be similar under all three alternatives.

The biological resources (i.e., habitat and species) present on and around Ault Field and OLF Coupeville are generally similar. Species at or near Ault Field and OLF Coupeville would be impacted to greater or lesser extents depending on which scenario is selected within a given alternative.

Under the Proposed Action, the greatest potential for impacts on biological resources would occur during aircraft operations, when noise and collision impacts could occur. Research shows that some animals begin to respond to aircraft noise at as little as 60 dB (Black et al., 1984). Dolbeer et al. (2014) found that most wildlife-aircraft collisions (hereafter referred to as "strikes") occur below an altitude of 3,500 feet. Based on these findings, the Navy defined the study area as all areas where modeled average noise levels under the Proposed Action would be equal to or greater than 60 dB at ground/surface level and all areas where aircraft operations would occur at or below an altitude of 3,500 feet (Figure 3.8-1). Potential noise and wildlife-aircraft impacts are discussed in more detail below.

The biological resources that could be impacted under the Proposed Action are divided into two general categories, terrestrial wildlife and marine wildlife. Potential impacts on terrestrial wildlife (i.e., general birds, mammals, and reptiles and amphibians) include habitat loss, sensory disturbance, and wildlife-aircraft strikes. Potential impacts on marine wildlife (i.e., fish and marine mammals) include sensory disturbance and indirect effects from construction (e.g., increased stormwater runoff). Species protected under the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), and Marine Mammal Protection Act (MMPA) are discussed separately.

4.8.2.1 Effects on Terrestrial Wildlife

As a result of the Proposed Action, three effect categories are applicable to terrestrial wildlife: habitat loss, sensory disturbance, and wildlife strikes. Each effect is discussed below, along with impacts specific to species groups, including separate conclusions for special status species (i.e., those protected under the ESA, MBTA, and BGEPA).

4.8.2.1.1 Habitat Loss

Habitat loss would be limited to the construction of proposed facilities under each of the three action alternatives and would occur in developed or previously disturbed areas of Ault Field. No construction is proposed for OLF Coupeville. Under each alternative, proposed construction activities would result in the permanent loss of up to 2.3 acres of non-native grassland and landscaped vegetation. No loss of any unique or regionally significant vegetation communities would occur. The vegetation that would be cleared has been previously disturbed and occurs in areas with high levels of human activity. Therefore, the previously disturbed areas likely provide only marginal, temporary habitat for species that are adapted to human-modified environments (e.g., raccoons). Wildlife that could occur in these areas are likely common within the study area.

The construction site provides marginal habitat for MBTA-protected species, and species occurring in construction areas would likely be adapted to human-modified environments. Ground-nesting birds generally avoid the area of the proposed construction. However, the area would be surveyed at the start of the nesting season to ensure nests are not built in the area. If found, the inactive nests would be

removed prior to completion so that a new nest could be built outside the construction area. Temporary and minor changes may occur to the abundance and frequency of migratory birds occurring in the construction area, but use of the area is anticipated to return to prior levels after construction is complete.

Vegetation removal under each of the three action alternatives would have negligible impacts on terrestrial wildlife and their habitat. Impacts from construction activities on terrestrial wildlife would not be significant.

As described in Section 4.9, there would be no significant impacts on surface water, wetlands, or marine waters and sediments. Therefore, there would be no significant impact on terrestrial wildlife related to water quality.

4.8.2.1.1.1 Endangered Species Act

Pursuant to the ESA, no effect to ESA-listed vegetation or terrestrial wildlife species would occur because no ESA-listed vegetation is located within the construction area, and ESA-listed terrestrial wildlife are extremely unlikely to occur within the construction area. Vegetation removal would have negligible impacts on habitat and therefore would have no effect on availability of habitat for ESA-listed species. Consultation under the ESA regarding habitat loss is not required.

4.8.2.1.1.2 Migratory Bird Treaty Act

MBTA-protected species may occur within the construction area of Ault Field, and construction activities are not exempt from "take" under the military readiness rule. Given the small footprint of the construction area, that the area has been previously disturbed and is highly used, and that vegetation removal would have negligible impact on the habitat, no changes to a bird's ability to feed, shelter, or reproduce are anticipated. Pursuant to the MBTA, no take of migratory birds is anticipated.

4.8.2.1.1.3 Bald and Golden Eagle Protection Act

Although bald eagles use various habitats around Ault Field for breeding, foraging, roosting, and perching, the location of the construction is not in an area that is used highly by bald eagles. Golden eagles are rare visitors to Whidbey Island during migration, and the construction site does not provide an important rest area for this species. Pursuant to the BGEPA, the loss of 2.3 acres of non-native grassland would neither disturb bald and golden eagles to a degree that would substantially interfere with their normal breeding, feeding, or sheltering behavior nor result in nest abandonment because the construction footprint is small and does not represent a biologically important or unique location for any of these behaviors. As such, coordination with the USFWS is not required.

4.8.2.1.2 Sensory Disturbances

The Proposed Action may cause sensory disturbances of wildlife during the construction and operations phases. Construction and operation of proposed new facilities would result in an increase in human activity, noise, and vibrations associated with equipment use that could disturb wildlife. Likewise, increases in aircraft operations would result in increases in potential noise and visual disturbances of wildlife in the study area. Refer to Section 4.2 for a complete description of changes in noise impacts of the Proposed Action compared to the No Action Alternative. In general, wildlife in the study area are currently exposed to high levels of aircraft operations and other human disturbances, and the Proposed Action may result in some additional sensory disturbance impacts, particularly from noise. As previously

stated, the impacts would be similar under each action alternative; however, the levels of impacts would vary between the five scenarios within the alternatives.

Anthropogenic noise can cause temporary or permanent hearing damage as well as mask sounds or distract wildlife. Animals in loud environments face damage to hair cell receptors of their auditory system caused by overstimulation. The amount and type of damage differs among species (Beason, 2004). Noise can also affect hearing by inhibiting the perception of sound, a phenomenon called "masking," which may disrupt communications and cause some animals to alter their vocalization to reduce its effects. Masking only occurs in the presence of the masking noise and does not persist after the noise ceases. As such, constantly noisy environments have a greater potential for long-term impact because masking conditions are more prevalent (Patricelli and Blickley, 2006). Masking can affect mate choice by limiting the number of individuals heard, and it can affect social groups that use alarm calls to warn of predators or use contact calls to maintain group cohesion. In addition, masking of one species' vocalizations can affect other species' abilities to assess predation risks, find prey, or make habitat decisions (Barber et al., 2010).

Wildlife behavioral responses to anthropogenic disturbances may include displacement or avoidance of affected areas, increased vigilance, and changes in foraging behavior, habitat selection, mate attraction, and parental investment (Frid and Dill, 2002; Shannon et al., 2015). While difficult to measure in the field, all behavioral responses are accompanied by some form of physiological response (Frid and Dill, 2002). Deleterious physiological responses to noise may include hearing loss, increased stress, hypertension, and startle responses (Barber et al., 2010). A startle response is a rapid, primitive reflex characterized by rapid increase in heart rate, shutdown of nonessential functions, and mobilization of glucose reserves. Energy lost by behavioral responses to sensory disturbances, should they occur, must be replaced, or the health of the individual exhibiting those behavioral responses may decline. Replenishing energy requires more time spent feeding and resting than the individual might have otherwise budgeted. If the affected individual is caring for an egg or chick, then the energy expenditures or altered activity budget may also negatively affect the young's health. The disturbances could also keep birds away from more productive feeding habitats. This could also negatively affect the impacted individuals because they may be forced to forage in areas with smaller or inferior prey resources. Noise and other disturbances can also distract wildlife, taking their attention away from other key functions and behaviors, such as predator awareness (Chan and Blumstein, 2011; Francis and Barber, 2013). Animals can learn to control the behavioral reactions associated with a startle response and often become habituated to noise (NPS, 1994; Bowles, 1995; Larkin et al., 1996). Habituation is a reduction in response to repetitious or continuous stimuli over time as individuals learn there are neither adverse nor beneficial effects associated with the stimulus (Bejder et al., 2009). Habituation keeps animals from expending energy and attention on harmless stimuli, but the physiological component might not habituate completely (Bowles, 1995).

Animals exhibiting observable responses to anthropogenic disturbances are not necessarily the only animals affected by the disturbance. Observable responses (e.g., fleeing) may be determined by a variety of factors, such as individual tolerance, experience, species, age, sex, reproductive condition, resource availability, and habitat conditions (Gill et al., 2001; Beale and Monaghan, 2004; Yasue, 2006; Stillman et al., 2007; Bejder et al., 2009; Francis and Barber, 2013). Wildlife make similar ecological considerations when responding to anthropogenic disturbances as they do with considering predation risks. That is, they will consider costs and benefits of responding versus continuing with other fitness-enhancing activities (Frid and Dill, 2002; Beale and Monaghan, 2004; Bejder et al., 2009; Francis and

Barber, 2013). Wildlife most adversely affected by disturbances may be those constrained to a particular site, potentially suffering reduced survival or reproductive success (Gill et al., 2001). Wildlife readily responding to disturbances may not necessarily be the most impacted because their response may come at low fitness costs (Gill et al., 2001; Beale and Monaghan, 2004; Yasue, 2006; Ware et al., 2015). In addition, acclimation or tolerance to disturbances might not release individuals from costs to their fitness (Kight et al., 2012; Francis and Barber, 2013).

Gill et al. (2001) suggested that the impacts of anthropogenic disturbances are best determined by evaluating resulting fitness costs and effects on populations and community demographics. Ample research has demonstrated that anthropogenic disturbances contribute to ecological effects on wildlife, such as reduced species richness, time budgets, space use and habitat selection, reproductive success, and predator-prey interactions, and greater nest abandonment in birds (Barber et al., 2010; Barber et al., 2011). These ecological effects, in turn, may affect species' populations and community composition (Frid and Dill, 2002; Francis et al., 2009; Francis et al., 2012). At the community level, anthropogenic disturbances, particularly noise, can impact interspecific relationships, in some cases negatively impacting some species while benefiting others (Francis et al., 2009; Francis et al., 2011; Francis et al., 2012). For example, human-made noise may negatively impact the ability of predators to use audible cues to track prey while indirectly improving the survival and reproductive success of prey species (Francis et al., 2009; Francis et al., 2011).

Noise associated with construction and aircraft operations has the potential to impact terrestrial wildlife. Construction and aircraft noise are discussed below, with regulatory conclusions provided where appropriate.

4.8.2.1.2.1 Construction

Terrestrial wildlife that live at or near the proposed Ault Field construction site would be expected to be those species adapted to living in urban or human-modified environments because this site is subject to high levels of noise associated with Ault Field activities and aircraft operations under existing conditions.

The increase in noise during construction would be temporary and minor when compared to the existing noise generated by airfield operations (see Section 2.3.3.3 for details on construction under the alternatives and Section 3.2 for existing aircraft noise). Therefore, each of the three action alternatives would have minimal, short-term impacts on terrestrial wildlife from sensory disturbances associated with construction of the proposed facilities. These impacts would not be significant.

4.8.2.1.2.1.1 Endangered Species Act

Pursuant to the ESA, no effect to ESA-listed vegetation or terrestrial wildlife species would occur because no ESA-listed vegetation is located within the construction area (and would not be affected by noise). ESA-listed terrestrial wildlife are extremely unlikely to occur within the small footprint of the construction site and therefore would not be exposed to construction noise. Consultation under the ESA regarding sensory disturbance from construction is not required.

4.8.2.1.2.1.2 Migratory Bird Treaty Act

MBTA-protected species occurring in construction areas would likely be adapted to human-modified environments. As discussed in Section 4.8.2.1.1 (Habitat Loss), ground-nesting birds generally avoid the area of the proposed construction. However, the area would be surveyed at the start of the nesting season to ensure nests are not built in the area. If found, the inactive nests would be removed prior to

completion so that a new nest could be built outside the construction area. Temporary behavioral disturbance of non-nesting birds may result from noise, vibrations, or human presence, but these minor changes are not expected to differ appreciably from existing high levels of disturbance near the construction site. Temporary and minor changes in abundance and frequency of migratory birds occurring in the construction area may occur, but use of the area is anticipated to return to prior levels after construction is complete. No changes to a bird's ability to feed, shelter, or reproduce are anticipated. Pursuant to the MBTA, no take of migratory birds is anticipated.

4.8.2.1.2.1.3 Bald and Golden Eagle Protection Act

Although bald eagles use various habitats around Ault Field for breeding, foraging, roosting, and perching, the location of the construction is not in an area used highly by bald eagles, and the nearest nesting location for bald eagles is 0.75 mile from the construction area. Golden eagles are rare visitors to Whidbey Island during migration, and the construction site and surrounding area do not provide an important habitat for this species. Although noise from construction would extend beyond the footprint of the construction site, the increase in noise during construction would be temporary and minor when compared to the existing noise generated by airfield operations. Because of the small footprint and temporary nature of the construction and associated increase in noise, sensory disturbance associated with the construction activities would not disturb bald and golden eagles to a degree that would substantially interfere with their normal breeding, feeding, or sheltering behavior, pursuant to the BGEPA. As such, coordination with the USFWS is not required.

4.8.2.1.2.2 Aircraft Operations

Aircraft operations under each of the three action alternatives would produce potential noise and visual disturbances to terrestrial wildlife. Wildlife may respond to both seeing and hearing the aircraft. Similar to construction discussed above, aircraft operations could result in behavioral and physiological responses that lead to impacts on fitness of wildlife from the affected area; however, potential disturbance from aircraft operations would occur over a much larger area than that affected by construction. Aircraft operations may disturb wildlife within the study area.

The following sections focus on potential aircraft disturbances on vertebrate wildlife (i.e., birds, mammals, and reptiles and amphibians) in the study area, including separate discussions of special status species (i.e., those protected under the ESA, MBTA, and BGEPA).

4.8.2.1.2.2.1 Birds

Bird responses to anthropogenic disturbances, including aircraft noise, vary by species and may vary by situation (Grubb and Bowerman, 1997; Goudie, 2006). Birds rely heavily on acoustic signals not only for avoiding predators but also for territorial defense and attracting mates (Slabbekoorn and Ripmeester, 2008). Noise can mask birds' songs and alter their use of habitats. Nesting birds or those caring for eggs or young would presumably be more sensitive to disturbances than birds that are not caring for eggs or young. Although minor variations in reactions are likely between species, aircraft overflights associated with the Proposed Action would cause similar types of reactions (e.g., alerting, flushing) to the stimuli. As such, the information regarding all categories of birds (e.g., shorebirds, wading birds) is synthesized in the analysis below, except where specifically noted.

Studies of hearing loss (called "threshold shift") in birds within their frequencies of best hearing (between 2 and 4 kHz) due to long-duration (30 minutes to 72 hours), continuous, non-impulsive, high-

level sound exposures in air have shown that susceptibility to hearing loss varies substantially by species, even in species with similar auditory sensitivities, hearing ranges, and body size (Niemiec et al., 1994; Ryals et al., 1999; Saunders and Dooling, 1974). However, data on threshold shift in birds due to shorter duration sound exposures that could be used to estimate the onset of threshold shift are limited. Saunders and Dooling (1974) provide the only threshold shift growth data measured for birds. Saunders and Dooling (1974) exposed young budgerigars (*Melopsittacus undulatus*) to four levels of continuous 1/3-octave band noise (76, 86, 96, and 106 dB re 20 µPa) centered at 2.0 kHz and measured the threshold shift at various time intervals during the 72-hour exposure. The earliest measurement found 7 dB of threshold shift after approximately 20 minutes of exposure to the 96 dB re 20 µPa sound pressure level noise (127 dB re 20 µPa2-s sound exposure level [SEL]). Because of the observed variability of threshold shift susceptibility among bird species and the relatively long duration of sound exposure in Saunders and Dooling (1974), the observed onset level cannot be assumed to represent the SEL that would cause onset of temporary threshold shift for other bird species or for shorter duration exposures (i.e., a higher SEL may be required to induce threshold shift for shorter duration exposures). Although birds are more resistant to hearing loss than other animals, continually loud environments may damage their auditory system (Beason, 2004). However, unlike many other animals, birds have the ability to regenerate hair cells in the ear, usually resulting in considerable anatomical, physiological, and behavioral recovery within several weeks (Rubel et al., 2013; Ryals et al., 1999). Data are not available regarding the potential for hearing loss associated with intermittent aircraft operations (e.g., takeoffs, landings, and overflights) or similar short-duration sound exposure. However, given the short period of exposure, hearing loss is not anticipated to occur to bird species in the study area.

Behavioral responses to aircraft overflights are likely the result of both the noise stimulus and the visual stimulus. Behavioral reactions by birds include lifting the head up, adopting alert postures, agitation, flushing, and panic diving. Behavioral reactions to aircraft overflights are dependent upon species and activity at the time of the stimulus. Generally, birds tend to begin to react (by lifting the head or alerting to the stimulus) to aircraft overflights at 60 dBA to 65 dBA (Black et al., 1984), with more intense alert responses (e.g., flushing) occurring when noise levels exceed 75 dBA (Wright et al., 2010; Goudie and Jones, 2004). However, other birds have been observed to show no reaction or significant effect from overflights with noise levels ranging from 52 to 101 dBA (Grubb, 1979; Burger, 1981; Trimper and Thomas, 2001).

In addition to the noise emitted during the overflight, the altitude of the aircraft and its distance from the bird is a factor in determining the potential for a behavioral reaction. Airplane overflights less than 1,000 feet AGL (or mean sea level, for seabirds) more frequently elicit behavioral responses (Komenda-Zehnder et al., 2003; Black et al., 1984; Rojek et al., 2007; Smit and Visser, 1985), although geese responded more significantly when aircraft flew between 1,000 feet AGL and 2,500 feet AGL (Ward et al., 1999). However, not all birds react to overflights, as black-crowned night herons (*Nycticorax nycticorax*) and great blue herons (*Ardea herodias)* in nesting colonies had "no apparent reaction" from aircraft at altitudes between 150 and 800 feet AGL (Grubb, 1979), and sandhill cranes (*Grus canadensis*) remained on their nests when exposed to helicopter flights as low as 130 feet (Dwyer and Tanner, 1992).

Behavioral reactions to either the noise or the visual stimulus produced are likely to be temporary, with the birds returning to their normal behaviors shortly after exposure. Most observations report a return to normal behaviors within 5 minutes of exposure (Goudie and Jones, 2004; Komenda-Zehnder et al., 2003; Black et al., 1984; Smit and Visser, 1985, as cited by Smit and Visser, 1993). Some responses such

as decreased courtship persisted up to 2 hours after the overflight occurred, although the responses were unlikely to affect critical behaviors of breeding pairs, such as resting, foraging, and courtship (Goudie and Jones, 2004). Habituation to repeated exposure to aircraft noise and visual disturbance has been noted in numerous species (Grubb, 1979; Smit and Visser, 1993; Trimper and Thomas, 2001; Delaney et al., 1999), but not all species exhibit the same pattern of habituation, and residual effects are possible (Koolhaas et al., 1993; Goudie, 2006). For example, 25 percent to 30 percent of captive American black ducks (*Anas rubripes*) initially responded to aircraft noise and visual disturbances, but they habituated to the disturbances with repeated exposure, whereas wood ducks (*Aix sponsa*) did not exhibit habituation to the same stimuli (Conomy et al., 1998).

The potential for population-level effects from aircraft overflights has been noted in few studies, whereas other types of anthropogenic disturbance has been more frequently identified for potential population-level impacts. Aircraft overflights generally have not been shown to impact breeding, nest attendance, feeding of young, nest success, chick survival, nestling mortality, or nesting chronology of wading birds (Black et al., 1984). However, Rojek et al. (2007) identified that flushing of nesting seabirds can result in eggs breaking or chicks and/or eggs being exposed to predation or the elements, and a weak correlation between aircraft noise and reduced reproductive success in the coastal California gnatcatcher (*Polioptila californica californica*) and the least Bells's vireo (*Vireo pusillus belli*) has been suggested (Hunsaker, 2001). Other types of anthropogenic disturbances have been noted to potentially result in reduced species distribution (Forman et al., 2002; Tarr et al., 2010), densities (Bayne et al., 2008), clutch size (Halfwerk et al., 2011), and survival (Goss-Custard et al., 2006) and increased population decline (Pfister et al., 1992) and energy expenditure (Lilleyman et al., 2016). However, uncoupling the impacts from noise with other environmental variables, such as changes in vegetation, makes direct causation from noise difficult.

The introduction of noise may also affect ecological patterns. For example, some species of passerines had higher nest success in noisy habitats, which was attributed to reduced rates of nest predation by western scrub-jays (*Aphelocoma californica*[33]) (Francis et al., 2009; Francis et al., 2011). Complex pollination and seed dispersal interactions were observed by Francis et al. (2012); in noisy habitats, black-chinned hummingbirds (*Archilochus alexandri*) pollinated more flowers, and the assemblage of species dispersing seeds of pinon pines (*Pinus edulis*) was altered.

Pigeon guillemots are one of the more common seabirds in the study area, present year-round (eBird, 2015a; Seattle Audubon Society, 2015). Twenty-seven documented breeding colonies of the species occur on Whidbey Island (Bishop et al., 2016). Bishop et al. (2016) found that breeding pigeon guillemot populations on Whidbey Island were stable (i.e., no significant change) during a 6-year study period from 2009 through 2014 and that the number of colonies increased from 23 to 27 during that span. They recorded counts of pigeon guillemots on Whidbey Island nearly 10 times higher than for counts conducted in the early 1980s on Whidbey Island; however, it is unclear whether populations have increased since then or if the 1980s surveys underestimated the population of the species. No published research examining the impacts of aircraft or other anthropogenic noise on pigeon guillemots is available, but Gill (2007) posited that the impacts of anthropogenic disturbances on wildlife may be best highlighted by population-level effects. Considering that the population of pigeon guillemots has remained stable in recent years and may have increased since the 1980s, it is probable that existing high

[33] The interior population of the western scrub-jay is now known as the Woodhouse's scrub-jay (*Aphelocoma woodhouseii*).

levels of human disturbance, including decades of aircraft operations at the NAS Whidbey Island complex, have not significantly impacted this species. Pigeon guillemot nesting population trends are considered one indicator of ecosystem health in the Puget Sound marine environments (Pearson and Hamel, 2013; Bishop et al., 2016). As such, the health of seabird populations, particularly colony-nesting species, may be reflected, to some degree, in the pigeon guillemot's stable to increasing populations on Whidbey Island (Bishop et al., 2016) despite many years of exposure to high levels of aircraft and other human disturbances.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to birds in the study area. Aircraft operations are not seasonally dependent, and therefore annual totals are used for comparison. To determine the amount of increased noise disturbance, the amount of exposure time to Growler events greater than or equal to 92 dBA SEL was calculated. Although 60 dBA DNL was used as the basis for determining the overall area potentially impacted by aircraft noise, the 92 dBA SEL threshold is a better indicator of potential disturbance because it relates to more severe responses to a disturbance, such as flushing. The 92 dBA SEL threshold is derived from research on Mexican spotted owls exposed to helicopter noise (owls did not flush from their roosts until the noise exceeded 92 dBA SEL [Delaney et al., 1999]) and is used by the USFWS (USFWS, 2010b) as the threshold to determine potential effects on the marbled murrelet (details on the marbled murrelet are provided below under Endangered Species Act).

Table 4.8-1 provides the amount and percentage of time during a year that noise levels from Growler aircraft are estimated to be greater than 92 dBA for the No Action Alternative and Alternative 1, Scenarios A through C. Alternative 1 was used to represent the potentially greatest impacts, as the greatest number of proposed flights would occur under this alternative. Additionally, Scenario A provides the greatest potential for impacts at OLF Coupeville, Scenario C provides the greatest potential for impacts at Ault Field, and Scenario B provides a 50-percent split of FCLPs between the two locations.

The greatest increase in noise is calculated at Ault Field under Scenario C. Pattern operations would result in increased noise for an estimated additional 2 percent of a year (from 3.27 percent to 5.23 percent). However, under this scenario, the amount of noise greater than 92 dBA at OLF Coupeville would decrease for arrival operations. The data in Table 4.8-1 indicate that, although an increase in aircraft operations would occur under the Proposed Action, the increased percentage of time birds would hear noise above 92 dBA over the course of a year would be minimal.

Potential impacts to IBAs would be similar under Alternatives 1 through 3, but the level of impact would vary by scenario. Potential impacts at Skagit Bay and Deception Pass IBAs would be greatest under Scenario C and least under Scenario A because the largest number of air operations would occur at Ault Field, and these IBAs are located closer to Ault Field than OLF Coupeville. Likewise, potential impacts to Crockett Lake and Penn Cove IBAs would be greatest under Scenario A and least under Scenario C because the largest number of air operations would occur at OLF Coupeville, and these IBAs are located closer to this airfield than Ault Field. As Cresent Harbor is located between the two airfields, the potential impacts on this IBA would be dependent on total number of operations rather than the number of operations at each location. The greatest potential for impact at Crescent Harbor Marshes IBA would occur under Scenario A, and the least potential for impact would occur under Scenario C.

Table 4.8-1 Annual Time of Exposure to Growler Events Greater than or Equal to 92 dBA in the Study Area

Location	*Operation Type[1]*	*Annual Hours within the 92 dBA SEL Contour[2]*	*Annual Percentage Of Time within the 92 dBA SEL Contour[3]*	*Change in Percentage From No Action to Proposed Action*
No Action Alternative				
Ault Field	Departures	83.06	0.95	N/A
	Arrivals	249.00	2.84	N/A
	Pattern	286.68	3.27	N/A
OLF Coupeville	Departures	2.36	0.03	N/A
	Arrivals	7.03	0.08	N/A
	Pattern	43.95	0.50	N/A
Alternative 1 Scenario A				
Ault Field	Departures	102.50	1.17	0.22
	Arrivals	307.62	3.51	0.67
	Pattern	302.21	3.45	0.18
OLF Coupeville	Departures	8.62	0.10	0.07
	Arrivals	25.92	0.30	0.22
	Pattern	181.24	2.07	1.57
Alternative 1 Scenario B				
Ault Field	Departures	98.48	1.12	0.18
	Arrivals	295.42	3.37	0.53
	Pattern	380.49	4.34	1.07
OLF Coupeville	Departures	5.40	0.06	0.03
	Arrivals	16.20	0.18	0.10
	Pattern	113.31	1.29	0.79
Alternative 1 Scenario C				
Ault Field	Departures	95.32	1.09	0.14
	Arrivals	286.00	3.26	0.42
	Pattern	458.09	5.23	1.96
OLF Coupeville	Departures	2.17	0.02	0.00
	Arrivals	6.53	0.07	-0.01
	Pattern	45.38	0.52	0.02
Alternative 1 Scenario D				
Ault Field	Departures	101.43	1.16	0.21
	Arrivals	101.46	1.16	-1.68
	Pattern	109.28	1.25	-2.03
OLF Coupeville	Departures	7.54	0.09	0.06
	Arrivals	7.56	0.09	0.01
	Pattern	52.81	0.60	0.10
Alternative 1 Scenario E				
Ault Field	Departures	96.41	1.10	0.15
	Arrivals	96.43	1.10	-1.74
	Pattern	144.07	1.64	-1.63
OLF Coupeville	Departures	3.26	0.04	0.01
	Arrivals	3.28	0.04	-0.04
	Pattern	22.69	0.26	-0.24

Table 4.8-1 Annual Time of Exposure to Growler Events Greater than or Equal to 92 dBA in the Study Area

Location	*Operation Type[1]*	*Annual Hours within the 92 dBA SEL Contour[2]*	*Annual Percentage Of Time within the 92 dBA SEL Contour[3]*	*Change in Percentage From No Action to Proposed Action*

Sources: Data for number of operations obtained from *Aircraft Noise Study for Naval Air Station Whidbey Island Complex, Washington* (see Appendix A). No Action Alternative data were obtained from Table 5-2, Alternative 1A data from Table 6-2, Alternative 1B data from Table 6-4, Alternative 1C data from Table 6-6, Alternative 1D data from Table 6-8, and Alternative 1E data from Table 6-10 of the study.

Key:
dBA = A-weighted decibels
OLF = Outlying landing field
SEL = Sound Exposure Level

Notes:
1 Ault Field Departures include "Departures" and "Interfacility – Departure to OLF." Ault Field Arrivals include "Arrivals" (VFR SI/Non-Break, Overhead Break, and IFR) and "Interfacility – Break Arrival from OLF." Ault Field Pattern Operations include half the number of "Closed Pattern" events because a pattern includes an arrival and departure; only half the number of events is necessary because the entire pattern is above 92 dBA and needs to be only counted once. OLF Coupeville Departures include "Interfacility – Departure to Ault." OLF Coupeville Arrivals include "Interfacility – Break Arrival from Ault." OLF Coupeville Pattern Operations include half the number of "Close Pattern" events, similar to Ault Field.
2 Within the 92 dBA SEL contour, elevated sound levels may be experienced for up to 20 seconds per departure and 60 seconds upon arrival. The annual number of operations was multiplied by either 20 or 60 seconds, depending on operation type, and then converted to hours.
3 Percentage of time is calculated by dividing the annual hours by the total hours in a year (8,760 hours).

Birds in the study area that have not habituated to the current level of aircraft operations, or those that are new to the area, may respond to aircraft operations under the Proposed Action by exhibiting alert postures, flushing, or diving, but they would be expected to resume normal activities within a short period after overflights (Goudie and Jones, 2004); therefore, these disturbances are not expected to affect critical behaviors. Individuals breeding in the area of potential aircraft disturbance are currently exposed to a high level of long-term operations activity as well as other human-made disturbances. Each of the three action alternatives would have minimal, short-term impacts on birds from sensory disturbances associated with aircraft noise. These impacts would not be significant.

4.8.2.1.2.2.1.1 Endangered Species Act

With the exception of the marbled murrelet, the Proposed Action would have no effect on ESA-listed terrestrial wildlife species discussed in Chapter 3 because no other species are anticipated to occur in the area. As such, this section provides an analysis only for the marbled murrelet.

In general, impacts on the marbled murrelet would be similar to those described above for birds in general. Behavioral responses of marbled murrelets to noise and visual disturbances could be as minor as alert postures, mild startling, or a brief disruption of activities. More severe responses could include individuals attempting to move away from the disturbance by flying, diving, or swimming. If behavioral responses were to occur, they could result in energy expenditure and disruption or loss of feeding, resting, sheltering, and/or social opportunities. Energy expenditures, opportunity costs, and habitat loss could have indirect, negative effects on the health and reproduction of individuals. The severity of

sensory disturbance effects on marbled murrelets may vary widely and would be dependent on the individuals' sensitivity as well as the intensity, duration, and frequency of the disturbances.

Research into the effects of aircraft disturbances on marbled murrelets is extremely limited. Kuletz (1996) found that marbled murrelet counts in marine waters decreased in response to increasing numbers of both boats and low-flying planes. This appears to be the only study noting the effects of aircraft on marbled murrelets in marine waters, although evaluating aircraft impacts was not a primary objective. In the absence of information regarding aircraft disturbances on marbled murrelets in marine waters, boat-related studies provide some insight into how marbled murrelets respond to human disturbances. Due to the lack of studies regarding aircraft disturbances on at-sea marbled murrelets, the following serves as the best available information.

At two sites near Juneau, Alaska, marbled murrelets appeared to habituate to boat traffic (Speckman et al., 2004). Very few individuals reacted to approaching boats by flying away. The majority of individuals either paddled away or dived briefly and then paddled away. Fish-holding individuals, or those signaling that the bird is about to deliver food to its young, were often threatened by approaching boats (within about 15 to 130 feet) and typically responded by swallowing the fish. This, the authors suggested, may lead to substantial energetic costs to the adults that have to continue foraging to feed their chicks and an even greater cost to the chick if the adult is not able to catch another fish to feed it (Speckman et al., 2004).

In another study, approximately 60 percent of marbled murrelets showed no reaction to boat encounters off Vancouver Island, British Columbia (Hentze, 2006). Approximately 31 percent of individuals dove and 9 percent flushed (flew away) in response to approaching boats. Marbled murrelets did not dive or flush in response to boats at least 295 feet or 330 feet away, respectively. The reactions to approaching boats also depended on a combination of environmental variables (e.g., sea state), boat speed and distance, and other factors. In addition, birds observed flushing did not fly far and typically resumed foraging relatively quickly (Hentze, 2006).

In a second study off Vancouver Island, British Columbia, 58.1 percent of individuals did not respond to moving boats, while about 30.8 percent dove and 11.7 percent flew (Bellefleur et al., 2009)[34]. The majority of marbled murrelets reacted within 130 feet of the boats. Bird age, boat speed, and boat density were significant predictors of flushing response. Faster boats caused more birds to fly or dive and at greater distances, and birds were more likely to fly completely out of feeding areas when approached by boats at high speeds. Juveniles were also more likely to fly or dive than were adults. Individuals that responded by flying left the feeding area completely (Bellefleur et al., 2009).

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to marbled murrelets in the study area. Total area exposed to 92 dBA SEL or greater would decrease by 4,827 acres from the No Action Alternative to the Proposed Action. While total acreage exposed would decrease, the total number of hours aircraft spend at 92 dBA SEL or greater would increase slightly, as discussed in the analysis for birds above (Table 4.8-1).

Marbled murrelets may occur in all marine waters in the study area and have been documented at a number of locations, and they would be susceptible to disturbances from aircraft operations. However,

[34] The percentages are reported as published in Bellefleur et al. (2009). The Navy is aware that the reported numbers exceed 100 percent when summed (100.6 percent).

marbled murrelets in the study area would be exposed to an annual average of 84,700 aircraft operations and associated noise on the NAS Whidbey Island complex under the No Action Alternative (Table 3.1-3), which suggests they are habituated to the existing high levels of aircraft activity as well as other human-made disturbances (e.g., boat traffic). Existing research indicates that most individuals would not respond to aircraft overflights, and those that do may return to normal foraging and loafing activities relatively soon after the disturbances end (Speckman et al., 2004; Hentze, 2006; Bellefleur et al., 2009).

Pursuant to the ESA, sensory disturbance from aircraft overflights may affect marbled murrelets because some individuals may react to the aircraft overflights. The Navy has consulted with the USFWS as required by section 7(a)(2) of the ESA. The USFWS concluded in its June 14, 2018, Biological Opinion that the Proposed Action is not likely to jeopardize the continued existence of the marbled murrelet. As required by the terms and conditions associated with the Incidental Take Statement, the Navy will submit an annual monitoring report to the USFWS describing Growler flight operations from the previous year to ensure the amount of activity does not exceed that which was evaluated in the Biological Opinion.

4.8.2.1.2.2.1.2 Migratory Bird Treaty Act

As described in Section 3.8.2.1, nearly all bird species that occur in the study area are protected under the MBTA. For military readiness activities, the Armed Forces may take migratory birds provided that they confer with the USFWS for activities that may result "in a significant adverse effect on a population of migratory bird species" (50 CFR Part 21.15). Analysis under the MBTA is focused on population-level impacts rather than the potential for individual reactions to aircraft overflights.

As discussed for birds in general, population-level effects have generally not been recorded as a result of aircraft overflights. During aircraft operations, birds in the immediate vicinity of the flight pattern may alert to the stimulus or temporarily flush from the area. However, these temporary responses are not expected to result in abandonment of the area, as documented by the stable, if not increasing, population of pigeon guillemots. If nesting birds were to flush from nests during aircraft operations, the possibility exists that there could be impacts to the egg(s) or chick(s). However, aircraft operations are currently underway at NAS Whidbey Island, so the minor increase in aircraft noise (Table 4.8-1) is not likely to result in a significant change to nesting behavior. Birds nesting in the immediate vicinity of the airfield are likely habituated to the noise from aircraft overflights, and therefore population-level impacts are not expected.

Pursuant to the MBTA, sensory disturbance associated with the Proposed Action would not result in significant adverse effects on populations of migratory bird species. As such, conferring with the USFWS is not required.

4.8.2.1.2.2.1.3 Bald and Golden Eagle Protection Act

Bald eagles (*Haliaeetus leucocephalus*) are state listed as Sensitive and protected under the BGEPA may breed in the study area. Bald eagle responses to military aircraft overflights have been studied. Of bald eagles studied in Arizona and Michigan, the median distance from eagles to military jet aircraft at which there was no response was approximately 2,000 feet (Grubb and Bowerman, 1997). Thirty-one percent of bald eagles responded to military jets when they were at a median distance of 1,300 feet from the birds. Bald eagles also responded more frequently as the breeding season progressed.

The population of bald eagles has been steadily increasing throughout Washington (Kalasz and Buchanan, 2016). Breeding bald eagles have been documented at Ault Field (NAS Whidbey Island, 2013a), and increased aircraft operations would increase the potential for impacts on nesting eagles. No eagles have been documented breeding at OLF Coupeville.

Skagit Bay and Penn Cove were designated as IBAs, in part, because of their importance to breeding bald eagles. Assuming these IBAs support higher concentrations of breeding bald eagles than other areas in the study, there would be a greater potential for aircraft disturbance impacts at these locations. The potential for impacts on breeding bald eagles at Skagit Bay IBA would increase most under Scenario C because aircraft operations at Ault Field would be greatest under this scenario. Potential impacts on breeding bald eagles at Penn Cove IBA would be greatest under Scenario A, which calls for the greatest increase in operations at OLF Coupeville.

During the non-breeding season, both bald eagles and golden eagles may occur. No research is available that examines aircraft disturbances on eagles, or any other raptor species, during the non-breeding season. Skagit Bay is a migration stopover spot for raptors, including eagles, and, similar to other birds, migrating and wintering raptors may be disturbed by aircraft. The potential for impacts to raptors on Skagit Bay IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to bald and gold eagles in the study area. Breeding or non-breeding eagles near Ault Field (e.g., near Skagit Bay IBA) may be exposed to an additional 220 hours (or 2.5 percent of a year) of aircraft noise above 92 dBA (maximum under Alternative 1, Scenario C) when compared to the No Action Alternative (Table 4.8-1). Similarly, breeding eagles near OLF Coupeville (e.g., near Penn Cove IBA) may be exposed to an additional 162 hours (or 1.85 percent of a year) of aircraft noise greater than 92 dBA (maximum under Alternative 1, Scenario A) when compared to the No Action Alternative (Table 4.8-1). Given the current airfield operations conducted at NAS Whidbey Island, breeding bald eagles are likely familiar with aircraft noise, and the small increase in hours of aircraft noise (over the course of a year) would not likely result in decreases in productivity.

Pursuant to the BGEPA, sensory disturbance associated with the Proposed Action would not disturb bald and golden eagles to a degree that would substantially interfere with the eagles' normal breeding, feeding, or sheltering behavior. As such, coordination with the USFWS is not required.

4.8.2.1.2.2.2 Mammals

Few published studies have examined aircraft disturbances on terrestrial large mammals. Of those available, most focus on ungulates (e.g., deer). Ungulates often move when disturbed, which results in increased energy expenditure that can affect the individual's health and production (Efroymson et al., 2000). Weisenberger et al. (1996) found that captive mule deer[35] and bighorn sheep (*Ovis canadensis*) in Arizona changed behavior and exhibited increased heart rates during simulated aircraft overflight noise, but the species returned to pre-disturbance conditions within a few minutes after the disturbance ended. Similarly, Goldstein et al. (2005) found that mountain goats (*Oreamnos americanus*) returned to pre-disturbance behaviors an average of 30 seconds after helicopter overflights in Alaska. Maier et al.

[35] Columbian black-tailed deer, which occur in the study area, are a subspecies of mule deer.

(1998) observed caribou being more active, traveling longer distances, or interrupting resting bouts in response to low-altitude military jet overflights in Alaska. They concluded that females with young are the most sensitive to aircraft disturbance.

Efroymson et al. (2000) reviewed existing studies of aircraft disturbance on ungulates and estimated the distance thresholds at which adverse effects have been observed. The distance threshold was conservatively estimated at about 1,380 feet AGL. At this altitude, approximately 10 percent of ungulate herds would be expected to exhibit a response to aircraft. Thresholds for responses to sound ranged from 75 dBA to 113 dBA. Efroymson et al. (2000) noted that several species of ungulates have exhibited habituation to aircraft overflights with repeated exposure, including mule deer.

Studies of the effects of aircraft noise on small mammals are limited. Bowles et al. (1995) observed decreases in survival and life spans of rodents in Arizona exposed to low-altitude military aircraft overflights, where an average of 30 operations per day exceeded 80 dB, compared to control sites. However, rodents compensated for lower survivorship with increased recruitment at exposure sites. Furthermore, rodents were indistinguishable between control and exposure sites in terms of population density, diversity, proportions that were reproductively active, mean body weight, and biomass. This study also found that a top rodent predator, the kit fox (*Vulpes macrotis*), exhibited higher mortality rates at exposure sites but showed no differences in home range size or population numbers between the exposure and control sites.

Noise impacts from other anthropogenic sources also are limited. Rabin et al. (2006) found that California ground squirrels (*Spermophilus beecheyi*) increased alertness and moved closer to their burrows in response to alarm call playback at wind turbine sites that were approximately 30 dB louder than control sites. Ground squirrels appeared to be exhibiting the behaviors to compensate for masking by the turbine noise. Similarly, Kern and Radford (2016) discovered that dwarf mongooses (*Helogale parvula*) exhibited different behaviors in response to anti-predator surveillance calls in the presence of traffic noise compared to ambient noise. Mongooses interrupted foraging activities to scan for predators more often and for longer periods. In fact, dwarf mongooses scanned for predators more often in road traffic noise without playback of antipredator calls as well.

Shannon et al. (2014) showed that black-tailed prairie dogs (*Cynomys ludovicianus*) spent more time in burrows, spent less time foraging and resting, and were more vigilant when exposed to traffic noise perceived at 48 to 58 dBA at the center of the colony. However, the study colonies were located a minimum of 1.5 km from road traffic, and the prairie dogs were responding to pre-recorded traffic audio played for 1 hour in 10 tests over a 3-month period. Therefore, the disturbance was novel, and the colonies did not habituate to it over the course of the study. In another study of black-tailed prairie dogs, Shannon et al. (2016) found that animals became alert and took flight sooner during periods of experimental noise exposure compared to the control. Both prairie dog studies indicate that these small mammals exhibit increased vigilance and predator detection in the presence of anthropogenic noise (Shannon et al., 2014, 2016), just as the Rabin et al. (2006) and Kern and Radford (2016) studies found.

Morris-Drake et al. (2017) provided evidence that anthropogenic noise can affect interspecific interactions between mammals, specifically eavesdropping of vocalizations. Dwarf mongooses in South Africa flee in response to alarm calls from tree squirrels (*Paraxerus cepapi*), which share a similar suite of predators. Morris-Drake et al. found that the mongooses' responses differed in the presence of road traffic noise compared to ambient noise. While all individuals responded to the alarm calls, dwarf

mongooses were less likely to flee and more likely to look up and scan (i.e., exhibit increased vigilance) with traffic noise.

Overall, existing research shows that anthropogenic noise may often result in behavioral and/or physiological responses. These responses, in turn, may result in effects on individual fitness of mammals and, ultimately, have potential population-level effects if enough individuals in the population are affected. Still, others may not exhibit population-level effects despite apparent impacts on individual fitness (Bowles et al., 1995). While most mammals may respond to anthropogenic noise, habituation and impacts on populations are likely to vary between species and local environments.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to mammals in the study area. As discussed above for birds, the amount of additional time that loud noises (e.g., when aircraft are at the closest approach to the animal) would be present because of the Proposed Action is minimal when compared to the No Action Alternative (Table 4.8-1).

Mammals in the study area that have not habituated to the current level of aircraft operations may respond to aircraft operations under the Proposed Action by exhibiting alert postures, fleeing, and increasing vocal calls. Mammals that have habituated to the noise may change their vocal behavior during the short duration of the overflight. The length of time each overflight may disrupt a mammal is short, and mammals would likely return to their normal behavior immediately after the noise has subsided. Each of the three action alternatives would have minimal, short-term impacts on mammals from sensory disturbances associated with aircraft noise. These impacts would not be significant.

4.8.2.1.2.2.3 Reptiles and Amphibians

Studies addressing reptile responses to noise, especially aircraft noise, are extremely limited. Therefore, the following studies are presented as the best available information even though they may not be directly applicable to Whidbey Island or the Pacific Northwest. In general, reptiles have narrower hearing ranges than mammals and birds but are highly sensitive to vibrations (Bowles, 1995).

Desert tortoises (*Gopherus agassizii*) are the only reptiles for which aircraft disturbance effects have been studied (Bowles et al., 1999; Efroymson et al., 2000). Desert tortoises became motionless in response to being startled but habituated to aircraft noises quickly (Bowles et al., 1999). No significant physiological changes in response to noise were documented. Studies on the effects of land-based vehicle noise on desert reptiles found that sound pressure levels of 95 dBA and 115 dBA could affect hearing (Bondello, 1976; Brattstrom and Bondello, 1983; Efroymson et al., 2000).

Numerous studies have evaluated the impacts of anthropogenic noise on amphibians. Most research has examined the effects of traffic noise on frogs; however, two studies evaluated the effect of aircraft noise on frogs. Sun and Narins (2005) found that three frog species in a Thailand pond decreased their calling rate in response to aircraft overflights, while a fourth species increased its calling rate, seemingly in response to the other species' decreased rate. Kruger and Du Preez (2016) found that a frog species in South Africa significantly increased its call rates and called at higher frequencies during flyovers to overcome masking of auditory signals. Several studies have shown that traffic noise also affects frog vocalization behavior (Bee and Swanson, 2007; Lengagne, 2008; Narins, 2013; Lukanov et al., 2014). Conversely, Nelson et al. (2017) discovered that the Pacific chorus frog (*Pseudacris regilla*), a species native to the Proposed Action's study area, did not change vocalizations in the presence of traffic noise, which strongly impacted its communication at noisier sites.

Effects on vocal communication may not be the only impacts on amphibians (i.e., frogs) attributable to anthropogenic noise. Brattstrom and Bondello (1983) found that Couch's spadefoot toads (*Scaphiopus couchii*) aroused from dormancy during hot, dry periods and prematurely emerged from burrows in response to motorcycle noise at 95 dBA and higher. Two studies revealed that anthropogenic noise can also decrease locomotion activities (Lukanov et al., 2014; Tennessen et al., 2014) and result in loss of coloration used in visual communication (Troianowski et al., 2017), both of which affect reproductive success by impairing mate attraction. Reproductive success may also be directly impacted through physiological changes, as Kaiser et al. (2015) found that traffic noise significantly decreased sperm counts and sperm viability in White's treefrogs (*Litoria caerulea*). Several studies observed increases in corticosterone, a physiological sign of stress, in frogs exposed to traffic noise (Tennessen et al., 2014; Kaiser et al., 2015; Troianowski et al., 2017). Prolonged increases in corticosterone levels can suppress the immune system and affect survival and reproduction.

Impacts on the health, reproduction, and survival of amphibians from anthropogenic noise could lead to negative impacts on their populations and communities. However, Herrera-Montes and Aide (2011) found that traffic noise did not affect species richness, occurrence, and composition of frog communities in Puerto Rico. They posited that frogs mainly call at night, when traffic activity is low, whereas traffic noise affected bird communities because birds largely communicate vocally during the day, when traffic activity is higher. Frogs in the study area call primarily at night (WDFW, 2005), and aircraft operations under the Proposed Action would mostly occur during daylight hours (refer to Section 3.1.2); therefore, the Navy does not expect the Proposed Action to have significant effects on vocal communication in amphibians.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to reptiles and amphibians in the study area. As discussed above for birds, the amount of additional time that loud noises would be present because of the Proposed Action is minimal when compared to the No Action Alternative (Table 4.8-1).

Reptiles and amphibians in the study area that have not habituated to the current level of aircraft operations may respond to aircraft operations under the Proposed Action by exhibiting alert postures and increasing vocal calls. The length of time each overflight may disrupt an individual is short, and reptiles and amphibians would likely return to their normal behavior immediately after the noise has subsided. Each of the three action alternatives would have minimal, short-term impacts on reptiles and amphibians from sensory disturbances associated with aircraft noise. These impacts would not be significant.

4.8.2.1.3 Bird/Animal Aircraft Strike Hazard

4.8.2.1.3.1 Construction

During construction, wildlife may be directly harmed or killed by equipment and vehicles. Terrestrial wildlife that live at or near the proposed Ault Field construction site would be expected to be those species adapted to living in an urban or human-modified environment because this site is subject to high levels of activity (e.g., vehicle traffic). The heavy equipment used during construction has the potential to directly strike terrestrial animals. However, many of these species are highly mobile and may avoid construction equipment and vehicles. In the event of a strike of terrestrial wildlife by construction equipment or vehicles, an individual may be harmed or killed. However, the construction area's small footprint and the fact that it is in a previously disturbed area of Ault Field minimize any potential

population-level effects. Although individuals may be impacted, the overall effects from construction activities would be minimal and temporary. These impacts would not be significant.

4.8.2.1.3.1.1 Endangered Species Act

Pursuant to the ESA, no vegetation or terrestrial wildlife species are anticipated to use the construction area as habitat, and therefore construction activities would have no effect on these species. Consultation under the ESA regarding strike hazards is not required.

4.8.2.1.3.1.2 Migratory Bird Treaty Act

MBTA-protected birds, particularly those that are nesting, are susceptible to being harmed or killed by construction equipment and vehicles. Pre-construction and construction avoidance and minimization measures will be taken in order to avoid impacts to MBTA-protected species. For military readiness activities, the Armed Forces may take migratory birds provided that they confer with the USFWS for activities that may result "in a significant adverse effect on a population of migratory bird species" (50 CFR Part 21.15). Even in the event of a strike to a migratory bird, impacts to the population are not anticipated. Pursuant to the MBTA, strike hazards associated with construction would not result in significant adverse effects on populations of migratory birds. As such, conferring with the USFWS is not required.

4.8.2.1.3.1.3 Bald and Golden Eagle Protection Act

The likelihood of construction equipment directly striking a bald or golden eagle is extremely remote because these birds would be easily seen and would readily avoid any equipment. Nesting would also not be expected in the grassland area of the construction site.

Pursuant to the BGEPA, a strike of a bald or golden eagle by construction equipment and vehicles is not anticipated. As such, coordination with the USFWS is not required.

4.8.2.1.3.2 Aircraft Operations

During operations, birds and animals are susceptible to strikes with aircraft. The Air Force and Navy/Marine Corps report at least 3,000 bird strikes at their installations each year (DoD and Partners in Flight, 2010). However, the actual number of bird strikes is likely higher because only an estimated 20 to 47 percent are reported for civilian and military aviation as collisions with small birds (i.e., passerines) may go unnoticed or carcasses may disappear in aquatic or dense terrestrial environments (DoD and Partners in Flight, 2010; Dolbeer, 2015).

NAS Whidbey Island reported approximately 350 aircraft-wildlife strikes between 2005 and 2017 (Naval Safety Center, 2015a, 2015b, 2018). Of these, approximately 70 of the strikes were confirmed from Growler aircraft (Naval Safety Center, 2015a, 2015b, 2018). Assuming that an estimated 20 percent to 47 percent of strikes were reported (DoD and Partners in Flight, 2010; Dolbeer, 2015), the NAS Whidbey Island complex would have averaged between 70 and 164 aircraft-wildlife strikes annually during that period, most of which would have been birds. The estimated numbers of strikes (and actual number of reported strikes) are minimal relative to the 84,700 aircraft operations flown at the NAS Whidbey Island complex under the No Action Alternative (refer to Table 3.1-3) and the high numbers of wildlife inhabiting the study area throughout the year. The NAS Whidbey Island BASH plan (NAS Whidbey Island, 2013a) is, in large part, responsible for minimizing the numbers of strikes at the complex through the implementation of a series of land management (e.g., maintaining grass height), wildlife dispersal (e.g.,

chase, pyrotechnics, bioacoustics, and other forms of non-lethal harassment and depredation), and warning system measures (e.g., setting bird-watch conditions and alerts when conditions make an influx of birds onto the airfield likely).

The following sections focus on potential aircraft-wildlife strikes by species groups (i.e., birds, mammals, and reptiles and amphibians) and include separate discussions of special status species (i.e., those protected under the ESA, MBTA, and BGEPA).

4.8.2.1.3.2.1 Birds

At the NAS Whidbey Island complex, birds comprised approximately 99 percent of the reported strikes from 2005 through 2017 (Naval Safety Center, 2015a, 2015b, 2018). Songbirds, raptors, and shorebirds comprised 90 percent of all bird strikes identified to species group at the NAS Whidbey Island complex from 2005 through 2017 (Naval Safety Center, 2015a, 2015b, 2018).

At the NAS Whidbey Island complex, 55 percent of reported bird strikes occurred between July and October (Naval Safety Center, 2015a, 2015b, 2018). Relatively few bird strikes—8 percent of total reports—were reported in winter (November through February). Fall migration occurs between July and October, and bird populations are at their highest point of the year then because the breeding season has just ended. Under each of the action alternatives, the number of operations would not vary by season, but based on the trends described above, the risk of wildlife, particularly bird, strikes would be greatest from July through October.

Strikes could occur at nearly any altitude; however, most strikes are reported at lower altitudes. Strike altitude data were not available for military aircraft, so civilian aircraft strike data were analyzed as a surrogate. The majority of reported civilian aircraft bird strikes (92 percent of commercial strikes and 97 percent of general aviation strikes) occurred at or below 3,500 feet (Dolbeer et al., 2014). Furthermore, about 71 percent of commercial strikes and 74 percent of general aviation strikes of birds occurred at or below 500 feet AGL. Bird strikes at ground level also are common, comprising 41 percent and 37 percent of reported commercial and general aviation strikes, respectively.

Most reported bird strikes by civilian aircraft occur during the day (Dolbeer et al., 2014). Under all alternatives, most of the operations would be conducted from 7:00 a.m. to 10:00 p.m. at both Ault Field (88 percent under the No Action Alternative) and OLF Coupeville (84 percent under the No Action Alternative) (refer to Section 3.1.2). Thus, most flight operations would be conducted during daylight hours, the time at which birds are more susceptible to strike (Dolbeer et al., 2014).

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for strikes to birds in the study area. Alternative 1 would increase operations at the NAS Whidbey Island complex between 30 percent and 33 percent, and Alternatives 2 and 3 would increase operations between 29 percent and 32 percent (refer to Section 4.1). The increase in operations would result in an increase in the potential for aircraft-wildlife strikes, and the potential increase would be similar under all three alternatives because the increase in air operations is similar. However, impacts would vary by scenario.

To determine the potential for an increased risk of strike, the amount of time that Growler aircraft would spend below 500 feet in altitude was calculated. An altitude of 500 feet was used for the metric because the majority (more than 70 percent) of civilian aircraft strikes have been recorded at altitudes less than 500 feet (Dolbeer, 2006). Additionally, the USFWS requested data based on the 500-foot AGL

metric in support of the analysis for the marbled murrelet (details on the marbled murrelet are provided below under Endangered Species Act).

Table 4.8-2 provides the amount of time, and percentage over a year, that Growler aircraft would be flying at altitudes less than 500 feet for the No Action Alternative and Alternative 1, Scenarios A through C. Alternative 1 was used to represent the greatest potential impacts because the greatest number of proposed flights would occur under this alternative. Additionally, Scenario A provides the greatest potential for impacts at OLF Coupeville, Scenario C provides the greatest potential for impacts at Ault Field, and Scenario B provides a 50-percent split of FCLPs between the two locations. At OLF Coupeville, aircraft flying at altitudes less than 500 feet occurs entirely over land.

The greatest increase in time spent below 500 feet AGL at Ault Field occurs under Scenario C. Arrivals would result in an additional approximately 180 hours (or 2 percent of a year) of time below 500 feet AGL over the course of a year when compared to the No Action Alternative (Table 4.8-2). The data in Table 4.8-2 indicate that, although an increase in aircraft operations would occur under the Proposed Action, the increased percentage of time birds would be exposed to aircraft flying at altitudes below 500 feet AGL over the course of a year would be a minimal.

NAS Whidbey Island would continue to implement the measures outlined in the installation's BASH plan to minimize the risk of a strike occurring. Therefore, it is expected that the number of bird-aircraft strikes at the NAS Whidbey Island complex would remain relatively low compared to the high number of operations. In general, bird populations consist of hundreds or thousands of individuals, ranging across a large geographical area. In this context, the loss of several or even dozens of birds due to physical strikes would not be expected to have population-level impacts. Aircraft strikes would not have significant impacts on local bird populations.

Table 4.8-2 Annual Time EA-18G Growler Aircraft Altitude is less than 500 feet in the Study Area

Location	*Operation Type[1]*	*Annual Hours Spent below 500 Feet above Ground Level[1]*	*Annual Percentage Of Time below 500 feet above Ground Level[3]*	*Change in Percentage from No Action to Proposed Action*
No Action Alternative				
Ault Field	Departures	94.15	1.07	N/A
	Arrivals	564.70	6.45	N/A
OLF Coupeville	Departures	9.71	0.11	N/A
	Arrivals	9.71	0.11	N/A
Alternative 1 Scenario A				
Ault Field	Departures	101.62	1.16	0.09
	Arrivals	609.83	6.96	0.52
OLF Coupeville	Departures	34.52	0.39	0.28
	Arrivals	207.16	2.36	2.25

Table 4.8-2 Annual Time EA-18G Growler Aircraft Altitude is less than 500 feet in the Study Area

Location	Operation Type[1]	Annual Hours Spent below 500 Feet above Ground Level[1]	Annual Percentage Of Time below 500 feet above Ground Level[3]	Change in Percentage from No Action to Proposed Action
Alternative 1 Scenario B				
Ault Field	Departures	112.65	1.29	0.21
	Arrivals	675.91	7.72	1.27
OLF Coupeville	Departures	21.58	0.25	0.14
	Arrivals	129.51	1.48	1.37
Alternative 1 Scenario C				
Ault Field	Departures	124.01	1.42	0.34
	Arrivals	744.09	8.49	2.05
OLF Coupeville	Departures	8.65	0.10	-0.01
	Arrivals	51.91	0.59	0.48
Alternative 1 Scenario D				
Ault Field	Departures	105.35	1.20	0.13
	Arrivals	632.21	7.22	0.77
OLF Coupeville	Departures	30.18	0.34	0.23
	Arrivals	181.11	2.07	1.96
Alternative 1 Scenario E				
Ault Field	Departures	120.24	1.37	0.30
	Arrivals	721.52	8.24	1.79
OLF Coupeville	Departures	12.98	0.15	0.04
	Arrivals	77.92	0.89	0.78

Sources: Data for number of operations obtained from *Aircraft Noise Study for Naval Air Station Whidbey Island Complex, Washington* (see Appendix A). No Action Alternative data were obtained from Table 5-2, Alternative 1A data from Table 6-2, Alternative 1B data from Table 6-4, Alternative 1C data from Table 6-6, Alternative 1D data from Table 6-8, and Alternative 1E data from Table 6-10 of the study.

Notes:

[1] Ault Field Departures include "Departures," "Interfacility – Departure to OLF," and half of the "Closed Pattern" events. Ault Field Arrivals include "Arrivals," "Interfacility – Break Arrival from OLF," and half of the "Closed Pattern" events. OLF Coupeville Departures include "Interfacility – Departure to Ault" and half of the "Closed Pattern" events. OLF Coupeville Arrivals include "Interfacility – Break Arrival from Ault" and half of the "Closed Pattern" events. Closed Pattern events are included for each of the arrivals and departures because the entire pattern does not occur under 500 feet in altitude, and therefore the separate arrival and departure segments need to be considered.

[2] Aircraft are below 500 feet in altitude for up to 10 seconds for departures and up to 60 seconds for arrivals. The annual number of operations was multiplied by either 10 or 60 seconds, depending on operation type, and then converted to hours.

[3] Percentage of time is calculated by dividing the annual hours at altitudes less than 500 feet by the total hours in a year (8,760 hours).

4.8.2.1.3.2.1.1 Endangered Species Act

With the exception of the marbled murrelet, the Proposed Action would have no effect on ESA-listed terrestrial wildlife species discussed in Chapter 3 because no other species are anticipated to occur in the area. As such, this section provides an analysis only for the marbled murrelet.

The height at which marbled murrelets fly and the speed of the aircraft are considered risk factors when assessing the likelihood of aircraft collision with marbled murrelets. Alcid flight patterns in the marine environment are often closely associated with the surface of the water and the flight heights detailed in Section 3.8.2.2, Special Status Terrestrial Species. Marbled murrelet flight altitudes have been measured using radar surveys at several sites in the Pacific Northwest. Mean marbled murrelet flight altitudes ranged from 300 feet (Sanzenbacher et al., 2014) to 1,010 feet (Hamer Environmental, 2009) above ground level. Flight altitudes vary greatly between coastal and inland areas (Sanzenbacher et al., 2014).

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for strikes of marbled murrelets in the study area. As discussed above for birds generally, the potential for an increased risk of strike (over that of the No Action Alternative) was calculated by determining the amount of time that Growler aircraft would spend below 500 feet in altitude. An altitude of 500 feet was used for the metric because the majority (greater than 70 percent) of civilian aircraft strikes with birds have been recorded at altitudes lower than 500 feet (Dolbeer, 2006). Additionally, the USFWS requested data based on the 500-foot AGL metric in support of the consultation on the marbled murrelet.

Table 4.8-2 provides the amount of time, and percentage over a year, that Growler aircraft would be flying at altitudes lower than 500 feet for the No Action Alternative and Alternative 1, Scenarios A through C. Alternative 1 was used to represent the potentially greatest impacts because the greatest number of proposed flights would occur under this alternative. Additionally, Scenario A provides the greatest potential for impacts at OLF Coupeville, Scenario C provides the greatest potential for impacts at Ault Field, and Scenario B provides a 50-percent split of FCLPs between the two locations. At OLF Coupeville, aircraft flying at altitudes lower than 500 feet do so entirely over land.

Approaching aircraft spend more time below 500 feet AGL than departing aircraft because descending aircraft maintain lower flight altitudes and a more horizontal trajectory, resulting in a longer duration (up to 60 seconds) below 500 feet AGL. Departures result in the aircraft climbing in altitude more quickly, spending approximately 10 seconds at altitudes lower than 500 feet AGL. No aircraft at OLF Coupeville spend time below 500 feet AGL over marine environments.

The greatest increase in time spent below 500 feet AGL at Ault Field occurs under Scenario C. Arrivals would result in an additional approximately 180 hours (or 2 percent of a year) of time for aircraft at altitudes below 500 feet AGL over the course of a year when compared to the No Action Alternative (Table 4.8-2). The data in Table 4.8-2 indicate that, although an increase in aircraft operations would occur under the Proposed Action, the increased percentage of time marbled murrelets would be exposed to aircraft flying at altitudes below 500 feet AGL over the course of a year would be minimal.

The management of marbled murrelet strikes is also included in the installation's BASH plan (see Sections 3.3.1.2 and 3.3.2.2), and, to date, there have been no reported strikes of marbled murrelets or any alcids recorded at NAS Whidbey Island (Naval Safety Center, 2015a, 2015b).

Pursuant to the ESA, the potential for strikes of marbled murrelets during aircraft operations may affect marbled murrelets. The Navy has consulted with the USFWS as required by section 7(a)(2) of the ESA.

The USFWS concluded in its June 14, 2018, Biological Opinion that the Proposed Action is not likely to jeopardize the continued existence of the marbled murrelet. As required by the terms and conditions associated with the Incidental Take Statement, the Navy will submit an annual monitoring report to the USFWS describing Growler flight operations from the previous year to ensure the amount of activity does not exceed that which was evaluated in the Biological Opinion.

4.8.2.1.3.2.1.2 Migratory Bird Treaty Act

As described in Section 3.8.2.1, nearly all bird species that occur in the study area are protected under the MBTA. For military readiness activities, the Armed Forces may take migratory birds provided that they confer with the USFWS for activities that may result "in a significant adverse effect on a population of migratory bird species" (50 CFR Part 21.15). Analysis under the MBTA is focused on population-level impacts rather than the potential for individual impacts.

NAS Whidbey Island would continue to implement the measures outlined in the installation's BASH plan to minimize the risk of a strike occurring. Additionally, NAS Whidbey Island has a USFWS depredation permit that allows the Navy to lethally remove problem birds (protected under the MBTA) from around the airfield and a special use permit that allows the Navy to collect the remains of birds for use in bird identification (NAS Whidbey Island, 2013a). The permits carry conditions that are adhered to by the Navy, and all birds collected are reported to USFWS annually.

It is expected that the number of bird-aircraft strikes at the NAS Whidbey Island complex would remain relatively low compared to the high number of operations conducted there. In general, bird populations consist of hundreds or thousands of individuals, ranging across a large geographical area. In this context, the loss of several or even dozens of birds due to physical strikes would not be expected to have population-level impacts. Aircraft strikes would not have significant impacts on local bird populations.

Pursuant to the MBTA, aircraft strikes associated with the Proposed Action would not result in significant adverse effects on populations of migratory bird species. As such, conferring with the USFWS is not required.

4.8.2.1.3.2.1.3 Bald and Golden Eagle Protection Act

The NAS Whidbey Island complex reported three strikes of bald eagles, all at Ault Field, between 2005 and 2015 (Naval Safety Center, 2015a, 2015b). No strikes of bald eagles were reported between 2016 and 2017 (Naval Safety Center, 2017a, 2017b). Three reported strikes is relatively low when considering the number of operations annually occurring at the NAS Whidbey Island complex from 2005 to 2015 (refer to Section 1.4), the species' being most abundant near marine shorelines in Washington (WDFW, 2013; Rodewald, 2015), and bald eagles being one of the most commonly reported bird species in Island County (eBird, 2015a). Although airfield operations would increase under the Proposed Action (from 84,700 under the No Action Alternative to as many as 112,600 under Alternative 1, Scenario A; see Section 2.3), the number of potential strikes to bald or golden eagles would not increase significantly. This 33-percent increase would result in the potential for one additional strike over a 10-year-period (e.g., from the three that were reported to potentially four strikes). The loss of several bald eagles due to aircraft strikes under the Proposed Action would not be expected to have population-level impacts for this relatively abundant species. NAS Whidbey Island would continue to implement the measures outlined in the installation's BASH plan to minimize the risk of a strike occurring. Thus, aircraft strikes would not have significant impacts on local bald eagle populations.

NAS Whidbey Island did not report any strikes of golden eagles between 2005 and 2017 (Naval Safety Center, 2015a, 2015b, 2017a, and 2017b), and the species is a transient visitor to the study area (NAS Whidbey Island, 2013a; eBird, 2015a). Therefore, aircraft strikes of golden eagles as a result of the Proposed Action would be unlikely, and potential impacts would not be significant.

NAS Whidbey Island has a bald eagle permit from the USFWS that allows the species to be trapped, banded, and removed from the airfield (NAS Whidbey Island, 2013a). Bald eagle trapping and relocating focuses on juvenile birds that congregate near the runways, but it avoids trapping adults during nesting season to prevent nesting failure caused by removing the adults of nearby nesting pairs.

Pursuant to the BGEPA, the Proposed Action would cause minor increases in aircraft operations below 500 feet AGL. Additionally, the Navy would continue to adhere to all requirements identified in its bald eagle permit. As such, additional coordination with USFWS is not required for the Proposed Action.

4.8.2.1.3.2.2 Mammals

Although the majority of aircraft strikes at the NAS Whidbey Island complex have been with birds, strikes of mammals (three strikes to bat species between 2005 and 2017) have also been reported (Naval Safety Center, 2015a, 2015b, 2018). Most mammal strikes occur at night and bat strikes would not be expected in winter because the species of bats occurring in the study area hibernate (Dolbeer et al., 2014). Strike altitude data were not available for military aircraft, so civilian aircraft strike data were analyzed as a surrogate. Most civilian aircraft strikes of mammals occur at ground level; however, 9 percent of mammal (excluding bats) strikes occurred immediately after take-off or before landing when, for example, deer were struck by landing gear (Dolbeer et al., 2014). As such, mammal strikes would largely be limited to Ault Field and OLF Coupeville runways.

Under all alternatives, most of the operations would be conducted from 7:00 a.m. to 10:00 p.m. at both Ault Field (88 percent under the No Action Alternative) and OLF Coupeville (84 percent under the No Action Alternative) (refer to Section 3.1.2). Aircraft operations during daylight hours minimize the potential for strikes with bats, and the total number of strikes of mammals regardless of time of day is low despite a high level of operations (Naval Safety Center, 2015a, 2015b).

The Proposed Action would increase aircraft operations at the NAS Whidbey Island complex by between 30 percent and 33 percent under Alternative 1 or by between 29 percent and 32 percent under Alternatives 2 and 3 compared to the No Action Alternative (Refer to Section 4.1). The increase in operations would result in an increase in the potential for aircraft-mammal strikes, and the potential increase would be similar under all three alternatives because the increase in air operations is similar. The potential impacts would not affect mammals in the study area differently between scenarios, as the both Ault Field and OLF Coupeville support the same general mammal species compositions and abundances.

The NAS Whidbey Island complex would continue to implement the measures outlined in the installation's BASH plan to minimize the risk of a strike occurring. Additionally, NAS Whidbey Island has a deer depredation permit from the Washington Department of Fish and Wildlife that allows for the lethal removal of deer from the airfield. Deer removal is limited to a few deer that try to inhabit the areas near the runways each year.

The number of mammal-aircraft strikes at the NAS Whidbey Island complex would remain low, especially when compared to the high number of operations. Although additional aircraft operations

would increase the potential for a strike with a mammal, impacts to an individual animal would not have impacts on local mammal populations. Impacts associated with the potential for mammal-aircraft strikes would not be significant.

4.8.2.1.3.2.3 Reptiles and Amphibians

Reptile and amphibian strikes with aircraft are known to occur; however, none were reported at the NAS Whidbey Island complex between 2005 and 2015 (Naval Safety Center, 2015a, 2015b). Although additional aircraft operations would increase the potential for a strike with a reptile or amphibian, impacts to an individual animal would not have impacts on local populations. Impacts associated with the potential for reptile or amphibian-aircraft strikes would not be significant.

4.8.2.2 Effects on Marine Species

As a result of the Proposed Action, sensory disturbance is the only type of impact that is applicable to marine species. In-air construction noise was considered for hauled-out pinnipeds, and noise generated from aircraft operations was analyzed for impacts to all marine species. Each part of the Proposed Action is discussed below, with separate conclusions for special status species (i.e., those protected under the ESA).

4.8.2.2.1 Construction

Construction would not result in direct impacts to marine species. Because the construction would occur on land, no marine habitat would be disturbed, and noise generated by construction would not propagate through the water. Therefore, underwater noise impacts to fish and cetaceans (whales, dolphins, and porpoises) would not occur. While hauled-out seals and sea lions could be exposed to in-air noise from construction, the closest known haul-out sites are located on Whidbey Island and Kalamut Island (approximately 6 miles away from Ault Field), in Skagit Bay (approximately 7 miles away from Ault Field), and on Smith and Minor Island (approximately 7 miles away from Ault Field) (Jeffries et al., 2000). Due to the distance from the construction site, sound from construction would attenuate below levels that might impact pinnipeds.

4.8.2.2.1.1 Endangered Species Act

The Navy initiated consultation with the NMFS for the potential effects of aircraft disturbance on the Mexico Distinct Population Segment (DPS) and Central America DPS of the humpback whale. Although the Navy concluded that the construction activities would have no effect on this species, the NMFS's response indicated that the potential for increased stormwater runoff, and by extension increased pollutant discharge, would have insignificant effects. As such, the NMFS determined that construction activities may affect, but are not likely to adversely affect, the Mexico and Central America DPSs of the humpback whale.

Similarly to humpback whales, the Navy initiated consultation with the NMFS for the potential effects of aircraft disturbance on Southern Resident killer whales. During consultation, the NMFS additionally determined that the construction activities associated with the Proposed Action may affect, but are not likely to adversely affect, Southern Resident killer whales and their critical habitat. The NMFS identified that the addition of 2 acres of impervious surface under the Proposed Action would result in increased stormwater runoff from Ault Field. However, impacts to water quality from the increased infrastructure and associated stormwater discharge on the growth and development of the Southern Resident killer

whale are expected to be insignificant. Additionally, NMFS does not anticipate any effects on the quantity and quality of prey as a result of stormwater discharge. Therefore, the NMFS determined that the potential effects associated with construction activities on Southern Resident killer whales and their critical habitat is insignificant.

4.8.2.2.1.2 Marine Mammal Protection Act

Pursuant to the MMPA, the construction activities associated with the Proposed Action would not result in reasonably foreseeable takes of marine mammals. Therefore, permitting under the MMPA is not required.

4.8.2.2.2 Aircraft Operations

Marine species could be exposed to aircraft noise wherever aircraft overflights occur in the project area; however, sound is primarily transferred into the water from the air in a narrow cone under the aircraft. A sound wave propagating from an aircraft must enter the water at an angle of incidence of 13 degrees or less from the vertical for the wave to continue propagating under the water's surface (Richardson et al., 1995). At greater angles of incidence, the water surface acts as a reflector of the sound wave and allows very little penetration of the wave below the water (Urick, 1983). Water depth and bottom conditions also strongly influence propagation and levels of underwater noise from passing aircraft. For low-altitude flights, sound levels reaching the water surface would be higher, but the transmission area would be smaller. As an aircraft gains altitude, sound reaching the water surface diminishes, but the possible transmission area increases.

The operations portion of the Proposed Action would not directly impact marine habitats (see Section 4.9, Water Resources). Direct injury or loss of hearing are unlikely because aircraft overflights lack the intensity and duration to cause injury or hearing loss and because the sound does not have a rapid rise from ambient to extremely high peak pressure, as occurs with many impulsive sounds (U.S. Air Force, 2000). Aircraft overflights have the potential to affect surface waters and, therefore, to expose fish and marine mammals occupying those upper portions of the water column to sound and general disturbance, which could potentially result in short-term behavioral or physiological responses. Additionally, marine mammals that haul out on land also have the potential to be disturbed by aircraft overflights. These behavioral and physiological responses are discussed in the sections below.

Masking refers to the presence of a noise that interferes with an animal's ability to hear biologically important sounds, including those produced by prey, predators, or conspecifics. Masking occurs in all vertebrate groups and can effectively limit the distance over which an animal can communicate and detect biologically relevant sounds. Masking is more likely to occur in the presence of broadband, relatively continuous noise sources, such as vessel noise. Researchers have studied masking in fishes using continuous masking noise, but masking due to intermittent, short duty-cycle sounds has not been studied.

Underwater sound from aircraft overflights has been derived for some airframes. Underwater sound has not been derived for the EA-18G Growler; data for the airframe most similar to the Growler, the FA-18 Hornet, is provided. For an FA-18 Hornet at the lowest altitude (984.2 feet), the sound level at 6.6 feet below the water surface peaked at 152 dB re 1 µPa, and the sound level at 164.0 feet below the surface peaked at 148 dB re 1 micropascal (µPa) (Eller and Cavanagh, 2000). When FA-18 Hornet flight sound was derived at 9,842.4 feet altitude, peak sound level at a depth of 6.6 feet dropped to 128 dB re 1 µPa. It must be noted that these mathematically derived values cover a very small footprint based on the

altitude of the aircraft, and, due to the flight speed, these sound levels would only be present for, at most, tens of seconds (Eller and Cavanagh, 2000).

4.8.2.2.2.1 Fish

The inner ears of fish are sensitive to acoustic particle motion rather than acoustic pressure. Although a propagating sound wave contains pressure and particle motion components, particle motion is most significant at low frequencies (less than a few hundred Hz) and closer to the sound source. However, a fish's gas-filled swim bladder (an organ present in many fishes that controls their buoyancy) can enhance sound detection by converting acoustic pressure into localized particle motion, which may then be detected by the inner ear. Behavioral effects to fish could include disruption or changes in natural activities, such as swimming, schooling, feeding, breeding, and migrating. Sudden changes in sound level can cause fish to dive, rise, or change swimming direction (Popper et al., 2014). There is a lack of studies that have investigated the behavioral reactions of unrestrained fish to man-made sound, especially in the natural environment. Studies of caged fish have identified three basic behavioral reactions to sound: startle, alarm, and avoidance (McCauley et al., 2000; Pearson et al., 1992; Scripps Institution of Oceanography and Foundation, 2008). Changes in sound intensity may be more important to a fish's behavior than the maximum sound level. Sounds that fluctuate in level tend to elicit stronger responses from fish than even stronger sounds with a continuous level (Schwartz, 1985). In addition, sound can induce generalized stress responses in fish, particularly a startle response during initial activity, which can in turn induce behavioral changes, such as site avoidance of the Project area throughout the remainder of pile-driving activities (Wysocki, Dittami, and Ladich, 2006).

Masking refers to the presence of a noise that interferes with a fish's ability to hear biologically relevant sounds. Fish use sounds to detect predators and prey, and for schooling, mating, and navigating, among other uses (Myrberg, 1980; Popper et al., 2003). Masking of sounds associated with these behaviors could have impacts to fish by reducing their ability to perform these biological functions. Masking may take place whenever the noise level heard by a fish exceeds ambient noise levels, the animal's hearing threshold, and the level of a biologically relevant sound. Masking is found among all vertebrate groups, and the auditory system in all vertebrates, including fish, is capable of limiting the effects of masking noise, especially when the frequency range of the noise and biologically relevant signal differ (Fay, 1988; Fay and Megela-Simmons, 1999).

The majority of fish species exposed to non-impulsive noise sources would likely have no reaction or mild behavioral reactions. Overall, there would be no long-term impacts for individual fish because acoustic exposures are of short duration (tens of seconds), intermittent, and unlikely to repeat over short periods. Impacts from aircraft overflights on fish would not be significant.

4.8.2.2.2.1.1 Endangered Species Act

Eight species of fish listed under the ESA could potentially occur in the study area. In order for a fish to be affected by aircraft overflights, it would need to be at or near the water's surface at the moment the aircraft is taking off or landing, and be able to perceive the sound entering the water. Some species, such as the green sturgeon and rockfish, are deepwater species and are not likely to be at the water's surface during an overflight. Although the likelihood of a fish being affected by an aircraft overflight is exceedingly remote given the small area and short amount of time of the overflight, there is a potential for the overflights to affect ESA-listed fish species.

Pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, the Southern DPS green sturgeon, Southern DPS eulachon, Puget Sound ESU Chinook salmon, Hood Canal summer-run chum, Puget Sound DPS steelhead, Puget Sound/Georgia Basin DPS bocaccio rockfish, Puget Sound/Georgia Basin DPS yelloweye rockfish, and bull trout. The Navy has consulted with the NMFS and USFWS as required by Section 7(a)(2) of the ESA. The NMFS and USFWS have concurred with the Navy's finding in letters dated July 20, 2018 (marine mammals), April 23, 2018 (NMFS fish), and June 14, 2018 (USFWS fish).

Critical habitat has been designated in the study area for Southern DPS green sturgeon, Puget Sound ESU Chinook salmon, Hood Canal summer-run chum, Puget Sound DPS steelhead, Puget Sound/Georgia Basin DPS bocaccio rockfish, Puget Sound/Georgia Basin DPS yelloweye rockfish, and bull trout. Aircraft overflights would introduce temporary sound into the water column. However, temporary increases in sound would have no effect on the features for which the critical habitats were designated. As such, the Proposed Action would have no effect on these designated critical habitats.

4.8.2.2.2.2 Marine Mammals

Aircraft overflights produce sound with energy at low frequencies (e.g., less than 1 kilohertz). Direct measurements of hearing sensitivity exist for approximately 25 of the nearly 130 species of marine mammals. Aircraft overflight sounds may be audible to all species of marine mammals in the study area, although sensitivities vary greatly between species (Richardson et al., 1995; Southall et al., 2007). Exposure to intense sound may result in noise-induced hearing loss that persists after cessation of the noise exposure. However, noise from aircraft overflights would not result in hearing loss to marine mammals because it lacks the intensity and duration to cause these types of effects. Kastak and Reichmuth (2006) documented a temporary threshold shift in harbor seals from in-air noise sources, although details regarding experiment design were unavailable to determine similarity in the sources used and overflight noise. However, threshold shift was documented only after 22 minutes of exposure; given that aircraft overflights would be much shorter in duration, threshold shift is not anticipated. As such, only behavioral reactions to aircraft overflights are analyzed below.

Thorough reviews of the behavioral reactions of marine mammal species to overhead flights are presented in Richardson et al. (1995) and elsewhere (e.g., Efroymson et al., 2000; Patenaude et al., 2002; Holst et al., 2011; Luksenburg and Parsons, 2009; Smith et al., 2016). Richardson et al. (1995) noted that marine mammal reactions to aircraft overflights largely consisted of opportunistic and anecdotal observations lacking clear distinction between reactions potentially caused by the noise of the aircraft and the visual cue an aircraft presents. In addition, it was suggested that variations in the responses noted were due generally to other undocumented factors associated with overflights (Richardson et al., 1995). These factors could include aircraft type (single engine, multi-engine, jet turbine), flight path (altitude, centered on the animal, off to one side, circling, level and slow), environmental factors (e.g., wind speed, sea state, cloud cover), animal activity state, acoustic habitat, and locations where native subsistence hunting continues and animals are more sensitive to anthropogenic impacts, including the noise from aircraft. Ellison et al. (2012) outlined an approach to assessing the effects of sound on marine mammals that incorporates these contextually based factors. They recommend considering not just the received level of sound but also the activity in which the animal is engaged, the nature and novelty of the sound (i.e., is this a new sound from the animal's perspective?), and the distance between the sound source and the animal.

The impact of aircraft overflights is one of the lesser understood sources of potential behavioral response by any species or taxonomic group, and so many generalities must be made based on the little data available. Some data for each taxonomic group are available; taken together, it appears that in general, marine mammals have varying levels of sensitivity to overflights depending on the species and context. Information specific to pinnipeds (seals and sea lions) and cetaceans (whales, dolphins, and porpoises) is provided below, followed by information specific to federally protected threatened and endangered species.

4.8.2.2.2.2.1 Pinnipeds

Richardson et al. (1995) noted that responsiveness of pinnipeds to aircraft overflights generally was dependent on the altitude of the aircraft, the abruptness of the associated aircraft sound, and the life cycle stage (breeding, molting, etc.) of the individual. In general, pinnipeds are unresponsive to overflights and may startle, orient toward the sound source or increase vigilance, or briefly re-enter the water but typically remain hauled out or immediately return to their haul-out location (Blackwell et al., 2004; Gjertz and Børset, 1992). Adult females, calves, and juveniles are more likely to enter the water than males, and stampedes resulting in mortality to pups (by separation or crushing) can occur when disturbance is severe, although these are rare (Holst et al., 2011). Responses may also be dependent on the distance of the aircraft. For example, reactions of walruses on land varied in severity and included minor head raising at a distance of 2.5 km, orienting toward or entering the water at less than 150 m and 1.3 km in altitude, to full flight reactions at horizontal ranges of less than 1 km at altitudes as high as 1,000 to 1,500 m (Richardson et al., 1995).

Harbor seals are the primary marine mammal known to haul out on the southeastern shores of Whidbey Island, primarily in Crescent Harbor (NAS Whidbey Island, 2013a; Jeffries et al., 2000). In addition to harbor seals, elephant seals also haul out on Smith and Minor Islands, which are located on the western edge of the study area (USFWS, 2014b; Jeffries et al., 2000). Harbor seals and elephant seals may also be present on islands in Skagit Bay, approximately 7 miles east of Ault Field. Harbor seals and elephant seals also breed on these islands. Efroymson et al. (2000) reviewed documented altitudes at which harbor seals respond to aircraft, and the most conservative observed threshold was about 1,000 feet.

The Kalamut Island haul-out site is located near the approach path for the Ault Field landing strip, where planes will reach lower altitudes around 50 feet, resulting in greater aircraft noise and risk of potential impacts. The MMPA defines “harassment” for military readiness activities as any activity that disturbs or is likely to disturb a marine mammal or mammal stock in the wild by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point that they are abandoned or significantly altered (16 U.S.C. 1362[18][B]). Currently, the same Growler aircraft that would operate under the Proposed Action use the approach route, and the seals have continued to use the haul-out site (i.e., they have not abandoned the site).

The number of operations at the NAS Whidbey Island complex would increase by between 30 percent and 33 percent under Alternative 1 and by between 29 percent and 32 percent under Alternatives 2 and 3 annually compared to the No Action Alternative (refer to Section 4.1). The increase in operations would result in an increase in the potential for aircraft disturbance on pinnipeds, and the potential disturbance would be similar under all three alternatives because the in-air operations are similar. The potential impacts would not affect pinnipeds in the area of potential aircraft disturbance differently between scenarios, as they may occur in marine waters and shorelines in the flight paths for operations at both Ault Field and OLF Coupeville.

Harbor seals in the area of potential aircraft disturbance are currently exposed to high levels of aircraft, vessel, and other human-made disturbances. Harbor seals are presumably habituated to the activity because they are common in the area of potential aircraft disturbance (NAS Whidbey Island, 2013a) despite the existing long-term high level of disturbances. Repeated exposures of an individual to multiple sound-producing activities over a season, year, or life stage cause some animals to habituate to, or become tolerant of, repeated exposures over time, learning to ignore a stimulus that in the past has not accompanied any overt threat. Several studies have documented marine mammal habituation to repeated exposure to human-caused noise (Stockin et al., 2008; Bejder et al, 2006; Blackwell et al., 2004). Marine mammals that are more tolerant may stay in a disturbed area. In addition, no breeding areas would be impacted.

Alternatives 1 through 3 are not expected to have significant impacts on pinnipeds, either through behavioral disturbance or injury resulting from military readiness activities.

4.8.2.2.2.2.2 Cetaceans

There are a number of studies on cetaceans but few on the effects of aircraft noise on species within the study area. The most common responses of cetaceans to overflights are short surfacing durations, abrupt dives, swimming away from the flight path, and percussive behavior (breaching and tail slapping) (Richardson et al., 1995; Patenaude et al., 2002; Nowacek et al., 2007). Other behavioral responses such as flushing and fleeing the area of the source of the noise have also been observed (Holst et al., 2011; Manci et al., 1988).

Mysticetes either ignore or occasionally dive in response to aircraft overflights (Koski et al., 1998; Patanaude et al., 2002). Richardson et al. (1985; 1995) found no evidence that single or occasional aircraft flying above mysticetes causes long-term displacement of these mammals. Variable responses to aircraft have been observed in odontocetes (toothed whales), although overall little change in behavior has been observed during flyovers. Some toothed whales dove, slapped the water with their flukes or flippers, or swam away from the direction of the aircraft during overflights; others did not visibly react (Richardson et al., 1995).

Bowhead whales in the Beaufort Sea exhibited a transient behavioral response to fixed-wing aircraft and vessels. Reactions were frequently observed when aircraft were less than 1,000 feet MSL, infrequently observed at 1,500 feet, and not observed at all at 2,000 feet (Richardson et al., 1985). Patenaude et al. (2002) found that bowhead whales (*Balaena mysticetus*) and beluga whales (*Delphinapterus leucas*) responded to aircraft through abbreviated surfacing, immediate dives or turns, changes in behavior state, vigorous swimming, and breaching during spring migration in Alaska. Bowheads responded to 2.2 percent and belugas responded to 3.2 percent of fixed-winged aircraft overflights. Bowheads and belugas responded to helicopters 14 percent and 38 percent of the time, respectively. Responses by these species most often occurred when fixed-winged aircraft were at altitudes below about 600 feet or at lateral distances of less than 820 feet. Both species responded significantly more often when helicopters were less than 820 feet away in lateral distance. It should be noted that bowhead whales in this study may have had more acute responses to anthropogenic activity than many other marine mammals because these animals were presented with restricted egress due to limited open water between ice floes. Additionally, these animals are hunted by Alaska Natives, which could lead to animals developing additional sensitivity to human noise and presence.

During standard marine mammal surveys, conducted from an altitude of 750 feet, some sperm whales remained on or near the surface the entire time the aircraft was in the vicinity, while others dove immediately or a few minutes after being sighted (Green et al., 1992; Richter et al., 2003; Richter et al., 2006; Smultea et al., 2008a; Würsig et al., 1998). In one study, sperm whales showed no reaction to a helicopter until they encountered the downdrafts from the rotors (Richardson et al., 1995). A group of sperm whales responded to a circling aircraft (at an altitude of 800 to 1,100 feet) by moving closer together and forming a defensive fan-shaped semicircle, with their heads facing outward. Several individuals in the group turned on their sides, apparently to look up toward the aircraft (Smultea et al., 2008b). Whale-watching aircraft (fixed-wing airplanes and helicopters) apparently caused sperm whales to turn more sharply but did not affect blow interval, surface time, time to first click, or the frequency of aerial behavior (Richter et al., 2003).

Smaller delphinids generally react to overflights either neutrally or with a startle response (Würsig et al., 1998). Beluga whales reacted to helicopter overflights by diving, breaching, changing direction or behavior, and altering breathing patterns to a greater extent than mysticetes in the same area (Patenaude et al., 2002). These reactions increased in frequency as the altitude of the helicopter dropped below 150 m. A change in travel direction was noted in a group of pilot whales as the aircraft circled while conducting monitoring (HDR, 2011).

It is important to note that bowhead whales, beluga whales, and sperm whales do not occur in the study area. However, these species are similar to those that do occur in the study area (i.e., gray whales and minke whales), and therefore studies concerning these species are relevant.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to marine mammals in the study area. The number of operations at the NAS Whidbey Island complex would increase by between 30 percent and 33 percent under Alternative 1 and by between 29 percent and 32 percent under Alternatives 2 and 3 annually compared to the No Action Alternative (refer to Section 4.1). The increase in operations would result in an increase in the potential for aircraft disturbance on cetaceans, and the potential disturbance would be similar under all three alternatives because the in-air operations are similar. The potential impacts would not affect cetaceans in the area of potential aircraft disturbance differently between scenarios, as they may occur in marine waters in the flight paths for operations at both Ault Field and OLF Coupeville.

As described above, studies have shown that the majority of individual cetaceans did not respond to overflights (Patenaude et al., 2002; Smultea et al., 2008b). Whales in Alaska (Patenaude et al., 2002) and Hawaii (Smultea et al., 2008b) were likely not exposed to the long-term high levels of aircraft operations, vessels, and other human-made disturbances that occur in the area of potential aircraft disturbance. Cetaceans in the area of potential aircraft disturbance are presumably habituated to high levels of long-term disturbances and would be even less likely to respond to aircraft than those individuals in the above-mentioned studies. Therefore, the Proposed Action is not expected to have significant impacts on cetaceans, either through behavioral disturbance or injury resulting from military readiness activities.

4.8.2.2.2.2.1 Endangered Species Act

No aircraft disturbance data or studies exist specifically for the Mexico and Central America DPSs of humpback whales. However, as described, marine mammals exposed to low-altitude fixed-wing aircraft

overflights could exhibit a short-term behavioral response. Fixed-wing aircraft overflights are not expected to result in chronic stress because it is extremely unlikely that individual animals would be repeatedly exposed to low altitude overflights.

Pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, the Mexico and Central America DPSs of humpback whales. The Navy has consulted with the NMFS as required by Section 7(a)(2) of the ESA, and the NMFS has provided concurrence with the Navy's determination.

No aircraft disturbance data or studies exist specifically for Southern Resident killer whales. However, as described, marine mammals exposed to low-altitude fixed-wing aircraft overflights could exhibit a short-term behavioral response. Fixed-wing aircraft overflights are not expected to result in chronic stress because it is extremely unlikely that individual animals would be repeatedly exposed to low-altitude overflights.

Pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, Southern Resident killer whales. The Navy has consulted with the NMFS as required by Section 7(a)(2) of the ESA, and the NMFS has provided concurrence with the Navy's determination.

During consultation, the NMFS additionally determined that there is a low likelihood of exposure of the critical habitat to aircraft operations, and, if exposed, the operations are not likely to significantly alter passage conditions (i.e., any disturbance due to noise will be short term and localized, with no lasting effects or displacement). As passage conditions are identified as one of the primary constituent elements of the critical habitat, the NMFS determined that the Proposed Action may affect, but is not likely to adversely affect, Southern Resident killer whale critical habitat.

4.8.2.2.2.2.2.2 Marine Mammal Protection Act

All marine mammal species are protected under the MMPA. Harassment for military readiness activities only arises when an animal's behavioral patterns are disturbed to the point that they are "abandoned or significantly altered," and not just "disturbed" (16 U.S.C. 1362[18][B]). Short-term behavioral responses would not necessarily rise to the level of harassment. As is evident by the use of Kalamut Island as a continued haul-out site for harbor seals, abandonment or significant alteration of normal behavioral patterns are not expected.

Pursuant to the MMPA, sensory disturbance from aircraft overflights as proposed in Alternatives 1 through 3 would not result in reasonably foreseeable takes of marine mammals. Therefore, permitting under the MMPA is not required.

4.8.3 Biological Resources Conclusion

Potential effects on terrestrial and marine wildlife from implementation of the Proposed Action would be similar between all three action alternatives but greater under Alternative 1 because that alternative would result in the largest increase in aircraft operations. Negligible differences to impacts on biological resources would occur between scenarios across all three action alternatives. These minor differences would be attributable to the location and frequency of operations (e.g., more FCLPs proposed under Scenario C). The Navy has consulted with the appropriate regulatory agencies, as required. The overall conclusions regarding the Proposed Action's potential impacts on various wildlife species groups are highlighted below.

- Construction of the new facilities would occur in previously disturbed areas of high-volume human activity and is not expected to result in significant impacts on terrestrial wildlife. Construction noise would not have any impacts on marine species.
- Wildlife in the study area are currently exposed to high levels of aircraft operations and other human disturbances, and the Proposed Action would result in some additional sensory disturbance impacts, particularly from noise. The impacts would be similar under each action alternative; however, the levels of impacts would vary between the five scenarios within the alternatives. Scenario A would result in greater impacts at OLF Coupeville, whereas Scenario C would result in greater impacts at Ault Field, based on the division of aircraft operations at each. However, these differences would be minor and insignificant.
- The NAS Whidbey Island complex reports a proportionally small number of bird/animal aircraft strikes annually (approximately 30 strikes annually) relative to the high number of aircraft operations flown (84,700 annually) at the complex and the large numbers of wildlife inhabiting the study area throughout the year. With the continued implementation of the NAS Whidbey Island complex's BASH plan, the Proposed Action would not significantly impact local wildlife populations.
- For MBTA-protected species, the impacts from stressors from the Proposed Action would not result in a significant adverse effect on migratory bird populations. As such, conferring with USFWS is not warranted. Pursuant to the BGEPA, stressors from the Proposed Action would not disturb bald and golden eagles to a degree that would substantially interfere with their normal breeding, feeding, or sheltering behavior.
- The Proposed Action may have aircraft-strike or sensory disturbance impacts on the marbled murrelet. The Navy determined that aircraft-strike impacts would be discountable, to which the USFWS concurred in its Biological Opinion dated June 14, 2018. Sensory disturbance by aircraft overflights was determined by USFWS to have a potential adverse effect on marbled murrelets. The USFWS concluded in its June 14, 2018, Biological Opinion that the Proposed Action is not likely to jeopardize the continued existence of the marbled murrelet.
- The Proposed Action may have behavioral or masking impacts on ESA-listed fish species (i.e., bull trout, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, and yelloweye rockfish). However, those potential impacts would be insignificant. Therefore, the Proposed Action may affect, but is not likely to adversely affect, ESA-listed fish species. The NMFS and USFWS have concurred with the Navy's finding in letters dated April 23, 2018, and June 14, 2018, respectively.
- The Proposed Action's increase in aircraft operations would not have significant noise and/or visual impacts on the Southern Resident killer whale and Mexico and Central America DPSs of the humpback whale. Because of the potential for reactions due to auditory and/or visual disturbance, the Proposed Action may affect, but is not likely to adversely affect, the Southern Resident killer whale and Mexico and Central America DPSs of the humpback whale. Additionally, the NMFS determined that the construction activities may affect, but not adversely affect, the Southern Resident killer whale and its critical habitat. The NMFS's determination under the ESA was issued on July 20, 2017.
- Marine mammals, including non-ESA species, exposed to fixed-wing aircraft overflights could exhibit a short-term behavioral response, but these responses would not lead to abandonment

or significant alteration of normal behavioral patterns. Pursuant to the MMPA, the Proposed Action would not result in the unintentional taking (e.g., harassment) of marine mammals incidental to the activity.

4.9 Water Resources

This assessment examines how the Proposed Action would affect groundwater, surface water, wetlands, floodplains, marine waters, and marine sediments. The analysis of groundwater focuses on the potential for impacts to the quality, quantity, and accessibility of water. The analysis of surface water considers whether any new construction would impact the quality of water. BMPs are identified to minimize soil impacts and prevent or control pollutant discharge into stormwater. The analysis of marine waters focuses on whether any new construction would impact the quality of marine waters. The analysis of wetlands considers the potential for impacts that may change the local hydrology, soils, or vegetation that support a wetland. The analysis of marine sediments focuses on whether any new construction would impact the quality of the marine sediments.

Water Resources

Impacts on surface water from construction activities, but would be minimized and avoided through implementation of BMPs and therefore would not be significant.

Potential indirect impacts from construction activities, but would be minimized and avoided through implementation of BMPs and therefore would not be significant.

4.9.1 Water Resources, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to affected environment water resources. Therefore, no significant impacts to water resources would occur with implementation of the No Action Alternative.

4.9.2 Water Resources, Alternatives 1 through 3

New construction under Alternatives 1 through 3 would include expanded hangar space and/or new hangars, armament storage, maintenance facilities, and expanded personnel parking areas. All planned construction activities would occur in proximity to the flight line at Ault Field. No construction would occur at OLF Coupeville. While each alternative would result in up to 2.3 acres of new impervious surface at NAS Whidbey Island, development associated with Alternative 1 would result in different, new impervious surface located at the hangar space, and development associated with Alternative 3 would result in slightly more impervious surface at the Armaments Storage area. Overall, the impacts to water resources would be minimal, and the differences between alternatives in regard to their impacts would only result in slight local variations in groundwater and surface water quality.

4.9.2.1 Water Resources Potential Impacts

4.9.2.1.1 Groundwater

New construction under each of the alternatives would not impact Whidbey Island's three groundwater aquifers or any private wells in the vicinity of NAS Whidbey Island because none of the proposed construction would extend below the ground surface to a depth that would impact the underlying water tables. Although fuel or other chemicals could be spilled during construction, implementation of BMPs (as detailed in section 3.9.2.2 and 4.9.2.1.2), such as immediate cleanup of these spills, would prevent any infiltration into the underlying groundwater. Although the number of personnel employed or stationed at NAS Whidbey would increase, resulting in a corresponding increase in the demand for

groundwater, this is anticipated to be minimal because NAS Whidbey Island does not use groundwater as a source of drinking water.

4.9.2.1.1.1 Per- and Polyfluoroalkyl Substances

Regarding drinking water testing, the Navy is actively identifying all known and suspected sites where perfluorooctane sulfanate (PFOS) and/or perfluorooctanic acid (PFOA) may have been released, as well as locations where PFOA or PFOS may have migrated to off-installation drinking water sources. Through public comment on this document, inquiries were received related to the Navy's handling of these emerging contaminants. Areas surrounding both Ault Field and OLF Coupeville are receiving drinking water testing to confirm the USEPA drinking water lifetime health advisory is not exceeded for PFOS and PFOA. In situations where the USEPA lifetime health advisory level is exceeded, the Navy is providing alternative drinking water.

The Navy is also taking action to reduce potential releases of these compounds into the environment. Consistent with Navy policy, these include ceasing uncontrolled environmental release of aqueous film-forming foam (AFFF) for shoreside installations (with the exception of emergency response), ceasing training with AFFF, testing firefighting and crash response vehicle AFFF systems, and testing to ensure hangar AFFF and other fixed systems have appropriate controls in place to prevent environmental release. The Navy is identifying for removal and destruction all legacy 3M® PFOS-containing (and PFOA-containing) AFFF. The Navy is testing current AFFF (most of which was developed to comply with the USEPA 2010/2015 PFOA Stewardship Program) to confirm chemical formulations, with the goal of identifying suitable replacements for existing stocks. If a crash occurs that necessitates the use of AFFF, the Navy will contain and capture released AFFF to the maximum extent practical to ensure limited infiltration into the soil and/or groundwater.

4.9.2.1.2 Surface Water

The Proposed Action would result in up to 2 acres of new impervious surface created by the new armament storage, mobile maintenance facility storage area, vehicle parking, and hangar space. The increase in impervious surface would be less than 1 percent compared to the existing approximately 600 acres of impervious surface at NAS Whidbey Island.

The new impervious surfaces under each alternative would increase the quantity and velocity of stormwater runoff, which would in turn increase the susceptibility of surface water to runoff impacts like increased turbidity and pollutants, resulting in diminished water quality. Stormwater runoff could impact surface water and waters around NAS Whidbey Island; however, as stated above, the percent increase in impervious surface from existing impervious surface is minimal and would not impact overall water quality. This includes surface water bodies such as the Salish Sea and Puget Sound.

Examples of BMPs for controlling non-point source pollution include, but are not limited to, the following:

- Activities such as vehicle maintenance, chemical or waste oil storage, or transferring potential contaminants would be conducted in covered areas so stormwater would not wash contaminants into storm drains or surface waters.
- Areas that cannot be covered should have their stormwater runoff retained and diverted to the sanitary sewer system.

- The storm drain system should not be used to dump or discharge any materials or chemicals. All departments should notify the Environmental Division before conducting any operations that may discharge materials or washes into the system. This includes water from vehicle washing. All storm drains should be labeled with "no dumping" signs.

The installation's Spill Prevention, Control, and Countermeasures (SPCC) Plan provides guidance that would be used in a spill response, such as a response procedures, notification, and communication; roles and responsibilities; and response equipment inventories. Developing stormwater and erosion-control measures, implementing standard stormwater BMPs, and educating station personnel are proactive measures to limit the exposure of stormwater to contaminants.

Because more than 1 acre would be disturbed during construction under all alternatives, a construction National Pollutant Discharge Elimination System (NPDES) stormwater permit would be obtained from the USEPA through its water quality permit program. Under the permit, the Navy (NAS Whidbey Island) would develop a site-specific Stormwater Pollution Prevention Plan for new discharges that would include a site plan for managing stormwater runoff and describe the BMPs to be implemented to eliminate or reduce erosion, sedimentation, and stormwater pollution. With proper implementation of the Stormwater Pollution Prevention Plan, impacts on water quality from erosion and off-site sedimentation during construction would not be significant.

Additional mitigation might be required to account for the excess runoff from new impervious surfaces. The Navy may install underground stormwater retention infrastructure; infiltrate stormwater via wet ponds, ditches, and swales; or employ a combination of these measures to meet the standards established by the Washington State Department of Ecology in its 2012 Western Washington Stormwater Manual. These measures would be developed and incorporated into facility design based on existing site conditions.

4.9.2.1.3 Wetlands

Each of the three alternatives would have no direct impacts on wetlands at NAS Whidbey Island because no wetlands occur in or adjacent to the proposed construction areas. Stormwater runoff from construction activities could have indirect impacts on nearby wetlands, such as increased turbidity and pollutant levels. However, implementation of BMPs during construction, similar to those described for Section 4.9.2.1.2, Surface Waters, would minimize runoff into nearby wetlands.

4.9.2.1.4 Floodplains

No construction would occur within Federal Emergency Management Agency-mapped floodplains under any of the three alternatives. Therefore, there would be no impacts on floodplains, and all three alternatives would be fully consistent with EO 11988.

Storm-related flooding at Ault Field and the Seaplane Base has only been an issue related to high tide and high wind events. The Final Installation Development Plan recommends use of green infrastructure outside of the airfield and runways and use of LID practices be used in construction projects (NAVFAC, 2016b). These practices would minimize potential impacts from storm-related flooding regarding the new construction associated with the Proposed Action.

4.9.2.1.5 Marine Waters and Sediments

The projected increase in new impervious surfaces under each alternative would increase the quantity and velocity of stormwater runoff. This would increase the susceptibility of marine water sediments to impacts such as increased turbidity and pollutant levels. These impacts would be minimized or avoided by implementing the BMPs described above in Section 4.9.2.1.2, Surface Waters. This includes impacts to surface water bodies such as Puget Sound and the Salish Sea.

4.9.3 Water Resources Conclusion, Alternatives 1 through 3

Overall, as discussed above, implementation of the Proposed Action at NAS Whidbey Island would not result in significant impacts to water resources. There would be no impact on groundwater because new construction under each of the alternatives would not extend below the ground surface to a depth that would impact the underlying water tables, and implementation of BMPs, such as immediate cleanup of spills, would prevent any infiltration from spills into the underlying groundwater. The Proposed Action would result in up to 2.3 acres of new impervious surface, but impacts to surface waters, floodplains, and marine waters and sediment would be minimized and avoided through implementation of BMPs, LIDs, and green infrastructure and therefore would not be significant. Each of the three alternatives would have no direct impacts on wetlands at NAS Whidbey Island because no wetlands occur in or adjacent to the proposed construction areas. Indirect impacts to wetlands, as discussed above, would be minimized through use of BMPs. Construction activities are similar under the three alternatives and therefore there would be negligible differences in impacts to water resources. The differences between alternatives in regard to their impacts would only result in slight local variations in groundwater and surface water quality.

4.10 Socioeconomics

Analysis of impacts to socioeconomics is focused on the issues of the effects of the alternatives on population, economy, employment and income, housing, local government revenues and expenditures, and community services and facilities.

This socioeconomic analysis focuses on impacts caused by changes in military and civilian personnel levels and those caused by an increase in construction expenditures. Economic impacts are defined to include direct effects, such as changes to employment, payrolls, and expenditures that affect the flow of dollars into the local economy, and indirect effects, which result from the "ripple effect" of spending and re-spending in response to the direct effects.

Socioeconomic impacts, particularly impacts such as those being evaluated in this EIS, are often mixed: beneficial in terms of gains in jobs, expenditures, and tax revenues but adverse in terms of growth-management issues, such as demands for housing and community services.

Socioeconomics

Construction impacts would result in temporary and positive impacts to the local economy. Operational impacts would result in positive impacts to the local economy.

The action alternatives would have minor impacts on the local and regional population, and local government revenues. Significant impacts to housing availability and housing affordability may occur in Oak Harbor.

Local school districts, particularly the Oak Harbor School District, would experience significant impacts. Minimal to no impact is expected on medical, police, and fire services.

4.10.1 Socioeconomics, No Action Alternative

Under the No Action Alternative, no additional personnel would be assigned to the NAS Whidbey Island complex, and no additional construction would occur at Ault Field or OLF Coupeville compared to the affected environment conditions. Therefore, there would be no impacts to local population, the regional economy, or housing market. In addition, there would be no fiscal impacts to local governments, and there would not be any change to the provision of local community services and facilities compared to the affected environment conditions. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

4.10.2 Socioeconomic Impacts, Alternatives 1 through 3

The affected environment for the more general socioeconomic impact analyses for Alternatives 1 through 3 is defined as Island and Skagit Counties. However, as described in Section 3.10.3, more focused areas have been utilized for the analyses of specific community services and facilities. The Oak Harbor, Coupeville, and Anacortes school districts are the defined affected environment for the assessment of impacts to public education; Island and Skagit Counties are the defined affected environment for the assessment of impacts to medical facilities; and the City of Oak Harbor and the Town of Coupeville are the defined affected environment for the assessment of impacts to emergency services such as police and fire protection.

4.10.2.1 Population Impacts

Implementation of Alternatives 1 through 3 would result in minor impacts on the personnel loading at the NAS Whidbey Island complex and on total population in the region. Total Growler personnel loading at the NAS Whidbey Island complex is expected to increase under Alternatives 1 through 3 when

compared to the personnel loading under the No Action Alternative. As shown on Table 4.10-1, the total number of military personnel associated with the Growler aircraft at the NAS Whidbey Island complex under the No Action Alternative would be 4,104 personnel, including 517 officers and 3,587 enlisted personnel. Once all transition activities are complete in 2021, total Growler personnel at the station would range between a low of 4,439 personnel under Alternative 1 to a high of 4,732 personnel under Alternative 2. These personnel numbers would correspond to an increase of between 335 and 628 personnel when compared to the No Action Alternative, depending on the alternative selected. Table 4.10-1 shows both the total number of Growler personnel who would be assigned to the NAS Whidbey Island complex under each alternative and the expected change in personnel loading when compared to the No Action Alternative. Estimates of the total number of military dependents have also been included in this table (see Table 4.10-1).

The population and demographic characteristics of Island and Skagit Counties would be similarly impacted under each alternative. Table 4.10-2 provides an estimate of regional population impacts for each of the three alternatives. As additional military personnel are stationed at the NAS Whidbey Island complex, it is assumed that their dependents (e.g., spouses and children) would also move into the region. The number of military dependents affected by the proposed alternatives was calculated using 2013 data collected by the Office of the Deputy Assistant Secretary of the Defense (Military Community and Family Policy) on the average number of dependents (e.g., spouses and children) for Navy and DoD personnel (DoD, n.d.). These average percentages were applied to the expected number of personnel who would be reassigned under each of the proposed alternatives to determine the corresponding number of dependents (see Table 4.10-2).

As shown on Table 4.10-2, the resulting changes in population are expected to be minor compared to the size of the regional population under all three alternatives. Alternative 2 is expected to cause the largest demographic impact out of the three alternatives considered. Under Alternative 2, 1,488 military personnel and dependents would move into the region compared to the No Action Alternative level. Assuming that the geographic distribution of the new personnel will be similar to the current geographical distribution of Navy personnel, the majority of these new residents (1,171 residents) would likely live in Island County. The remaining personnel and dependents are expected to live in Skagit County (317 residents). This increase in population would amount to an increase of approximately 1.4 percent over Island County's 2020 projected population level and an increase of 0.2 percent over Skagit County's 2020 projected population level. An estimated 794 additional military personnel and dependents under Alternative 1; 1,488 additional military personnel and dependents under Alternative 2; and 808 additional military personnel and dependents under Alternative 3 are expected to reside in the two counties compared to the No Action Alternative. In total, Alternative 1 would result in an increase of 0.4 percent, Alternative 2 would result in an increase of 0.7 percent, and Alternative 3 would result in an increase of 0.4 percent of the total population in the two counties (see Table 4.10-2).

See Table 4.10-2 for the demographic impacts associated with all three alternatives.

Table 4.10-1 EA-18G Growler Personnel Loading at the NAS Whidbey Island Complex under Each Alternative in 2021

		Alternative 1		*Alternative 2*		*Alternative 3*	
	No Action Alternative	*Personnel*	*Change from No Action Alternative*	*Personnel*	*Change from No Action Alternative*	*Personnel*	*Change from No Action Alternative*
Officers	517	597	80	619	102	597	80
Enlisted	3,587	3,842	255	4,113	526	3,848	261
Military Personnel Total	4,104	4,439	335	4,732	628	4,445	341
Military Dependents[1]	5,627	6,086	459	6,487	860	6,094	467
Total Military and Dependents	9,731	10,525	794	11,219	1,488	10,539	808

Note:

[1] Military dependents include spouses and children aged 0-22 years residing with military personnel.

Table 4.10-2 Regional Population Impacts[1] Resulting from the Changes in EA-18G Growler Personnel Loading at the NAS Whidbey Island Complex Compared to the Affected Environment Levels

	Change from Affected Environment		
	Alternative 1	***Alternative 2***	***Alternative 3***
Military Personnel	335	628	341
Military Dependents	459	860	467
Total Population Change[2]	**794**	**1,488**	**808**
Island County Impacts			
Number of Military Personnel and Dependents Expected to Reside in Island County	625	1,171	636
Island County's 2020 Projected Population	84,044	84,044	84,044
Total Population Change as a Percentage of Island County's 2020 Population	**0.7%**	**1.4%**	**0.8%**
Skagit County Impacts			
Number of Military Personnel and Dependents Expected to Reside in Skagit County	169	317	172
Skagit County's 2020 Population	130,705	130,705	130,705
Total Population Change as a Percentage of Skagit County's 2020 Population	**0.1%**	**0.2%**	**0.1%**

Source: Washington State Office of Financial Management, 2017

Notes:

1 All population impacts are calculated for 2021, the time when all transition activities have been completed. The current geographical distribution of the personnel stationed at and employed by the NAS Whidbey Island complex, as listed in Table 3.10-2, was used to forecast the expected geographic distribution of the Growler personnel by county.

2 Total population change also includes those military personnel and dependents who are expected to live outside of Island and Skagit Counties.

4.10.2.2 Economy, Employment, and Income Impacts

Implementation of Alternatives 1 through 3 would have the potential to impact the regional economy in two ways. First, any additional construction activity that is required to support the mission would have a short-term positive economic effect as these funds were injected into the regional economy. Secondly, there would be a positive, long-term economic impact on the regional economy as a result of the increased employment and payroll at the NAS Whidbey Island complex that is associated with each alternative. The impacts from construction would be one-time in nature, whereas the impacts from the increased employment and employee earnings would be annual and long term.

In order to quantify the total economic impact the proposed alternatives would have on the regional economy, the Navy used the Regional Input-Output Modeling System, designed by the U.S. Bureau of Economic Analysis. The multipliers utilized in this input-output model are based on regional information derived from databases analyzing commercial, industrial, and household spending patterns and relationships. These multipliers also estimate the potential number of jobs created or lost as a result of changes in earning and spending patterns. Both one-time, short-term construction-related economic impacts and annual, long-term operational spending impacts are discussed below.

4.10.2.2.1 Short-term Construction-related Impacts

Implementation of the proposed alternatives would necessitate the expenditure of different levels of construction funds to support the revised mission. At present time, detailed cost estimates for each alternative are not available. However, the Navy expects that the total construction costs would range between approximately $47.8 million and $122.5 million for each alternative, depending on the facilities constructed.

This increase in construction spending would directly impact the regional economy by increasing employment and earnings in the construction industry. In addition, these construction expenditures would also have a positive indirect impact on the local economy.

As the new construction workers spend a portion of their payroll in the local area and construction companies purchase materials from local suppliers, the overall demand for local goods and services would expand. Revenues at local retail outlets and service providers would increase. As these local merchants respond to this increase in demand, they may in turn increase employment at their operations and/or purchase more goods and services from their providers. These new workers may then spend a portion of their income in the area, thus "multiplying" the positive economic impacts of the original injection of funds. These "multiplier" effects would continue until all of the original funds have left the regional economy through either taxes, savings, or purchases from outside the local area.

Table 4.10-3 shows the direct and indirect impacts from construction under both the low-cost estimate and under the high-cost estimate.

Table 4.10-3 Total Direct and Indirect Impacts Resulting from Construction Expenditures under Each Alternative at the NAS Whidbey Island Complex

	Low Cost Estimate	*High Cost Estimate*
Total Construction Expenditures	$47,800,000	$122,500,000
Change in Regional Output	$63,300,000	$162,300,000
Change in Value Added	$33,200,000	$85,100,000
Change in Employee Earnings	$18,000,000	$46,100,000
Change in Employment (jobs)	327	839

Source: Navy, 2015e; U.S. Bureau of Economic Analysis, 2015

Because these construction costs represent one-time expenditures, the resulting positive economic impacts would last only a short time. Once these funds leave the regional economy through leakages such as savings, taxes, or through the purchase of goods and services from outside the region, these positive economic impacts would cease.

4.10.2.2.2 Long-term Employee Earnings and Spending Impacts

As described above, direct Navy employment at NAS Whidbey Island would expand by an additional 335 to 628 personnel under the three proposed alternatives compared to the No Action Alternative level. As additional income is injected into the regional economy through changes in the NAS Whidbey Island complex's payroll, employment and earnings in the regional economy would be expanded or be multiplied. Every additional job created at the NAS Whidbey Island complex would stimulate the regional economy and create more employment and business opportunities.

As more personnel are assigned to the NAS Whidbey Island complex, these new employees would spend a portion of their additional disposable income in the regional economy, and the profits and sales of local merchants would increase. These local merchants may, in turn, increase employment or increase output as a direct result of the additional demand for their goods and services. Thus, the positive economic impacts of the original injection of funds would be cycled back into the economy, repeating or multiplying the effect.

Table 4.10-4 summarizes projected changes in employment and payroll at the NAS Whidbey Island complex under each of the alternatives. Payroll expenditures were calculated for all additional personnel expected to move to the area under each of the alternatives. The change in direct payroll for personnel stationed or employed at the NAS Whidbey Island complex is shown in Table 4.10-4. The alternatives would result in an increase in employee earnings in the region directly related to the military, ranging from approximately $12.2 million under Alternatives 1 and 3 to $21.4 million under Alternative 2.

Table 4.10-4 NAS Whidbey Island Complex Direct Employment and Employee Earnings Impacts Associated with Each Alternative Compared to the Affected Environment

	Total Employment	*Total Employee Earnings*
Alternative 1	335	$12,200,000
Alternative 2	628	$21,400,000
Alternative 3	341	$12,300,000

4.10.2.2.3 Impacts to Other Industries

4.10.2.2.3.1 Agriculture

Alternatives 1 through 3 would not directly impact agricultural production in the affected area. No agricultural lands will be removed from production as a direct result of implementation of the proposed alternatives, and agricultural production in the region is expected to remain unchanged.

However, some minor increases in the cost of production may occur as a result of the proposed alternatives. Farm operations within the greater than 65 dB DNL contours may experience some loss of productivity during flight activities as spoken communication may become difficult. In addition, depending upon the exact location of the farm and the amount of its expected noise exposure, some of these agricultural operations may be required to expend funds to meet Occupational Safety and Health Administration health and safety requirements for noise protection for outdoor farm workers.

Finally, it is possible that noise levels from flight operations may impact patronage at outdoor farmers' markets and food stands during flight times. While this reduction in patronage may affect the sales revenues of certain farmers and vendors at specific times, these reductions would likely be minor compared to overall agricultural revenues.

4.10.2.2.3.2 Tourism

Increased flight operations and the resulting noise exposure under Alternatives 1 through 3 may have a negative impact on some visitors' experiences at certain tourist destinations in the greater than 65 dB

DNL contours (See Section 4.5, Land Use, for a discussion of noise-related impacts on recreational activities within the study area).

Susceptible locations include outdoor recreation and ecotourism sites such as state and federal parks that fall within the greater than 65 dB DNL contours. The increase in noise created by flight operations associated with the Proposed Action could reduce the perceived quality of visits to these locations by certain tourists, who may elect to not visit again, choose different sites in the region to visit, or shorten their visits as a result (see Section 4.2, Noise Associated with Aircraft Operations, for a discussion of the increased noise from the Proposed Action). This perceived change in quality of the visitor experience could lead to some reduction in attendance at the various parks and destinations discussed in Section 3.10.2, Tourism, and may reduce tourism-related expenditures in Island, San Juan, and Skagit Counties.

However, this reduction in tourism expenditures is not anticipated to be substantial, given historical evidence that travel and tourism-related spending, earnings, and tax receipts have increased in the three counties over the past decades alongside increases in total aircraft operations at the NAS Whidbey Island complex (See Section 3.10.2, Tourism, for information on travel and tourist expenditures in Island, San Juan, and Skagit Counties). Figure 4.10-1 shows the number of airfield operations at the NAS Whidbey Island complex as well as employment estimates and total spending in the travel and tourism industry in Island, Skagit, and San Juan Counties between 1997 and 2014. As shown on the figure, there is no obvious direct correlation between operations at the NAS Whidbey Island complex and tourism-related employment or spending patterns in the three counties.

Attendance at state parks near the NAS Whidbey Island complex has alternatively risen and fallen over past decades. Some decrease in attendance may be attributable to increased noise from expanded flight operations at the NAS Whidbey Island complex over the years; however, this change in noise levels would be only one among several factors that influence travel and tourism expenditures and choice of visitor destinations. For example, economic growth and recessions during known periods appear to have influenced attendance figures at several parks studied. In the past 5 years--a period of steady economic growth--attendance recorded at Deception Pass State Park has steadily risen despite a moderate increase in flight operations at the NAS Whidbey Island complex. Visitation to parks within Ebey's Landing National Historical Reserve surged in 2012 and 2013 and then dropped off, a trend that would not be attributable to increased noise from the NAS Whidbey Island complex because Navy operations were greater during 2012 and 2013 than during 2014 and 2015.

In summary, Alternatives 1 through 3 could potentially reduce attendance levels at certain tourist destinations from reaching the levels that would have occurred without the Proposed Action; however, the effect of the Proposed Action on the tourism industry as a whole is not expected to be substantial. Based on past evidence and the limited number of locations affected by the change in noise levels under the Proposed Action, Alternatives 1 through 3 are not expected to eliminate a large numbers of visitors from the region. Additionally, visitor days and visitor expenditures are not expected to be reduced such that the tourism industries in Island, Skagit, or San Juan Counties would decline significantly.

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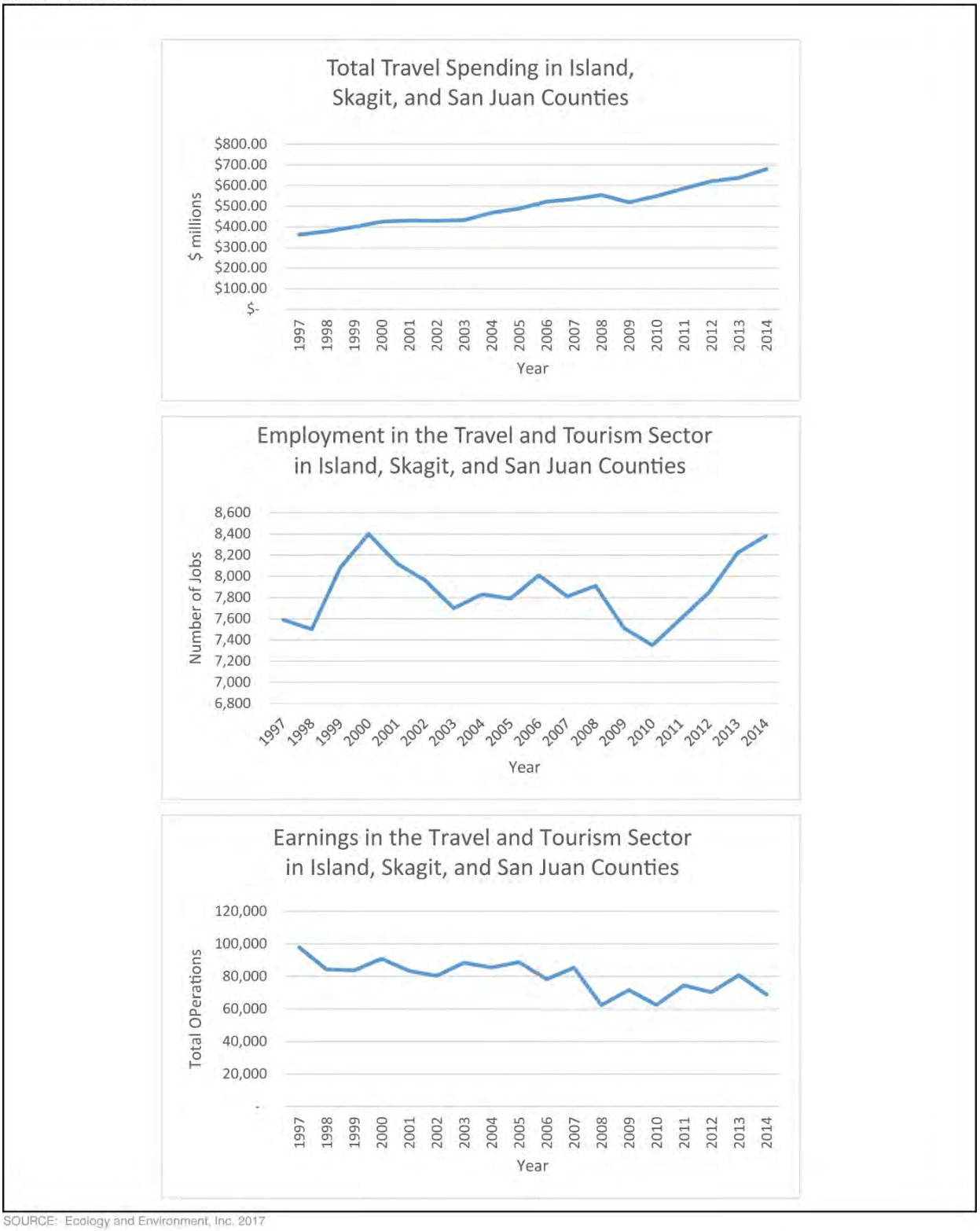

SOURCE: Ecology and Environment, Inc. 2017

Figure 4.10-1 Tourism Revenue and Employment in Island, Skagit, and San Juan Counties, 1997-2014

4.10.2.2.3.3 Other Noise-Sensitive Industries

Other noise-sensitive industries that fall within the greater than 65 dB DNL contours, such as recording studios, meditation spas, and other businesses that require low ambient noise levels to function, may experience some negative impacts as a result of implementation of Alternatives 1 through 3. Increased noise levels during flight operations may reduce the amount of time that these noise-sensitive businesses can effectively operate, thereby potentially impacting their revenue and profitability. However, given the fact that relatively few noise-sensitive industries are located within the greater than 65 dB DNL contours, this impact, while potentially substantial to individual businesses, will be relatively minor in terms of the regional economy.

4.10.2.2.4 Economy, Employment, and Income Summary

Implementation of Alternatives 1 through 3 would, in general, have a positive economic effect on the regional economy. Construction activities under each alternative would generate positive, short-term direct and indirect economic impacts through an increase in construction employment and construction expenditures. The additional personnel stationed at the complex would generate positive long-term direct and indirect economic impacts through their additional payroll expenditures and the resulting increase in economic activity in the region. However, some negative economic impacts may occur to specific industries such as tourism and other noise-sensitive industries. No significant impact is expected to occur to the agricultural industry as a result of the proposed alternatives.

4.10.2.3 Housing Impacts

All types of housing around the NAS Whidbey Island complex, including military-controlled housing, would experience an increase in demand as a result of the personnel changes associated with the proposed alternatives. However, nearly all these additional households are expected to reside off base. In May 2016, of the 1,509 Public Private Venture family housing units at the NAS Whidbey Island complex, less than 2 percent were vacant. In addition, less than 10 percent of the 1,625 bachelor enlisted quarters housing units were vacant in May 2016. No additional military-controlled housing is currently planned to be built as a result of the proposed alternatives; therefore, only a limited number of the newly assigned personnel would be able to reside on station (Switalski, 2016). However, the Navy periodically assesses on- and off-base housing demand and availability to determine whether additional Navy-controlled housing is required for service members and their dependents. For the purposes of this analysis, however, it has been assumed that all additional personnel would be required to seek accommodations in the community.

The change in personnel loading at the NAS Whidbey Island complex that would occur under any of the proposed alternatives compared to the No Action Alternative would have a moderate impact on the overall housing market in the two counties under all three alternatives. Implementation of the proposed alternatives would result in 335 personnel, 628 personnel, and 341 personnel relocating to the region under Alternative 1, 2, and 3, respectively. If it is assumed that each additional personnel at the NAS Whidbey Island complex would bring his or her entire household and that each relocating household would require a housing unit, then between 335 and 628 additional housing units would be required under the three alternatives. These figures may slightly overestimate the total number of housing units required because some households may voluntarily refrain from moving to the area, and some Navy personnel may choose to share housing.

To further refine the analysis, Navy-wide demographic statistics, which showed that approximately 51.5 percent of all Navy personnel are married, were used to approximate the number of military personnel who would require family housing. Using these statistics, Alternatives 1, 2, and 3 would require, respectively, 173 family housing units, 323 family housing units, and 176 family housing units. In addition, 162 unaccompanied personnel housing units would be required under Alternative 1, 305 unaccompanied personnel housing units would be required under Alternative 2, and 165 unaccompanied personnel housing units would be required under Alternative 3.

In 2017, a housing study completed for the NAS Whidbey Island complex found that without including the effects of the Proposed Action, there would be a surplus of 54 acceptable family housing units in the housing market area by 2022 but a deficit of 914 unaccompanied personnel housing units (Leidos, Inc., 2017).

Implementation of Alternatives 1 or 3 would result in a moderate increase in the number of housing units needed by Navy personnel. The increase in Navy personnel stationed at the NAS Whidbey Island complex would likely increase the projected deficit of unaccompanied personnel housing units to 1,076 units under Alternative 1 and 1,079 units under Alternative 3. In addition, the projected surplus of family housing units would change to a deficit of 119 family housing units under Alternative 1 and a deficit of 122 family housing units under Alternative 3. Likewise, implementation of Alternative 2 would likely increase the projected deficit of unaccompanied personnel housing units at the complex to 1,219 units and change the existing surplus in family housing units to a deficit of 269 units.

The housing market study also estimated that there would be a total of 19,221 suitable rental units, with 359 of these units vacant and available for rent in 2022 without implementation of the Proposed Action (Leidos, Inc., 2017). Suitable units were those units that met the Navy's physical conditions and health and safety requirements. However, many of these units would not meet the Navy's size and/or affordability requirements. The Navy does not consider studio apartments or efficiency apartments adequate for either unaccompanied personnel or Navy families. Also, the Navy uses criteria for the number of bedrooms required based on rank and household size. Depending on the rank and household size of the personnel occupying a unit, some units may not meet Navy housing requirements. In addition, units that exceed the Navy's Maximum Allowable Housing Cost or that fall below the Navy's cost of a minimal acceptable housing unit also do not meet Navy housing requirements (Leidos, Inc., 2017).

On average, 48.3 percent of all officers, 56.1 percent of all E7 to E9 enlisted personnel, and 23.9 percent of all E4 to E6 personnel choose to purchase housing in the local community instead of rent their housing. All E1 to E3 enlisted personnel are required to reside on base (Leidos, Inc., 2017).

Based on these findings, under Alternatives 1 or 3, an adequate number of vacant, suitable rental housing units would be available in the region to accommodate the incoming military personnel. However, not all of these units would meet the Navy's size and affordability standards. Under Alternative 2, a sufficient number of vacant, suitable rental properties would not be available in the housing area. As a result, some Navy personnel would likely have to commute longer than one hour, reside with other Navy personnel, and/or live in housing that does not meet Navy suitability requirements. In addition, other Navy personnel may be unable to locate rental property that meets Navy size and affordability standards.

The influx of Navy personnel under Alternatives 1, 2, or 3 could have a significant impact on the regional housing market. As described in Section 3.10.3, the housing market in the region currently has low homeowner and rental vacancy rates, with a limited number of properties available for sale or rent. The increase in personnel stationed at the NAS Whidbey Island complex is expected to increase the regional demand for housing. This additional demand is expected to further limit the available properties for sale or rent in the region, likely leading to some increase in property prices and rental costs. In the longer run, it is anticipated that local developers will respond to the increased price and demand for housing by constructing more units, thereby slightly reducing the expected housing deficit.

However, given the existing deficit of affordable housing in Island and Skagit Counties, the influx of Navy personnel to the region would likely exacerbate affordable housing issues in the region. Any increase in regional housing prices would most likely result in more households spending more than 30 percent of their income on housing costs. The Navy further acknowledges that the increase in the cost of housing and the decrease in available properties may have a negative impact on low-income residents, who typically spend a larger proportion of their income on housing than the general population.

4.10.2.4 Property Values

Aircraft noise could negatively affect the value of property within the greater than 65 DNL noise contours. Economic studies have analyzed the impacts of noise on the sale price of properties and have discovered a correlation between noise and the sale price of properties.

The relationship between the price and noise is usually presented as the Noise Depreciation Index (NDI) or Noise Sensitivity Depreciation Index, both of which estimate the percent loss of value per dB (measured by the DNL metric). An early study by Nelson (1978) at three airports found an NDI of 1.8 to 2.3 percent per dB. Nelson also noted a decline in NDI over time, which he theorized could be due to either a change in population or the increase in commercial value of the property near airports. Crowley (1973) reached a similar conclusion. A larger study by Nelson (1980) looking at 18 airports found an NDI from 0.5 to 0.6 percent per dB.

In a review of property value studies, Newman and Beattie (1985) found a range of NDI from 0.2 to 2 percent per dB. They noted that many factors other than noise affected values.

Fidell et al. (1996) studied the influence of aircraft noise on actual sale prices of residential properties in the vicinity of a military base in Virginia and one in Arizona. They found no meaningful effect on home values. Their results may have been due to non-noise factors, especially given the wide differences in homes between the two study areas.

Recent studies of noise effects on property values have recognized the need to account for non-noise factors. J. P. Nelson (2004) analyzed data from 33 airports and discussed the need to account for those factors and the need for careful statistics. His analysis showed NDI from 0.3 to 1.5 percent per dB, with an average of about 0.65 percent per dB. Nelson (2007) and Andersson et al. (Andersson, Jonsson, and Ogren, 2013) discuss statistical modeling in more detail. Enough data are available to conclude that aircraft noise has a real effect on property values. This effect falls in the range of 0.2 to 2.0 percent per dB, with the average on the order of 0.5 percent per dB. The actual value varies from location to location and is very often small compared to that of non-noise factors. Real property values are dynamic and influenced by a combination of factors, including market conditions, neighborhood characteristics, and individual real property characteristics (e.g., the age of the property, its size, and amenities). The

degree to which a particular factor may affect property values is influenced by many other factors that fluctuate widely with time and market conditions.

Frankel (1988) found that economic impacts to noise-affected property owners differed depending on when their properties were purchased. In his study, Frankel divided property owners into three categories: those owners who purchased their property when the location was quiet and who were then subsequently exposed to aircraft noise; those owners who purchased their property after the airport and flight operations were established; and those owners who purchased their property after the airport and some flight operations were occurring but were then at a later date subjected to an increase in aircraft noise. As described in his study, property owners who purchased their property when the location was quiet are the most significantly impacted. The monetary impact to these property owners includes the entire decrease in the value of their property (Frankel, 1988).

In contrast, those owners who willingly purchased their property after the airport and flight operations were established would not be economically or monetarily injured. Since these individuals voluntarily purchased their properties after aircraft noise was already occurring, they would have received the property at a discounted price. Any discount in the sale price of the property would be, in essence, compensation for the nuisance costs attributable to aircraft noise. Because each property owner willingly entered into this real estate transaction, it can be assumed that these owners accepted the lower price as compensation for the aircraft noise (Frankel, 1988).

The third category of owners, those owners who purchased their property after flight operations were already occurring but later experienced an increase in aircraft noise, would experience some economic loss, but these losses would not be as large as those of the first group. Frankel found that this group would already have been compensated for the pre-existing noise level through the discounted property price. However, any loss in property value caused by the incremental increase in noise would be an economic loss to this category of owner (Frankel, 1988).

Based on the economic literature, the majority of property owners around the NAS Whidbey Island complex impacted by the Proposed Action would fall within this third category and would experience an economic loss associated with the incremental increase in noise. Only a small portion of original owners would experience the entire loss in property values associated with aircraft noise from the NAS Whidbey Island complex. New property owners who purchase their land/residences after implementation of the Proposed Action would not experience an economic or monetary loss.

4.10.2.5 Local Government Revenues

The increase of personnel at the NAS Whidbey Island complex would have a positive impact on the generation of tax revenues in Island and Skagit Counties and on the State of Washington as a whole under all three alternatives. Because the majority of the additional personnel currently do not reside in Washington or in Island or Skagit Counties, any taxes these individuals pay would represent a net increase in revenues for the state and local areas. Property tax and sales tax receipts would all increase as a direct result of the expanded regional economy.

Table 4.10-5 provides estimates of the increase in tax revenues resulting from changes in personnel loading at the NAS Whidbey Island complex for all three alternatives. Alternative 2, which is expected to have the largest impact in terms of tax generation, is expected to increase tax receipts in Island County by $415,000 and Skagit County by $181,000. These additional tax receipts under Alternative 2 would represent an estimated 1.5-percent increase in annual tax receipts in Island County and an estimated

0.3-percent increase in annual tax receipts in Skagit County when compared to the No Action Alternative.

Table 4.10-5 Estimated Increase in Tax Revenues Resulting from the Changes in EA-18G Growler Personnel Loading at the NAS Whidbey Island Complex Compared to the Affected Environment Levels

	Change from Affected Environment		
	Alternative 1	*Alternative 2*	*Alternative 3*
Island County Impacts			
Number of Military Personnel and Dependents Expected to Reside in Island County	625	1,171	636
Per Capita Tax Contribution	$354.66	$354.66	$354.66
Estimated Increase in Tax Revenues	$222,000	$415,000	$226,000
Skagit County Impacts			
Number of Military Personnel and Dependents Expected to Reside in Skagit County	169	317	172
Per Capita Tax Contribution	$570.50	$570.50	$570.50
Estimated Increase in Tax Revenues	$96,000	$181,000	$98,000

Note:

[1] All population impacts are calculated for 2021, the time when all transition activities have been completed. The estimated per capita tax contribution is calculated using total Fiscal Year 2014 tax revenue figures described in Section 4.10.2.4 and total population estimates for Island and Skagit Counties from the U.S. Census Bureau's *2014 American Community Survey (1-year estimates)*. The estimated increase in tax revenues was calculated by multiplying the number of military personnel and dependents by the per capita tax contribution.

4.10.3 Community Services Impacts, Alternatives 1 through 3

4.10.3.1 Education

The anticipated personnel changes at the NAS Whidbey Island complex under each of the proposed alternatives are expected to increase the number of school-aged children living in the area. Assuming that all additional military personnel and their families stationed at the NAS Whidbey Island complex relocate to the area, a net increase in the population of school-aged children would occur under all three proposed alternatives (see Table 4.10-6). Total military-connected children and total military school-aged children were calculated utilizing Navy and DoD-wide statistics on the average number of children per active duty personnel and statistics on the typical age distribution of children throughout the Navy (DoD, n.d.).

The enrollment gains attributable to military school-aged dependents are expected to be concentrated in schools with a history of high enrollment by students who are affiliated with the NAS Whidbey Island complex. If the geographical distribution of the relocating military families is similar to the geographical distribution of military families currently stationed at the NAS Whidbey Island complex, then the vast majority of these additional students would attend the schools in the Oak Harbor School District. Table 4.10-6 shows the distribution of school-aged children by district for each alternative.

Table 4.10-6 Projected Number of School-aged Children Relocating to the Region as a Result of Changes in EA-18G Growler Personnel Loading at NAS Whidbey Island Compared to the No Action Alternative Levels

	Change from No Action Alternative		
	Alternative 1	***Alternative 2***	***Alternative 3***
Military Personnel	335	628	341
Total Military-connected Children (ages 0 to 22 residing with Navy personnel)	287	538	292
Total Military School-aged Children (ages 5 to 18)	173	324	176
Oak Harbor School District	121	226	123
Coupeville School District	8	15	8
Anacortes School District	21	39	21
All Other Districts	23	43	24

Source: DoD, n.d.

Note: Due to rounding, totals may not sum.

In addition, given the demographic characteristics of Navy personnel, the majority of these school-aged children would be elementary-school-aged. According Navy-wide statistics, elementary-school-aged dependents account for approximately 62.8 percent of all Navy school children. Middle-school- and high-school-aged students are less common and account each for only 18.6 percent of all Navy school children (DoD, n.d.).

The increase in "federally connected students" attending local district schools would result in a corresponding increase in federal impact aid received by the district. However, federal impact aid typically does not cover the full per-pupil costs experienced by the district and has been declining over time.

Given the relatively few additional students expected to attend the Coupeville School District or the Anacortes School District, only minor impacts are expected to occur to these districts. However, given the serious overcrowding issues already facing the Oak Harbor School District, the potential increase of between 121 and 226 additional students would further exacerbate the overcrowding problem and have a significant adverse impact on the district. Table 4.10-7 shows the expected enrollment gains at Oak Harbor School District by type of school and by alternative. Under the alternative with the maximum impact (Alternative 2), an additional 226 students could relocate to the district, including 143 elementary students (grades Kindergarten through 5); 42 middle school students (grades 6 through 8); and 41 high school students (grades 9 through 12). The majority of the additional students would be elementary-school-aged, further skewing the district's enrollment in favor of the younger grades. Additional schools would need to be built, additional portable classrooms would have to be purchased, and/or additional reconfiguring of the district's schools would have to occur to accommodate these students. Additional staff would also be required to handle the increase in enrollment. Because state aid and federal impact aid has been at a static or declining per-pupil level, additional local funding sources would likely be required to finance the additional expenditures, if present programing is to be maintained.

Table 4.10-7 Projected Number of School-aged Children Enrolling in the Oak Harbor School District as Result of Changes in EA-18G Growler Personnel Loading at NAS Whidbey Island Compared to the No Action Alternatives Levels

	Change from No Action Alternative		
	Alternative 1	***Alternative 2***	***Alternative 3***
Total Change in Enrollment	121	226	123
Elementary School (K-5th)	76	143	78
Middle School (6th-8th)	23	42	23
High School (9th-12th)	22	41	22

Source: DoD, n.d.

Note: Due to rounding, totals may not sum.

4.10.3.2 Medical Services

The proposed relocation of Growler squadrons under all three alternatives is not anticipated to negatively impact the provision of medical services at either the NAS Whidbey Island complex or in the region as a whole.

Implementation of Alternative 1, 2, or 3 is expected to have only a minimal impact on the Naval Hospital Oak Harbor. Some additional demand for services from Naval Hospital Oak Harbor would occur under each alternative as active duty personnel and their dependents would be eligible for treatment at the facility. Some additional hiring and billet changes may be required to meet the expected influx of additional patients; however, this increase is not expected to be substantial. All active duty personnel would be covered by additional squadron assets such as unit flight surgeons and would, therefore, not place an additional patient load on existing personnel at Naval Hospital Oak Harbor. In addition, a facilities modernization program began in 2017 and is ongoing to improve flow and access to care throughout the hospital (Rose, 2018).

Given the large coverage area served by the regional medical facilities and the relative infrequency with which these facilities are typically utilized by an individual, the minor increase in the populations served associated with the alternatives would have only a negligible impact on the provision of these services. Existing medical facilities in the local community are anticipated to be adequate to serve the relocating military personnel and their dependents regardless of the alternative selected.

4.10.3.3 Fire and Emergency Services

No impacts are expected to occur to the Navy Region Northwest Fire and Emergency Services department at NAS Whidbey Island as a result of implementation of any of the three alternatives. With the addition of the Growlers to the NAS Whidbey Island complex, Ault Field would remain a Type 2 airfield; therefore, staff, facilities, and apparatus needs are expected to remain unchanged. No impacts to response time are anticipated as a result of the additional growth and new construction (Merrill, 2016).

The increase in population in the City of Oak Harbor or the Town of Coupeville is expected to have only a minimal impact on the provision of fire and emergency services in the communities under any of the three alternatives. In 2016, the Oak Harbor Fire Department responded to 62 calls for assistance due to fires and 536 calls for assistance due to emergency medical service (EMS)/rescue incidents, while serving a city population of an estimated 22,693 residents (City of Oak Harbor Fire Department, 2017). This

equates to answering approximately three fire calls for every 1,000 residents and 24 EMS/rescue calls per 1,000 residents per year.

Implementation of Alternative 2, the alternative with the maximum population impacts, is anticipated to increase total population in the City of Oak Harbor by 1,040 residents and the Town of Coupeville by 69 residents. Assuming that these ratios of incidents to population remain constant and apply to both the City of Oak Harbor and the Town of Coupeville, implementation of Alternative 2 could potentially result in an additional three fire calls and 25 EMS/rescue calls per year for the Oak Harbor Fire Department and no fire calls and only two additional EMS/rescue call per year in the Town of Coupeville.

While the additional population under any of these alternatives would increase the demand for fire and emergency services, this increase is not expected to be substantial. Additional tax revenues that would be paid by the relocating households and the additional tax revenues that would be generated by the increased economic activity associated with the construction and operations on station could be used to offset any additional increased expenditures associated with the additional demand for fire and emergency services.

4.10.3.4 Police Protection

The relocation of Growler aircraft squadrons and associated personnel positions to the NAS Whidbey Island complex is not anticipated to significantly impact Oak Harbor's or Coupeville's ability to provide adequate police protection to its residents under any of the three alternatives. The City of Oak Harbor currently has approximately 1.7 police officers per 1,000 residents. Even under the alternative with the maximum population impact (Alternative 2), this ratio is expected to change to approximately 1.6 police officers per 1,000 residents as a result of the projected influx of residents associated with the proposed relocation. The Town of Coupeville currently has approximately 1.0 police officers per 1,000 residents. Under Alternative 2 (the maximum population impact), this ratio would decline slightly to 0.9 police officers per 1,000.

However, if a portion of the additional tax revenues that would be paid by the relocating households and the additional tax revenues that would be generated by the increased economic activity associated with the construction and operations on station were used to hire more police officers and offset any additional increased expenditures needed, a similar level of police protection could continue to be provided.

4.10.4 Socioeconomics Conclusion, Alternatives 1 through 3

The Proposed Action would have negligible to minor to moderate impacts on the local and regional population and local government revenues. The alternatives would have a moderate short-term positive impact and a minor positive long-term impact on the local and regional economy. Employment and earnings would increase under all three alternatives. However, some negative economic impacts may occur to specific industries, such as tourism. Alternatives 1 through 3 could potentially reduce attendance levels at certain tourist destinations from reaching the levels that would have occurred without the Proposed Action; however, the effect of the Proposed Action on the tourism industry as a whole is not expected to be substantial. Alternatives 1 through 3 are not expected to eliminate a large number of visitors from the region. Additionally, visitor days and visitor expenditures are not expected to be reduced such that the tourism industries in Island, Skagit, or San Juan Counties would decline significantly. No significant impact is expected to occur to the agricultural industry as a result of the proposed alternatives.

The influx of Navy personnel under Alternatives 1, 2, or 3 could have a significant impact on the regional housing market, particularly affecting housing availability and affordability. In addition, aircraft noise could negatively affect the value of property within the greater than 65 DNL noise contours. The provision of medical services and fire and rescue services and police protection are not expected to be significantly impacted. The Oak Harbor School District would receive a significant adverse impact under the proposed alternatives, with the majority of the school-aged military dependents expected to attend schools in that district. Elementary schools in the Oak Harbor School District would experience the greatest impact under all three alternatives. The Navy's Fleet and Family Support Program would be the first stop for Navy personnel and their dependents needing access to other social and financial support services, and it is expected the Proposed Action would have a negligible to minor impact on other social services within the community. Impacts on socioeconomic resources are dependent on the number of personnel and amount of construction and not on the number and/or location of aircraft operations; therefore, there would be no difference in impacts between scenarios or between average year and high-tempo FCLP year conditions.

4.11 Environmental Justice

Environmental Justice

The Navy has determined there will be no disproportionately high and adverse human health or environmental effects from the Proposed Action or any alternatives on minority or low-income populations from noise, Clear Zones/APZs, and school overcrowding. However, impacts on housing availability and housing affordability could disproportionately impact low-income communities.

This section identifies the existence of environmental justice communities (i.e., minority or low-income populations) impacted by the Proposed Action and determines whether impacts on these communities are disproportionately high and adverse. This section is organized as follows: Section 4.11, general methodology and identifying environmental justice communities in affected census block groups; Section 4.11.1, identifying environmental justice communities and identifying disproportionately high and adverse impacts under the No Action Alternative with respect to communities living under conceptual and existing APZs, communities living under the noise contours, and community access to public education, specifically in Oak Harbor; Section 4.11.2, identifying environmental justice communities and identifying potential disproportionately high and adverse impacts under Alternatives 1 through 3 with respect to communities living under conceptual and existing APZs, communities living under the noise contours, community access to public education, specifically in Oak Harbor, and housing affordability.

4.11.1 Methodology

This analysis focuses on the potential for a disproportionate and adverse exposure of specific off-station population groups to the projected adverse consequences discussed in the previous sections of this chapter. As described in previous sections, noise impacts are expected to be the primary negative environmental and human health impact associated with the Proposed Action. Other adverse human health and environmental consequences of the Proposed Action include an increased safety risk associated with the additional aircraft operations and new APZs located around OLF Coupeville and the potential negative impacts to the pupils at the Oak Harbor School District caused by the projected influx of additional students to the district.

Due to the importance of the potential noise impacts, the study area for the environmental justice analysis has been defined as the census block groups that either fully or partially fall beneath the modeled dB DNL contours for each scenario under each alternative. This study area also encompasses all areas under the conceptual and existing APZs at Ault Field and OLF Coupeville. Additionally, the majority of the Oak Harbor School District falls within the greater than 65 dB DNL noise contours.

4.11.1.1 Methodology for Identifying Environmental Justice Communities

In order to assess the impacts to minority and low-income communities, the Navy first identified whether there are any areas of minority and low-income populations that may experience disproportionately high and adverse impacts from the Proposed Action. These environmental justice communities were determined by analyzing the demographic and economic characteristics of the affected area and comparing those to the characteristics of the larger community as a whole. This larger community is known as the community of comparison.

Environmental justice communities were identified by comparing population characteristics from all the census block groups with the community of comparison—in this case, the county within which the census block groups are located. For the purposes of this analysis, minority populations of concern (environmental justice communities) were identified where the minority population of the affected area is "meaningfully greater" than the minority population percentage in the general population or other comparison group. "Meaningfully greater" was defined as where the minority population percentage within a census block group is 15 percent or more than the community of comparison (county percentage of minorities). Low-income environmental justice communities were defined as census block groups where the percentage of the population considered to be low income is greater than the percentage of the general population with low incomes in the community of comparison.

The dB DNL noise contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these dB DNL contours; therefore, these counties have been excluded from this analysis. In addition, any census block groups that exist solely over water are excluded from this analysis.

To simplify the analysis, demographic and economic statistics for Island County were used as the community of comparison for all areas within the greater than 65 dB DNL contours, including those areas that fell within Skagit County, because approximately 99.7 percent of all residents impacted by the greater than 65 dB DNL contours reside in Island County, while no more than 0.3 percent of these residents (or 41 persons) reside in Skagit County. Additionally, Island County has a smaller percentage of minority and low-income residents than Skagit County, making the analysis more conservative by utilizing Island County data.

Table 4.11-1 provides demographic and economic data for all of the census block groups either wholly or partially impacted by the greater than 65 dB DNL noise contours under any of the alternatives or scenarios. Figures 4.11-1 through 4.11-3 show the location of the census block groups that are considered environmental justice communities under the alternatives. To further refine the analysis and to estimate the actual number of minority and low-income residents affected by each of the dB DNL contours, the dB DNL contours were overlaid onto mapped U.S. Census Bureau 2010 population and demographic data to calculate the total affected area within each census block. See Figure 3.11-1 for the location of the census tracts and census block groups affected by the No Action Alternative. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period, thereby calculating the total affected population for each alternative and scenario, including the No Action Alternative (Washington State Office of Financial Management, 2017).

Demographic characteristics of the corresponding census block groups were then compared to the total affected population number to estimate the total minority and low-income populations impacted by each dB DNL contour for each alternative and scenario. These calculations assume an even distribution of the population across the census block and census block groups, and they exclude populations on military properties within the dB DNL contours.

Cells in Table 4.11-1 (and in subsequent tables throughout this section) that are shaded grey identify census blocks where an environmental justice community exists based on thresholds defined in Section 3.11. Appendix F provides data on potential environmental justice issues under the high-tempo FCLP year conditions.

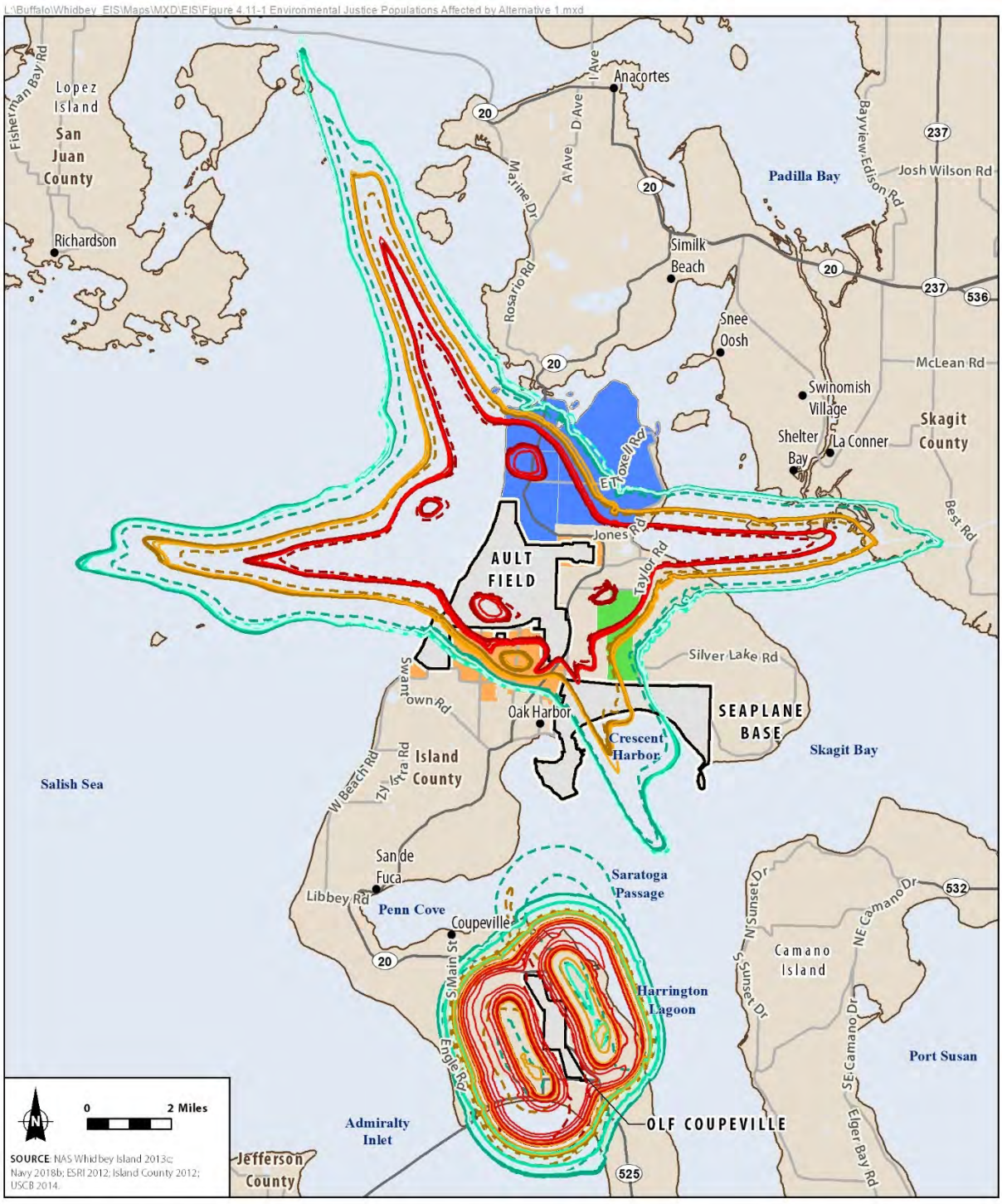

Figure 4.11-1
Environmental Justice Populations Affected by Alternative 1
NAS Whidbey Island Complex
Whidbey Island, Island County, WA

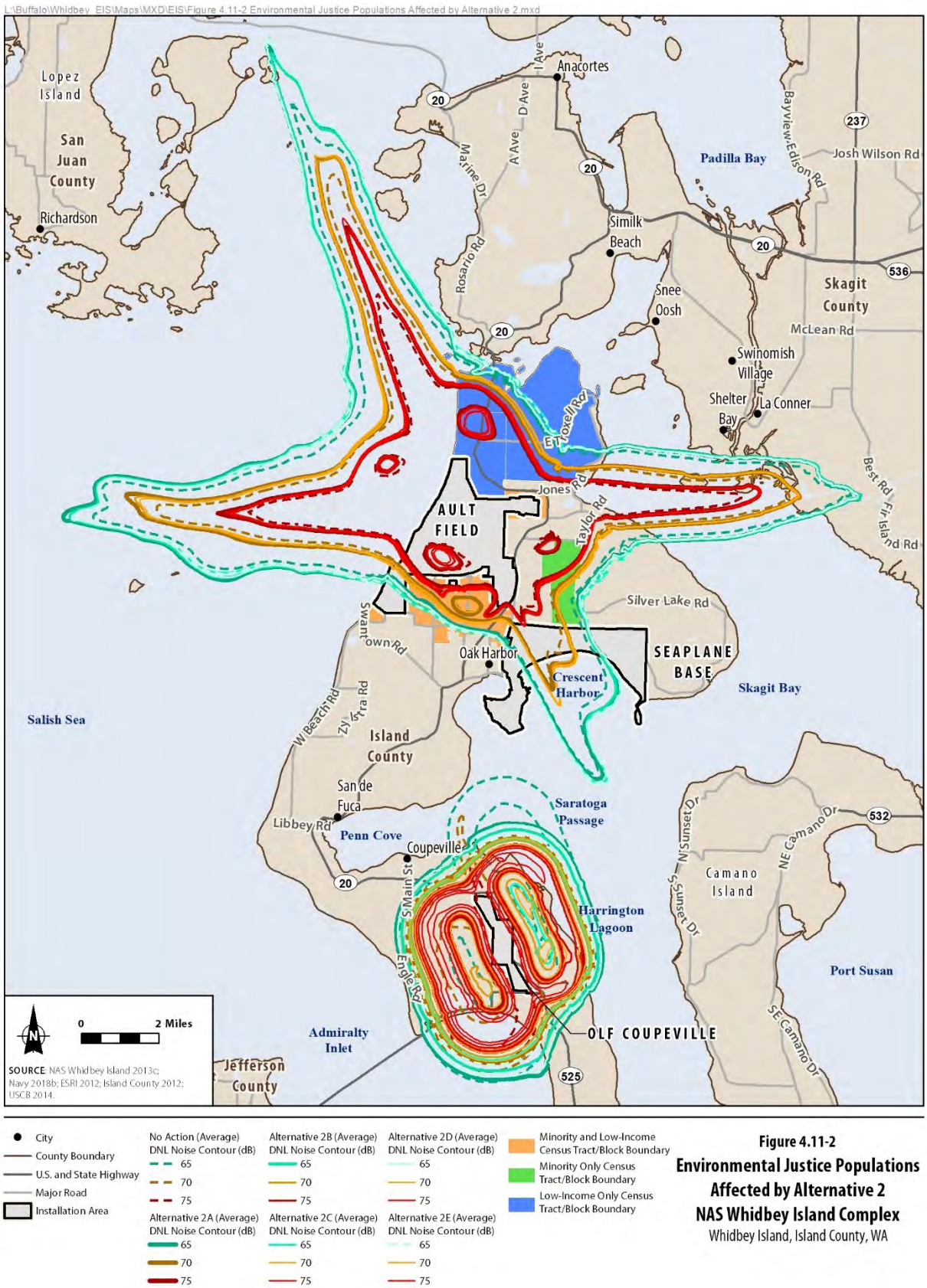

Figure 4.11-2
Environmental Justice Populations Affected by Alternative 2
NAS Whidbey Island Complex
Whidbey Island, Island County, WA

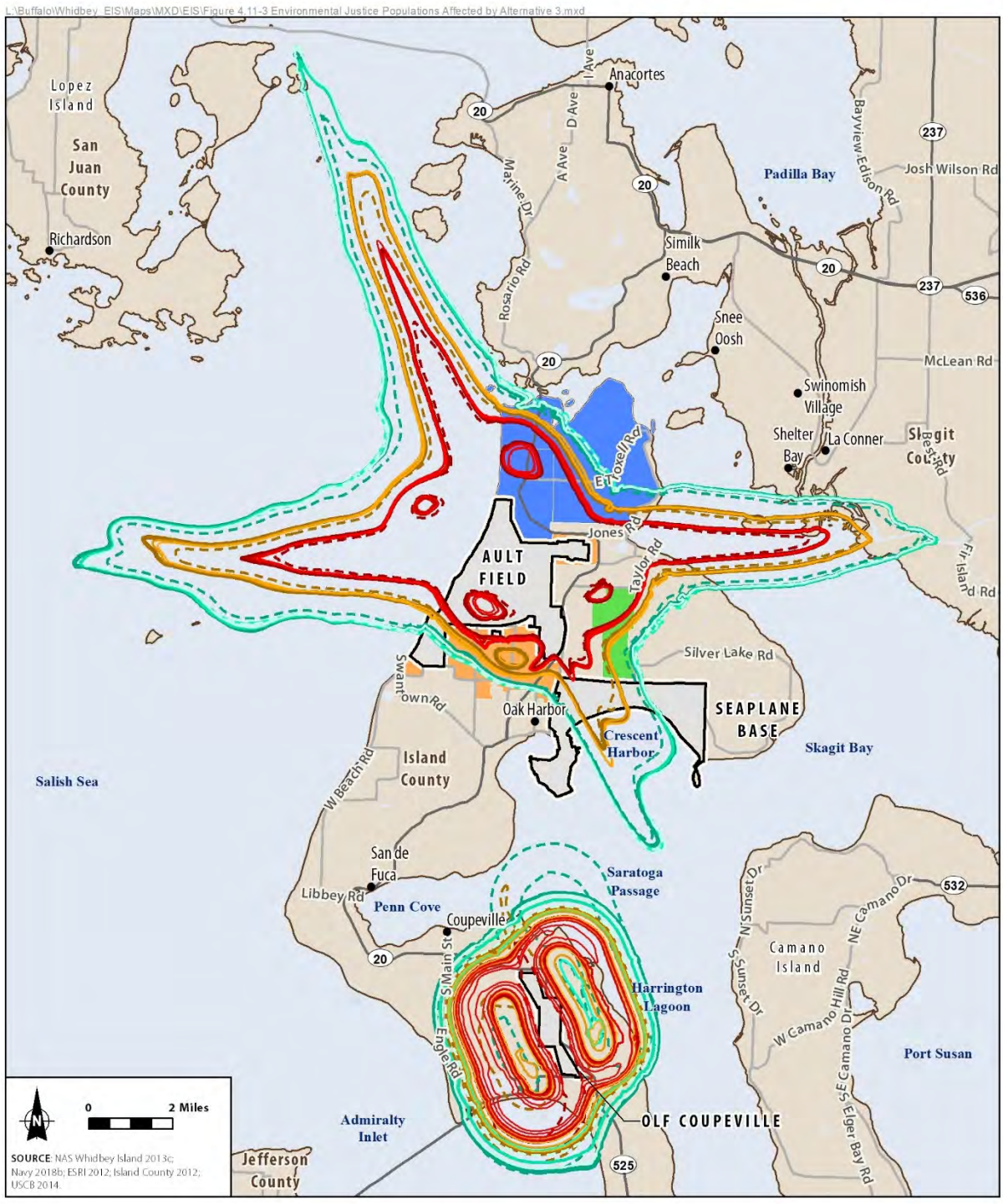

Figure 4.11-3
Environmental Justice Populations Affected by Alternative 3
NAS Whidbey Island Complex
Whidbey Island, Island County, WA

Table 4.11-1 Minority and Low-Income Populations in Census Block Groups Underlying Ault Field and OLF Coupeville dB DNL Contours,* either Wholly or Partially Impacted by the Greater than 65 dB DNL Noise Contour by Any Alternatives or Scenarios, Average Year

Census Block Group	*Percent Population Total Minority[2]*	*Percent Population below Poverty Level[3]*
Island County – Community of Comparison	***16.9%***	***8.0%***
Block Group 1, Census Tract 9701	18.7%	14.1%**
Block Group 2, Census Tract 9701	13.6%	14.1%
Block Group 1, Census Tract 9702	35.2%	23.4%
Block Group 1, Census Tract 9703	24.3%	4.4%
Block Group 2, Census Tract 9703	15.7%	4.4%
Block Group 3, Census Tract 9703	13.5%	4.4%
Block Group 4, Census Tract 9703	11.6%	4.4%
Block Group 1, Census Tract 9704	39.3%	8.6%
Block Group 2, Census Tract 9704	31.9%	8.6%
Block Group 1, Census Tract 9706.01	41.3%	11.2%
Block Group 2, Census Tract 9706.01	30.8%	11.2%
Block Group 1, Census Tract 9708	25.9%	8.7%
Block Group 1, Census Tract 9710	12.7%	6.3%
Block Group 1, Census Tract 9711	14.7%	2.9%
Block Group 2, Census Tract 9711	7.5%	2.9%
Block Group 3, Census Tract 9713	5.9%	6.8%
Skagit County – Community of Comparison	***23.3%***	***11.7%***
Block Group 1, Census Tract 9403	7.4%	6.2%
Block Group 1, Census Tract 9408	31.7%	18.2%
Block Group 2, Census Tract 9521	13.2%	9.1%
Block Group 3, Census Tract 9527	12.9%	7.3%

Table 4.11-1 Minority and Low-Income Populations in Census Block Groups Underlying Ault Field and OLF Coupeville dB DNL Contours,* either Wholly or Partially Impacted by the Greater than 65 dB DNL Noise Contour by Any Alternatives or Scenarios, Average Year

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Total population for each affected census block group is the total 2010 population for the entire census block group as reported by the U.S. Census Bureau. These numbers may be greater than the total number of residents affected by the dB DNL contours because in many instances only a portion of the census block group falls under the dB DNL contours.

[2] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[3] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** Shaded cells identify census block groups with a "meaningfully greater" percentage of a minority population than the community of comparison (i.e., the county within which the census block group is located) or the percentage of the population considered to be low income in the census block is greater than the percentage considered low income in the community of comparison. For this analysis, "meaningfully greater" is defined as demographic or economic statistics that differ by more than 15 percent from those of the community of comparison. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

Tables 4.11-2 and 4.11-4 through 4.11-12 (see Section 4.11.2) present estimates of the affected minority and low-income populations under each dB DNL contour for each alternative and scenario, for the average year.

Demographic data from the U.S. Census Bureau's 2010 Census of Population and Housing were used throughout this analysis. This data source is the most current available that provides demographic detail to the block level. Some changes in the geographical distribution of environmental justice communities may occur between 2010 and the 2021; however, at this point, it is impossible to forecast these changes. Therefore, this analysis assumes that there would be no change in the geographical distribution of environmental justice communities between 2010 and 2021.

In an effort to analyze the environmental justice impacts on agricultural workers who worked but did not reside within the 65 dB DNL contours, *2012 Census of Agriculture* data on migrant farm workers were utilized to assess this potentially affected population. As described in Section 3.10.2.2 (Economy, Employment, and Income–Other Industries), only a very small number of migrant agricultural workers were reported employed in all of Island or Skagit counties. According to the survey, in 2012 only seven migrant workers were employed on three farms in all of Island County. Similarly, in 2012 only two farms in all of Skagit County reported employing any migrant workers. The total number of migrant workers in Skagit County was not disclosed due to confidentiality rules (USDA, National Agricultural Statistics Service, 2014). Given the very small number of migrant workers potentially affected by the Proposed Action, no detailed environmental justice analysis was completed on the issue.

4.11.2 Environmental Justice, No Action Alternative

Under the No Action Alternative, no change in the aircraft or personnel loadings at the NAS Whidbey Island complex would occur compared to current conditions. Therefore, no additional environmental or human health impacts would be associated with the implementation of the No Action Alternative. Table 4.11-2 shows the demographic and economic characteristics of the population that currently resides under the greater than 65 dB DNL contours for Ault Field and OLF Coupeville. Total population estimates have been revised to reflect an expected 7.1-percent increase in total population in Island County between 2010 and 2020.

Table 4.11-2 Environmental Justice Populations at NAS Whidbey Island Complex under the No Action Alternative, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low Income Population[2]*	*Percent Low-Income*
Community of Comparison (Island County)			**16.9%**		**8.0%**
65-70 dB DNL	4,140	1,020	24.6%***	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population[3]* **	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level. Consequently, block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1+V_2)}{2}} \times 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

4.11.2.1 Identifying Environmental Justice Communities Analysis under the No Action Alternative

Table 4.11-2 presents estimates of the affected minority and low-income populations within each dB DNL contour under the No Action Alternative. The shaded cells indicate where percentages of minority populations are "meaningfully greater" than those in the community of comparison, which is the percentage of minority populations in Island county, and where the low-income population is greater than the percentage of residents with low incomes in the community of comparison. These calculations allow the Navy to determine the minority and/or low-income populations impacted by each alternative and scenario.

4.11.2.2 Identifying Disproportionately High and Adverse Impacts under the No Action Alternative Methodology

Once the presence or absence of environmental justice communities was determined, the Navy then assessed the impacts from the Proposed Action and determined whether these impacts would have a disproportionately high and adverse effect on these populations. This analysis involved comparing the impacts on the identified environmental justice communities to the general population within the affected environment (e.g., within the noise contours). In determining whether potential disproportionately high and adverse impacts exist, the Navy also considered the significance of the impacts under NEPA.

The Council on Environmental Quality (CEQ) guidance on environmental justice analysis requires that any disproportionately high and adverse human health or environmental effects on minority and low-income populations be identified and analyzed. A disproportionate effect is defined as an adverse effect that either is predominately borne by a minority population and/or low-income population or is an effect that will be suffered by the minority and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or low-income population.

As informed by CEQ's *Environmental Justice Guidance Under the National Environmental Policy Act* (December 1997) and based on recommendations from the report of the Federal Interagency Working Group on Environmental Justice and NEPA Committee, *Promising Practices for EJ Methodologies in NEPA Reviews* (USEPA, 2016h), disproportionately high and adverse impacts are typically determined based on the impacts in one or more resource topics analyzed in NEPA documents. Any identified impact to human health or the environment (e.g., impacts on noise, biota, air quality, traffic/congestion, or land use) that potentially affects minority populations and low-income populations in the affected environment might result in disproportionately high and adverse impacts.

According to the CEQ guidance mentioned above (December 1997), when determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

1. whether there is, or will be, an impact on the natural or physical environment that significantly and adversely affects a minority or low-income population
2. whether environmental effects are significant (as defined by NEPA) and are, or may be, having an adverse impact on minority or low-income populations that appreciably exceeds or is likely to exceed those on the general population or other appropriate comparison group

3. whether the environmental effects occur, or would occur, in a minority or low-income population affected by cumulative or multiple adverse exposures from environmental hazards

Similar factors are considered in determining whether there are disproportionately high and adverse human health effects, including significance of measured health effects, in risk and rates, of hazard exposure and whether this hazard exposure exceeds the risk or rate of exposure to the general population or appropriate comparison groups.

The report from the Federal Interagency Working Group on Environmental Justice and NEPA (USEPA, 2016h) also provides recommendations for determining whether the impacts to minority or low-income populations may be disproportionately high and adverse. The Federal Interagency Working Group on Environmental Justice suggests that agencies should consider the following factors:

1. The significance of any direct, indirect, or cumulative impacts to minority and low-income populations in the affected environment for each alternative carried forward for detailed analysis in the NEPA document (as employed by NEPA). Agencies' approaches should not determine that a Proposed Action or alternative would not have a disproportionately high and adverse impact on minority and low-income populations solely because the potential impacts of the Proposed Action or alternative on the general population would be less than significant (as defined by NEPA).
2. The distribution of beneficial and adverse impacts between minority and low-income populations and the general population in the affected environment, as well as how adverse impacts are mitigated.

   After considering all appropriate mitigation measures, balance any remaining adverse impacts with beneficial impacts of the project to the community, as appropriate. If an adverse impact to minority and low-income populations remains after accounting for all appropriate mitigation measures and related project benefits, continue to consider whether the remaining adverse impact(s) is/are disproportionately high and adverse. In determining the balance between beneficial and adverse impacts, the beneficial impacts and mitigation should be related to the type and location of the adverse impact. Agencies should not balance adverse impacts that directly affect human health at levels of concern, especially those that exceed health criteria, with project benefits.

   Situations in which minority and low-income populations receive an uneven distribution of benefits in the presence of adverse impacts (e.g., a smaller proportion of beneficial impacts accrue to minority and low-income populations than to the general population) could indicate a potential disproportionately high and adverse impact.
3. Comparing direct, indirect, and cumulative adverse impacts to minority and low-income populations in the affected environment within the geographic unit of analysis to an appropriate comparison group.

   Identify a relevant and appropriate comparison group when evaluating the impact of the proposed federal action on minority and low-income populations. The comparison group provides context for the analysis of human health effects, environmental effects, and the risk or rate of hazard exposure to minority and low-income populations in the affected environment. This comparison group is distinct from the reference community, which was used to identify the existence of minority and low-income populations.

In the disproportionately high and adverse impact analysis, agencies compare impacts to minority and low-income populations *in the affected environment* with an appropriate comparison group *within the affected environment*. Relevant and appropriate comparison groups are selected based on the nature and scope of the proposed project.

4. The degree to which any of the following seven factors could amplify identified impacts. Factors that can potentially amplify an impact to minority and low-income populations in the affected environment include, but are not limited to, the following:
    a. proximity and exposure to chemical and other adverse stressors, e.g., impacts commonly experienced by fenceline communities
    b. vulnerable populations, e.g., minority and low-income children, pregnant women, elderly, or groups with high asthma rates
    c. unique exposure pathways, e.g., subsistence fishing, hunting, or gathering in minority and low-income populations
    d. multiple or cumulative impacts, e.g., exposure to several sources of pollution or pollutants from single or multiple sources
    e. ability to participate in the decision-making process, e.g., lack of education or language barriers in minority and low-income populations
    f. physical infrastructure, e.g., inadequate housing, roads, or water supplies in communities
    g. non-chemical stressors, e.g., chronic stress related to environmental or socioeconomic impacts

The identification of a disproportionately high and adverse impact on minority and low-income populations does not preclude a proposed agency action from going forward and does not necessarily compel a conclusion that a Proposed Action is environmentally unsatisfactory. If an agency determines there is a disproportionately high and adverse impact to minority and low-income populations, that agency may wish to consider heightening its focus on meaningful public engagement regarding community preferences, considering an appropriate range of alternatives (including alternative sites), and mitigation and monitoring measures.

In certain instances where an impact from the Proposed Action initially appears to be identical to both the affected general population and the affected minority and low-income populations, there may be inter-related ecological, aesthetic, historic, cultural, economic, social, or health factors that amplify the impact (e.g., unique exposure pathways, social determinants of health, or community cohesion). After consideration of factors that can amplify an impact to minority and low-income populations in the affected environment, an agency may determine the impact to be disproportionately high and adverse.

4.11.2.3 Analysis for Identifying Disproportionately High and Adverse Impacts under the No Action Alternative

As described throughout this EIS, aircraft noise impacts are expected to be the primary adverse environmental impact associated with the Proposed Action. Other impacts described in this EIS that have the potential to be disproportionately high and adverse on environmental justice communities include potential safety risks from a concentration of environmental justice populations within APZs and concentration of overcrowding in schools within the Oak Harbor School District. As discussed under *Methodology* above, this section compares the potential impacts on the environmental justice

populations within the affected area to the general population within the affected area and makes a determination of whether or not these impacts are disproportionately high and adverse upon the previously identified environmental justice communities.

4.11.2.3.1 Aircraft Noise

Populations living under the No Action Alternative dB DNL noise contours experience a significant amount of noise. In order to assess whether the impacts on the population within the noise contours are disproportionately high and adverse on identified environmental justice communities, the Navy compared the potential impacts on the affected general population (the total population within the different dB DNL noise contours for each alternative/scenario) to the identified environmental justice populations in the affected area (within the dB DNL noise contours for the No Action Alternative).

Based on the data shown in Tables 4.11-2, the comparison of the impacts to the identified environmental justice communities (shaded cells in the tables) within the affected environment to the impacts on the general population (the non-environmental justice communities) within the affected environment indicates that the identified environmental justice communities are not experiencing disproportionately high and adverse impacts. Even though the noise impacts to the entire community may be significant, it does not appear that these adverse impacts appreciably exceed or are likely to exceed those experienced by the total affected population. Therefore, the Navy has determined there will be no disproportionately high and adverse human health or environmental effects from the No Action Alternative on minority or low-income populations.

Additionally, there are no known cumulative or multiple adverse exposures from environmental hazards on minority or low-income environmental justice communities identified in the tables above. Finally, there do not appear to be any of the seven factors identified above under Section 4.11.1.2, Methodology, that could amplify identified impacts on minority or low-income communities. Therefore, the Navy has determined there will be no disproportionately high or adverse human health or environmental effects from the No Action alternative on minority populations or low-income populations.

4.11.2.3.2 Potential Increased Risk of Aircraft Mishaps in Clear Zones/Accident Potential Zones

Under the No Action Alternative, there would not be an increase in the risk of a mishap because there would be no additional Growler flight operations over existing conditions. APZs are created based on projected operations for approach, departure, and flight tracks for a runway. APZs are based on historical accident and operations data throughout the military and the specific areas that would be impacted (which have been determined to be potential impact areas) if an accident were to occur.

There are existing APZs at Ault Field and Clear Zones at OLF Coupeville (see Section 3.3, Public Health and Safety, and Figure 3.3-2 for 2005 AICUZ Clear Zones and APZs at Ault Field and Figure 3.3-3 for 2005 AICUZ Clear Zones at OLF Coupeville).

An existing, potential environmental justice issue could be raised if environmental justice communities were concentrated in higher-risk areas and subjected to disproportionate adverse impacts, such as being located within APZs. Using the same methodology employed for identifying environmental justice communities within the noise contours, the Navy estimated the number of minority and low-income residents located within the APZs at Ault Field and OLF Coupeville.

All APZs identified in Section 3.3 (2005 AICUZ APZs at Ault Field and 2005 AICUZ Clear Zones at OLF Coupeville) were overlaid onto mapped U.S. Census Bureau 2010 population and demographic data to calculate the total affected area within each census block. The percent area of the census block covered by the Clear Zones/APZs was applied to the population of that census block to estimate the population within the Clear Zone/APZ boundary. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period, thereby calculating the total affected population for each alternative and scenario, including the No Action Alternative (Washington State Office of Financial Management, 2017).

Demographic characteristics of the corresponding census block groups were then applied to this total affected population number to estimate the total minority and low-income populations impacted by each Clear Zone/APZ. These calculations assume an even distribution of the population across the census block groups, and they exclude populations on military properties within the Clear Zones/APZs. Table 4.11-3 presents estimates of the affected minority and low-income populations under each existing Clear Zone/APZ.

The Navy has determined there are environmental justice communities living within the 2005 AICUZ APZs at Ault Field (see Table 4.11-3). Under the No Action Alternative, there would be no increase in the number of operations at Ault Field and, therefore, no increase in risk for mishap, as well as no impact on the land use of any population living within the boundaries of the APZs. In addition, the Navy has determined there are no environmental justice communities living within the 2005 Clear Zones at OLF Coupeville (see Table 4.11-3).

Potential aircraft mishaps are the primary safety concern with regard to military training flights. NAS Whidbey Island maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to mishaps, whether on or off the installation. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoDI 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*) (DoD, 2011).

Table 4.11-3 Environmental Justice Populations at NAS Whidbey Island Complex under Clear Zones/APZs for Ault Field and OLF Coupeville

APZ	*Total Affected Population**	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Ault Field Existing APZs	1,860	523	28.1%**	230	12.4%
OLF Coupeville Clear Zones	96	9	9.4%	3	3.1%
Island County			16.9%		8.0%

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individual(s) who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the Census Tract level, and Block Groups within the same Census Tract will report the same value.

* All population estimates for areas within the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

** The shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. For this analysis, "meaningfully greater" is defined as demographic statistics that differ by more than 15 percent from those of the community of comparison. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

This EIS has determined there would not be an increase of risk under the No Action Alternative because there would not be any increase in aircraft operations. In addition, no schools or churches are within the existing Clear Zones/APZs surrounding Ault Field (see Figure 3.3-2) or OLF Coupeville (see Figure 4.3-1). However, there are existing businesses that may entertain or house large groups of people at a single time, such as shopping centers, group camps, dance classes, and halls and lodging within the APZs surrounding Ault Field. No businesses are within existing clear zones at OLF Coupeville. Since the EIS has determined there would not be an increase of risk under the No Action Alternative, the Navy has determined that although there are environmental justice communities within the Clear Zones/APZs, the risk associated with aircraft mishaps is not expected to increase within the areas surrounding both Ault Field and OLF Coupeville under the No Action Alternative. Therefore, the Navy has determined there will be no disproportionately high and adverse human health or environmental effects from the No Action Alternative on minority populations and low-income populations.

4.11.2.3.3 Potential Impacts from Overcrowding at Oak Harbor School District

The EIS concluded that the elementary schools in the Oak Harbor School District are experiencing significant overcrowding. Implementation of the No Action Alternative would have no impact on current school enrollment and therefore no impact on overcrowding at the Oak Harbor School District.

4.11.2.3.4 Potential Impacts on Housing Affordability

While the EIS has concluded that the regional housing market is experiencing low homeowner and rental vacancy rates, implementation of the No Action Alternative would have no impact on regional housing demand or supply and, therefore, have no impact on housing availability or affordability in Island or Skagit Counties.

4.11.3 Environmental Justice, Alternatives 1 through 3

4.11.3.1 Identifying Environmental Justice Communities Analysis under Alternatives 1 through 3

As indicated above, Tables 4.11-4 through 4.11-18 present estimates of the affected minority and low-income populations within each dB DNL contour under each alternative and scenario, for the average year. The shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in the community of comparison, which is the percentage of minority populations in Island County, and where the low-income population is equal to or greater than the percentage of residents with low incomes in the community of comparison. These calculations allow the Navy to determine the minority and/or low-income populations impacted by each alternative and scenario.

Under all alternatives/scenarios, there are minority populations and low-income populations living within the affected environment. Likewise, under the high-tempo FCLP year, there are minority populations and low-income populations under all alternatives/scenarios (see Appendix F).

Table 4.11-4 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario A, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 1A					
65-70 dB DNL	4,257	1,088	25.6%**	346	8.1%
70-75 dB DNL	2,844	593	20.9%	191	6.7%
75+ dB DNL	5,475	907	16.6%	387	7.1%
Total Affected Population	**12,576**	**2,588**	**20.6%**	**924**	**7.3%**

Table 4.11-4 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario A, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Population Change from No Action Alternative					
65-70 dB DNL	117	68	-	31	-
70-75 dB DNL	-225	-121	-	-27	-
75+ dB DNL	1,513	174	-	50	-
Population Change from No Action Alternative[3]* **	**1,405**	**121**	**8.6%**	**54**	**3.8%**

Sources: USCB, 2012c, 2012f, n.d.[d]

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level. Consequently, block groups within the same census tract will report the same value.

[4] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent: $\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} X\ 100$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-5 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario B, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 1B					
65-70 dB DNL	4,161	1,071	25.7%**	341	8.2%
70-75 dB DNL	3,511	810	23.1%	243	6.9%
75+ dB DNL	5,317	918	17.3%	396	7.4%
Total Affected Population	**12,989**	**2,799**	**21.5%**	**980**	**7.5%**
Population Change from No Action Alternative					
65-70 dB DNL	21	51	-	26	-
70-75 dB DNL	442	96	-	25	-
75+ dB DNL	1,355	185	-	59	-
Population Change from No Action Alternative[3]* **	**1,818**	**332**	**18.3%**	**110**	**6.1%**

Table 4.11-5 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario B, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d]

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-6 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario C, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 1C					
65-70 dB DNL	4,802	1,187	24.7%**	366	7.6%
70-75 dB DNL	3,551	829	23.3%	245	6.9%
75+ dB DNL	4,668	865	18.5%	391	8.4%
Total Affected Population	13,021	2,881	22.1%	1,002	7.7%
Population Change from No Action Alternative					
65-70 dB DNL	662	167	-	51	-
70-75 dB DNL	482	115	-	27	-
75+ dB DNL	706	132	-	54	-
Population Change from No Action Alternative[3]* **	**1,850**	**414**	**22.4%**	**132**	**7.1%**

Table 4.11-6 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario C, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-7 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario D, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 1D					
65-70 dB DNL	4,243	1,098	25.9%**	349	8.2%
70-75 dB DNL	3,163	702	22.2%	217	6.9%
75+ dB DNL	5,529	927	16.8%	397	7.2%
Total Affected Population	**12,935**	**2,727**	**21.1%**	**963**	**7.4%**
Population Change from No Action Alternative					
65-70 dB DNL	103	78	-	34	-
70-75 dB DNL	94	-12	-	-1	-
75+ dB DNL	1,567	194	-	60	-
Population Change from No Action Alternative[3]* **	**1,764**	**260**	**14.7%**	**93**	**5.3%**

Table 4.11-7 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario D, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-8 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario E, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 1E					
65-70 dB DNL	4,568	1,145	25.1%**	356	7.8%
70-75 dB DNL	3,545	820	23.1%	244	6.9%
75+ dB DNL	4,937	890	18.0%	396	8.0%
Total Affected Population	**13,050**	**2,855**	**21.9%**	**996**	**7.6%**
Population Change from No Action Alternative					
65-70 dB DNL	428	125	-	41	-
70-75 dB DNL	476	106	-	26	-
75+ dB DNL	975	157	-	59	-
Population Change from No Action Alternative[3]* **	**1,879**	**388**	**20.6%**	**126**	**6.7%**

Table 4.11-8 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario E, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-9 Environmental Justice Populations at NAS Whidbey Island Complex under the Alternative 2, Scenario A, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 2A					
65-70 dB DNL	4,238	1,087	25.6%**	346	8.2%
70-75 dB DNL	2,873	590	20.5%	191	6.6%
75+ dB DNL	5,376	894	16.6%	383	7.1%
Total Affected Population	**12,487**	**2,571**	**20.6%**	**920**	**7.4%**
Population Change from No Action Alternative					
65-70 dB DNL	98	67	-	31	-
70-75 dB DNL	-196	-124	-	-27	-
75+ dB DNL	1,414	161	-	46	-
Population Change from No Action Alternative[3]* **	**1,316**	**104**	**7.9%**	**50**	**3.8%**

Table 4.11-9 Environmental Justice Populations at NAS Whidbey Island Complex under the Alternative 2, Scenario A, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-10 Environmental Justice Populations at NAS Whidbey Island under the Alternative 2, Scenario B, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 2B					
65-70 dB DNL	4,178	1,066	25.5%**	339	8.1%
70-75 dB DNL	3,488	800	22.9%	241	6.9%
75+ dB DNL	5,210	905	17.4%	391	7.5%
Total Affected Population	**12,876**	**2,771**	**21.5%**	**971**	**7.5%**
Population Change from No Action Alternative					
65-70 dB DNL	38	46	-	24	-
70-75 dB DNL	419	86	-	23	-
75+ dB DNL	1,248	172	-	54	-
Population Change from No Action Alternative[3]* **	**1,705**	**304**	**17.8%**	**101**	**5.9%**

Table 4.11-10 Environmental Justice Populations at NAS Whidbey Island under the Alternative 2, Scenario B, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1+V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-11 Environmental Justice Populations at NAS Whibdey Island Complex under Alternative 2, Scenario C, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 2C					
65-70 dB DNL	4,760	1,167	24.5%**	360	7.6%
70-75 dB DNL	3,490	815	23.4%	241	6.9%
75+ dB DNL	4,564	845	18.5%	385	8.4%
Total Affected Population	**12,814**	**2,827**	**22.1%**	**986**	**7.7%**
Population Change from No Action Alternative					
65-70 dB DNL	620	147	-	45	-
70-75 dB DNL	421	101	-	23	-
75+ dB DNL	602	112	-	48	-
Population Change from No Action Alternative[3]* **	**1,643**	**360**	**21.9%**	**116**	**7.1%**

Table 4.11-11 Environmental Justice Populations at NAS Whibdey Island Complex under Alternative 2, Scenario C, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. Because the American Community Survey does not estimate data at the census block group level, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-12 Environmental Justice Populations at NAS Whibdey Island Complex under Alternative 2, Scenario D, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 2D					
65-70 dB DNL	4,221	1,089	25.8%**	346	8.2%
70-75 dB DNL	3,216	704	21.9%	218	6.8%
75+ dB DNL	5,380	905	16.8%	390	7.2%
Total Affected Population	**12,817**	**2,698**	**21.1%**	**954**	**7.4%**
Population Change from No Action Alternative					
65-70 dB DNL	81	69	-	31	-
70-75 dB DNL	147	-10	-	0	-
75+ dB DNL	1,418	172	-	53	-
Population Change from No Action Alternative[3]* **	**1,646**	**231**	**14.0%**	**84**	**5.1%**

Table 4.11-12 Environmental Justice Populations at NAS Whibdey Island Complex under Alternative 2, Scenario D, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. Because the American Community Survey does not estimate data at the census block group level, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-13 Environmental Justice Populations at NAS Whibdey Island Complex under Alternative 2, Scenario E, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 2E					
65-70 dB DNL	4,563	1,130	24.8%**	352	7.7%
70-75 dB DNL	3,482	802	23.0%	239	6.9%
75+ dB DNL	4,844	875	18.1%	390	8.1%
Total Affected Population	**12,889**	**2,807**	**21.8%**	**981**	**7.6%**
Population Change from No Action Alternative					
65-70 dB DNL	423	110	-	37	-
70-75 dB DNL	413	88	-	21	-
75+ dB DNL	882	142	-	53	-
Population Change from No Action Alternative[3]* **	**1,718**	**340**	**19.8%**	**111**	**6.5%**

Table 4.11-13 Environmental Justice Populations at NAS Whibdey Island Complex under Alternative 2, Scenario E, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. Because the American Community Survey does not estimate data at the census block group level, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than (those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-14 Environmental Justice Populations at NAS Whidbey Island Complex under the Alternative 3, Scenario A, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 3A					
65-70 dB DNL	4,244	1,087	25.6%**	346	8.2%
70-75 dB DNL	2,839	583	20.5%	189	6.7%
75+ dB DNL	5,400	896	16.6%	383	7.1%
Total Affected Population	**12,483**	**2,566**	**20.6%**	**918**	**7.4%**
Population Change from No Action Alternative					
65-70 dB DNL	104	67	-	31	-
70-75 dB DNL	-230	-131	-	-29	-
75+ dB DNL	1,438	163	-	46	-
Population Change from No Action Alternative[3]* **	**1,312**	**99**	**7.5%**	**48**	**3.7%**

Table 4.11-14 Environmental Justice Populations at NAS Whidbey Island Complex under the Alternative 3, Scenario A, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-15 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario B, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 3B					
65-70 dB DNL	4,150	1,061	25.6%**	338	8.1%
70-75 dB DNL	3,474	797	22.9%	240	6.9%
75+ dB DNL	5,256	909	17.3%	392	7.5%
Total Affected Population	**12,880**	**2,767**	**21.5%**	**970**	**7.5%**
Population Change from No Action Alternative					
65-70 dB DNL	10	41	-	23	-
70-75 dB DNL	405	83	-	22	-
75+ dB DNL	1,294	176	-	55	-
Population Change from No Action Alternative[3]* **	**1,709**	**300**	**17.6%**	**100**	**5.9%**

Table 4.11-15 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario B, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-16 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario C, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 3C					
65-70 dB DNL	4,743	1,163	24.5%**	359	7.6%
70-75 dB DNL	3,496	813	23.3%	241	6.9%
75+ dB DNL	4,585	847	18.5%	385	8.4%
Total Affected Population	**12,824**	**2,823**	**22.0%**	**985**	**7.7%**
Population Change from No Action Alternative					
65-70 dB DNL	603	143	-	44	-
70-75 dB DNL	427	99	-	23	-
75+ dB DNL	623	114	-	48	-
Population Change from No Action Alternative[3]* **	**1,653**	**356**	**21.5%**	**115**	**7.0%**

Table 4.11-16 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario C, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than (or equal to) those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-17 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario D, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 3D					
65-70 dB DNL	4,210	1,088	25.8%**	345	8.2%
70-75 dB DNL	3,205	700	21.8%	217	6.8%
75+ dB DNL	5,402	907	16.8%	390	7.2%
Total Affected Population	**12,817**	**2,695**	**21.0%**	**952**	**7.4%**
Population Change from No Action Alternative					
65-70 dB DNL	70	68	-	30	-
70-75 dB DNL	136	-14	-	-1	-
75+ dB DNL	1,440	174	-	53	-
Population Change from No Action Alternative[3]* **	**1,646**	**228**	**13.9%**	**82**	**5.0%**

Table 4.11-17 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario D, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-18 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario E, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**
Alternative 3E					
65-70 dB DNL	4,532	1,125	24.8%**	351	7.7%
70-75 dB DNL	3,483	800	23.0%	239	6.9%
75+ dB DNL	4,869	877	18.0%	390	8.0%
Total Affected Population	**12,884**	**2,802**	**21.7%**	**980**	**7.6%**
Population Change from No Action Alternative					
65-70 dB DNL	392	105	-	36	-
70-75 dB DNL	414	86	-	21	-
75+ dB DNL	907	144	-	53	-
Population Change from No Action Alternative[3]* **	**1,713**	**335**	**19.6%**	**110**	**6.4%**

Table 4.11-18 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario E, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.

[3] Due to rounding, some totals may not sum.

* dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \text{X } 100$$

*** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:
dB DNL = day-night average sound level in decibels

4.11.3.2 Methodology for Identifying Disproportionately High and Adverse Impacts under Alternatives 1 through 3

As described in detail in Section 4.11.1.2, once the presence or absence of environmental justice communities was determined, the Navy then assessed the impacts from the Proposed Action and determined whether these impacts would have a disproportionately high and adverse effect on these populations. This analysis involved comparing the impacts on the identified environmental justice communities to the general population within the affected environment (e.g., noise contours). In determining whether potential disproportionately high and adverse impacts existed, the Navy also considered the significance of the impacts under NEPA. The methodology for identifying disproportionally high and adverse impacts under the alternatives is the same as defined for the No Action Alternative.

4.11.3.3 Analysis for Identifying Disproportionately High and Adverse Impacts under Alternatives 1 through 3

As described throughout this EIS, aircraft noise impacts are expected to be the primary adverse environmental impact associated with the Proposed Action. Other impacts described in this EIS that have the potential to have disproportionately high and adverse impacts on environmental justice communities include potential safety risks from a concentration of environmental justice populations within Clear Zones/APZs; concentration of overcrowding in schools within the Oak Harbor School District; and impacts of housing affordability and housing availability on low-income populations. As discussed under Methodology above, this section compares the potential impacts on the environmental justice populations within the affected area to the general population within the affected area and makes a determination of whether or not these impacts are disproportionately high and adverse on the previously identified environmental justice communities.

4.11.3.3.1 Aircraft Noise

This EIS determines there is a significant impact to the populations living under the noise contours from implementation of all alternatives/scenarios (see Section 4.2). In order to assess whether the significant impacts on the population under the noise contours are disproportionately high and adverse upon identified environmental justice communities, the Navy compared the potential impacts on the affected general population (the total population under the different dB DNL noise contours for each alternative/scenario) to the identified environmental justice populations in the affected area (under the dB DNL noise contours for each alternative/scenario).

Based on the data shown in Tables 4.11-2 and Tables 4.11-4 through 4.11-18, the comparison of the impacts to the identified environmental justice communities (shaded cells in the tables) within the affected environment to the impacts on the general population (the non-environmental justice communities) within the affected environment indicates that the identified environmental justice communities are not experiencing disproportionately high and adverse impacts. Even though the noise impacts to the entire community may be significant under NEPA, it does not appear that these adverse impacts appreciably exceed or are likely to exceed those experienced by the total affected population. The tables indicate that for each noise contour (greater than 65 dB DNL), the identified environmental justice communities are not concentrated in higher noise zones. The environmental justice communities represent a range of approximately 21 percent to 22 percent for identified minority populations and approximately 7 percent to 8 percent for identified low-income populations within each noise contour.

Consequently, these identified communities do not appear to be subjected to an uneven distribution of adverse impacts.

The significance of the impacts under NEPA is also a factor in determining whether impacts to environmental justice communities may be disproportionately high and adverse. As part of this determination, the net change between each alternative and the No Action Alternative of each environmental justice community was analyzed. For this analysis, the estimates of the affected minority, and low-income populations for each alternative/scenario were compared to the results of the analysis for the No Action Alternative. The net change in the total population and the net change in the environmental justice populations between the various alternatives/scenarios and the No Action Alternative were then calculated. The results of these analyses can be found on Tables 4.11-2 and Tables 4.11-4 through 4.11-18 and are summarized on Table 4.11-19. See Appendix F for detailed tables showing the effects of the high-tempo FCLP year conditions; summary conclusions are included on Table 4.11-19. This calculation allows the Navy to determine the minority and/or low-income populations impacted by each alternative and scenario.

As shown on Table 4.11-19 under the average year, the change in minority environmental justice communities within the dB DNL noise contours under the 15 alternatives/scenarios when compared to the No Action Alternative ranges from 7.5 percent to 22.4 percent. This means that 7.5 percent to 22.4 percent of the residents within the greater than 65 dB DNL noise contour are calculated to be a minority (and 77.6 percent to 92.5 percent are calculated to be a non-minority). In a similar calculation, 3.7 percent to 7.1 percent of the population residing within the 65 dB DNL noise contours for the alternatives are calculated to be part of the low-income population (and 92.9 percent to 96.3 percent are calculated to be not in the low-income population).

Under the high-tempo FCLP year, the change in minority environmental justice communities within the dB DNL noise contours under the 15 alternatives/scenarios when compared to the No Action Alternative ranges from 0.0 percent to 19.2 percent of the population residing under the dB DNL contours (80.8 percent to 100.0 percent are calculated to be non-minority) and 0.0 percent to 6.5 percent to be part of the low-income population (93.5 percent to 100.0 percent are calculated to be not in the low-income population). In fact, for scenario A under all three alternatives, the absolute number of minority residents declined when compared to the No Action Alternative. In addition, the absolute number of low-income residents when compared to the No Action Alternative declined by one person in Alternative 3, Scenario A (see Appendix F).

Table 4.11-19 Demographic and Economic Characterstics of the Population Change from the No Action Alternative for Each Alternative and Scenario under the Average Year and High-Tempo FCLP Year

*Geographical Area**	*Population Change from No Action Alternative*		
	*Total Affected Population***	*Difference in Percent Minorities*	*Difference In Percent Low Income*
No Action Alternative			
Average Year	**11,171**	**22.1%**	**7.8%**
High-tempo FCLP Year	**11,804**	**22.7%**	**7.9%**
Alternative 1A			
Average Year	1,405	8.6%	3.8%
High-tempo FCLP Year	945	0.0%***	1.0%
Alternative 1B			
Average Year	1,818	18.3%	6.1%
High-tempo FCLP Year	1,362	12.8%	4.8%
Alternative 1C			
Average Year	1,850	22.4%	7.1%
High-tempo FCLP Year	1,457	19.2%	6.5%
Alternative 1D			
Average Year	1,764	14.7%	5.3%
High-tempo FCLP Year	1,318	7.4%	3.7%
Alternative 1E			
Average Year	1,879	20.6%	6.7%
High-tempo FCLP Year	1,458	16.9%	5.9%
Alternative 2A			
Average Year	1,316	7.9%	3.8%
High-tempo FCLP Year	829	0.0%***	0.1%
Alternative 2B			
Average Year	1,705	17.8%	5.9%
High-tempo FCLP Year	1,279	12.3%	4.7%
Alternative 2C			
Average Year	1,643	21.9%	7.1%
High-tempo FCLP Year	1,246	16.4%	5.9%
Alternative 2D			
Average Year	1,646	14.0%	5.1%
High-tempo FCLP Year	1,167	5.1%	3.2%
Alternative 2E			
Average Year	1,718	19.8%	6.5%
High-tempo FCLP Year	1,262	14.0%	5.3%
Alternative 3A			
Average Year	1,312	7.5%	3.7%
High-tempo FCLP Year	826	0.0%***	0.0%***
Alternative 3B			
Average Year	1,709	17.6%	5.9%
High-tempo FCLP Year	1,258	11.1%	4.4%
Alternative 3C			
Average Year	1,653	21.5%	7.0%
High-tempo FCLP Year	1,178	15.7%	5.7%

Table 4.11-19 Demographic and Economic Characterstics of the Population Change from the No Action Alternative for Each Alternative and Scenario under the Average Year and High-Tempo FCLP Year

*Geographical Area**	*Population Change from No Action Alternative*		
	*Total Affected Population***	*Difference in Percent Minorities*	*Difference In Percent Low Income*
Alternative 3D			
Average Year	1,646	13.9%	5.0%
High-tempo FCLP Year	1,168	5.5%	3.1%
Alternative 3E			
Average Year	1,713	19.6%	6.4%
High-tempo FCLP Year	1,307	15.7%	5.4%

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

* Residents living in Island and Skagit Counties within the 65+ dB DNL contours are included in this analysis. dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** Total Affected Population equals the total population in Island and Skagit Counties that falls within the 65+ dB DNL contours under the No Action Alternative. The Total Affected Population under all other alternatives/scenarios represents the change in the total population within the 65+ dB DNL contours compared to the No Action Alternative. All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

*** Under Alternatives 1A, 2A, and 3A during the high-tempo FCLP year, the absolute number of minority residents would decline when compared to the No Action Alternative. In addition, under Alternative 3A, the absolute number of low-income residents impacted also would decline when compared to the No Action Alternative.

Key:
FCLP = field carrier landing practice

When analyzing data provided on Tables 4.11-2 and Tables 4.11-4 through 4.11-18, it is shown that within the affected area, minority and low-income residents are more likely to reside within quieter dB DNL contours (i.e., 65 to 70 dB DNL contours) than in the louder dB DNL contours (i.e., 75 dB DNL or greater contours) when compared to the total affected population. For instance, in the alternative that records the largest percentage of minorities impacted when compared to the No Action Alternative under the average year (Alternative 1, Scenario E), approximately 20.6 percent of this population change

are minority residents. At the same time, 25.1percent of all residents living in the 65 to 70 dB DNL contours are minorities, while only 18.0 percent of all residents living in the 75 dB DNL or greater contours are minorities. This relationship holds true for all alternatives and scenarios in both the average and the high-tempo FCLP year. Similarly, low-income residents are more likely to reside in the quieter dB DNL contours (i.e., 65 to 70 dB DNL contours) than in the louder dB DNL contours (i.e., 75 dB DNL or greater contours) when compared to the total affected population. With the exception of Scenario C and Scenario E under all three alternatives, there is typically a greater concentration of low-income populations in the 65 to 70 dB DNL contours than those found in the greater than 75 dB DNL contours. In Scenario C and Scenario E under all three alternatives, there is a slightly greater concentration of low-income populations within the greater than 75 dB DNL contours than in the 65 to 70 dB DNL contours. On average, non-minority populations and populations that are not low-income are more likely to be affected by the louder dB DNL contours than the communities of concern. Therefore, while minority and low-income residents are potentially significantly and adversely affected by aircraft noise under each of the alternatives/scenarios, these populations do not experience disproportionately high and adverse impacts when compared to the total affected population.

Additionally, there are no known cumulative or multiple adverse exposures from environmental hazards on minority or low-income environmental justice communities identified in the tables above. Finally, there do not appear to be any of the seven factors identified above under Methodology that could amplify identified impacts on minority or low-income communities. Therefore, the Navy has determined there will be no disproportionately high and adverse human health or environmental effects from the Proposed Action or any alternatives on minority populations or low-income populations.

4.11.3.3.2 Potential Increased Risk of Aircraft Mishaps in Clear Zones/Accident Potential Zones

This EIS identifies that because under all alternatives/scenarios the Proposed Action would add 35 or 36 Growler aircraft and increase overall airfield flight operations at the NAS Whidbey Island complex, there would be a negligible increase in the risk of a mishap (see Section 4.3.1.1). Clear Zones/APZs are created based on projected operations for approach, departure, and flight tracks for a runway. Clear Zones/APZs are based on historical accident and operations data throughout the military and the specific areas that would be impacted (which have been determined to be potential impact areas) if an accident were to occur.

It is not expected that the Clear Zones at Ault Field would change regardless of alternative selected under this Proposed Action; however, this would be confirmed through the Navy's subsequent AICUZ Update process (see Figure 3.3-2 for 2005 AICUZ Clear Zones at Ault Field).

A potential environmental justice issue could be raised if environmental justice communities were concentrated in higher-risk areas and subjected to disproportionate adverse impacts, such as being located in Clear Zones/APZs. Using the same methodology employed for identifying environmental justice communities under the noise contours, the Navy estimated the number of minority and low-income residents located within the existing Clear Zones at Ault Field and OLF Coupeville. All Clear Zones/APZs identified in Section 4.3 (2005 AICUZ Clear Zones at Ault Field, 2005 AICUZ Clear Zones at OLF Coupeville, and Conceptual APZs at OLF Coupeville) were overlaid onto mapped U.S. Census Bureau 2010 population and demographic data to calculate the total affected area within each census block. The percent area of the census block covered by the Clear Zones/APZs was applied to the population of that census block to estimate the population within the Clear Zone/APZ boundary. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and

2020 based on medium forecasted population projections during that period, thereby calculating the total affected population for each alternative and scenario, including the No Action Alternative (Washington State Office of Financial Management, 2017).

Demographic characteristics of the corresponding census block groups were then applied to this total affected population number to estimate the total minority and low-income populations impacted by each Clear Zone/APZ. These calculations assume an even distribution of the population across the census block groups, and they exclude populations on military properties within the Clear Zones/APZs. Table 4.11-20 presents estimates of the affected minority and low-income populations under each Clear Zone/APZ.

As mentioned above, the potential development of APZs does not directly correlate to an increased risk of incident for the population living under the APZs. The Navy's official recommendation for APZs at OLF Coupeville will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish an APZ for OLF Coupeville and to adopt zoning to enhance public safety. It is the municipality's action that will influence future land use decisions. In fact, the municipality has choices on the degree to which the Navy's land use recommendations are implemented--for instance, it could decide to establish an APZ for Runway 14 even though the current or proposed number of operations does not warrant one under Navy policy.

The Navy has determined there are environmental justice communities living within the 2005 AICUZ Clear Zones at Ault Field (see Table 4.11-20). Additionally, as shown in Table 4.11-20 and described in detail in Section 4.3.1, the increase in airfield operations at Ault Field under all of the alternatives/ scenarios would not result in a change to the existing Clear Zones surrounding the installation. Consequently, there would be an increase in the number of operations at Ault Field from the Proposed Action and, therefore, an increase in risk for mishap, but there would be no impact on the land use of any population living within the boundaries of the Clear Zones.

The Navy has determined there are no environmental justice communities living within the 2005 AICUZ Clear Zones at OLF Coupeville.

Under Scenario C and E for all alternatives, the number of airfield operations would not warrant additional APZs at OLF Coupeville; therefore, only the Clear Zones would be required. Consequently, there would be an increase in the number of operations at OLF Coupeville under Scenario C and E for all alternatives and, therefore, an increase in risk for mishap, but there would be no impact on the land use of any population living within the boundaries of the Clear Zones.

Under Scenarios A, B, and D for all alternatives, this EIS determined there is a potential for APZs to be warranted due to the number and type of flight operations at OLF Coupeville. Under Scenarios A, B, and D, conceptual APZs may be warranted. Official APZs are established through the AICUZ study process and would depend on the findings of this study. There would be an increase in the number of operations at OLF Coupeville under Scenarios A , B, and D for all alternatives and, therefore, an increase in risk for mishap, and there would be a minor impact on land use under the conceptual APZs for these three scenarios. Because there are no environmental justice communities identified under the conceptual APZ, the Navy has determined implementation of the Proposed Action or any alternatives is not expected to have disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

Table 4.11-20 Environmental Justice Populations at NAS Whidbey Island Complex under Clear Zones/APZs for Ault Field and OLF Coupeville

APZ	*Total Affected Population**	*Total Minority Population[1]*	*Percent Minority*	*Total Low-Income Population[2]*	*Percent Low Income*
Community of Comparison (Island County)			***16.9%***		***8.0%***
Ault Field Existing Clear Zones	1,860	523	28.1%**	230	12.4%
OLF Coupeville Existing Clear Zones[3]	96	9	9.4%	3	3.1%
OLF Coupeville Conceptual APZs[4]	677	92	13.6%	21	3.1%

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

[1] Minority is defined as individual(s) who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates as the US Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level, therefore the percent of the population below the poverty level is displayed in this table at the Census Tract level; therefore, Block Groups within the same Census Tract will report the same value.

[3] Under Alternative 1, Scenario C; Alternative 1, Scenario E; Alternative 2, Scenario C; Alternative 2, Scenario E; Alternative 3, Scenario C; and Alternative 3, Scenario E no new APZs would be required at OLF Coupeville. There would be no change in the Clear Zones at Ault Field or OLF Coupeville compared to existing conditions.

[4] Under Alternative 1, Scenario A; Alternative 1, Scenario B; Alternative 1, Scenario D; Alternative 2, Scenario A; Alternative 2, Scenario B; Alternative 2, Scenario D; Alternative 3, Scenario A; Alternative 3, Scenario B; and Alternative 3, Scenario D OLF Coupeville Conceptual APZs would be required. There would be no change in Clear Zones at Ault Field compared to existing conditions.

* All population estimates for areas within the Clear Zones/APZs utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

** The shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are "meaningfully greater" than in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. For this analysis, "meaningfully greater" is defined as demographic statistics that differ by more than 15 percent from those of the community of comparison. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$

This EIS has determined that there is not a significant increase in risk associated with the increase in aircraft operations under the alternatives/scenarios because current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and airfield flight operations would adhere to established safety procedures. While it is generally difficult to project future safety/mishap rates for any aircraft, the Growler has a well-documented and established safety record as a reliable aircraft.

Potential aircraft mishaps are the primary safety concern with regard to military training flights. NAS Whidbey Island maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to mishaps, whether on or off the installation. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoDI 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*) (DoD, 2011).

In addition, no schools or churches are within the existing Clear Zones or APZs surrounding Ault Field (see Figure 3.3-2) or OLF Coupeville (see Figures 4.3-1). However, there are existing businesses that may entertain or house large groups of people at a single time, such as shopping centers, transit authorities, animal shelters, group camps, dance classes, and halls and lodging.

The Navy has determined implementation of the Proposed Action is not expected to have disproportionately high and adverse impacts on minority populations or low-income populations.

4.11.3.3.3 Potential Impacts from Overcrowding at Oak Harbor School District

The EIS concluded that because the elementary schools in the Oak Harbor School District are currently experiencing significant overcrowding, implementation of the Proposed Action would increase the number of students attending schools in the district and exacerbate an existing issue. The Navy considered whether this impact had the potential to have disproportionately high and adverse impacts on environmental justice communities and concluded that overcrowding, as with noise impacts, would be equally felt across the affected area. The Navy concluded that although environmental justice communities do exist, they are not expected to be subjected to disproportionately high and adverse impacts on education because overcrowding and noise impacts would be equally felt across the school district in the affected area.

4.11.3.3.4 Potential Impacts to Housing Affordability

As described in greater detail in Section 4.10.3, the data indicate that Island and Skagit Counties are experiencing a high demand and relatively low supply of housing, which has led to low homeowner and rental vacancies, and upward price pressure. Implementation of the Proposed Action would increase the number of Navy families and unaccompanied personnel requiring housing in the region and exacerbate the current tight housing market. Housing and rental prices are expected to increase, and housing availability is expected to decline as a result of the increase in demand for housing. In the longer run, it is anticipated that local developers will respond to the increased price and demand for housing by constructing more units, thereby slightly reducing the expected housing deficit. However, because low-income residents typically spend a larger proportion of their income on housing than the general

population, if housing prices were to increase, low-income households would experience a greater impact. Therefore, the Navy has concluded that the impacts on housing availability and affordability could have the potential to have a disproportionately high and adverse impact on low-income communities. In accordance with current Navy policies, the Navy will periodically assess on- and off-base housing demand and availability to determine whether additional Navy-controlled housing is required.

4.11.4 Environmental Justice Conclusion, Alternatives 1 through 3

The Navy has determined that there are environmental justice communities within the affected area and there are significant impacts outlined within the EIS to populations living within the affected area (noise impacts to those living within the 65 dB DNL noise contours, risks to those living within the Clear Zones/APZs, overcrowding at Oak Harbor School District schools). However, the Navy has determined there will be no disproportionately high and adverse human health or environmental effects from noise, Clear Zones/APZs, and the overcrowding of schools on minority populations or low-income populations. The Navy has, however, concluded that the impacts on housing availability and affordability could have the potential to have a disproportionately high and adverse impact on low-income communities.

The Navy has embarked on a robust community outreach program as part of this EIS process. As detailed in Section 1.9, Public and Agency Participation and Intergovernmental Coordination, the Navy has held eight public scoping meetings and has kept residents informed throughout the process with mailings (both letters and postcards), newspaper advertisements, press releases, a project website, and digital advertisements. Project documents have been made available at local public libraries as well as online at the project's website. Public outreach efforts will continue throughout the public comment period to ensure that impacted environmental justice populations are kept informed and involved in the decision-making process.

4.12 Transportation

Transportation

Construction results in increased traffic on and off the installation, but roadways would be able to handle the increase.

Increase in personnel and dependents results in an increase in traffic on local roads. Traffic would be spread throughout roads in Island and Skagit Counties and is not expected to result in LOS falling below established LOS standards.

Increase in gate traffic may result in queuing of vehicles, but this would be limited to peak hours during the day.

No significant increase in use of transit, pedestrian, and bicycle facilities because the majority of new traffic would be car-based.

This section summarizes the potential transportation impacts that could result from renovation of facilities and an increase in Growler operations at NAS Whidbey Island under the No Action Alternative and Alternative 1 through Alternative 3. As discussed in Section 3.12.2, the study area consists of:

- State Route (SR) 20 between Burlington and SR 525
- SR 525 between SR 20 and Clinton
- Interstate (I)-5 at the interchange with SR 20 in Burlington
- roadways serving NAS Whidbey Island or immediately adjacent to NAS Whidbey Island

Potential transportation impacts were estimated by evaluating how the proposed increase in personnel and dependents under each alternative could affect traffic volume and level of service (LOS) on major roadways within the project study area. Traffic volumes were estimated and assessed based on the following:

- Full transition of P-8A squadrons to NAS Whidbey Island would occur by 2020.
- Background growth factors of 1.5 percent in Island County and 5.3 percent in Skagit County would apply based on medium county population projections (Washington State Office of Financial Management, 2017), which account for regional growth in traffic volumes through 2020.
- Trip generation was based on the assumption that each new Navy personnel would result in one new household with dependents, as described in Section 4.10. The Institute of Traffic Engineers Trip Generation Manual 9th Edition (ITE [Institute of Traffic Engineers], 2012) was used to determine weekday trip generation rates for households based on the housing unit types in the region (USCB, n.d.[c]). Trips were assigned to study area road segments (I-5, SR 20, and SR 525) based on the percentage of personnel stationed and employed at NAS Whidbey Island by place of residence (Coury, 2018).
    - It was assumed that no new Navy personnel under the alternatives would be living on base; therefore, the percentage of NAS Whidbey Island personnel living on-base (37 percent) was distributed proportionally across the study area for future trip generation.
    - It was assumed two of the weekday trips generated by each household would be attributed to Navy personnel traveling between a place of residence and Ault Field. It was assumed remaining trips generated by each household would occur within a place of residence (see Appendix D).

- A general LOS analysis under No Action Alternative and action alternative conditions was performed using the 2010 Highway Capacity Manual generalized daily service volumes for urban freeway facilities, rural multilane highways, urban multilane highways, and urban street facilities (see Appendix D). LOS under the action alternatives was compared to LOS standards under the No Action Alternative.
- For a conservative analysis, no transit, bicycle, or pedestrian trips were assumed for Navy personnel and dependents.
- Personnel would commute to Ault Field under each scenario; therefore, traffic impacts under a given alternative would be the same under each scenario.

4.12.1 Transportation, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to transportation. SR 20, SR 525, and I-5 and local roads would experience an increase in traffic over affected environment conditions that would be attributed to background community growth. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

4.12.2 Transportation, Alternatives 1 through 3

Construction activities associated with the Proposed Action under each alternative would result in short-term but negligible increases in traffic, and they would not result in a worsening of LOS on major roadways under No Action conditions. Operations associated with the Proposed Action under each alternative would result in a long-term and moderate increase in traffic, but they would not result in a worsening of LOS on major roadways beyond LOS standards. Some local roadways and intersections near Ault Field may see increases in traffic delay from personnel accessing gates to Ault Field, however impacts would be limited to peak hours during the day and are expected to be less than significant. Therefore, implementation of the Proposed Action under any alternative would not result in significant impacts to transportation.

4.12.2.1 Renovation of Existing Facilities at NAS Whidbey Island

Construction-related traffic from the renovation of facilities at NAS Whidbey Island would consist of delivery trucks, dump trucks, heavy equipment, and vehicles driven by construction crews. This could result in short-term impacts on traffic from additional truck trips and slower-moving vehicles. Trips are assumed to access Ault Field via SR 20, Ault Field Road, and Charles Porter Avenue. The number of construction trips on these roadways would be negligible and temporary. No construction trips are expected to access the Seaplane Base as a result of the Proposed Action. Oversize vehicles would need to obtain permits from the appropriate jurisdiction. Pilot/escort vehicles or flaggers may be requirements of an oversize or overweight permit to facilitate the movement of these vehicles through traffic.

4.12.2.2 Off-base Operations, Trip Generation

The Proposed Action would generate between 122 and 2,051 new trips per weekday under Alternative 1; 229 to 3,845 new trips per weekday under Alternative 2; and 125 to 2,088 new trips per weekday under Alternative 3 within the study area. Table 4.12-1 shows the daily traffic volumes generated on segments of SR 20, SR 525, and I-5 under each alternative. Under each alternative, traffic volumes at each of the existing road segments would be expected to increase compared to the No Action

Alternative. Trip projections take into account an annual background growth based on population projections from the Washington State Office of Financial Management. Trips do not take into account deployment schedules, and actual traffic during deployment may be lower. Table 4.12-2 compares traffic volumes for each alternative and demonstrates that much of the increase in traffic volumes in Skagit County can be attributed to background growth. Whereas, increases in Island County traffic near NAS Whidbey Island can largely be attributed to trips generated under the alternatives. The largest trip percentage increase over the No Action Alternative would occur on SR 20 north of Case Road in Oak Harbor and would range from 16 percent under Alternative 1 and Alternative 3 to 29 percent under Alternative 2.

Table 4.12-1 NAS Whidbey Island Trip Distribution

		Alternative			
Road	***Location***	***1***	***2***	***3***	***No Action***
I-5	***North and South of SR 20***	166	311	169	0
SR 20	Under I-5	166	311	169	0
SR 20	East of Pulver Road to West of March Point Road	154	290	157	0
SR 20	East of SR 20 Spur to South of SR 20 Spur	420	787	427	0
SR 20	North of Rosario Drive to South of Rosario Drive	236	443	240	0
SR 20	North of Banta Road to South of Frostad Road	238	445	242	0
SR 20	North of Regatta Drive to South of Swantown Road	2,051	3,845	2,088	0
SR 20	North of Sidney Street to South of Libbey Road	153	287	156	0
SR 20	West of Main Street to East of Main Street	156	292	159	0
SR 20/SR 525	West of Quail Trail Lane to Clinton Ferry Dock	122	229	125	0
Banta Road	East of SR 20 Spur	128	239	130	0
Clover Valley Road	West of Heller Road	161	302	164	0
Heller Road	South of Ault Field Road	228	428	232	0
Ault Field Road	West of Langley Boulevard	161	302	164	0
Ault Field Road	East of Langley Boulevard	429	805	437	0
Ault Field Road	East of Oak Harbor Road	295	553	301	0
Ault Field Road	East of Goldie Road	329	616	335	0
Oak Harbor Road	South of Ault Field Road	262	491	266	0
Goldie Road	North of Ault Field Road	282	528	287	0
Goldie Road	South of Ault Field Road	228	428	232	0

Note: Based on percentage of personnel stationed and employed at NAS Whidbey Island by place of residence (Coury, 2018), ITE Trip Generation Manual 9th Edition (ITE, 2012), and Housing Unit Type (USCB, n.d.[c]); assumes 2 trips per household from ITE trip generation rate were Navy personnel traveling to and from Ault Field; assumes remaining trips on major roadways occur within place of residence. Number of dependents is based on discussion in Section 4.10.

Table 4.12-2 NAS Whidbey Island Projected Average Daily Traffic and Level of Service

				Alternative							
		Affected Environment		1		2		3		No Action	
Location	LOS Standard	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS
Road: Interstate 5 (I-5)											
Municipality: Burlington											
South of SR 20	D	73,000	C	77,000	D	77,200	D	77,000	D	76,900	D
North of SR 20	D	57,000	B	60,200	B	60,300	B	60,200	B	60,000	B
Road: State Route 20 (SR 20)											
Municipality: Burlington											
Under I-5	D	27,000	B	28,600	B	28,700	B	28,600	B	28,400	B
Municipality: Skagit County											
East of Pulver Road	D	28,000	B	29,600	B	29,800	B	29,600	B	29,500	B
East of Avon Allen Road	D	29,000	B	30,700	B	30,800	B	30,700	B	30,500	B
West of Avon Allen Road	D	27,000	B	28,600	B	28,700	B	28,600	B	28,400	B
East of SR 536	D	25,000	B	26,500	B	26,600	B	26,500	B	26,300	B
West of SR 536	D	32,000	B	33,900	B	34,000	B	33,900	B	33,700	B
East of LaConner Whitney Road	D	34,000	B	36,000	B	36,100	B	36,000	B	35,800	B
West of LaConner Whitney Road	D	34,000	B	36,000	B	36,100	B	36,000	B	35,800	B
East of March Point Road	D	33,000	B	34,900	B	35,000	B	34,900	B	34,700	B
West of March Point Road	D	33,000	B	34,900	B	35,000	B	34,900	B	34,700	B
Road enters Anacortes											
North of Rosario Drive	D	15,000	D	16,000	D	16,200	D	16,000	D	15,800	D
South of Rosario Drive	D	18,000	D	19,200	D	19,400	D	19,200	D	19,000	D
Road enters Island County											
Municipality: Anacortes											
East of SR 20 Spur	D	33,000	B	35,200	B	35,500	B	35,200	B	34,700	B
South of SR 20 Spur	D	19,000	D	20,400	D	20,800	D	20,400	D	20,000	D
Municipality: Island County											
North of Banta Road	D	17,000	D	17,500	D	17,700	D	17,500	D	17,300	D
North of Frostad Road	D	17,000	D	17,500	D	17,700	D	17,500	D	17,300	D
South of Frostad Road	D	18,000	D	18,500	D	18,700	D	18,500	D	18,300	D
Road enters Oak Harbor											
North of Sidney Street	D	13,000	C	13,300	C	13,500	C	13,400	C	13,200	C

Table 4.12-2 NAS Whidbey Island Projected Average Daily Traffic and Level of Service

				Alternative							
		Affected Environment		1		2		3		No Action	
Location	LOS Standard	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS
South of Libbey Road	D	12,000	C	12,300	C	12,500	C	12,300	C	12,200	C
Road enters Coupeville											
East of Quail Trail Lane	D	8,800	C	9,100	C	9,200	C	9,100	C	8,900	C
North of SR 525 and Race Road	D	7,100	B	7,300	B	7,400	B	7,300	B	7,200	B
West of SR 525 and Race Road	D	1,100	B	1,200	B	1,300	B	1,200	B	1,100	B
Municipality: Oak Harbor											
North of Regatta Drive	E	17,000	D	19,300	D	21,100	D	19,300	D	17,300	D
North of Case Road	E	13,000	C	15,200	D	17,000	D	15,300	D	13,200	C
North of Goldie Street	E	15,000	C	17,300	C	19,100	D	17,300	C	15,200	C
South of SE Midway Boulevard	E	18,000	C	20,300	C	22,100	C	20,400	C	18,300	C
North of SE Sixth Avenue	E	21,000	C	23,400	C	25,200	C	23,400	C	21,300	C
South of SE Sixth Avenue	E	21,000	C	23,400	C	25,200	C	23,400	C	21,300	C
North of SE Barrington Avenue	E	19,000	C	21,300	C	23,100	C	21,400	C	19,300	C
North of SE Pioneer Way	E	15,000	C	17,300	C	19,100	C	17,300	C	15,200	C
West of Beeksma Drive	E	18,000	C	20,300	C	22,100	C	20,400	C	18,300	C
North of Swantown Road	E	20,000	C	22,400	C	24,100	C	22,400	C	20,300	C
South of Swantown Road	E	16,000	C	18,300	D	20,100	E	18,300	D	16,200	D
Municipality: Coupeville											
West of Main Street	D	11,000	C	11,300	C	11,500	C	11,300	C	11,200	C
East of Main Street	D	8,500	B	8,800	C	8,900	C	8,800	C	8,600	B
State Route 525 (SR 525)											
Municipality: Island County											
South of SR 20	D	7,600	B	7,800	B	7,900	B	7,800	B	7,700	B
North of Ellwood Drive	D	7,000	B	7,200	B	7,300	B	7,200	B	7,100	B
Road enters Freeland											
West of Bayview Road	D	13,000	C	13,300	C	13,400	C	13,300	C	13,200	C
West of Maxwelton Road	D	12,000	C	12,300	C	12,400	C	12,300	C	12,200	C
East of Maxwelton Road	D	11,000	C	11,300	C	11,400	C	11,300	C	11,200	C
West of Campbell Road	D	9,500	C	9,800	C	9,900	C	9,800	C	9,600	C
East of Cedar Vista Drive	D	9,400	C	9,700	C	9,800	C	9,700	C	9,500	C

Table 4.12-2 NAS Whidbey Island Projected Average Daily Traffic and Level of Service

				Alternative							
		Affected Environment		1		2		3		No Action	
Location	LOS Standard	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS
West of Humphrey Road	D	8,700	C	9,000	C	9,100	C	9,000	C	8,800	C
East of Humphrey Road	D	7,300	C	7,500	C	7,600	C	7,500	C	7,400	C
At Clinton Ferry Dock	D	6,100	C	6,300	C	6,400	C	6,300	C	6,200	C
Municipality: Freeland											
West of Honeymoon Bay Road	D	7,200	B	7,400	B	7,500	B	7,400	B	7,300	B
East of Honeymoon Bay Road	D	12,000	C	12,300	C	12,400	C	12,300	C	12,200	C
West of Fish Road	D	14,000	C	14,300	C	14,400	C	14,300	C	14,200	C
Road: Banta Road (Island County)											
West of SR 20	D	1,470	C	1,600	C	1,700	C	1,600	C	1,500	C
Road: Clover Valley Road (Island County)											
West of Heller Road	D	2,864	C	3,100	C	3,200	C	3,100	C	2,900	C
Road: Heller Road (Island County)											
South of Ault Field Road	D	6,995	C	7,500	C	7,700	C	7,500	C	7,300	C
Road: Ault Field Road (Island County)											
West of Langley Boulevard	D	8,171	C	8,700	C	8,800	C	8,700	C	8,500	C
East of Langley Boulevard	D	10,073	C	10,900	C	11,300	C	10,900	C	10,500	C
East of Oak Harbor Road	D	10,506	C	11,300	C	11,500	C	11,300	C	11,000	C
East of Goldie Road	D	8,876	C	9,600	C	9,900	C	9,600	C	9,300	C
Road: Oak Harbor Road (Island County)											
South of Ault Field Road	D	5,174	C	5,700	C	5,900	C	5,700	C	5,400	C
Road: Goldie Road (Island County)											
North of Ault Field Road	D	8,864	C	9,800	C	10,000	C	9,800	C	9,500	C
South of Ault Field Road	D	7,561	C	8,300	C	8,500	C	8,300	C	8,100	C

Table 4.12-2 NAS Whidbey Island Projected Average Daily Traffic and Level of Service

				Alternative							
		Affected Environment		1		2		3		No Action	
Location	LOS Standard	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS

Sources: ADT (WSDOT, 2016e; Island County, 2010, 2011, 2014, and 2016c); LOS Standards (Island County, 2015c; City of Oak Harbor, 2014a; Skagit County, 2007a) Trip Generation (ITE, 2012)

Note: Trip generation is based on Trip Generation Manual 9th Edition (ITE, 2012) and LOS is based on 2010 Highway Capacity Manual (Transportation Research Board, 2010), Appendix D; ADT is rounded to nearest 100. In addition, a 1.5-percent (Island County) and 5.3-percent (Skagit County) growth factor was applied to the 2016 Washington State Department of Transportation traffic counts to account for population changes between 2016 and 2020 based on median forecasted population projections during that period (Washington State Office of Financial Management, 2017)

Key:
ADT = average daily traffic
LOS = level of service
SR = State Route

Additional trips from Navy personnel and dependents would be expected on other local roads and would vary depending on housing decisions. The largest increase in traffic volumes on local roads would be expected to occur on roads near Ault Field and the Seaplane Base from Navy personnel commuting to and from the installation. The increase in trips on local roadways providing access to Ault Field would range from 6 percent on Ault Field Road east of Langley Boulevard under Alternative 1 to 16 percent on Banta Road west of SR 20 under Alternative 2.

4.12.2.3 Off-base Operations, Level of Service

The majority of road segments studied would not experience a change in LOS under the alternatives compared to the affected environment or the No Action Alternative. SR 20 south of Swantown Road would experience degradation in LOS under each alternative compared to the affected environment. SR 20 South of Swantown Road currently operates at LOS C and would operate at LOS D under Alternative 1, Alternative 3, and the No Action Alternative; under Alternative 2, this road segment would drop to LOS E. The road segment would still operate at or better than the LOS standard of E under each alternative. SR 20 north of Goldie Street currently operates at LOS C but would degrade to LOS D under Alternative 2. However, SR 20 north of Goldie Street would still operate above the LOS standard of E. SR 20 north of Case Road currently operates at LOS C and would continue to operate at that LOS under the No Action Alternative. This road segment would degrade to LOS D under the three action alternatives but continue to operate at a better LOS than the LOS standard of E. SR 20 east of Main Street in Coupeville currently operates at LOS B but would degrade to LOS C under the No Action Alternative and Alternatives 1, 2, and 3. Similar to the other segments that would see a worsening of LOS, SR 20 east of Main Street would continue to operate above LOS standards under each of the alternatives. I-5 south of SR 20 currently operates at LOS C but would operate at LOS D under each of the action alternatives and the No Action Alternative. I-5 would not exceed the LOS standard of D under any of the alternatives. No road segments along SR 20, SR 525, and I-5 under the Proposed Action (any of the alternatives) would fail to operate at or better than LOS standards.

County and local roads would be expected to see some increase in traffic volumes. LOS was only determined for some local roads near Ault Field due to a lack of recent traffic counts on local roads and the regional nature of traffic patterns that is difficult to predict for local roadways (e.g., exact location of residences for Navy personnel and work and school destinations for dependents). The increase in trips on local roads is expected to be greatest near Oak Harbor based on the percentage of Navy personnel currently residing in Oak Harbor and at NAS Whidbey Island. However, these trips would be spread throughout the community and would not be expected to cause significant impacts to traffic.

Local roads providing access to Ault Field gates (i.e., Ault Field Road, Langley Boulevard, Clover Valley Road, North Saratoga Street, and West Banta Road) would be expected to see the greatest increase in traffic from additional Navy personnel under the Proposed Action. Local road segments near Ault Field gates currently operate at LOS C and would continue to operate at LOS C under all alternatives. The Navy has identified the intersection of SR 20 and Banta Road, to the north of Ault Field, as an area of concern. SR 20 currently operates at LOS D, and it is expected to continue to operate at LOS D under all Alternatives. The number of trips using this intersection is expected to increase by 238 vehicles (Alternative 1) to 445 trips (Alternative 2) compared to the No Action Alternative. The intersection is currently controlled by a stop sign on Banta Road and North Gate Drive to SR 20. WSDOT is currently studying improvements to this intersection, such as installation of a traffic signal or roundabout. Construction will begin in spring 2019 and be completed by fall 2019 (WSDOT, 2018b). This increase in

trips at this intersection may result in vehicles queuing in the right and left-turn only lanes on SR 20 and Banta Road from vehicles entering and exiting Ault Field from Saratoga Gate. Vehicle queuing would be limited to peak traffic hours and alleviated by planned intersection improvements, and general LOS on this segment of SR 20 would not be expected to worsen under the Proposed Action under any of the alternatives.

The City of Oak Harbor Comprehensive Plan indicates that currently all intersections meet the city's adopted LOS standards (City of Oak Harbor, 2014a). The plan identified four intersections that may fail to meet LOS standards with additional development:

- SR 20 and Beeksma Drive (LOS F)
- SR 20 and Scenic Heights Road (LOS F)
- Heller Street and SW Swantown Avenue (LOS E)
- Midway Avenue and NE 7th Avenue (LOS F)

Traffic under any of the alternatives may contribute to the degradation of LOS at these intersections; however, the comprehensive plan includes a number of priority projects that would improve LOS at these intersections (City of Oak Harbor, 2016). Oak Harbor and Washington State Department of Transportation also recently completed a traffic study for a corridor of SR 20 that includes the Beeksma Drive intersection and identified the addition of turning lanes or roundabouts as possible roadway improvements to improve LOS along SR 20 (WSDOT, 2012).

An increase in traffic on the Deception Pass Bridges would occur similar to what would be experienced on the segments of SR 20 North of Banta Road and South of Rosario Road. Similar to these segments, the Deception Pass Bridges are not expected to experience a drop in LOS under any of alternatives. The Navy would not transport any new, large military vehicles or equipment across the bridges under any of the alternatives. Recent improvements to the bridges should ensure they remain structurally sound and would not be significantly impacted under any of the alternatives (WSDOT, 2015c; Island County Sub-Regional RTPO, 2012).

Any increase in traffic would likely result in a corresponding increase in collisions involving one or more vehicles, pedestrians, or bicyclists. However, the increase in traffic under each alternative is not expected to be significant, and Island County has a comparatively low collision rate compared to statewide averages. As discussed above, the installation of roundabouts at multiple intersections within the study area is already being considered, and roundabouts have been shown to significantly reduce collision rates while improving traffic flows (City of Oak Harbor, 2014a; WSDOT, 2012; WSDOT, 2017).

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to transportation.

4.12.2.4 On-base Operations

The four gates providing access to NAS Whidbey Island process approximately 19,400 vehicles daily. Assuming one round trip for each Navy personnel under the alternatives, gates at Ault field could see an increase of between 670 and 1,256 daily trips (approximately 3 percent to 6 percent over No Action Alternative traffic volumes entering and exiting the installation). It is assumed the increase in traffic would worsen existing backups identified in the NAS Whidbey Island Transportation Plan at the intersections of Midway Street and Langley Boulevard; the intersection of Midway Street and Charles Porter Avenue; and on Lexington Street near Building 113. The NAS Whidbey Island Transportation Plan

has identified installation of a roundabout at the intersection of Midway Street and Langley Boulevard, and Rerouting Lexington Street to create a 90-degree connection with Princeton Street as potential roadway improvements to improve traffic flow. It is assumed that there would be no housing available on station at the Seaplane Base; however, some additional trips may result from Navy personnel and dependents accessing services located at the Seaplane base.

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to transportation.

4.12.2.5 Transit, Pedestrian, and Bicycle Facilities

Use of transit, pedestrian, and bicycle facilities would be expected to increase under any of the alternatives. The increase in use of these facilities by Navy personnel and dependents is not expected to be significant because it is expected that the automobile would be used as the primary means of transportation. Transit, pedestrian, and bicycle facilities are not expected to significantly reduce actual vehicle trip generation on road segments in the study area. Ferries may see an increase in ridership, but because the majority of new Navy personnel are expected to reside on Whidbey Island and within Skagit County, ferries would not be regularly used for commuting.

Therefore, implementation of the Proposed Action under any of alternatives would not result in significant impacts to transportation.

4.12.3 Transportation Conclusion, Alternatives 1 through 3

Implementation of the Proposed Action would not result in significant impacts to transportation resources. Construction under each alternative would result in an increase in construction vehicles on roadways in and outside of the installation. Roadways are expected to be able to handle the temporary increase in construction vehicles. The increase in personnel and dependents during operations would result in an increase in traffic on local roads. Traffic would be spread throughout roads in Island and Skagit Counties and is not expected to result in LOS falling below established LOS standards. An increase in traffic at gates providing access to NAS Whidbey Island would result under each alternative; however any increase in traffic delays would be limited to peak traffic hours. The automobile is expected to be the primary mode of transportation for Navy personnel and therefore, there would be no significant increase in use of transit, pedestrian, and bicycle facilities. Impacts on traffic and transportation resources are dependent on number of personnel and not number and/or location of aircraft operations; therefore there would be no difference in impacts between scenarios or between average year and high-tempo FCLP year conditions.

If identified by the County or local municipality, measures could be implemented that would reduce congestion during peak traffic hours, such as restricting access at specific gates, changes to gate hours of operations, utilizing flaggers to direct traffic during peak traffic hours, or other traffic control devices. Roadway improvements at Ault field and in Oak Harbor already identified in the NAS Whidbey Island Transportation Plan, the City of Oak Harbor's comprehensive plan, and by the Washington State Department of Transportation would further reduce congestion on SR 20 and local roadways.

4.13 Infrastructure

Infrastructure

Increased consumption or demand for water, wastewater, stormwater, solid waste management, energy, and communications systems from the increase in population that would be spread throughout Island and Skagit Counties.

New facilities under each alternative would also result in increased demand for infrastructure resources.

Existing and future capacity is expected to handle the increases in demand.

This section analyzes the magnitude of anticipated increases or decreases in public works infrastructure demands, considering historic levels, existing management practices, and storage capacity, and evaluates potential impacts to public works infrastructure associated with implementation of the alternatives. Impacts are evaluated by whether they would result in the use of a substantial proportion of the remaining system capacity, reach or exceed the current capacity of the system, or require development of facilities and sources beyond those existing or currently planned.

The assessment of impacts is based on comparing existing use and conditions to anticipated changes in capacity associated with the utilities. Existing utility use and capacity were considered to be the best representation for year 2021 conditions. The analysis compares current use with anticipated future demands as a result of each alternative to determine potential impacts. In circumstances where personnel numbers are expected to increase, multipliers were used for each utility to assess how the increase in personnel would potentially impact the surrounding community. The multipliers are published by the U.S. Geological Survey and the U.S. Department of Energy and represent the average per capita use or per household use. The analysis focuses on the change in demand in relation to the ability of providers to meet additional demands while maintaining the current level of service for existing customers.

Infrastructure that relies on regional sources (i.e., electricity, natural gas) was analyzed at the regional level. Other utilities that could have a direct impact on municipal systems are discussed for specific jurisdictions. The majority of households would be located in Oak Harbor, NAS Whidbey Island, and Anacortes based on the percentage of personnel stationed and employed at NAS Whidbey Island who are residing in each municipality (Coury, 2018). The analysis assumed each new Navy personnel would result in a new household with dependents. The number of dependents under each alternative is discussed in Section 4.10 and would range from 459 (Alternative 1) to 860 (Alternative 2). For the purposes of this analysis, it is not expected there would be any vacant housing units at the Seaplane Base.

4.13.1 Infrastructure, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to the existing infrastructure at Ault Field. Minor increases in demand for utilities would be expected under the No Action Alternative due to an increase in background community growth.

Therefore, no significant impacts to infrastructure would occur with implementation of the No Action Alternative.

4.13.2 Infrastructure, Alternatives 1 through 3

4.13.2.1 Potable Water Impacts

The increase in military personnel and dependents in the study area would result in an increased demand for potable water. However, as shown in Table 4.13-1, NAS Whidbey Island, Oak Harbor, and Anacortes currently have additional water capacity. Therefore, each alternative is expected to have a negligible impact on potable water sources.

Table 4.13-1 NAS Whidbey Island Water Supply Capacity by District

Water District	*Daily Consumption (gpd)*	*Daily Supply Capacity (gpd)*	*Additional Supply Capacity (gpd)*
NAS Whidbey Island	630,000	4,500,000 [1]	3,870,000
Oak Harbor	2,218,000 [2]	2,740,000	522,000
Anacortes	15,700,000 [2]	42,000,000	26,300,000
Skagit PUD	12,000,000	24,000,000	12,000,000

Sources: City of Oak Harbor, 2014b; City of Anacortes, 2018a; NAVFAC, 2014; Skagit PUD, 2014

Notes:
[1] Capacity does not include emergency wells or wells located at OLF Coupeville
[2] Oak Harbor consumption includes NAS Whidbey Island; Anacortes consumption includes NAS Whidbey Island and Oak Harbor

Key:
gpd = gallons per day
PUD = Public Utility District

Table 4.13-2 identifies the projected water demand per alternative. Approximately 94,000 (Alternative 1) to 176,000 (Alternative 2) gallons per day would be needed to support 335 to 628 additional households in the region, depending on the alternative selected. Additional water consumption at Ault Field for new and renovated facilities under each alternative is presented in Table 4.13-3. Facility projections include consumption projects for uses in existing space that would be renovated. Facility consumption would be within the installation's current water supply capacity and would represent less than 1 percent of Ault Field's additional supply capacity.

Table 4.13-2 NAS Whidbey Island Area Projected Water Consumption per Alternative

Water District	*Number of Households*	*Projected Water Usage (gpd)*	*Percent of Additional Supply Capacity*
Alternative 1			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	234	65,600	12.6%
Anacortes	275	77,000	0.3%
Skagit PUD	17	4,700	0.0%
Unincorporated[1]	44	12,200	n/a
Study Area	335	93,800	n/a
Alternative 2			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	439	122,900	23.5%
Anacortes	516	144,400	0.5%
Skagit PUD	31	8,800	0.1%
Unincorporated	82	22,900	n/a
Study Area	628	175,800	n/a
Alternative 3			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	238	67,700	12.8%
Anacortes	280	78,400	0.3%
Skagit PUD	17	4,800	0.0%
Unincorporated	44	12,400	n/a
Study Area	341	95,500	n/a

Source: Nelson, Arthur C., 2004

[1] Unincorporated includes Coupeville, Washington

Note: Totals do not sum because Oak Harbor consumption includes NAS Whidbey Island; Anacortes consumption includes NAS Whidbey Island and Oak Harbor. Totals also do not sum due to rounding. Residential household consumption was assumed to be 280 gpd; additional supply capacity is based on the data shown in Table 4.13-1.

Key:
gpd = gallons per day
n/a = not applicable
PUD = Public Utility District

Table 4.13-3 Projected Annual Water Consumption for New Facilities at Ault Field (gpd)

Alternative	*Armament Storage*	*Mobile Maintenance Facility*	*Hangar Space*	*Total*
No Action Alternative	-	-	-	-
Alternative 1	40	390	560	990
Alternative 2	40	390	1,650	2,080
Alternative 3	40	390	560	990

Source: Navy, 2015b

Note: Projected totals are based on projected water consumption for similar future facilities at NAS Whidbey Island and include new construction and renovated existing structures

Key:
gpd = gallons per day

The percent of existing additional supply capacity in Oak Harbor ranges from 13 percent (Alternative 1) to 24 percent (Alternative 2). Oak Harbor anticipates having sufficient supply capacity until 2035 under current production and until 2060 with increased groundwater production (City of Oak Harbor, 2014b). NAS Whidbey and Oak Harbor both rely on Anacortes as their primary source of water. Total projected water demand represents less than 1 percent of Anacortes' current water capacity of 42 million gallons per day (mgd), and Anacortes has water rights for, and the ability to expand to, 55 mgd (City of Anacortes, 2011, 2018a). Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to public water supplies.

New households in unincorporated areas of Island or Skagit Counties would rely on individual wells or small water districts using groundwater. Due to the small number of new households and the likelihood they would be spread out over a large geographic area, impacts to these water resources are expected to be minimal. Existing houses in unincorporated areas are expected to retain their existing access to water via a well or connection to a water district, and no new wells or connections would be needed. Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to the water district.

Implementation of the Proposed Action under any of the alternatives would not result in significant impacts to potable water.

4.13.2.2 Wastewater Impacts

The increase in military personnel and dependents in the study area would result in an increased production of wastewater. However, as shown in Table 4.13-4, NAS Whidbey Island, Oak Harbor, and Anacortes all currently have additional wastewater treatment capacity. Therefore, the Proposed Action, regardless of alternative selected, is expected to have an impact, but not significant, on wastewater treatment.

Table 4.13-4 NAS Whidbey Island Area Wastewater Treatment Capacity

Water District	*Daily Processing (gallons/day)*	*Daily Capacity (gallons/day)*	*Additional Capacity (gallons/day)*
NAS Whidbey Island	360,000	850,000	490,000
Oak Harbor	2,900,000	5,200,000	2,300,000
Anacortes	1,890,000	4,500,000	2,610,000
Mount Vernon	4,000,000	16,500,000	12,500,000

Sources: USEPA, 2008; Carollo Engineers, 2013; City of Oak Harbor, 2015c, 2017; City of Anacortes, 2018b; Mount Vernon, n.d.

Note: Oak Harbor consumption includes the Seaplane Base. Oak Harbor capacity assumes the Oak Harbor Clean Water Facility is operational by 2018

Table 4.13-5 identifies projected wastewater production under each alternative. Approximately 84,000 to 158,000 gallons per day would be produced by 335 to 628 additional households in the region. Additional wastewater production at Ault Field for new and renovated facilities under each alternative is presented in Table 4.13-6. Facility projections include production for existing space that would be renovated. Facility production would be within the installation's current wastewater treatment capacity of 0.85 mgd, representing less than 1 percent of the additional capacity (USEPA, 2008).

Additional households in Oak Harbor and Anacortes would produce significantly less wastewater than their respective wastewater treatment capacities. Therefore, implementation of the Proposed Action would not result in significant impacts to wastewater treatment.

New households in unincorporated areas of Island and Skagit Counties would rely on on-site wastewater treatment systems. Existing houses are assumed to already have on-site wastewater systems. Property owners would be responsible for ensuring on-site wastewater systems meet state and local regulations.

Implementation of the Proposed Action under any of the alternatives would not result in significant impacts to wastewater.

Table 4.13-5 NAS Whidbey Island Area Projected Wastewater Production

Wastewater District	*Number of Households*	*Projected Wastewater Production (gpd)*	*Percent of Additional Capacity*
Alternative 1			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	234	59,000	2.6%
Anacortes	41	10,300	0.2%
Mount Vernon	17	4,200	0.0%
Unincorporated	44	11,000	n/a
Study Area	335	84,400	n/a
Alternative 2			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	439	110,600	4.8%
Anacortes	77	19,300	0.7%
Mount Vernon	31	7,900	0.1%
Unincorporated	82	20,600	n/a
Study Area	628	158,300	n/a
Alternative 3			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	238	60,100	2.6%
Anacortes	42	10,500	0.4%
Mount Vernon	17	4,300	0.0%
Unincorporated	44	11,200	n/a
Study Area	341	85,900	n/a

Source: Nelson, Arthur C., 2004

Note: Assumed residential household production of 252 gpd; additional capacity based on the totals listed in Table 4.13-4.

Key:
gpd = gallons per day
n/a = not applicable

Table 4.13-6 Projected Annual Wastewater Production for New Facilities at Ault Field (gpd)

Alternative	*Armament Storage*	*Mobile Maintenance Facility*	*Hangar Space*	*Total*
No Action	0	0	0	0
Alternative 1	40	150	560	750
Alternative 2	40	150	1,650	1,840
Alternative 3	40	150	560	750

Source: Navy, 2015b

Note: Totals are based on projected wastewater consumption for similar future facilities at NAS Whidbey Island and include new construction and renovated existing structures

Key:
gpd = gallons per day

4.13.2.3 Stormwater Impacts

The Proposed Action would result in an increase in total impervious surface area at Ault Field. Specifically, 2.3 acres of new impervious surface area would be created on Ault Field as a result of new armament storage, the mobile maintenance facility storage area, vehicle parking, and hangar space. The projected 2.3 acres of impervious surface area would be an increase of less than 1 percent over the existing approximately 600 acres of existing impervious surface at Ault Field. Because more than 1 acre would be disturbed during construction under all alternatives, a construction NPDES stormwater permit would be obtained from the USEPA through its water quality permit program (see Section 4.9.2). The installation would need to implement BMPs to ensure that any new stormwater runoff would not further degrade the quality of water discharged into Dugualla Bay beyond current NPDES permit limits. NAS Whidbey Island currently complies with the State Stormwater Management Manual for Western Washington (NAVFAC, 2016b). BMPs in the manual include proper use and handling of de/anti-icing chemicals for aircraft and requirements and performance standards for LID. No new facilities or housing are expected to be constructed at the Seaplane Base under the Proposed Action; therefore, no impacts to stormwater would result there.

The stormwater system in areas of Oak Harbor is at or over capacity. However, the Proposed Action is not expected to impact stormwater in Oak Harbor or other areas of Island and Skagit Counties. Within the City of Oak Harbor and other areas of Island and Skagit Counties, mitigation is required by property developers under local regulations to reduce stormwater impacts.

If any new housing units were built as a result of the Proposed Action, stormwater impacts would be reduced through the implementation of stormwater management practices required by local and state regulations. Oak Harbor requires developers to be responsible for drainage in and through subdivisions, and it may require storm drain detention or infiltration systems (Code Publishing, 2016).

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to stormwater management systems.

4.13.2.4 Solid Waste Management Impacts

An increase in total solid waste generation is expected at NAS Whidbey Island and within the City of Oak Harbor and other areas of Island and Skagit Counties under the Proposed Action. However, regional landfill facilities have sufficient capacity. Therefore, no significant impact on solid waste management is expected.

Table 4.13-7 shows the projected solid waste production under each alternative. Additional households would generate between approximately 3,500 and 6,500 pounds of solid waste daily. Approximately 1,200 to 2,200 pounds of total solid waste generated would be recycled or composted. New facilities under each alternative would be expected to increase solid waste and hazardous waste generation by approximately 2 percent, based on the increase in square footage of facilities at Ault Field under each alternative. Hazardous waste collection and disposal is discussed in more detail in section 4.15. All municipal solid waste in the study area is sent to the Roosevelt Regional Landfill. Waste generated under any of the alternatives would represent a negligible amount of the facility's permitted capacity of 120 million tons.

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to solid waste management.

Table 4.13-7 NAS Whidbey Island Projected Solid Waste Production (pounds per day)

Alternative	*Total Solid Waste*	*Waste Recycled/Composted*
Alternative 1	3,500	1,200
Alternative 2	6,500	2,200
Alternative 3	3,600	1,200
No Action	0	0

Source: USEPA, 2015b

Notes: Assumes population increase described in Section 4.10.
Assumes solid waste generation rate of 4.4 pounds per person.
Assumes recycling/composting rate of 1.51 pounds per person.

4.13.2.5 Energy Impacts

An increase in total energy consumption at NAS Whidbey Island and within the City of Oak Harbor and other areas of Island and Skagit Counties would be expected under each alternative. However, projections anticipate sufficient energy supply for the foreseeable future. Therefore, no significant impact to energy supply is expected under any of the alternatives.

Approximately 1.4 million kWh to 2.6 million kWh of electricity per year (see Table 4.13-8) is expected to support new households under the Proposed Action. New households would require new connections to the existing distribution system, and some areas may require new infrastructure to accommodate increased capacity, depending on the location and quantity of housing.

The data in Table 4.13-8 show that 25,100 million British thermal units to 47,000 million British thermal units of additional natural gas would be needed within the region to support new homes under the alternatives. Property owners would be responsible for contacting Cascade Natural Gas Corporation (CNG) to obtain a connection to the existing gas distribution system. New properties too far from existing gas mains may be required to find other fuel sources, such as propane; however, the number of these homes would be minimal and would not impact alternative fuel types.

Table 4.13-8 NAS Whidbey Island Projected Annual Energy Consumption

	Households	*Electricity Consumption (kWh)*	*Natural Gas (MMBTU)*
Alternative 1	335	1,390,200	25,100
Alternative 2	628	2,606,000	47,000
Alternative 3	341	1,415,100	25,500
No Action	0	0	0

Source: EIA, 2013

Note: Assumed daily household consumption of 12.57 megawatt hours for electricity and 74.8 MMBTU for natural gas (EIA, 2013).

Key:
kWh = kilowatt hours
MMBTU = million British thermal units

The data in Tables 4.13-9 and 4.13-10 show projected annual electricity and natural gas consumption for new facilities that would be needed at Ault Field under each alternative. New energy use was estimated using projected building square footage and was based on Energy Information Administration commercial building energy-use intensities (EIA, 2008). New federal buildings are required to use 30 percent less energy than those built using traditional construction techniques, and this requirement was incorporated into the energy-use estimates. No areas of concern have been identified at Ault Field, and upgrades or expansion to the existing electric power distribution system on the installation are expected under the alternatives. The Navy would need to perform an economic analysis to determine if the addition of the new facilities at Ault Field to the installation's existing steam system is feasible (NAVFAC, 2016a).

Table 4.13-9 Projected Annual Electricity Consumption for New Facilities at Ault Field (kWh)

Alternative	*Armament Storage*	*Mobile Maintenance Facility*	*Hangar Space*	*Total*
Alternative 1	21,324	160,030	302,570	483,930
Alternative 2	21,324	160,030	891,610	1,072,970
Alternative 3	21,324	160,030	302,570	483,930
No Action	0	0	0	0

Source: NAS Whidbey Island, 2016

Note: Totals are based on projected electricity consumption from new buildings and on EIA's commercial building survey (EIA, 2008), assuming a reduction of 30 percent as required by federal energy efficiency requirements for new federal buildings.

Key:
kWh = kilowatt hours

Table 4.13-10 Projected Annual Natural Gas Consumption for New Facilities at Ault Field (MMBTU)

Alternative	*Armament Storage*	*Mobile Maintenance Facility*	*Hangar Space*	*Total*
Alternative 1	70	540	940	1,550
Alternative 2	70	540	2,760	3,770
Alternative 3	70	540	940	1,710
No Action	0	0	0	0

Source: Navy, 2015b

Note: Totals are based on projected natural gas consumption from new buildings and on EIA's commercial building survey (EIA, 2008), assuming a reduction of 30 percent as required by federal energy efficiency requirements for new federal buildings.

Key:
MMBTU = million British thermal units

As discussed in Section 3.13, NAS Whidbey Island has improved its electricity-use efficiency through implementation of several building renovation projects, thereby reducing its overall energy usage 40

percent between 2003 and 2015 (NAS Whidbey Island, 2016). The projected increase in building energy use from this action under any alternative would be less than 2 percent of total building energy use in 2015. New building energy efficiency standards would be implemented at the new buildings as NAS Whidbey Island continues to reduce site-wide energy use to meet DoD requirements.

The State of Washington is home to abundant and cheap supplies of hydroelectric power. The state is a net exporter of electricity and provides power to the Canadian power grid as well as California and the Southwest (EIA, 2018b). Washington State has produced over 114 million megawatt hours, with retail sales of only 89 megawatt hours (EIA, 2018a). Electricity demand under any of the alternatives would account for less than 1 percent of surplus production.

CNG projects natural gas production of over 4.2 million therms (1 therm equals 100,000 British thermal units) and demand of just over 4 million therms in 2021 (CNG, 2011). Projected natural gas consumption under any of the alternatives represents a small fraction of projected surplus. CNG has acknowledged it will need to identify additional capacity resources or supply arrangements to meet peak demands within its service area. However, the company's integrated resource plan indicates that, thanks to new technologies, the gas supply is adequate to meet growing demands in the Pacific Northwest and North America (CNG, 2011).

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to energy utilities.

4.13.2.6 Communications Impacts

It is expected that existing housing is already connected to telephone networks. Cell phone service is provided by multiple carriers throughout the study area. Capacity is largely driven by consumer demand, and it is expected carriers would install new cell towers or upgrade existing cell towers as needed to meet demand.

The Proposed Action is expected to result in an increased use of the bandwidth of existing communication systems at NAS Whidbey Island resulting from the increased number of personnel and operations. Existing capacity does not currently keep up with peak demand. Renovation or construction of new facilities under the alternatives would include new or upgraded communication networks to facilities, such as fiber optic and copper cables to support alarms, telephones, video teleconferencing, processing, perimeter security, enterprise land mobile radio, legacy applications, environmental controls, and information assurance and cyber security. Upgrades during renovation and construction would ensure existing communications at Ault Field are not significantly impacted.

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to communications utilities.

4.13.2.7 Facilities Impacts

Existing facilities at Ault Field would need to be modified, and new facilities would be constructed in order to support the necessary training, maintenance, and operational requirements under each alternative. See Section 2.3.2.3 for a description of these facilities. All planned construction activities would occur on the north end of the flight line at Ault Field, and sufficient space at the installation exists to accommodate all planned facilities. Renovation and construction of new facilities would have a beneficial impact to facilities under each alternative. No new facilities would be constructed off station.

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to facilities.

4.13.3 Infrastructure Conclusion, Alternatives 1 through 3

Overall, as discussed above, implementation of Alternatives 1 through 3 at NAS Whidbey Island would not result in significant impacts to infrastructure resources. Each alternative would result in increased consumption or demand for water, wastewater, stormwater, solid waste management, energy, and communications systems. Increased demand under each alternative would result from an increase in population that would be spread throughout Island and Skagit Counties. New facilities under each alternative would also result in increased demand for infrastructure resources. Based on existing and future capacity and projected demand, Navy and local infrastructure systems are expected to have sufficient capacity to accommodate the increase in population and facility requirements. Therefore, the impact under each alternative would be less than significant. Difference in impacts between alternatives would only occur due to slight differences in construction and personal needs and would be negligible. Impacts on infrastructure needs are dependent on number of personnel and not number and/or location of aircraft operations; therefore there would be no difference in impacts between scenarios or between average year and high-tempo FCLP year conditions for all resources.

4.14 Geological Resources

This section assesses potential impacts of the Proposed Action on geological resources, including topography, geology, seismic events, and soils. The analysis of geological resources focuses on the area of proposed construction where soils would be disturbed and where there would be potential for soil erosion. BMPs are identified to minimize soil impacts and prevent or control pollutant discharge into stormwater.

4.14.1 Geological Resources, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to geological resources. Therefore, no significant impacts to geological resources would occur with implementation of the No Action Alternative.

4.14.2 Geological Resources, Alternatives 1 through 3

New construction under Alternatives 1 through 3 would include expanded hangar space and/or new hangars, armament storage, maintenance facilities, and expanded personnel parking areas. All planned construction would occur in proximity to the flight line at Ault Field. No construction would occur at OLF Coupeville. Each alternative would result in up to 2.3 acres of new impervious surface at NAS Whidbey Island.

Geological Resources

Construction would not include clearing or blasting of earth or rock, and only include minor grading; therefore, no significant impacts on geologic resources would occur.

There would be no impact on resistance to seismic events because all buildings constructed under the Proposed Action would be designed to conform to the seismic provisions of the Washington State Building Code, and a SPCC plan would be in place during construction.

Impacts to soils during construction could include grading, compaction, and rutting from vehicle traffic and an increase in erosion, but impacts minimized due to the use of BMPs. No significant impacts. BMPs will be implemented to further reduce or eliminate any potential impacts.

4.14.2.1 Geological Resources Potential Impacts

4.14.2.1.1 Topography Impacts

Alternatives 1 through 3 would have no impact on topography as topography at the construction sites would not be affected by minor grading because the sites are generally level.

4.14.2.1.2 Geology Impacts

Under each of the three alternatives, construction would not include clearing or blasting of earth or rock. There would only be minor grading, around 18 to 24 inches deep, which would not affect bedrock or geology. Therefore, no significant impacts on geology would occur.

4.14.2.1.3 Seismic Activity and Geologic Hazard Impacts

Under each of the three alternatives, construction and operation activities, including increases in Growler activity, would not result in impacts to seismic activity, liquefaction risk, landslide risk, or bluff erosion.

In the event of an earthquake, seismic hazards including liquefaction may result in damage to buildings or other structures. Potential for damage from ground shaking is highest in local areas that contain

artificial fill, areas underlain by peat, existing landslides, and valley floors underlain by unconsolidated alluvial sediments. Much of the runway and airfield areas at Ault Field were constructed on artificial fill. However, all buildings constructed under the Proposed Action would be designed to conform to the seismic provisions of the Washington State Building Code. In the event of an earthquake, there is also the potential for spills to occur. However, an SPCC plan would be developed and implemented in order to help prevent spills and to control and clean up spills in the event that they did occur. Therefore, if a seismic event were to occur, human health and safety would be protected to the maximum extent practicable.

4.14.2.1.4 Soils Impacts

Under each of the three alternatives, impacts to soils during construction could include compaction and rutting from vehicle traffic and an increase in erosion. Up to 2.3 acres of new impervious surfaces would increase the quantity and velocity of stormwater runoff, which would increase the susceptibility of surrounding soils to erosion. These impacts would be minimized or avoided by using standard soil erosion- and sedimentation-control techniques at the construction site such as a silt barrier (filter fabric) and appropriate revegetation techniques upon completion. Areas that cannot be covered would have their stormwater runoff retained and diverted to the sanitary sewer system.

Minor grading, around 18 to 24 inches deep, would occur and the soils removed. To the extent possible, soils from grading would be reused on site for the project. Any remaining soils would be taken off station to a designated soil disposal site. In addition, construction practices would meet the policies and objectives contained within OPNAVINST 5090.1D, which are to protect, conserve, and manage the vital elements of the natural resource program, including soils, as well as basing land use practices on scientifically sound conservation procedures and techniques. Construction practices would also be consistent with the goals of the Integrated Natural Resources Management Plan, which directs identification of and appropriate use of soil in accordance with, and within the limits of, its physical characteristics while protecting it from uncontrolled stormwater runoff to prevent and control soil erosion (NAS Whidbey Island, 2013a). Revegetation techniques would include replanting disturbed areas with native plants.

Therefore, implementation of each of the three alternatives would not result in significant impacts on soils.

4.14.3 Geological Resources Conclusion

Overall, as discussed above, implementation of Alternatives 1, 2, or 3 at NAS Whidbey Island would not result in significant impacts to geological resources. Topography would not be impacted because new construction would be conducted in generally level areas. Construction would not include clearing or blasting of earth or rock, and only minor grading, and, therefore, no significant impacts on geologic resources would occur. There would be no impact on resistance to seismic events because all buildings constructed under the Proposed Action would be designed to conform to the seismic provisions of the Washington State Building Code, and an SPCC plan would be in place during construction. Up to 2.3 acres of new impervious surfaces would result from construction activities; however, implementation of each of the three alternatives would not result in significant impacts on soils due to the use of BMPs to reduce or eliminate any potential impacts. Construction activities are similar under the three alternatives and therefore there would be negligible differences in impacts to geological resources.

4.15 Hazardous Materials and Wastes

The hazardous materials and wastes analysis contained in the respective sections addresses issues related to the use and management of hazardous materials and wastes as well as the presence and management of specific cleanup sites at NAS Whidbey Island.

Hazardous Materials and waste Potential Impacts

Hazardous materials and wastes would increase in quantity but would be managed under existing law and Navy regulations and management practices. The existing practices and strategies would successfully manage the use and disposal of these materials.

No proposed construction activities would impact existing DERP sites; therefore, ongoing remedial programs would not be impacted.

4.15.1 Hazardous Materials and Wastes, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur; this means the Navy would not operate additional Growler aircraft and would not add additional personnel at NAS Whidbey Island. Annual Growler airfield operations would be maintained at levels consistent with those identified in the 2005 and 2012 transition EAs. Consequently, there would not be any improvements to the Navy's electronic attack capability and no construction to support additional Growler aircraft or personnel. The No Action Alternative would not meet the purpose of or need for the Proposed Action; however, as required by NEPA, the No Action Alternative is carried forward for analysis in this EIS and provides a benchmark for measuring the environmental consequences of the alternatives.

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change associated with hazardous materials and wastes. Therefore, no significant impacts associated with hazardous materials and wastes would occur with implementation of the No Action Alternative.

4.15.2 Hazardous Materials and Wastes, Alternatives 1 through 3

The analysis of hazardous materials, hazardous waste, and contaminated sites focuses on the potential for these substances to be introduced into the environment during construction activities or from aircraft operations and maintenance. Potentially affected areas consist of proposed construction areas, the airfields, and aircraft support and maintenance facilities.

4.15.2.1 Hazardous Materials and Wastes Potential Impacts

Factors considered in the analysis include the potential for increased human health risk or environmental exposure, as well as changes in the quantity and types of hazardous substances transported, stored, used, and disposed. Operation and maintenance of additional Growler aircraft would not introduce any new hazardous materials and/or waste streams at the NAS Whidbey Island complex. While the addition of 35 or 36 Growler aircraft would increase the amount of hazardous materials handled and generate increased amounts of hazardous wastes, this increase would be managed by existing hazardous material and waste management functions and facilities at NAS Whidbey Island and would not result in significant impacts with regard to the handling, use, storage, or disposal of fuel, oils, and lubricants at the station. Increases in hazardous wastes would be negligibly higher under Alternatives 2 and 3 (36 aircraft) than under Alternative 1 (35 aircraft). There would be no difference in hazardous waste generation between scenarios or between average year and high-tempo FCLP year conditions. All hazardous wastes would continue to be collected and managed on site in

accordance with the installation's hazardous waste management plan. Appropriate procedures for handling of hazardous materials and BMPs for the management of hazardous substances and spill response at NAS Whidbey Island would be applied. Hazardous waste management activities would follow existing procedures for the safe handling, use, and disposal of hazardous substances and waste.

Therefore, the Proposed Action under any alternative would have no impact to hazardous materials and the waste management program at NAS Whidbey Island.

The Navy manages past releases of hazardous wastes through the Defense Environmental Restoration Program (DERP). The methodology for evaluating impact to or from contaminated sites compares the proximity of proposed facility development/construction activities to contaminated sites and considers the operational uses of the facilities to determine potential impacts to or from these sites. The Proposed Action would not interfere with any ongoing remedial programs at the NAS Whidbey Island complex or result in the potentially hazardous exposure of on-site personnel. No proposed construction activities would require removal or disturbance of surface soil, subsurface soil, groundwater, or existing groundcover near or within any DERP sites.

4.15.3 Hazardous Materials and Wastes Conclusion, Alternatives 1 through 3

Hazardous materials and wastes would increase in quantity but would be managed under existing law and Navy regulations and management practices. The existing practices and strategies would successfully manage the use and disposal of these materials. No proposed construction activities would occur within or in proximity to any DERP sites; therefore, ongoing remedial programs would not be impacted at Ault Field.

4.16 Climate Change and Greenhouse Gases

Increased GHG emissions are the primary cause of climate change, and therefore efforts to reduce GHG emissions are considered the best way to reduce the potential impacts of climate change. The Office of the Chief of Naval Operations M-5090.1D *Environmental Readiness Program Manual* (Navy, 2014a) states that the Navy must address the effects of climate change, identifying and quantifying GHG emissions (where possible) that may be generated in executing the Proposed Action, and also describing the beneficial activities being implemented Navy-wide to reduce GHG emissions. The State of Washington has also established goals to minimize climate change impacts and reduce GHG emissions.

As discussed in Chapter 3, global climate change threatens ecosystems, water resources, coastal regions, crop and livestock production, and human health. The continuing increase in GHG concentrations in the Earth's atmosphere will likely result in a continuing increase in global annual average temperature and climate change effects. Global, federal, and state initiatives to reduce GHG emissions have been implemented to reduce the severity of climate change impacts in the future. These changes would occur under all alternatives. The Proposed Action would result in an increase in GHG emissions compared to the No Action Alternative, primarily from the increase in the use of jet fuel for military aircraft operations. The Navy and the DoD have implemented other programs and policies to reduce GHG emissions from other sources. The Navy, the DoD, and the State of Washington have implemented laws, policies, and programs to address the impacts of climate change in the future.

Climate Change and Greenhouse Gases

Climate change will continue to occur, resulting in global impacts affecting Whidbey Island and Puget Sound and the Navy's priorities and mission. Federal, state and local agencies, including the DoD, will continue to assess impacts and define adaptation and mitigation strategies to address them.

Potential changes in GHG emissions from implementation of the Proposed Action would be similar between all three action alternatives and scenarios but greatest under Alternative 2, Scenario A.

For all three alternatives, Scenario a, the option to conduct 80 percent of FCLPs at OLF Coupeville an d20 percent of FCLPs at Ault Field, would result in the greater increase in GHG emissions.

GHG emission s from the Proposed Action should not have a significate impact on Washington's GHG emission goals.

As discussed in Section 1.13, four changes were applied to the noise analysis between release of the Draft EIS and the Final EIS, which include 1) updating the noise model using the latest version of NOISEMAP (Version 7.3); 2) applying refinements to certain flight profiles/aircraft operating assumptions; 3) incorporating the effects of PLM, also known as MAGIC CARPET, into the noise analysis; and 4) updating the number of pilots per squadron.

While climate change has been removed as a priority in some federal policies, the DoD and the Navy have not changed their policies or directives related to the review of and preparation for climate-related impacts (Sobczyk, 2018). Therefore, the analysis in this Final EIS is completed with the same methods defined in the Draft EIS in 2016. The Sabin Center for Climate Change Law at Columbia University (the Sabin Center) conducts regular surveys examining how federal agencies have been implementing climate change analysis in NEPA reviews. The Sabin Center reviewed 31 EISs published in the fall of 2016

and noted that the NAS Whidbey Island Draft EIS was on the "most comprehensive end of the spectrum" in the specific quantification of GHG emissions (Sabin Center, 2017).

4.16.1 Global Climate Change Projections

Because GHGs remain in the atmosphere for long periods of time, the concentrations of GHGs in the atmosphere are likely to continue to remain elevated despite reductions in GHG emissions (IPCC, 2013), and therefore the impacts of climate change described in Chapter 3 are likely to continue to occur. Depending on society's commitment to reducing GHG emissions, the USEPA predicts that carbon dioxide (CO_2) concentrations could be stabilized at about the current levels of 400 parts per million by the end of this century, but if unchecked could reach 1,300 parts per million by then. By 2100, global average temperatures are expected to rise between 2.7 degrees and 8.6 degrees Fahrenheit. These temperature levels would result in a continuation of effects, such as the increase in sea levels, extreme weather events, and ocean acidification—all of which will increase impacts on ecological and economic systems, as well as human health. Significant reductions in GHG emissions will only reduce the severity of climate change impacts; however, such reductions will be critical to limiting impacts on infrastructure and natural resources (USEPA, 2016e)

4.16.1.1 Projections for Impacts of Climate Change to Washington and Puget Sound

Washington State has identified several specific risks to the state and sensitive areas. The direct effects of climate change that will affect the state are warmer temperatures, rising sea levels, reduced snow pack, and extreme weather events (Washington State Department of Ecology, n.d.[h]).

Warmer temperatures will result in milder winters with more rain and hotter summers with less rain. Annual temperatures are predicted to be 2 degrees warmer in the 2020s and 3 degrees warmer in the 2040s compared to 1970 through 1999 averages. These changes will result in a decline in water supplies, more human health risks, a changing growing season, more pests, native plant and animal population decline (including salmon), and wetlands decline (Washington State Department of Ecology, n.d.[l]).

It is difficult to predict rising sea levels and their impacts on the coast of Washington and within Puget Sound because sea level is affected by many different local factors, including ocean currents, wind patterns, land loss, local glacial melt, and even the potential for earthquakes. Sea levels in Puget Sound are projected to continue rising through the 21st century, increasing by 14 to 54 inches by 2100 (relative to 2000), resulting in higher tidal/storm surge and increased coastal inundation, erosion, and flooding (Climate Impacts Group, 2015). Higher sea levels will increase wave heights, particularly during storm surges. Sea level rise effects include coastal community flooding, coastal erosion and landslides, seawater intrusion into groundwater wells, and lost wetlands and estuaries (Washington State Department of Ecology, n.d.[j]).

Reduced snow pack and earlier runoff will have a wide impact in Washington. Average spring snowpack in the Puget Sound region is projected to decline by 42 to 55 percent by the 2080s (relative to 1970 through 1999) (Climate Impacts Group, 2015). Less snow means that glaciers are not replenished. Downstream effects that will likely increase in the future include changes in the timing of peak freshwater flows, power output and hydropower facilities, winter recreation, fish migration, and water availability in the dry summer season (Washington State Department of Ecology, n.d.[k]).

Extreme weather resulting from climate change in Washington is likely to take the form of a greater intensity of wind storms, heat waves, droughts, heavy rains, snow storms, and dust storms. Storms

result in flooding, landslides, hail, and wind that endanger life, damage property, and challenge state and local emergency response capabilities. Heat waves are also dangerous to temperature-sensitive individuals (e.g., infants and elderly) and natural habitats (Washington State Department of Ecology, n.d.[i]).

Many Pacific salmon populations could be harmed by warming stream temperatures, increasing winter peak flows, and decreasing summer low flows, which could affect salmon reproduction, growth, and survival. Some species may not be harmed; however, it is likely that salmon species with an in-stream rearing life stage (e.g., steelhead, some Chinook sockeye, and Coho) will be affected (Climate Impacts Group, 2015).

Ocean water is becoming more acidic because of elevated levels of CO_2 related to human activities. The pH of Washington's coastal waters is projected to decline by 0.14 to 0.32 by 2011 (relative to 1986 through 2005 levels) (Climate Impacts Group, 2015). This process, known as ocean acidification, may be having negative impacts on marine animals, particularly shellfish. Scientists predict that ocean acidification will continue in the future, which could cause significant developmental problems for many species in Washington, such as oysters, clams, barnacles, geoduck, and plankton, which are important food sources for salmon, seabirds, whales and other marine wildlife in the region (Washington State Department of Ecology, n.d.[m]).

4.16.1.2 Projections for Impacts of Climate Change on Department of Defense

As discussed in Chapter 3, The 2014 DoD Climate Change Adaptation Roadmap indicates that rising global temperatures, changing precipitation patterns, increasing frequency or intensity of extreme weather events, and rising sea levels and associated storm surges are likely to affect the DoD's activities, and adaptation will require consideration of climate change in DoD plans, operations, training, infrastructure, and acquisition (DoD, 2014).

4.16.1.3 Projections for Impacts of Climate Change at NAS Whidbey Island

As NAS Whidbey Island is located within Puget Sound, it will experience the same climate change effects described above. Increased sea levels, storm surges, and extreme weather events could have an impact on NAS Whidbey Island's existing facilities and infrastructure. Station facilities are at elevations ranging from 10 feet to 75 feet above sea level. Sea level increases for the Strait of Juan de Fuca are projected to be 1 to 6 inches by 2030, 1 to 14 inches by 2050, and 6 to 55 inches by 2100 (Climate Impacts Group, 2015). While this predicted increase would not cause a permanent inundation of the station, it is likely to increase the potential for flooding events at the station during storms. Higher sea levels also increase the power of waves and the associated rate of coastal erosion around the station.

Climate change could also affect operations at NAS Whidbey Island. Extreme weather could impact aircrew training schedules, and heat waves may increase the number of "black flag" days (suspended outdoor training due to heat), fire hazards, or dust generation during activities. Increases in cooling degree days will require more energy for cooling of buildings and may require increased capability of building cooling systems. Increased frequency of intense rain events could tax the existing stormwater treatment systems, leading to localized flooding and increased pollution levels in runoff.

4.16.2 Changes in Greenhouse Gas Emissions from the Proposed Action

In accordance with Navy guidance (Navy, 2014a), the following section quantifies the estimated GHG emissions that would be generated in executing the Proposed Action.

4.16.2.1 Changes in Greenhouse Gas Emissions from the Proposed Action, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No new stationary sources would be installed, and no existing stationary sources would have an increase in emissions. There would be no significant change in aircraft operations. Therefore, no significant impacts to GHG emissions would occur with implementation of the No Action Alternative.

4.16.2.2 Changes in Greenhouse Gas Emissions from the Proposed Action, Alternative 1

Alternative 1 would expand carrier capabilities by adding three additional aircraft to each existing carrier squadron and augmenting the FRS with eight additional aircraft (a net increase of 35 aircraft). While no new squadrons would be created, this expansion would require new buildings and the renovation of space for maintenance hangars, armament storage, and classroom space. The Navy would also construct additional paved areas for vehicle parking and aircraft runway improvements and parking areas. The expansion of Growler operations would require an increase of 335 personnel at the NAS Whidbey Island complex. Alternative 1 represents the largest increase in aircraft operations of the three alternatives. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 1.

Implementation of Alternative 1 would contribute directly to emissions of GHGs from the combustion of fossil fuels. Fossil fuel combustion results in the GHG emissions of primarily CO_2, with negligible amounts of methane (CH_4) and nitrous oxide (N_2O). The emissions of CO_2 from aircraft are used as the carbon dioxide equivalent (CO_2e) emissions per AESO's recommendation (AESO, 2014). CH_4 and N_2O emissions have been converted to CO_2e and included in the totals where emissions factors are available. GHG emissions have been calculated using resources and emission factors as described in Section 4.4 (Air Quality), and detailed assumptions and calculations are provided in Appendix B.

As listed in Table 4.4-1, construction activities would generate approximately 1,950 metric tons (MT) of CO_2e during construction, but these emissions would be temporary and would occur before implementation of the Proposed Action.

Once the Proposed Action has been implemented, ongoing increased stationary source operations, Growler aircraft operations, and personnel commuting would generate an increase in GHG emissions compared to No Action Alternative GHG emissions. Table 4.16-1 provides a summary of the annual GHG emissions under the five different scenarios.

Table 4.16-1 NAS Whidbey Island Complex Annual GHG Emissions, Alternative 1

Emission Source	GHG Emissions (MT per year CO_2e)					
	No Action	Alt 1A	Alt 1B	Alt 1C	Alt 1D	Alt 1E
Stationary Sources						
Site-wide Total GHG Emissions (2016 Reported)	11,575					
New Electricity Building Use (Indirect)	0	181	181	181	181	181
New Natural Gas Building Use (Direct)	0	276	276	276	276	276
Total Change in Stationary CO_2e Emissions		456	456	456	456	456
% increase in Stationary CO_2e Emissions		3%	3%	3%	3%	3%
Mobile Sources						
Aircraft Operations	87,730	125,906	118,430	111,453	123,547	113,317
GSE Emissions	134	166	159	154	164	156
Personnel Commute Emissions	9,091	9,833	9,833	9,833	9,833	9,833
Total Action-related Mobile CO_2e Emissions	96,954	135,904	128,422	121,440	133,543	123,305
Change in Mobile CO_2e Emissions		38,950	31,467	24,485	36,589	26,351
% increase in Mobile CO_2e Emissions		40%	32%	25%	37%	27%
Total Change in Emissions (Stationary and Mobile)		39,375	31,899	24,922	37,016	26,786
2013 Total CO_2e from Transportation in Washington State[1]		42,500,000				
Change in Mobile Emissions as % of Total 2013 Transportation CO_2e Emissions in Washington State		0.09%	0.07%	0.06%	0.09%	0.06%
2013 Total CO_2e from Aircraft in Washington State[1]		8,000,000				
Change in Aircraft Emissions as % of Total 2013 Aircraft CO_2e Emissions in Washington State		0.49%	0.39%	0.31%	0.46%	0.33%

Note:
[1] Washington State Department of Ecology, 2016b

Key:
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
MT = metric tons

Site-wide stationary source GHG emissions would increase by 3 percent, and site-wide mobile GHG emissions associated with the Proposed Action would increase by 25 percent to 40 percent. Regional GHG emissions inventories that include military aircraft emissions are not available; therefore, GHG emissions have been compared to applicable state sector totals (i.e., transportation and aircraft emissions) to provide a reference for the scale of emissions from the Proposed Action. The change in Growler GHG emissions represents less than 1 percent of aircraft emissions within the State of Washington.

Washington State has established GHG reduction targets to reduce overall emissions (Revised Code of Washington [RCW] 70.235.020 Washington State Legislature, 2008), and increases in GHG emissions could affect the state's efforts to meet these targets. While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million metric tons of equivalent carbon dioxide ($MTCO_2e$) between 1990 and 2013 (refer to Table 3.16-1 in Section 3.16), annual aircraft GHG emissions decreased from 9.1 to 6.57 million $MTCO_2e$ over the same period (Washington State Department of Ecology, 2016b). The change in GHG emissions from the Proposed Action would only result in a small percentage of total aircraft GHG emissions in the State of Washington. Therefore, the GHG emissions from the Proposed Action should not have a significant impact on Washington's GHG emission goals.

4.16.2.3 Changes in Greenhouse Gas Emissions from the Proposed Action, Alternative 2

Alternative 2 would expand expeditionary and carrier capabilities by establishing two new expeditionary squadrons, adding two additional aircraft to each existing carrier squadron, and augmenting the FRS with eight additional aircraft (a net increase of 36 aircraft). This expansion would require construction of new buildings for maintenance hangars, armament storage, and classroom space. The Navy would also construct additional paved areas for vehicle parking and aircraft runway improvements and parking areas. The expansion of Growler operations would require an increase of 628 personnel at the NAS Whidbey Island complex. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 2.

Implementation of Alternative 2 would contribute directly to emissions of GHGs from the combustion of fossil fuels. GHG emissions have been calculated using resources and emission factors as described in Section 4.4 (Air Quality), and detailed assumptions and calculations are provided in Appendix B. As listed in Table 4.4-1, construction activities would generate approximately 1,950 MT of CO_2e during construction, but these emissions would be temporary and would occur before implementation of the Proposed Action.

Once the Proposed Action has been implemented, ongoing increased stationary source operations, Growler aircraft operations, and personnel commuting would generate an increase in GHG emissions under Alternative 2 compared to No Action Alternative GHG emissions. Table 4.16-2 provides a summary of the annual GHG emissions under the five different scenarios.

Table 4.16-2 NAS Whidbey Island Complex Annual GHG Emissions, Alternative 2

Emission Source	GHG Emissions (MT per year CO_2e)					
	No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E
Stationary Sources						
Site-wide Total GHG Emissions (2016 Reported)	11,575					
New Electricity Building Use (Indirect)	0	181	181	181	181	181
New Natural Gas Building Use (Direct)	0	276	276	276	276	276
Total Change in Stationary CO_2 Emissions		456	456	456	456	456
% increase in Stationary CO_2 Emissions		3%	3%	3%	3%	3%
Mobile Sources						
Aircraft Operations	87,730	126,132	118,932	112,238	123,900	114,509
GSE Emissions	134	170	163	158	168	160
Personnel Commute Emissions	9,091	10,482	10,482	10,482	10,482	10,482
Total Action Related Mobile CO_2 Emissions	**96,954**	**136,783**	**129,577**	**122,878**	**134,549**	**125,151**
Change in Mobile CO_2 Emissions		**39,829**	**32,623**	**25,924**	**37,595**	**28,197**
% increase in Mobile CO_2 Emissions		40%	33%	26%	38%	29%
Total Change in Emissions (Stationary and Mobile)		**40,285**	**33,079**	**26,380**	**38,051**	**28,653**
2013 Total CO_2 from Transportation in Washington State[1]		40,400,000				
Change in Mobile Emissions as % of Total 2013 Transportation CO_2e Emissions in Washington State		0.10%	0.08%	0.06%	0.09%	0.07%
2013 Total CO_2e from Aircraft in Washington State[1]		6,570,000				
Change in Aircraft Emissions as % of Total 2013 Aircraft CO_2e Emissions in Washington State		0.61%	0..50%	0.39%	0.57%	0.43%

Note:
[1] Washington State Department of Ecology, 2016b

Key:
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
MT = metric tons

Site-wide stationary source GHG emissions would increase by 3 percent, and site-wide mobile GHG emissions associated with the Proposed Action would increase by 26 percent to 40 percent. Regional GHG emissions inventories that include military aircraft emissions are not available; therefore, GHG emissions have been compared to applicable state sector totals (i.e., transportation and aircraft emissions) to provide a reference for the scale of emissions from the Proposed Action. The change in Growler emissions represents less than 1 percent of aircraft GHG emissions within the State of Washington.

Washington State has established GHG reduction targets to reduce overall emissions (RCW 70.235.020 Washington State Legislature, 2008), and increases in GHG emissions could affect the state's efforts to meet these targets. While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million $MTCO_2e$ between 1990 and 2013 (refer to Table 3.16-1 in Section 3.16), annual aircraft GHG emissions decreased from 9.1 to 6.57 million $MTCO_2e$ over the same period (Washington State Department of Ecology, 2016b). The change in GHG emissions from the Proposed Action would only result in a small percentage of total aircraft GHG emissions in the State of Washington. Therefore, the GHG emissions from this Proposed Action should not have a significant impact on Washington's GHG emission goals.

4.16.2.4 Changes in Greenhouse Gas Emissions from the Proposed Action, Alternative 3

Alternative 3 would expand expeditionary and carrier capabilities by adding three additional aircraft to each existing expeditionary squadron, adding two additional aircraft to each existing carrier squadron, and augmenting the FRS with nine additional aircraft (a net increase of 36 aircraft). This expansion would require new buildings and the renovation of space for maintenance hangars, armament storage, and classroom space. The Navy would also construct additional paved areas for vehicle parking and aircraft runway improvements and parking areas. The expansion of the Growler community would require an increase of 341 personnel at the NAS Whidbey Island complex. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 3.

Implementation of Alternative 3 would contribute directly to emissions of GHGs from the combustion of fossil fuels. GHG emissions have been calculated using resources and emission factors as described in Section 4.4 (Air Quality), and detailed assumptions and calculations are provided in Appendix B. As listed in Table 4.4-1, construction activities would generate approximately 1,950 MT of CO_2e during construction, but these emissions would be temporary and would occur before implementation of the Proposed Action.

Once the Proposed Action has been implemented, ongoing increased stationary source operations, Growler aircraft operations, and personnel commuting under Alternative 3 would generate an increase in GHG emissions compared to existing and No Action Alternative GHG emissions. Table 4.16-3 provides a summary of the annual GHG emissions under the five different scenarios.

Site-wide stationary source GHG emissions would increase by 3 percent, and site-wide mobile GHG emissions associated with the Proposed Action would increase by 25 percent to 40 percent. Regional GHG emissions inventories that include military aircraft emissions are not available; therefore, emissions have been compared to state sector totals (i.e., transportation and aircraft emissions) to provide a reference for the scale of emissions from the Proposed Action. The change in Growler emissions represents less than 1 percent of aircraft emissions within the State of Washington.

Table 4.16-3 NAS Whidbey Island Complex Annual GHG Emissions, Alternative 3

Emission Source	CO_2e Emissions (Metric TPY)					
	No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E
Stationary Sources						
Site-wide Total GHG Emissions (2016 Reported)	11,575					
New Electricity Building Use (Indirect)	0	181	181	181	181	181
New Natural Gas Building Use (Direct)	0	276	276	276	276	276
Total Change in Stationary CO_2 Emissions		456	456	456	456	456
% increase in Stationary CO_2 Emissions		3%	3%	3%	3%	3%
Mobile Sources						
Aircraft Operations	87,730	125,813	119,164	112,008	123,588	114,259
GSE Emissions	134	169	164	158	167	160
Personnel Commute Emissions	9,091	9,846	9,846	9,846	9,846	9,846
Total Action Related Mobile CO_2 Emissions	**96,954**	**135,827**	**129,174**	**122,012**	**133,601**	**124,265**
Change in Mobile CO_2 Emissions		**38,873**	**32,220**	**25,057**	**36,647**	**27,310**
% increase in Mobile CO_2 Emissions		40%	33%	25%	37%	28%
Total Change in Emissions (Stationary and Mobile)		39,295	32,646	25,490	37,070	27,741
2013 Total CO_2e from Transportation in Washington State[1]		40,400,000				
Change in Mobile Emissions as % of Total 20123 Transportation CO_2e Emissions in Washington State		0.10%	0.08%	0.06%	0.09%	0.07%
2013 Total CO_2e from Aircraft in Washington State[1]		6,570,000				
Change in Aircraft Emissions as % of Total 2013 Aircraft CO_2e Emissions in Washington State		0.59%	0.49%	0.38%	0.56%	0.42%

Note:

[1] Washington State Department of Ecology, 2016b

Key:

CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
TPY = tons per year

Washington State has established GHG reduction targets to reduce overall emissions (RCW 70.235.020 Washington State Legislature, 2008), and increases in GHG emissions could affect the state's efforts to meet these targets. While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million $MTCO_2e$ between 1990 and 2013, annual aircraft GHG emissions decreased from 9.1 to 6.57 million $MTCO_2e$ (Washington State Department of Ecology, 2016b) over the same period. The change in GHG emissions from the Proposed Action would only result in a small percentage of total aircraft GHG emissions in the State of Washington. Therefore, the GHG emissions from the Proposed Action should not have a significant impact on Washington's GHG emission goals.

4.16.2.5 Greenhouse Gas Summary Conclusions, Alternatives 1 through 3

The Sabin Center for Climate Change Law at Columbia University conducts regular surveys examining how federal agencies have been implementing climate change analysis in National Environmental Policy Act (NEPA) reviews. The center reviewed 31 environmental impact statements (EISs) published in the fall of 2016, and noted that the NAS Whidbey Island Draft EIS was on the "most comprehensive end of the spectrum" in the specific quantification of GHG emissions (Sabin Center, 2017).

Potential changes in GHG emissions from implementation of the Proposed Action would be similar between all three alternatives and scenarios but greatest under Alternative 2, Scenario A (see Table 4.16-2). For air emissions, the difference in aircraft emissions between the scenarios within each alternative is more distinctive than the differences between the alternatives.

For all three alternatives, Scenario A, the option to conduct 80 percent of FCLPs at OLF Coupeville and 20 percent of FCLPs at Ault Field, would result in the greater increase in GHG emissions. Differences are less a result of the number of operations as they are due to the type of operations that change between the scenarios (e.g., more LTOs have been projected to occur at Ault Field if FCLPs are relocated to OLF Coupeville). A smaller increase is a result of the transit back and forth from the OLF.

As discussed in Chapter 3, based on average time-in-mode assumptions, each typical sortie with one full landing and take-off cycle (including all ground-level operations, such as taxiing and refueling operations), transit to OLF Coupeville, and eight T&G operations would take 95 minutes, or 1.6 hours, including an estimated 40 seconds total of AB use. Each such sortie would burn 1,480 gallons of jet fuel and produce 14.25 $MTCO_2e$, for an average fuel use of 937 gallons per hour and an average emission rate of 9.03 $MTCO_2e$ per hour. This analysis has estimated the emissions that will be produced by VAQ OLF training over the course of a year. While there are a certain number of operations per year, they are not constant, and power settings vary based on the type of operation. The highest emission increases are predicted under Alternative 2, Scenario A, with a total of 126,132 $MTCO_2e$ generated by all flight operations at Ault Field and OLF Coupeville from the 118 Growlers that would be stationed at NAS Whidbey Island under this alternative. The average annual GHG emissions per aircraft would be 1,069 $MTCO_2e$ per year, which is equivalent to the combined average annual CO_2e emission of 205 cars, if each car emits an average of 4.7 $MTCO_2e$ per year (USEPA, 2016l).

Washington State has established GHG reductions targets to reduce overall emissions (RCW 70.235.020 Washington State Legislature, 2008), and increases in GHG emissions could affect the state's efforts to meet these targets. While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million $MTCO_2e$ between 1990 and 2012 (Refer to Table 3.16-1 in Section 3.16), annual aircraft GHG emissions decreased from 9.1 to6.57 million $MTCO_2e$ over

the same period (Washington State Department of Ecology, 2016b). The change in GHG emissions from the Proposed Action would only result in a small percentage of total aircraft GHG emissions in the State of Washington. Therefore, the GHG emissions from the Proposed Action should not have a significant impact on Washington's GHG emission goals.

Chapter 173-442 of the Washington Administrative Code, The Clean Air Rule, was adopted in September 2016 and regulates the businesses that are responsible for about two-thirds of carbon pollution in Washington State. NAS Whidbey Island was not identified by the Washington State Department of Ecology as a potentially eligible party under the new clean air rule (Washington State Department of Ecology, 2016b) because the installation's stationary emissions have historically been below 25 tons.

GHG emissions would also be higher under the high-tempo FCLP year conditions across all three alternatives (see Table 4.16-4 and Appendix B for details). High-tempo FCLP conditions would produce 4 to 6 percent more GHG emissions under Alternative 2 compared to the average conditions, and 1-4 percent more under Alternatives 1 and 3. This is a result of not only changes in the number of operations but also in the type of operations.

Table 4.16-4 Total Change in GHG Emissions, All Alternatives

Alternative/Scenario	*Average Operations*	*High-Tempo Operations*	*Percent Difference*
	$MTCO_2e$		
Alternative 1			
Scenario A	39,375	40,828	4%
Scenario B	31,899	32,770	3%
Scenario C	24,922	25,254	1%
Scenario D	37,016	38,254	3%
Scenario E	26,786	27,854	4%
Alternative 2			
Scenario A	40,250	42,538	6%
Scenario B	33,050	34,653	5%
Scenario C	26,356	27,407	4%
Scenario D	38,018	40,047	5%
Scenario E	28,627	29,889	4%
Alternative 3			
Scenario A	39,295	40,702	4%
Scenario B	32,646	33,690	3%
Scenario C	25,490	25,982	2%
Scenario D	37,070	38,209	3%
Scenario E	27,741	28,463	3%

Key:
CO_2e = carbon dioxide equivalent
MT = metric ton

As described in Chapter 3, the DoD, Navy, and NAS Whidbey Island have implemented many policies and programs to reduce GHG emissions. In the 2010 Navy Energy Vision (Navy, 2010b), the Secretary of the Navy set goals to reduce the reliance on petroleum by increasing energy efficiency and the use of alternative energy, which will reduce GHG emissions. NAS Whidbey Island has implemented strategies

and programs to reduce GHG emissions from the NAS Whidbey Island complex. Improved energy efficiency through implementation of several building renovation projects has reduced overall facility energy usage by 40 percent between 2003 and 2015. Recent improvements have resulted in a site-wide reduction of reported GHG emissions. Reported site-wide stationary GHG emissions from NAS Whidbey Island peaked at 15,947 $MTCO_2e$ and were down to 11,371 $MTCO_2e$ in 2014 (see Table 3.16-2). 2015 and 2016 saw an increase in GHG emissions attributed to increased vehicle fuel use (i.e., from storage and dispensing sources). (Stewart, 2017). NAS Whidbey Island will continue to work toward the achievement of the DoD's GHG reduction goals (NAS Whidbey Island, 2016).

4.16.3 Adaptation and Mitigation

4.16.3.1 Washington State

As discussed in Chapter 3, the State of Washington has implemented laws, regulations, and policies to continue to research and address climate change. Washington State's *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy* (Washington State Department of Ecology, 2012) was published to describe the risks of climate change to the state and identify the state's priorities in addressing these risks. The report identifies the following strategies:

1. Protect people and communities most vulnerable to climate impacts by increasing state and local public health capacity to monitor, detect, plan, and respond to emerging threats and climate-related emergencies. Also increase awareness of climate risks among the public and health-care providers.
2. Reduce risk of damage to buildings, transportation systems, and other infrastructure. Identify vulnerable areas and take proactive steps to reduce risks to infrastructure, avoid climate risks when siting new infrastructure and planning for growth, and enhance capacity to prepare for more frequent and severe flooding, rising sea levels, wildfires, and changes in energy supply and demand.
3. Reduce risks to the ocean and coastlines. Help communities prepare for rising sea levels and storm surges and protect people and property. Prevent the degradation of habitats and create opportunities for upland habitat creation. Reduce shellfish vulnerability by reducing land-based contributions of carbon and polluted runoff to the marine environment.
4. Improve water management by promoting integrated approaches that consider future water supply and address competing water demands for irrigated crops, fish, municipal and domestic water needs, and energy generation. Implement enhanced water conservation and efficiency programs and incorporate climate change realities into agency decision making.
5. Reduce forest and agriculture vulnerability by enhancing surveillance of pests and disease. Promote and transition to species that are resilient to changing climate conditions, conserve productive and adaptive forest and farmland, and reduce forest and wildland fire risk in vulnerable areas.
6. Safeguard fish, wildlife, habitat, and ecosystems and improve the ability of wildlife to migrate to more suitable habitat as the climate shifts. Protect and restore habitat and sensitive and vulnerable species. Reduce existing stresses from development, pollution, unsustainable harvest, and other factors.

7. Support the efforts of local communities and strengthen capacity to respond and engage the public. Identify existing and new funding mechanisms to support adaptation work at the local level, and ensure a coordinated and integrated approach among levels of government and society. Support research and monitoring and ensure scientific information is accessible and responds to needs of decision-makers (Washington State Department of Ecology, 2012).

Many Puget Sound communities, government agencies, and organizations are preparing for the effects of climate change on water resources. For example, King County has begun modifying its flood infrastructure in preparation for projected flooding increases (Climate Impacts Group, 2015).

4.16.3.2 Department of Defense

The DoD has identified the potential impacts of climate change and addressed the need to plan for the worsening of natural events that will result from climate change. As described in Chapter 3, the federal government, DoD, Navy, and NAS Whidbey Island are in the process of implementing programmatic solutions for the adaptation to and mitigation of climate change.

The DoD's progress toward achieving the federal sustainability goals is outlined in the annual Strategic Sustainability Performance Plan (DoD, 2015). Table 4.16-5 provides a summary of the DoD's objectives and specific goals.

The Navy implements these federal and DoD policies to reduce energy usage, GHG emissions, and energy vulnerability. In the 2010 Navy Energy Vision (Navy, 2010b), the Secretary of the Navy set goals to improve energy security, increase energy independence, and reduce the reliance on petroleum by increasing energy efficiency and the use of alternative energy. The strategic imperatives of this report include:

- Alternative Energy Afloat: By 2020, half of the Navy's total energy consumption afloat will come from alternative sources.
- "Great Green Fleet": The Navy operates a carrier strike group composed of nuclear ships, hybrid electric ships running on biofuel, and aircraft flying on biofuel.
- Increase Alternative Energy Ashore: By 2020, the Navy will produce at least 50 percent of shore-based energy requirements from alternative sources; 50 percent of Navy installations will be net-zero.
- Reduce Non-Tactical Petroleum Use: By 2015, the Navy will reduce petroleum use in the commercial Fleet by 50 percent through the use of hybrid, electric, and flex-fuel vehicles (Navy, 2010b).

The DoD and the Navy are actively engaging in improving their resiliency to climate change--from conducting screening surveys to assess vulnerability of DoD installations from severe weather and projected changes in climate, to developing tools to help installations assess how much water they need to satisfy mission requirements. As climate science advances, the DoD and Navy will regularly evaluate climate change risks and opportunities in order to develop policies and plans to manage its effects on the DoD operating environment, missions, and facilities.

Table 4.16-5 DoD Strategic Sustainability Performance Plan Objectives

Objective #1: The Continued Availability of Resources Critical to the DoD Mission is Ensured
GOAL #1: The Use of Fossil Fuels Reduced
1.1 - Reduction in Facility Energy Intensity
1.2 - Use of Renewable Energy [Title 10, United States Code §2911(e)(2)]
1.3 - Reduction in Fleet Petroleum Use (non-tactical)
GOAL #2: Water Resources Management Improved
2.1 - Reduction in Facility Potable Water Intensity
2.2 - Reduction in Facility Industrial and Irrigation Water
2.3 - Stormwater Runoff Managed to Maintain Pre-Development Hydrology
Objective #2: DoD Readiness Maintained in the Face of Climate Change
GOAL #3: Greenhouse Gas Emissions Associated with DoD Operations Reduced
3.1 - Reduction in Scope 1&2 GHG Emissions
3.2 - Reduction in Scope 3 GHG Emissions
3.3 - Increase in Teleworking by Eligible Employees
3.4 - Reduced Scope 3 GHG Emissions from Employee Air Travel
GOAL #4: DoD Climate Change Risks Assessed and Resiliency Improved
Objective #3: The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution
GOAL #5: Solid Waste Minimized and Optimally Managed
5.1 - Increase in DoD Employees Covered by Policies to Reduce the Use of Printing Paper
5.2 - Increase in Non-Hazardous Solid Waste Diverted from the Waste Stream
5.3 - Increase in Construction and Demolition Debris Diverted from the Waste Stream
GOAL #6: The Use and Release of Chemicals of Environmental Concern Minimized
6.1 - Reduction in On-Site Releases and Off-Site Transfers of Toxic Chemicals
6.2 - DoD Personnel and Contractors Who Apply Pesticides Are Properly Certified
6.3 - Integrated Pest Management Plans Prepared, Reviewed, and Updated Annually
Objective #4: Continuous Improvement in the DoD Mission Achieved through Management and Practices Built on Sustainability and Community
GOAL #7: Sustainability Practices Become the Norm
7.1 - 95% of Procurement Conducted Sustainably
7.2 - Electronic Stewardship and the Efficient Use of Data Centers
7.3 - Sustainable Buildings (Conforming to the Guiding Principles)
7.4 - Environmental Management Systems Effectively Implemented and Maintained

Source: DoD, 2015

Key:
DoD = U.S. Department of Defense
GHG = greenhouse gas

NAS Whidbey Island has implemented many sustainability strategies and programs at the NAS Whidbey Island complex. Improved energy efficiency through implementation of several building renovation projects has reduced overall facility energy usage by 40 percent between 2003 and 2015, and water-use efficiency projects have reduced water use by 48 percent between 2007 and 2015. Both improvements in water and energy use exceed the DoD's interim sustainability goals for these resources (NAS Whidbey Island, 2016). Increased sea levels, storm surges, and risk of flooding may affect new and existing infrastructure and buildings, as well as Growler operations.

As discussed in Chapter 3, the Navy and the DoD continue to review and plan for the impacts of climate change on all Navy operations, adjusting strategies and programs as new information becomes available (DoD, 2014; Navy, 2010b).

4.17 Summary of Potential Impacts to Resources

A summary of the potential impacts associated with each of the action alternatives and the No Action Alternative is presented in Table 4.17-1. This EIS does not identify any new mitigation measures considering the degree of environmental impacts for the implementation of alternatives but does identify measures that could be taken to develop suggested mitigation techniques, including, but not limited to, stormwater retention practices. Appendix H (Noise Mitigation) provides an overview of existing, voluntary noise-mitigation measures that are in place at the NAS Whidbey Island complex. Appendix H also describes potential noise-mitigation measures that are being evaluated for potential future implementation as the Navy takes a proactive approach to noise mitigation and addressing community concerns. Under the Section 106 process, further consultation and development of a MoA to address adverse effects on historic resources is ongoing. The Navy is consulting with the Washington SHPO, the Advisory Council on Historic Preservation, tribes, and consulting parties regarding the MoA. If mitigation measures are identified during this process, they would be identified in the ROD. These measures would be funded, and efforts to ensure their successful completion or implementation would be treated as compliance requirements.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Airspace and Airfield Operations (No significant impact from projected increase in aircraft operations)					
Airspace (Sections 4.1.1; 4.1.2.1; 4.1.3.1; 4.1.4.1)					
No Action Alternative	The Navy would not operate additional Growler aircraft at Ault Field, and therefore there would be no impact on airspace.				
Action Alternative 1	No change in operational procedures or changes in departure/arrival route, and therefore no modification required to the current airspace. Additional Growler aircraft would be operating within the same flight parameters currently used within the controlled airspace surrounding the Naval Air Station (NAS) Whidbey Island complex, and therefore no adverse effect on civil or commercial aviation airspace.				
Action Alternative 2	Impacts are similar to those depicted under Alternative 1, Scenario A.				
Action Alternative 3	Impacts are similar to those depicted under Alternative 1, Scenario A.				
Airfield Operations (annual) (Sections 4.1.1; 4.1.2.1; 4.1.3.1; 4.1.4.1)					
No Action Alternative	The Navy would not operate additional Growler aircraft at Ault Field, and there would be no increase in annual airfield operations: 6,500 operations at Outlying Land Field (OLF) Coupeville and 81,700 operations at Ault Field.				
Action Alternative 1	The Navy would add 35 additional Growler aircraft				
	Change in annual operations: • +9,100 at Ault Field • +18,800 at OLF Coupeville Approximately 27,900 annual operations increase for the NAS Whidbey Island complex (33-percent increase over the No Action Alternative)	**Change in annual operations:** • +17,100 at Ault Field • +9,400 at OLF Coupeville Approximately 26,500 annual operations increase for the NAS Whidbey Island complex (31-percent increase over the No Action Alternative)	**Change in annual operations:** • +25,000 at Ault Field • +100 at OLF Coupeville Approximately 25,100 annual operations increase for the NAS Whidbey Island complex (30-percent increase over the No Action Alternative)	**Change in annual operations:** • +11,800 at Ault Field • +15,700 at OLF Coupeville Approximately 27,500 annual operations increase for the NAS Whidbey Island complex (32-percent increase over the No Action Alternative)	**Change in annual operations:** • +22,200 at Ault Field • +3,200 at OLF Coupeville Approximately 25,400 annual operations increase for the NAS Whidbey Island complex (30-percent increase over the No Action Alternative)
Action Alternative 2	The Navy would add 36 additional Growler aircraft				
	Change in annual operations: • +9,800 at Ault Field • +17,600 at OLF Coupeville Approximately 27,400 total annual operations increase for the NAS	**Change in annual operations:** • +17,300 at Ault Field • +8,700 at OLF Coupeville Approximately 26,000 total annual operations increase for the NAS	**Change in annual operations:** • +25,000 at Ault Field • -200 at OLF Coupeville Approximately 24,800 total annual operations increase for the NAS Whidbey Island complex	**Change in annual operations:** • +12,400 at Ault Field • +14,700 at OLF Coupeville Approximately 27,100 total annual operations increase for the NAS	**Change in annual operations:** • +22,500 at Ault Field • +2,800 at OLF Coupeville Approximately 25,300 total annual operations increase for the NAS Whidbey

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
	Whidbey Island complex (32-percent increase over the No Action Alternative)	Whidbey Island complex (31-percent increase over the No Action Alternative)	(29-percent increase over the No Action Alternative)	Whidbey Island complex (32-percent increase over the No Action Alternative)	Island complex (30-percent increase over the No Action Alternative)
Action Alternative 3	The Navy would add 36 additional Growler Aircraft.				
	Change in annual operations: • +9,500 at Ault Field • +17,600 at OLF Coupeville Approximately 27,100 total annual operations increase for the NAS Whidbey Island complex (32 percent increase over the No Action Alternative)	• +17,100 at Ault Field • +8,700 at OLF Coupeville Approximately 25,800 total annual operations increase for the NAS Whidbey Island complex (30 percent increase over the No Action Alternative)	• +24,700 at Ault Field • -200 at OLF Coupeville Approximately 24,500 total annual operations increase for the NAS Whidbey Island complex (29 percent increase over the No Action Alternative)	• +12,100 at Ault Field • +14,600 at OLF Coupeville Approximately 26,700 total annual operations increase for the NAS Whidbey Island complex (32-percent increase over the No Action Alternative)	• +22,100 at Ault Field • +2,800 at OLF Coupeville Approximately 24,900 total annual operations increase for the NAS Whidbey Island complex (29-percent increase over the No Action Alternative)
Noise Associated with Aircraft ***(Significant noise impact from proposed Growler operations at the NAS Whidbey Island complex)***					
DNL Noise Contours (Sections 4.2.1, 4.2.2.1.1, 4.2.3.1.1; 4.2.4.1.1)					
No Action Alternative	No additional Growlers would be assigned to NAS Whidbey Island, and there would be no associated increase in aircraft operations; therefore, no change in DNL noise contours at the airfields. The population within the 65 dB DNL noise contour would be 8,941 people at Ault Field and 2,230 people at OLF Coupeville, for a total of 11,171.				
The increase in aircraft operations will result in a larger decibel (dB) day-night average sound level (DNL) noise contour. Therefore, there will be an increase in population within the 65dB DNL noise contour of:					
Action Alternative 1	169 people, Ault Field 1,236 people, OLF Coupeville Total increase of 1,405	914 people, Ault Field 904 people, OLF Coupeville Total increase of 1,818	1,312 people, Ault Field 538 people, OLF Coupeville Total increase of 1,850	621 people, Ault Field 1,143 people, OLF Coupeville Total increase of 1,764	1,178 people, Ault Field 701 people, OLF Coupeville Total increase of 1,879
Action Alternative 2	137 people, Ault Field 1,179 people, OLF Coupeville Total increase of 1,316	840 people, Ault Field 865 people, OLF Coupeville Total increase of 1,705	1,154 people, Ault Field 489 people, OLF Coupeville Total increase of 1,643	557 people, Ault Field 1,089 people, OLF Coupeville Total increase of 1,646	1,037 people, Ault Field 681 people, OLF Coupeville Total increase of 1,718

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Action Alternative 3	109 people, Ault Field 1,203 people, OLF Coupeville Total increase of 1,312	821 people, Ault Field 888 people, OLF Coupeville Total increase of 1,709	1,136 people, Ault Field 517 people, OLF Coupeville Total increase of 1,653	533 people, Ault Field 1,113 people, OLF Coupeville Total increase of 1,646	1,019 people, Ault Field 694 people, OLF Coupeville Total increase of 1,713
Supplemental Metrics (Sections 4.2.1, 4.2.2.1.2, 4.2.3.1.2; 4.2.4.1.2)					
No Action Alternative	No additional Growlers would be assigned to NAS Whidbey Island, and there would be no associated increase in aircraft operations; therefore, no change in the noise environment.				
Action Alternative 1	The EIS analyzed the potential impacts of noise exposure as it relates to specific noise events at 48 points of interest (POIs). The following supplemental noise metrics were analyzed: single-event noise levels (sound exposure levels [SELs] and maximum noise levels [L_{max}]), indoor and outdoor speech interference, classroom/learning interference, sleep disturbance; and potential hearing loss for populations within the 80 dB DNL contour. The results of this analysis vary depending on the scenario and the annual operations modeled. To understand the full impact of these supplemental metrics, see Sections 4.2.2.1.2 (Alternative 1), 4.2.3.1.2 (Alternative 2), or 4.2.4.1.2 (Alternative 3).				
Action Alternative 2	Impacts are similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts are similar to those depicted under Alternative 1.				
Public Health and Safety (No significant impact from projected increase in aircraft operations)					
Flight Safety (Sections 4.3.1, 4.3.2.1)					
No Action Alternative	No additional Growler aircraft, so no impact on public health and safety with relation to flight safety at Ault Field or OLF Coupeville.				
Action Alternative 1	Increase of aircraft flying at Ault Field and OLF Coupeville would increase the risk of an incident; however, current risk management strategies in place at NAS Whidbey Island would minimize these risks. Therefore there would be no significant impact on flight safety.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Bird/Animal Aircraft Strike Hazard (BASH) (Sections 4.3.1, 4.3.2.1)					
No Action Alternative	No additional Growler aircraft, so no impact on public health and safety with relation to BASH at Ault Field or OLF Coupeville.				
Action Alternative 1	Increase in the volume of air operations; however, this would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield. Therefore, there would be no significant impact on BASH.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Clear Zones and Accident Potential Zones (APZs) (Sections 4.3.1, 4.3.2.1)					
No Action Alternative	No additional Growler aircraft, so no impact on public health and safety with relation to APZs or Clear Zones at Ault Field or OLF Coupeville.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Action Alternative 1	It is not expected that the Clear Zones or APZs at Ault Field would change; however, this needs to be confirmed through the Navy's Air Installation Compatible Use Zone (AICUZ) update process. The number of annual operations at OLF Coupeville may require the development of APZs (Clear Zones already exist) through the completion of the AICUZ Update process, which includes coordinating with the local community on land use recommendations.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on the development of APZs at Ault Field are similar to those depicted under Alternative 1, Scenario A. The number of annual operations at OLF Coupeville would not likely require the development of APZs (Clear Zones already exist); however, this needs to be confirmed through the Navy's AICUZ Update process.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.
Action Alternative 2	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.
Action Alternative 3	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Environmental Health Risks and Safety Risks to Children (Section 4.3.2.1)					
No Action Alternative	The number of children under the noise contour is: 2,799 – Average Year and 2,793 – High-tempo FCLP Year				
Based on the limited scientific literature available, there is no proven positive correlation between noise-related events and physiological changes in children. Additionally, the aircraft noise associated with the action alternatives is intermittent; therefore, the Navy does not anticipate any significant disproportionate health impacts to children caused by aircraft noise. There are no schools located within the APZs at Ault Field and OLF Coupeville under any of the alternatives or scenarios; therefore, there is no disproportionate environmental health and safety risk to children as a result of possible aircraft mishaps. *The number of children impacted under the noise contours will increase as compared to the No Action Alternative in the average year by:*					
Action Alternative 1	252 – Average Year 118 – High-tempo FCLP Year	399 – Average Year 269 – High-tempo FCLP Year	440 – Average Year 330 – High-tempo FCLP Year	361 – Average Year 231 - High-tempo FCLP Year	433 – Average Year 316 – High-tempo FCLP Year
Action Alternative 2	233 – Average Year 93 – High-tempo FCLP Year	372 – Average Year 252 – High-tempo FCLP Year	388 – Average Year 269 – High-tempo FCLP Year	333 – Average Year 196 – High-tempo FCLP Year	391 – Average Year 260 – High-tempo FCLP Year
Action Alternative 3	230 – Average Year 89 – High-tempo FCLP Year	370 – Average Year 241 – High-tempo FCLP Year	388 – Average Year 253 – High-tempo FCLP Year	332 – Average Year 194 – High-tempo FCLP Year	388 – Average Year 276 – High-tempo FCLP Year
Air Quality (No significant impacts from construction or stationary emissions. Mobile operational emissions from additional Growler operations may impact ambient air quality)					
Construction Emissions (Sections 4.4.1, 4.4.2.1.1; 4.4.3.1.1; 4.4.4.1.1)					
No Action Alternative	No existing stationary sources would have an increase in emissions, and there would be no change in aircraft operations. Therefore, no impacts to air quality or air resources would occur.				
Action Alternative 1	Emissions from construction equipment and activities would be minor and temporary and would not result in any significant impacts.				
Action Alternative 2	Construction emissions are identical to those depicted under Alternative 1.				
Action Alternative 3	Construction emissions are identical to those depicted under Alternative 1.				
Operational Stationary Emissions (Sections 4.4.1, 4.4.2.1.2; 4.4.3.1.2; 4.4.4.1.2)					
No Action Alternative	No existing stationary sources would have an increase in emissions, and there would be no change in aircraft operations. Therefore, no impacts to air quality or air resources would occur.				
Action Alternative 1	Increases in direct and indirect stationary emissions from new buildings and maintenance and fueling of aircraft are minor and would be covered under the existing NAS Whidbey Island air operating permit.				
Action Alternative 2	Operational stationary emissions like in type and magnitude to those depicted under Alternative 1.				
Action Alternative 3	Operational stationary emissions like in type and magnitude to those depicted under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Mobile Emissions (Sections 4.4.1, 4.4.2.1.3; 4.4.3.1.3; 4.4.4.1.3)					
No Action Alternative	No existing stationary sources would have an increase in emissions, and there would be no change in aircraft operations. Therefore, no impacts to air quality or air resources would occur.				
Action Alternative 1 Total Increase in Criteria Pollutant Emissions	***NO_x:*** 229.1 ***VOC:*** 190.3 ***CO:*** 638.1 ***SO_2:*** 18.0 ***PM_{10}:*** 90.8 ***$PM_{2.5}$:*** 84.4	***NO_x:*** 183.3 ***VOC:*** 159.8 ***CO:*** 527.0 ***SO_2:*** 14.5 ***PM_{10}:*** 74.7 ***$PM_{2.5}$:*** 68.2	***NO_x:*** 139.7 ***VOC:*** 135.9 ***CO:*** 433.5 ***SO_2:*** 11.3 ***PM_{10}:*** 59.9 ***$PM_{2.5}$:*** 53.5	***NO_x:*** 214.3 ***VOC:*** 182.1 ***CO:*** 606.3 ***SO_2:*** 16.9 ***PM_{10}:*** 85.8 ***$PM_{2.5}$:*** 79.4	***NO_x:*** 150.9 ***VOC:*** 144.2 ***CO:*** 465.7 ***SO_2:*** 12.1 ***PM_{10}:*** 64.0 ***$PM_{2.5}$:*** 57.5
Action Alternative 2 Total Increase in Criteria Pollutant Emissions	***NO_x:*** 227.5 ***VOC:*** 209.0 ***CO:*** 691.2 ***SO_2:*** 18.1 ***PM_{10}:*** 98.6 ***$PM_{2.5}$:*** 86.6	***NO_x:*** 183.4 ***VOC:*** 179.5 ***CO:*** 584.3 ***SO_2:*** 14.8 ***PM_{10}:*** 83.1 ***$PM_{2.5}$:*** 71.1	***NO_x:*** 141.6 ***VOC:*** 156.2 ***CO:*** 493.8 ***SO_2:*** 11.7 ***PM_{10}:*** 68.9 ***$PM_{2.5}$:*** 56.9	***NO_x:*** 213.5 ***VOC:*** 201.1 ***CO:*** 661.0 ***SO_2:*** 17.1 ***PM_{10}:*** 93.9 ***$PM_{2.5}$:*** 81.9	***NO_x:*** 155.7 ***VOC:*** 164.2 ***CO:*** 524.8 ***SO_2:*** 12.7 ***PM_{10}:*** 73.8 ***$PM_{2.5}$:*** 61.7
Action Alternative 3 Total Increase in Criteria Pollutant Emissions	***NO_x:*** 225.1 ***VOC:*** 206.4 ***CO:*** 679.3 ***SO_2:*** 17.9 ***PM_{10}:*** 91.7 ***$PM_{2.5}$:*** 85.1	***NO_x:*** 183.6 ***VOC:*** 183.7 ***CO:*** 590.3 ***SO_2:*** 14.9 ***PM_{10}:*** 77.6 ***$PM_{2.5}$:*** 71.1	***NO_x:*** 139.6 ***VOC:*** 154.5 ***CO:*** 484.3 ***SO_2:*** 11.5 ***PM_{10}:*** 62.2 ***$PM_{2.5}$:*** 55.7	***NO_x:*** 211.2 ***VOC:*** 198.6 ***CO:*** 649.2 ***SO_2:*** 16.9 ***PM_{10}:*** 87.0 ***$PM_{2.5}$:*** 80.4	***NO_x:*** 153.7 ***VOC:*** 162.4 ***CO:*** 514.9 ***SO_2:*** 12.6 ***PM_{10}:*** 67.0 ***$PM_{2.5}$:*** 60.4
Land Use (Increase in the land area within the projected greater than 65 dB DNL noise contours and some localized significant impacts on county and municipal parks)					
Land Use Analysis (Sections 4.5.1, 4.5.2)					
No Action Alternative	No new Growler operations, and therefore no change in land area impacted by DNL noise contours; therefore, no impact.				
Action Alternative 1	Due to larger DNL noise contours and noise exposure areas, land uses previously considered compatible may become incompatible per AICUZ recommendations.				
Action Alternative 2	Impacts on land use compatibility are similar to those under Alternative 1.				
Action Alternative 3	Impacts on land use compatibility are similar to those under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Increase in total land use within the greater than 65 dB DNL noise contour as compared to the No Action Alternative:					
Action Alternative 1	7 percent (Ault Field) 38 percent (OLF Coupeville)	10 percent (Ault Field) 28 percent (OLF Coupeville)	12 percent (Ault Field) 9 percent (OLF Coupeville)	8 percent (Ault Field) 35 perfect (OLF Coupeville)	11 percent (Ault Field) 19 perfect (OLF Coupeville)
Action Alternative 2	6 percent (Ault Field) 36 percent (OLF Coupeville)	9 percent (Ault Field) 27 percent (OLF Coupeville)	11 percent (Ault Field) 6 percent (OLF Coupeville)	7 percent (Ault Field) 33 perfect (OLF Coupeville)	10 percent (Ault Field) 18 perfect (OLF Coupeville)
Action Alternative 3	6 percent (Ault Field) 37 percent (OLF Coupeville)	9 percent (Ault Field) 28 percent (OLF Coupeville)	11 percent (Ault Field) 8 percent (OLF Coupeville)	7 percent (Ault Field) 34 perfect (OLF Coupeville)	10 percent (Ault Field) 18 perfect (OLF Coupeville)
Conceptual APZs at OLF Coupeville would impact:					
Action Alternative 1	503 acres of residential land use, if developed.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.
Action Alternative 2	503 acres of residential land use, if developed.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.
Action Alternative 3	503 acres of residential land use, if developed.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.
Recreation and Wilderness (Sections 4.5.1, 4.5.2.2)					
No Action Alternative	No new Growler operations, and no changes to noise environment at recreation and wilderness areas; therefore, no impact.				
Action Alternative 1	Long-term, intermittent, significant impacts to Ebey's Landing National Historical Reserve, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Coupeville Middle School, Coupeville High School, and other properties used for recreation.	Long-term, intermittent, significant impacts to Ebey's Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville High	Long-term, intermittent, significant impacts to Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Ika Island, Hand-in-Hand Early Learning, and other properties used for recreation. Impacts to other parks and recreational areas would	Long-term, intermittent, significant impacts to Ebey's Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville	Long-term, intermittent, significant impacts to Ebey's Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, and other

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
	Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	School, and other properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	Middle School, Coupeville High School, and other properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Action Alternative 2	Long-term, intermittent, significant impacts to Ebey's Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Coupeville Middle School, Coupeville High School, and other properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	Long-term, intermittent, significant impacts to Ebey's Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, and other properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent, moderate impacts to Williamson Rocks, which is designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	Impacts similar to those depicted under Alternative 1, Scenario C.	Impacts similar to those depicted under Alternative 1, Scenario D.	Impacts similar to those depicted under Alternative 1, Scenario E.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Action Alternative 3	Impacts similar to those depicted under Alternative 1, Scenario A.	Impacts similar to those depicted under Alternative 2, Scenario B.	Impacts similar to those depicted under Alternative 1, Scenario C.	Impacts similar to those depicted under Alternative 1, Scenario D.	Impacts similar to those depicted under Alternative 1, Scenario E.
Cultural Resources (No significant impacts from construction activities or operation of new aircraft)					
Archaeological Resources (Sections 4.6.1, 4.6.2.1)					
No Action Alternative	No new construction or operations, and therefore no impact.				
Action Alternative 1	As evaluated under NEPA, minimal to no impact will result to known or intact archaeological sites during construction and operation. Per its Section 106 responsibilities, the Navy has determined no adverse effect would occur to historic properties that are archaeological resources.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Architectural Resources (Sections 4.6.1, 4.6.2.1)					
No Action Alternative	No new construction or operations, and therefore no impact.				
Action Alternative 1	As evaluated under NEPA, moderate to no direct and indirect impacts are anticipated to occur to on-station architectural resources during construction. Minimal indirect impacts are anticipated to occur during operations. Minimal to no impacts are anticipated to occur during construction to off-station resources because activities are limited to Ault Field. Minimal to moderate indirect impacts are anticipated to occur to off-station historic	Impacts similar to those depicted under Alternative 1, Scenario A, with the exception that resources that are proximate to both Ault Field and OLF Coupeville may experience a higher level of impact.	Impacts similar to those depicted under Alternative 1, Scenario A, with the exception that resources that are proximate to Ault Field (and not OLF Coupeville) may experience a higher level of impact and at OLF Coupeville a lower level of impact.	Impacts similar to those depicted under Alternative 1, Scenario A, with the exception that resources that are proximate to OLF Coupeville (and not Ault Field) may experience a higher level of impact and at Ault Field a lower level of impact.	Impacts similar to those depicted under Alternative 1, Scenario A, with the exception that resources that are proximate to Ault Field (and not OLF Coupeville) may experience a higher level of impact and at OLF Coupeville a lower level of impact.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
	resources during operation. Resources that are closer to OLF Coupeville may experience a higher level of visual, auditory, and/or vibratory impact and more frequent occurrences of aircraft appearances, noise, and vibration than those located elsewhere due to the increased FCLPs at OLF Coupeville for this scenario as compared to Scenarios B, C, D, and E. Resources that are closer to Ault Field may experience a lower level of impact and less frequent occurrences than those located elsewhere due to the lower amount of FCLPs at Ault Field for this scenario as compared to Scenarios B, C, D, and E. Per its Section 106 responsibilities, the Navy has determined a finding of adverse effect to the Central Whidbey Island				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
	Historic District/Ebey's Landing National Historic Reserve and a no adverse effect to individual historic properties that are architectural resources. The Navy is consulting with the Washington State Historic Preservation Officer, the Advisory Council on Historic Preservation, tribes, and consulting parties regarding the development of a Memorandum of Agreement as part of its National Historic Preservation Act Section 106 consultation to mitigate adverse effects to the perceptual qualities of five landscape features that contribute to the significance of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1, Scenario A.	Impacts similar to those depicted under Alternative 1, Scenario B.	Impacts similar to those depicted under Alternative 1, Scenario C.	Impacts similar to those depicted under Alternative 1, Scenario D.	Impacts similar to those depicted under Alternative 1, Scenario E.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Action Alternative 3	Impacts similar to those depicted under Alternative 1, Scenario A.	Impacts similar to those depicted under Alternative 1, Scenario B.	Impacts similar to those depicted under Alternative 1, Scenario C.	Impacts similar to those depicted under Alternative 1, Scenario D.	Impacts similar to those depicted under Alternative 1, Scenario E.
Cemeteries (Sections 4.6.1, 4.6.2.1)					
No Action Alternative	No new construction or operations, and therefore no impact.				
Action Alternative 1	As evaluated under NEPA, minimal to no impact will result to known cemeteries or burial grounds during construction and operation. Per its Section 106 responsibilities, the Navy has determined no adverse effect would occur to historic properties that are cemeteries or human burials.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Traditional Cultural Properties (Sections 4.6.1, 4.6.2.1)					
No Action Alternative	No new construction or operations, and therefore no impact.				
Action Alternative 1	As evaluated under NEPA, no impact will result to Traditional Cultural Properties (TCPs) because no known TCPs have been identified. Per its Section 106 responsibilities, the Navy has determined no effect would occur because no known TCPs have been identified.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
American Indian Traditional Resources (No significant impact to tribal rights, protected tribal resources)					
American Indian Traditional Resources (Section 4.7.1, 4.7.2)					
No Action Alternative	No potential to significantly affect American Indian traditional resources since there would be no change to current tribal access and no additional potential to impact traditional resources in the study area.				
Action Alternative 1	No change to current access for tribes to the installation. Terrestrial and Marine Resources: There would be minor impacts during construction or operation on terrestrial and marine wildlife. Water Resources: Approximately 2 acres of impervious surface, but impacts to surface waters, would be minimized and avoided through implementation of best management practices (BMPs), low-impact development (LID), and green infrastructure and therefore would not be significant. Climate Change and Greenhouse Gases: Potential impacts in GHG emissions from the implementation of the Proposed Action would be similar but greatest under Alternative 2, Scenario A, and would not be significant.				
Action Alternative 2	Impacts are similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts are similar to those depicted under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Biological Resources (No significant impacts from construction activities or operation of new aircraft)					
Terrestrial Wildlife (Sections 4.8.1, 4.8.2.1)					
Habitat Loss					
No Action Alternative	No new construction and no new Growler aircraft; therefore, no habitat loss and no impact on terrestrial wildlife.				
Action Alternative 1	Vegetation removal from construction activities would have negligible impacts on terrestrial wildlife at Ault Field and would not negatively affect habitat use by any special status species (e.g., MBTA-protected birds).				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Sensory Disturbance Effects (Terrestrial Wildlife, with the exception of Birds)					
No Action Alternative	No new construction and no new Growler aircraft; therefore, no impact on terrestrial mammals and/or reptiles, fish, and amphibians.				
Action Alternative 1	Terrestrial wildlife in the study area are already exposed to high levels of aircraft operations and other human disturbances; and the Proposed Action would result in some additional sensory disturbance impacts. Scenario C for both Ault Field and OLF Coupeville would be the most comparable scenario to the No Action Alternative and constitutes the smallest change in sensory disturbance impacts, whereas Scenario A at OLF Coupeville would result in the greatest change in sensory disturbance impacts overall.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Sensory Disturbance Effects (Birds)					
No Action Alternative	No new construction and no new Growler aircraft; therefore, no impact on birds.				
Action Alternative 1	Birds in the study area are already exposed to high levels of aircraft operations and other human disturbances; and the Proposed Action would result in some additional sensory disturbance impacts. Under MBTA regulations applicable to military readiness activities, the impacts from aircraft operations would not result in a significant adverse effect on migratory bird populations.				
	Scenario A is the greatest change in sensory disturbance impacts compared to the No Action Alternative and would result in the greatest increase in sensory disturbance impacts of the five scenarios.	Scenario B is a greater change in the sensory disturbance impacts than Scenario C, but less change in the sensory disturbance impacts than Scenario A.	Scenario C for both Ault Field and OLF Coupeville would be the most comparable scenario to the No Action Alternative and constitutes the smallest change in sensory disturbance impacts.	Scenario D would result in sensory disturbance impacts similar to those under Scenario A.	Scenario E would result in sensory disturbance impacts similar to those under Scenario B.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1, Scenario A.	Impacts would be similar to those depicted under Alternative 1, Scenario B.	Impacts would be similar to those depicted under Alternative 1, Scenario C.	Impacts would be similar to those depicted under Alternative 1, Scenario D.	Impacts would be similar to those depicted under Alternative 1, Scenario E.
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1, Scenario A.	Impacts would be similar to those depicted under Alternative 1, Scenario B.	Impacts would be similar to those depicted under Alternative 1, Scenario C.	Impacts would be similar to those depicted under Alternative 1, Scenario D.	Impacts would be similar to those depicted under Alternative 1, Scenario E.
Bird/Animal Aircraft Strike Hazard Effects					
No Action Alternative	No new construction and no new Growler aircraft; therefore, no risk of aircraft-wildlife strikes.				
Action Alternative 1	Increase of aircraft flying at Ault Field and OLF Coupeville increases the risk of an incident; however, no aspect of the action would create attractants with the potential to increase birds in the area, and current risk management strategies in place at NAS Whidbey Island minimize the likelihood of an incident. Therefore, aircraft-wildlife strikes would not have significant impacts on local wildlife populations, including special status species (e.g., MBTA-protected birds).				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Endangered Species Act (ESA)-listed Terrestrial Species (Marbled Murrelet)					
No Action Alternative	No new construction and no new Growler aircraft flying over; therefore, no impact on protected species.				
Action Alternative 1	Increase of aircraft flying at Ault Field and OLF Coupeville increases the risk of a strike and increases noise and visual disturbances to the marbled murrelet. There have been no reported strikes of the marbled murrelet at NAS Whidbey Island, and the installation follows a detailed BASH management program. In addition, the local inhabitants of the species are already exposed to high levels level of noise and visual disturbances. The Navy, in consultation with the USFWS, has determined that, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, the marbled murrelet and is not likely to jeopardize the continued existence of the marbled murrelet.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Marine Species (Not Listed under ESA) (Sections 4.8.1, 4.8.2.2)					
No Action Alternative	No new construction and no new Growler aircraft flying over marine species; therefore, no impact.				
Action Alternative 1	Increase in aircraft activity may cause sensory disturbance to marine animals. Harbor seals and other pinnipeds are common around NAS Whidbey Island and have not abandoned haul-out sites despite the existing long-term high level of disturbances. In addition, no breeding areas would be impacted. Marine species are already exposed to a high level of long-term air operations and other human-made disturbances and visual disturbances at NAS Whidbey Island. Therefore, there would be no significant impacts on marine species through behavioral disturbance or injury resulting from military readiness activities.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
ESA-Listed Marine Species (Humpback Whale, Southern Resident Killer Whale, Bull Trout, Dolly Varden, Green Sturgeon, Eulachon, Chinook Salmon, Hood Canal summer-run chum, Steelhead, Bocaccio Rockfish, and Yelloweye Rockfish)					
No Action Alternative	No new construction and no new Growler aircraft flying over; therefore, no impact on protected species.				
Action Alternative 1	Marine species are already exposed to a high level of long-term air operations and other human-made disturbances, so they have presumably habituated to the very high level of noise and visual disturbances at NAS Whidbey Island. There is the potential to affect humpback whales, Southern Resident killer whales, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, yelloweye rockfish, and bull trout, but those impacts would be "insignificant" in ESA terms in that they would not rise to the level of take. Therefore, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, the humpback whale, Southern Resident killer whale, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, yelloweye rockfish, or bull trout.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Water Resources (No significant impact from construction activities or operation of new aircraft)					
Groundwater (Sections 4.9.1, 4.9.2.1)					
No Action Alternative	No new construction or increase in demand for groundwater resources; therefore, no impact.				
Action Alternative 1	No construction would extend to a depth that may impact groundwater resources, and minimal increase in demand for groundwater; therefore, no impact.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Surface Water/Wetlands/Floodplains/Marine Waters and Sediments (Sections 4.9.1, 4.9.2.1)					
No Action Alternative	No new construction; therefore, no impact.				
Action Alternative 1	No direct impact, since construction would not be occurring within resource areas. Potential indirect impact due to 2 acres of new impervious surface at Ault Field (1% increase over existing), which would slightly increase stormwater flow. Any impacts would be minimized through BMPs.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Socioeconomics (Significant impacts to education from increase in personnel and dependents; no other significant impacts due to increased personnel and dependents living in the region)					
Population (Sections 4.10.1, 4.10.2.1)					
No Action Alternative	No new personnel or dependents; therefore, no impact.				
Action Alternative 1	Net increase of 794 people to the region would result in a minor impact.				
Action Alternative 2	Net increase of 1,488 people to the region would result in a minor impact.				
Action Alternative 3	Net increase of 808 people to the region would result in a minor impact.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Economy, Employment, and Income (Sections 4.10.1, 4.10.2.1)					
No Action Alternative	No construction activities and no new personnel in the region; therefore, no impact.				
Action Alternative 1	Up to $122.5 million in direct construction expenditures, which would be a short-term impact. Up to 839 projected short-term employment positions from construction activities. 335 personnel in the region spending money. Some minor to moderate impacts to noise-sensitive industries in the area.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1, with the exception of 628 personnel in the region spending money.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1, with the exception of 341 personnel in the region spending money.				
Housing (Sections 4.10.1, 4.10.2.1)					
No Action Alternative	No new personnel/households in the region; therefore, no impact.				
Action Alternative 1	Up to 335 households relocating to the area. Additional personnel would generate a deficit of adequate family housing units and unaccompanied personnel housing units				
Action Alternative 2	Up to 628 households relocating to the area. Additional personnel would generate a deficit of adequate family housing units and unaccompanied personnel housing units.				
Action Alternative 3	Up to 341 households relocating to the area. Additional personnel would generate a deficit of adequate family housing units and unaccompanied personnel housing units.				
Local Government Revenue and Expenditures (Sections 4.10.1, 4.10.2.1)					
No Action Alternative	No new personnel/dependents in the region; therefore, no impact.				
Action Alternative 1	Increase in annual tax receipts in Island County by $222,000 and Skagit County by $96,000.				
Action Alternative 2	Increase in annual tax receipts in Island County by $415,000 and Skagit County by $181,000.				
Action Alternative 3	Increase in annual tax receipts in Island County by $226,000 and Skagit County by $98,000.				
Community Services (Sections 4.10.1, 4.10.2.1)					
No Action Alternative	No new personnel/dependents in the region; therefore, no impact.				
Action Alternative 1	Education Projected 173 students in already overcrowded school districts would result in significant impacts on school districts in the region. Medical, Fire and Emergency, and Police Protection Services Minimal impacts from increase in personnel/dependents in the area.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1 with the exception of 324 students projected.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1 with the exception of 176 students projected.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Environmental Justice (Environmental justice communities exist, and impacts on housing affordability have the potential to be disproportionately high and adverse on these communities in the short term (Section 4.11)					
No Action Alternative	No change in the aircraft or personnel loadings at the NAS Whidbey Island complex would occur; therefore, there would be no additional environmental or human health impacts.				
Action Alternative 1	The Navy has concluded that there are minority and low-income populations living within the affected area (environmental justice communities), and there are significant impacts outlined within the EIS to populations living within the affected area (noise impacts to those living within the 65 dB DNL noise contours and overcrowding at Oak Harbor School District schools). However, the Navy has determined that there will be no disproportionate high and adverse human health or environmental effects from noise, Clear Zones/Accident Potential Zones, or school overcrowding on minority populations or low-income populations. Impacts on housing availability and housing affordability could have the potential to have a disproportionately high and adverse impact on low-income communities. The Navy further acknowledges that the increase in the cost of housing and the decrease in available properties may have a negative impact on low-income residents, who typically spend a larger proportion of their income on housing than the general population.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Transportation (No significant impacts from construction activities or additional personnel and dependents)					
Renovation of Existing Facilities at NAS Whidbey Island (Sections 4.12.1, 4.12.2.1)					
No Action Alternative	No new construction; therefore, no impact.				
Action Alternative 1	Short-term impacts on traffic from additional truck traffic and slow-moving vehicles during construction.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Off Base Operations: Trip Generation and Level of Service (Sections 4.12.1, 4.12.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact.				
Action Alternative 1	Estimated 122 to 2,051 new trips per weekday on major roadways off base. Level of service (LOS) on State Route (SR) 20 east of Main Street would degrade from a LOS B to LOS C. LOS on SR 20 south of Swantown Road and north of Case Road would degrade from LOS C to LOS D. LOS on I-5 south of SR 20 would degrade from LOS C to LOS D. However, all segments would operate at or better than the LOS standard. Area of concern at intersection of SR 20 and Banta Road would see an increase of 238 daily trips; however, intersection improvements will be completed by 2019.				
Action Alternative 2	Estimated 229 to 3,845 new trips per weekday on major roadways off base. LOS on SR 20 east of Main Street would degrade from a LOS B to LOS C. LOS on SR 20 south of Swantown Road would degrade from a LOS C to LOS E. LOS on SR 20 north of Goldie Street and north of Case Road would degrade from LOS C to LOS D. LOS on I-5 south of SR 20 would degrade from LOS C to LOS D. However, these segments would operate at or better than the LOS standard. Area of concern at intersection of SR 20 and Banta Road would see an increase of 445 daily trips; however, intersection improvements will be completed by 2019.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Action Alternative 3	Estimated 125 to 2,088 new trips per weekday on major roadways off base. Level of service (LOS) on State Route (SR) 20 east of Main Street would degrade from a LOS B to LOS C. LOS on SR 20 south of Swantown Road and north of Case Road would degrade from LOS C to LOS D. LOS on I-5 south of SR 20 would degrade from LOS C to LOS D. However, these segments would operate at or better than the LOS standard. Area of concern at intersection of SR 20 and Banta Road would see an increase of 242 daily trips; however, intersection improvements will be completed by 2019.				
On Base Operations (Sections 4.12.1, 4.12.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact.				
Action Alternative 1	Gates at Ault Field could see an increase of 670 daily trips (approximately 3 percent over No Action Alternative traffic volumes entering and exiting the installation. Implementation of improvements identified in the NAS Whidbey Island Transportation Plan would help to alleviate traffic concerns.				
Action Alternative 2	Gates at Ault Field could see an increase of 1,256 daily trips (approximately 7 percent over No Action Alternative traffic volumes entering and exiting the installation. Implementation of improvements identified in the NAS Whidbey Island Transportation Plan would help to alleviate traffic concerns.				
Action Alternative 3	Gates at Ault Field could see an increase of 682 daily trips (approximately 4 percent over No Action Alternative traffic volumes entering and exiting the installation. Implementation of improvements identified in the NAS Whidbey Island Transportation Plan would help to alleviate traffic concerns.				
Transit, Pedestrian, and Bicycle Facilities (Sections 4.12.1, 4.12.2.1)					
No Action Alternative	No new personnel/dependents in the region; therefore, no impact				
Action Alternative 1	The increase in use of these facilities by Navy personnel and dependents is not expected to be significant because it is expected that the automobile would be used as the primary means of transportation.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1, Scenario A.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1, Scenario A.				
Infrastructure (No significant impact due to additional personnel and dependents)					
Potable Water (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact				
Towns have additional capacity to handle increase in demand; therefore, resource is impacted but not significantly impacted.					
Action Alternative 1	Approximately 93,800 gallons per day of potable water needed to support 335 additional households in the region and 990 gallons per day to support new facilities.				
Action Alternative 2	Approximately 175,800 gallons per day of potable water needed to support 628 additional households in the region and 2,080 gallons per day to support new facilities.				
Action Alternative 3	Approximately 95,500 gallons per day of potable water needed to support 341 additional households in the region and 990 gallons per day to support new facilities.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Wastewater (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact				
Towns have additional capacity to handle increase in demand; therefore, resource is impacted but not significantly impacted.					
Action Alternative 1	Approximately 84,400 gallons per day of additional wastewater to support 335 additional households in the region and 750 gallons per day to support new facilities.				
Action Alternative 2	Approximately 158,300 gallons per day of additional wastewater to support 628 additional households in the region and 1,840 gallons per day to support new facilities.				
Action Alternative 3	Approximately 85,900 gallons per day of potable water needed to support 341 additional households in the region and 750 gallons per day to support new facilities.				
Stormwater (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction; therefore, no impact				
Action Alternative 1	Increase of 2.0 acres of impervious surfaces from new facilities, and no new houses are expected to be constructed. BMPs and compliance with stormwater permit requirements would minimize any potential impacts, and therefore the resource is impacted but not significantly impacted.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Solid Waste Management (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact				
Regional landfills have additional capacity to handle increase in demand; therefore, resource is impacted but not significantly impacted.					
Action Alternative 1	Approximately 3,500 pounds of additional solid waste disposed of daily, and 1,200 pounds of additional waste recycled/composted daily.				
Action Alternative 2	Approximately 6,500 pounds of additional solid waste disposed of daily, and 2,200 pounds of additional waste recycled/composted daily.				
Action Alternative 3	Approximately 3,600 pounds of additional solid waste disposed of daily, and 1,200 pounds of additional waste recycled/composted daily.				
Energy (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact				
Projections anticipate sufficient energy supply for the foreseeable future; therefore, resource is impacted but not significantly impacted.					
Action Alternative 1	Increase of 1,390,200 kilowatt hour (kWh) of electricity per year and 25,100 million British Thermal Units (MMBTU) of additional natural gas needed per year to support 335 additional households throughout the region and 483,930 kWh of electricity and 1,550 MMBTU of additional natural gas per year needed to support new facilities.				
Action Alternative 2	Increase of 2,606,000 kWh of electricity per year and 47,000 MMBTU of additional natural gas needed to support 628 additional households throughout the region and 1,072,970 kWh of electricity and 3,770 MMBTU of additional natural gas per year needed to support new facilities.				
Action Alternative 3	Increase of 1,415,100 kWh of electricity per year and 25,500 MMBTU of additional natural gas needed to support 341 additional households throughout the region and 483,930 kWh of electricity and 1,710 MMBTU of additional natural gas per year needed to support new facilities.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Communications (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact				
Action Alternative 1	Existing housing is likely already connected to telephone networks and cell phone service provided by multiple carriers. Increased use of bandwidth at NAS Whidbey Island expected. New construction would include new or upgraded communication networks; therefore, the resource is impacted but not significantly impacted.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Facilities (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new facilities; therefore, no impact.				
Action Alternative 1	Beneficial impact from renovation of existing facilities and new facilities constructed. Sufficient space exists at Ault Field for construction. Therefore, no significant impact to resource.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Geological Resources (No significant impacts due to construction activities)					
Topography/Geology (Sections 4.14.1, 4.14.2.1)					
No Action Alternative	No new construction; therefore, no impact.				
Action Alternative 1	Construction conducted near to the surface on generally level, pre-disturbed, areas; therefore, no impacts to topography or geography.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Seismic Activity (Sections 4.14.1, 4.14.2.1)					
No Action Alternative	No new construction; therefore, no impact.				
Action Alternative 1	In event of earthquake, seismic hazards may damage buildings. BMPs and emergency planning would minimize any potential impact.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Soils (Sections 4.14.1, 4.14.2.1)					
No Action Alternative	No new construction; therefore, no impact.				
Action Alternative 1	Direct impacts to soils may include grading, compaction, and rutting. Indirect impacts from increased quantity and velocity of stormwater. All potential impacts would be avoided and minimized utilizing BMPs.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*
Hazardous Materials and Wastes (No significant impacts due to construction activities or from the addition and operation of additional Growler aircraft) **(Sections 4.15.1; 4.15.2.1)**					
No Action Alternative	No change associated with hazardous materials and wastes; therefore, no impact.				
Action Alternative 1	Hazardous materials and waste would increase in quantity at NAS Whidbey Island but would be managed under existing law and Navy regulations and management practices; therefore, there would be no significant impact under Alternative 1 (35 aircraft).				
Action Alternative 2	Impacts similar to those depicted under Alternative 1, but would be negligibly higher (36 aircraft) than under Alternative 1 (35 aircraft).				
Action Alternative 3	Impacts similar to those depicted under Alternative 2.				
Climate Change and Greenhouse Gases (No significant impact from the increase in aircraft operations)					
Climate Change (Sections 4.16.1.1; 4.16.1.2; 4.16.1.3)					
No Action Alternative	Climate change will continue to occur, resulting in global impacts affecting Whidbey Island and Puget Sound and the Navy's priorities and mission. Federal, state and local agencies, including the DoD, will continue to assess impacts and define adaptation and mitigation strategies to address them.				
Action Alternative 1	Impacts similar to those depicted under the No Action Alternative.				
Action Alternative 2	Impacts similar to those depicted under the No Action Alternative.				
Action Alternative 3	Impacts similar to those depicted under the No Action Alternative.				
Greenhouse Gas (GHG) (Sections 4.16.2.1; 4.16.2.2; 4.16.2.3; 4.16.2.4; 4.16.2.5)					
No Action Alternative	No existing stationary sources would have an increase in emissions, and there would be no change in aircraft operations. Therefore, no impacts on greenhouse gases would occur.				
Increase in mobile and stationary CO_2 emissions as compared to the No Action Alternative (Equates to less than 1 percent of all aircraft CO_2 emissions in Washington. GHG emissions from this action should not have significant impact on Washington's GHG emission goals.)					
Action Alternative 1	Stationary – 3 percent Mobile – 40 percent	Stationary – 3 percent Mobile – 32 percent	Stationary – 3 percent Mobile – 25 percent	Stationary – 3 percent Mobile – 37 percent	Stationary – 3 percent Mobile – 27 percent
	While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million $MTCO_2e$ from 1990 to 2013, annual aircraft GHG emissions decreased from 9.1 to 6.57 million $MTCO_2e$ over the same time period (Washington State Department of Ecology, 2016b).				
Action Alternative 2	Stationary – 3 percent Mobile – 40 percent	Stationary – 3 percent Mobile – 33 percent	Stationary – 3 percent Mobile – 26 percent	Stationary – 3 percent Mobile – 38 percent	Stationary – 3 percent Mobile – 29 percent
Action Alternative 3	Stationary – 3 percent Mobile – 40 percent	Stationary – 3 percent Mobile – 33 percent	Stationary – 3 percent Mobile – 25 percent	Stationary – 3 percent Mobile – 37 percent	Stationary – 3 percent Mobile – 28 percent

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*	*Scenario D*	*Scenario E*

Note: This table provides a summary of impacts of the Proposed Action under each alternative and each scenario. The impact conclusions in this table are based on detailed analysis provided in Chapter 4 of the EIS. Impact conclusions are based on average year conditions.

KEY

ACHP	=	Advisory Council on Historic Preservation
AICUZ	=	Air Installation Compatible Use Zone
APZ	=	Accident Potential Zone
BASH	=	Bird/Animal Aircraft Strike Hazard
BMP	=	Best Management Practice
dB	=	decibel
DNL	=	day-night average sound level
ESA	=	Endangered Species Act
FCLP	=	field carrier landing practice
GHG	=	greenhouse gas
IBA	=	Important Bird Area
kWh	=	kilowatt hour
LOS	=	level of service
MBTA	=	Migratory Bird Treaty Act
MMBTU	=	million British thermal units
MT	=	metric ton
$MTCO_2e$	=	metric tons of equivalent carbon dioxide
NAAQS	=	National Ambient Air Quality Standards
NAS	=	Naval Air Station
OLF	=	Outlying Landing Field
POI	=	Point of Interest
SR	=	State Route
TCP	=	Traditional Cultural Property

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5 Cumulative Impacts

This chapter 1) defines cumulative impacts, 2) describes past, present, and reasonably foreseeable future actions relevant to cumulative impacts, 3) analyzes the incremental interaction the Proposed Action may have with other actions with coincidental effects, and 4) evaluates cumulative impacts potentially resulting from these interactions of the coincidental effects on the same environmental resource.

5.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and CEQ guidance. Cumulative impacts are defined in 40 Code of Federal Regulations, Section 1508.7.

A cumulative impact is the impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

To determine the scope of an Environmental Impact Statements (EIS), agencies consider cumulative actions, which when viewed with other Proposed Actions, have cumulatively significant impacts and should therefore be discussed in the same impact statement. In addition, CEQ and the United States (U.S.) Environmental Protection Agency (USEPA) have published guidance addressing implementation of cumulative impact analyses, including *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ, 2005) and *Consideration of Cumulative Impacts in USEPA Review of NEPA Documents* (USEPA, 1999). CEQ (1997) guidance entitled *Considering Cumulative Impacts Under NEPA* states that cumulative impact analyses should:

> "…determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts…[and]…focus on truly meaningful impacts."

Cumulative impacts are most likely to arise when a relationship or synergism exists between a Proposed Action and other actions expected to occur coincidently in a similar location or during a similar time period. Actions overlapping with or in close proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts. To identify cumulative impacts, the analysis needs to address the following three fundamental questions:

- Does a relationship exist such that affected resource areas of the Proposed Action might interact coincidently with the same affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected coincidently by impacts of the other action?

- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

5.2 Scope of Cumulative Impacts Analysis

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the time frame in which the coincidental effects could be expected to occur. For this EIS, the study area defines the geographic extent of the cumulative impacts analysis. In general, the study area includes those areas previously identified in Chapter 4 for the respective resource areas. The time frame for cumulative impacts centers on the timing of the Proposed Action.

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. In addition to identifying the geographic scope and time frame for the previously completed and currently ongoing actions, the analysis also includes the identification of "reasonably foreseeable" actions (i.e., anticipated future actions). For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for EISs and Environmental Assessments (EAs), management plans, land use plans, and other planning-related studies. Additionally, Naval Air Station (NAS) Whidbey Island staff provided information on local and regional actions, as well as previously completed, currently ongoing, and reasonably foreseeable future actions at Ault Field and Outlying Landing Field (OLF) Coupeville. Finally, local websites for local news outlets were searched for articles pertaining to actions that would need to be included in this analysis.

Multiple U.S. Department of the Navy (Navy) actions are ongoing within the Pacific Northwest Region; however, each NEPA document addresses a specific Proposed Action, separated from other actions by its purpose and need, independent utility, timing, and geographic location. Some NEPA documents are stand-alone documents; others tier off of and/or expand the analyses of other existing NEPA documents. NEPA documents for at-sea training (for example [e.g.], the Northwest Training and Testing [NWTT] EIS/Overseas EIS [OEIS]) focus on training activities occurring within a range complex and/or Military Operations Area (MOA) and involve different types of aircraft, ships, and range complex enhancements. However, NEPA documents that analyze a specific type of aircraft operation at a military airfield (in this case, the Growler) are focused in and around that airfield and its facility needs. While the Navy has analyzed, and is currently analyzing, various Proposed Actions in the area, those Proposed Actions are not preconditions for Growler operations at the NAS Whidbey Island complex. Growler operations at the NAS Whidbey Island complex are not a precondition for larger military readiness activities on range complexes in the Pacific Northwest. Even in the absence of this Proposed Action, military training in the Pacific Northwest would continue independently from this Proposed Action, as analyzed in the documents referenced in Section 1.6. Each of the documents includes the results of a cumulative impact analysis that was conducted at the time the document was prepared; thus, the combined impacts of all of these activities are being captured in multiple documents.

5.3 Past, Present, and Reasonably Foreseeable Actions

This section focuses on past, present, and reasonably foreseeable future projects at and near the NAS Whidbey Island complex. In determining which projects to include in the cumulative impacts analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. Specifically, using the first fundamental question included in Section 5.1, it was determined whether a relationship exists such that the affected resource areas of the Proposed Action (included in this EIS) might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the project was not carried forward into the cumulative impacts analysis. In accordance with CEQ guidance (CEQ, 2005), these actions considered but excluded from further cumulative effects analysis are not catalogued here because the intent is to focus the analysis on the meaningful actions relevant to inform decision making. Projects included in this cumulative impacts analysis are listed in Table 5-1 and shown on Figure 5.1, and they are briefly described in the following subsections.

Table 5-1 Other Actions Considered for Potential Cumulative Impacts Associated with the Proposed Action for the NAS Whidbey Island Complex

Action	*Summary of Action*	*NEPA Analysis Completed/Timeframe*
Past Actions		
Transition of Expeditionary EA-6B Prowler Aircraft to EA-18G Growler Aircraft	The action included retaining the expeditionary Electronic Attack mission capabilities at Naval Air Station (NAS) Whidbey Island; performing the in-place transition of three existing expeditionary Electronic Attack squadrons home based at NAS Whidbey Island from the Prowler aircraft to the Growler aircraft; relocating one reserve expeditionary Electronic Attack squadron from Joint Base Andrews to NAS Whidbey Island, and transitioning from the Prowler aircraft to the Growler aircraft. *Aircraft, personnel, and construction associated with this project were accounted for in the No Action Alternative and are assessed in Chapter 4; therefore, this project was not retained for further analysis.*	Environmental Assessment (EA) A Finding of No Significant Impact (FONSI) for the EA was signed on October 30, 2012. Action completed in 2016

Table 5-1 Other Actions Considered for Potential Cumulative Impacts Associated with the Proposed Action for the NAS Whidbey Island Complex

Action	*Summary of Action*	*NEPA Analysis Completed/Timeframe*
P-8A Multi-Mission Maritime Aircraft (MMA) Supplemental Environmental Impact Statement (SEIS)	The purpose of the P-8A SEIS was to supplement the home basing alternatives and analysis contained in the 2008 Final EIS in light of new conditions and information. Circumstances and conditions that underwent significant change since the 2008 Record of Decision (ROD) were reexamined to better inform Navy decision makers and the public about the environmental effects of dual-siting P-8A squadrons (versus the original plan for triple siting) as a cost-saving measure while still meeting current strategic operational objectives and timelines. *Aircraft, personnel, and construction associated with this project were accounted for in the No Action Alternative and are assessed in Chapter 4; therefore, this project was not retained for further analysis.*	EIS/SEIS A ROD for the SEIS was signed on April 25, 2014. Operations of these aircraft are ongoing and are included in the "all other aircraft" operations analyzed in this EIS.
Replacement of the C-9 Aircraft with the C-40 Aircraft	The four C-9 Skytrain II aircraft stationed at NAS Whidbey Island were replaced by three C-40 Clipper aircraft. *Aircraft, personnel, and construction associated with this project were accounted for in the No Action Alternative and are assessed in Chapter 4; therefore, this project was not retained for further analysis.*	Record of Categorical Exclusion (CATEX) 2010 Completed
Tree Cutting at Ault Field at NAS Whidbey Island, Washington.	The Proposed Action is to clear 10 acres of trees present within a wetland located northeast of the approach end of Runway 25.	EA A Finding of No Significant Impact (FONSI) was signed on July 14, 2016. Project completed

Table 5-1 Other Actions Considered for Potential Cumulative Impacts Associated with the Proposed Action for the NAS Whidbey Island Complex

Action	*Summary of Action*	*NEPA Analysis Completed/Timeframe*
State Route (SR) 532 – Davis Slough Bridge Replacement	The Washington State Department of Transportation (WSDOT) constructed a new, wider bridge to carry SR 532 over Davis Slough and to replace the previous bridge, which was over 60 years old. This project also included widening SR 532 between the Camano Gateway Bridge and the west side of Davis Slough.	None; non-federal action Completed; construction occurred from August 2014 to spring 2016
WhidbeyHealth Medical Center Expansion Project	The hospital expansion project included installing a two-story, 60,000-square-foot expansion wing and a 5,000-square-foot renovation of the existing WhidbeyHealth Medical Center.	None; non-federal action Completed; construction occurred from September 2015 to fall 2017
Present and Reasonably Foreseeable Future Actions		
Northwest Training Range Complex (NWTRC) Final EIS/Overseas EIS (OEIS)	The Navy evaluated the impacts of increases in training activities, including those that would be needed as a result of changes in basing locations for ships, aircraft, and personnel (force structure changes) and impacts of providing for range enhancements in the NWTRC at sea and on shore.	EIS/OEIS A ROD for the EIS/OEIS was signed on October 25, 2010. Action implementation ongoing for on-shore activities. At-sea activities were reanalyzed in the Northwest Training and Testing (NWTT) EIS/OEIS addressed below.
Environmental Assessment for the Pacific Northwest Electronic Warfare Range	The Navy evaluated use of a fixed transmitter site and up to three mobile transmitter vans that emit signals that pilots need to detect and identify. This action was planned to improve training that was already occurring in existing military operations areas.	EA A FONSI was signed on August 28, 2014, and the final signed and executed permit is dated October 5, 2017. Action implementation is ongoing.
Outlying landing field (OLF) security barrier	The Navy installed security blocks on the perimeter of OLF Coupeville.	Record of CATEX signed September 23, 2013 Project completed and security blocks have been installed
Naval Special Operations Training in Western Washington State	The Navy proposes to conduct small unit, intermediate, and advanced land and maritime training activities for Navy Special Operations personnel.	EA EA completion anticipated summer 2018

Table 5-1 Other Actions Considered for Potential Cumulative Impacts Associated with the Proposed Action for the NAS Whidbey Island Complex

Action	*Summary of Action*	*NEPA Analysis Completed/Timeframe*
NWTT Final EIS/OEIS	The Navy is conducting military readiness training and testing activities in the NWTT Study Area, which is made up of air and sea space in the eastern north Pacific Ocean region, located adjacent to the Pacific Northwest coast of the U.S. and including the Strait of Juan de Fuca, Puget Sound (including Hood Canal), and Western Behm Canal in southeastern Alaska.	EIS/OEIS A ROD for the EIS/OEIS was signed on October 31, 2016 Action implementation ongoing (Notice of Intent for Supplemental EIS published August 22, 2017)
Northwest Regional Family Housing Privatization at NAS Whidbey Island	The Proposed Action includes the demolition of nine farmhouses at NAS Whidbey Island.	Analyzed in EA for PPV Housing Privatization A FONSI was signed on August 11, 2004 Demolition expected by 2019
Fleet Air Reconnaissance (VQ) Disestablishment	The U.S. Department of Defense (DoD) has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2021.	NEPA TBD. This disestablishment action is assumed in the operations numbers presented in this EIS. Completion by 2021
Triton Mission Control Station	This project would construct an approximately 30,000-square-foot Triton Mission Control Station facility to provide space and communications for two mission control stations that would control Triton unmanned aerial vehicles (UAVs) that fly from a remote location. *This project was accounted for in the No Action Alternative and is assessed in Chapter 4; therefore, this project was not retained for further analysis.*	Analyzed in P-8A MMA EIS 2008 Construction anticipated to start in 2018 and be completed in 2020.
Next Generation Jammer	This project would renovate and modernize the existing ALQ-99 electronic jamming pod maintenance, storage, and training facilities to support the requirements of the next generation jammer pod.	Record of CATEX to be completed Work anticipated in FY 19

Table 5-1 Other Actions Considered for Potential Cumulative Impacts Associated with the Proposed Action for the NAS Whidbey Island Complex

Action	*Summary of Action*	*NEPA Analysis Completed/Timeframe*
Naval Health Clinic Oak Harbor	The Defense Health Administration (DHA) has directed NAS Whidbey Island to develop a project to replace the existing naval clinic on the installation. Project details include the construction of a medical facility at NAS Whidbey Island in support of military personnel, their dependents, and retirees.	EA completion by summer 2019 Construction anticipated in FY 21
Regional Aircraft Service Facility Renovation	This project would construct an addition to Hangar 7 (Building 2544) to provide an aircraft maintenance hangar with space for high-bay aircraft maintenance and maintenance shops. This project includes site improvements, including replacement of fencing and construction of a concrete access apron, and demolition of five temporary relocatable buildings on the site.	Record of CATEX to be completed Construction anticipated between 2023 and 2025
City of Oak Harbor Water System Improvements	The City of Oak Harbor is planning to construct improvements to its water system in order to replace aging infrastructure and meet minimum storage requirements over the next 20-year planning horizon. Improvements will include construction of a new water reservoir tank and a new booster station.	None; non-federal action Construction anticipated to be completed in 2019.
Engineering Study and Infrastructure Improvements	An engineering study has been proposed for the Port of Coupeville's wharf to determine the state of the infrastructure and to recommend repairs and upgrades that should be undertaken.	None to date To be determined
City of Oak Harbor Clean Water Facility Project	The City of Oak Harbor is currently replacing its two existing wastewater treatment facilities (WWTFs) with a new wastewater treatment system.	None; non-federal action Construction: 2015-2018

Table 5-1 Other Actions Considered for Potential Cumulative Impacts Associated with the Proposed Action for the NAS Whidbey Island Complex

Action	*Summary of Action*	*NEPA Analysis Completed/Timeframe*
SR 20 – Sharpes Corner Interchange (Roundabout)	WSDOT is improving the Sharpes Corner intersection on SR 20 to address traffic congestion and safety risks. This project includes construction of a roundabout at Sharpes Corner and a second roundabout at Miller-Gibralter Road.	None; non-federal action Construction: 2018
SR 20 – Banta Road Intersection (Roundabout or Signal Light)	WSDOT is improving the Banta Road intersection on SR 20 to address safety risks. The project is under design and will consist of construction of a roundabout or installation of a signal light.	None; non-federal action Construction: 2019
Oak Harbor Urban Growth Area (UGA) expansion (Wright's Crossing)	The City of Oak Harbor proposed to expand the UGA to include Wright's Crossing, a proposed affordable single-family housing development of 1,000 to 1,500 single-family homes that would be constructed on property south of SR 20 and Miller Road. The Island County Planning Commission, which must approve the UGA expansion, voted to exclude the project from its 2018 planning docket. *This project is not currently moving forward and therefore was considered but not included in the cumulative impacts analysis.*	None; non-federal action To be determined

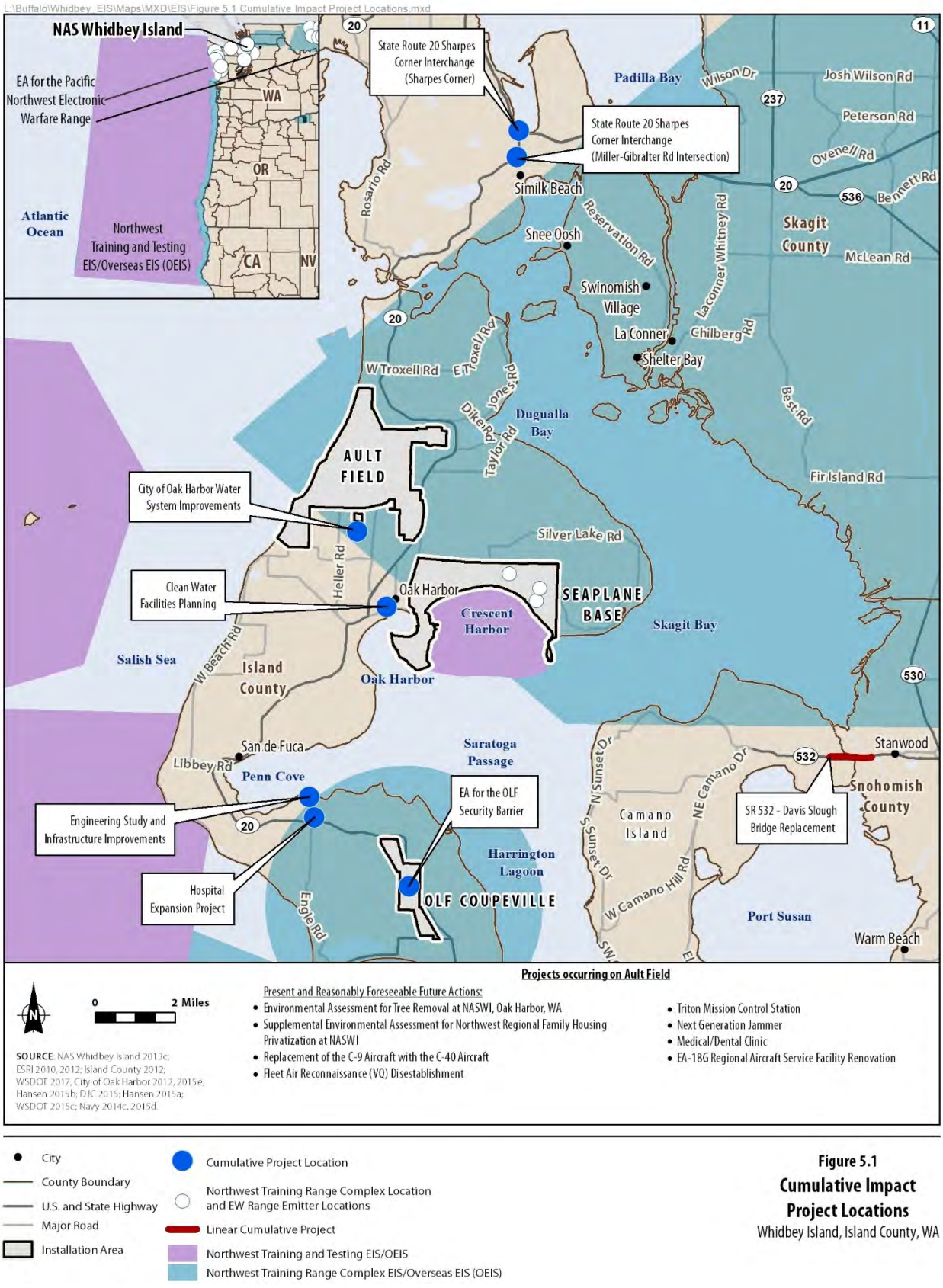

Figure 5.1
Cumulative Impact Project Locations
Whidbey Island, Island County, WA

5.3.1 Past Actions

5.3.1.1 Federal Actions

Five previous federal actions were identified in Table 5-1: the Environmental Assessment for the Transition of Expeditionary EA-6B Prowler Aircraft with EA-18G Growler Aircraft; the P-8A Multi-Mission Aircraft EIS/SEIS**;** the Replacement of the C-9 Aircraft with the C-40 Aircraft; and the tree cutting project at Ault Field. However, these projects are complete and included as part of the existing environment analysis in this EIS. Additionally, the Triton Mission Control Station project has been included in the No Action Alternative analysis in Chapter 4. The Triton Mission Control Station project would be complete before the baseline year of 2021 considered in this EIS and is therefore considered part of the baseline. These projects are not retained for further cumulative impacts analysis.

5.3.1.2 Non-federal Actions

There are no past non-federal actions that have been included as part of this analysis because they have been captured in the baseline.

5.3.2 Present and Reasonably Foreseeable Actions

5.3.2.1 Federal Actions

Northwest Training Range Complex Final Environmental Impact Statement/Overseas Environmental Impact Statement

The 2010 NWTRC Final EIS/OEIS assessed surface, submarine, aviation, and explosive ordnance disposal training operations by units located at Navy installations in northwest Washington over a five-year period. The proposed action included air and surface target training, development and use of a new electronic combat threat signal capability, development of a Portable Undersea Tracking Range (PUTR), and development of a new underwater minefield for training. Air and surface target training require use of surface combat vessels, submarines, and aircraft that will engage in a number of training exercises involving air-to-air missiles, air-to-air combat, surface-to-air weaponry, and air-to-surface bombs and missiles. In addition to the development of new training capabilities, the Navy increased the type and number of several types of training exercises compared to previous levels. Navy training exercises in the NWTRC occur in the air, on the ocean surface, and in subsurface ocean environments in the Pacific Ocean off the coasts of Washington, Oregon, and northern California; within the airspace, land, and waters of Coastal Washington and the Puget Sound region; and within the airspace over lands across the northern tier of Washington and into Idaho. Training areas within the NWTRC Study Area are shown on Figure 5-1. The at-sea portions of the study area were further analyzed in a subsequent EIS/OEIS (see the Northwest Training and Testing Final EIS/OEIS section below).

Environmental Assessment for the Pacific Northwest Electronic Warfare Range

The action consists of (1) the installation and operation of a Mission Control and Debrief Center in an existing facility at NAS Whidbey Island (already completed); (2) the installation and operation of a fixed Electronic Warfare emitter at Naval Station Everett Annex Pacific Beach, to include renovation of Building 104; (3) the installation and operation of communication equipment on an existing tower in the Olympic MOA at Octopus Mountain; (4) the operation of Mobile Electronic Warfare Training System vehicle-mounted emitters within the Olympic MOAs on U.S. Forest Service (USFS) and Washington State Department of Natural Resources lands; and (5) the operation of Mobile Electronic Warfare Training

System vehicle-mounted emitters on USFS lands within the Okanogan and Roosevelt MOAs (Navy, 2014c). The Finding of No Significant Impact was signed on August 28, 2014. USFS permits for this action have been received, and the Navy is conducting training with mobile emitters operated on USFS roads.

Categorical Exclusion for the OLF Security Barrier

The Navy installed security blocks on the perimeter of OLF Coupeville in order to ensure public safety by keeping vehicles off the runway.

Environmental Assessment for Naval Special Operations Training in Western Washington State

The Navy proposes to conduct small unit, intermediate, and advanced land and cold-water maritime training activities for Navy Special Operations personnel. The proposed action would take place on selected nearshore land and the inland waters of Puget Sound, including the Hood Canal, as well as the southwestern Washington coast with permission of willing property owners. As part of the rigorous training, the trainees learn skills needed to avoid detection along with the goal of leaving no trace of their presence during or after training activities. Support staff would always be present and would interact with the public, if necessary. All training would be non-invasive, to include no use of live-fire ammunition, no explosive demolitions, no off-road driving, no manned air operations, no digging, no vegetation cutting or removal, no tree climbing, no construction, no building campfires or infrastructure, and no leaving human waste. (Navy, 2018a).

Northwest Training and Testing Final EIS/OEIS

An EIS/OEIS was prepared to identify and evaluate the potential environmental consequences associated with at-sea training and testing activities within existing range complexes, air space, and Navy installation pier-side locations in the Pacific Northwest. The purpose of the Proposed Action is to conduct training and testing activities to ensure that the Navy meets its mission to maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. This mission is achieved in part by conducting training and testing within the study area (Navy, 2015d). The Final EIS/OEIS was published in October 2015, and the Record of Decision (ROD) was signed on October 31, 2016.

In August 2017, the Navy announced its intent to prepare a supplement to the 2015 NWTT Final EIS/OEIS. The Supplemental EIS/OEIS will assess training and testing activities projected to occur after 2020 and will support renewal of current regulatory permits and authorizations. These training and testing activities are generally consistent with those analyzed in the previous EIS/OEIS and are representative of activities the Navy has been conducting in the study area for decades (Navy, 2017b).

Included in the NWTT EIS/OEIS study area is the training use of the existing Special Use Airspace areas of Restricted Area R-6701 and Chinook A and B MOAs. These areas are in proximity to the airspace used for FCLP activities at OLF Coupeville but are seldom activated for current Navy aircraft training. R-6701 airspace parameters are from surface level up to an elevation of 5,000 feet above mean sea level (MSL). The Chinook MOAs' parameters are from 300 feet MSL to 5,000 feet MSL. Both R-6701 and the Chinook MOAs have been rarely used for military flights in recent decades, with an average of only two aircraft sorties occurring per year. Aircraft using these airspace areas in recent years have generally been limited to search and rescue SH-60 helicopters from NAS Whidbey Island conducting flight familiarization training and search and rescue training. Additionally, R-6701 has been used during infrequent events for small unmanned aircraft system (UAS) development and testing flights.

Tree Cutting at Ault Field at NAS Whidbey Island, Washington

The Proposed Action is to clear 10 acres of trees present within a wetland located northeast of the approach end of Runway 25. The trees are currently blocking approach lighting and as a result have raised the approach elevation, limiting the runway use during certain adverse weather conditions. A Finding of No Significant Impact was signed on July 14, 2016.

Supplemental Environmental Assessment for Northwest Regional Family Housing Privatization at NAS Whidbey Island

The Proposed Action includes the demolition of the nine farmhouses at NAS Whidbey Island.

Categorical Exclusion for the Fleet Air Reconnaissance Disestablishment

The U.S. Department of Defense (DoD) has directed the Navy to disestablish the Fleet Air Reconnaissance (VQ) mission capabilities at NAS Whidbey Island by 2021. VQ Squadron Two (VQ-2) was disestablished in Fiscal Year (FY) 2012, and personnel were consolidated with VQ Squadron One (VQ-1). Personnel loading for VQ-1 following consolidation will be approximately 640.

Categorical Exclusion for the Next Generation Jammer

This project would renovate and modernize the existing ALQ-99 electronic jamming pod maintenance, storage, and training facilities to support the requirements of the next generation jammer pod. Construction is anticipated to occur in FY 19.

Environmental Assessment for the Naval Health Clinic Oak Harbor

The Defense Health Administration has directed NAS Whidbey Island to develop a project to replace the existing Naval Hospital on the installation. Project details include the construction of a medical facility at NAS Whidbey Island in support of military personnel, their dependents, and retirees. Construction is anticipated to occur in FY 21.

Categorical Exclusion for the Regional Aircraft Service Facility Renovation

This project would construct an addition to Hangar 7 (Building 2544) to provide an aircraft maintenance hangar with space for high-bay aircraft maintenance. Five small buildings on the site totaling approximately 5,070 square feet would be demolished. The first and second floors of Building 2544 would be renovated to provide additional maintenance shops. Site improvements would include construction of a concrete access apron, utility connections, and replacement of a section of fenceline.

5.3.2.2 Non-federal Actions

City of Oak Harbor Water System Improvements

The City of Oak Harbor is planning to construct improvements to its water system in order to replace aging infrastructure and meet minimum storage requirements over the next 20-year planning horizon. Improvements will include construction of a new water reservoir tank, which will be 150 feet in diameter and 39 feet tall, with a capacity of 4.0 million gallons, and a new booster station. The reservoir tank and booster station will be located off of Gun Club Road, south of Ault Field. Additionally, 5,700 feet of 18-inch and 24-inch water transmission mains will be installed along Gun Club Road from Oak Harbor Road to the reservoir site. Other, follow-on improvement projects may include extension of large-diameter mains and construction of pressure-regulating valve stations in the city's distribution

system. The project will allow the city to supply water to the Seaplane Base through its distribution system (City of Oak Harbor, 2012).

Washington State Department of Transportation: State Route 532 - Davis Slough Bridge Replacement

The Washington State Department of Transportation (WSDOT) will raise and widen a 0.75-mile section of State Route (SR) 532 between Smith and Eide Roads and replace the Davis Slough Bridge to help improve and protect the highway from storms, high tides, floods, earthquakes, and blocking collisions (WSDOT, 2015c).

WhidbeyHealth Medical Center Expansion Project

The hospital expansion project includes installing a two-story, 60,000-square-foot expansion wing and a 5,000-square-foot renovation of the existing WhidbeyHealth Medical Center. The expansion will include 39 patient beds and possibly a laboratory, pharmacy, and space for materials management. The new inpatient wing at Whidbey General will include 39 single-patient rooms to provide medical/surgical care, labor and delivery, observation, and intensive care.

The estimated construction cost is $33.3 million, and site work began in July 2015. The new inpatient wing is slated for completion in April 2017 (DJC, 2015; Hansen, 2015a).

Engineering Study and Infrastructure Improvements

An engineering study has been proposed for the Port of Coupeville's wharf to determine the state of the infrastructure and to recommend repairs and upgrades that should be undertaken (Hansen, 2015b).

City of Oak Harbor Clean Water Facility Project

The City of Oak Harbor is currently replacing its two existing wastewater treatment facilities with a new wastewater treatment system. The current facilities have neither the technology to meet modern water quality standards nor the capacity for the city's projected population growth.

Construction for the Clean Water Facility Project is underway. The first phase of construction started in June 2015 with the replacement of the existing outfall pipe in Oak Harbor Bay (City of Oak Harbor, 2015b).

State Route 20 – Sharpes Corner Interchange (Roundabout)

To relieve congestion at the Sharpes Corner intersection on SR 20 and reduce the risk of traffic accidents, the WSDOT is constructing a roundabout at the intersection. This project also includes construction of a roundabout at the Miller-Gibralter Road intersection, improvements to bicycle and pedestrian facilities along the highway, and improvements to stormwater culverts and detention ponds. Construction is expected to be completed in 2018 (WSDOT, 2017).

State Route 20 – Banta Road Intersection

The WSDOT is proposing to improve safety and traffic flow at the Banta Road intersection with SR 20 by constructing a roundabout or traffic signal light. Construction on this project is expected to begin and be completed in 2019 (WSDOT, 2018b).

5.4 Cumulative Impact Analysis

Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources included for analysis, quantifiable data are not available, and a qualitative analysis was

undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made regarding cumulative impacts related to this EIS where possible. The analytical methodology presented in Chapter 4, which was used to determine potential impacts to the various resources analyzed in this document, was also used to determine cumulative impacts.

It is important to note that this analysis presents and discusses the impacts individually for each cumulative impact project for those resources where the potential impacts are more appreciable or where quantitative data are known (as it pertains to the projects identified in Table 5-1). Conversely, the cumulative impacts to those resources with less appreciable potential impacts are presented in a more qualitative analysis.

5.4.1 Airfield and Airspace

5.4.1.1 Description of Geographic Study Area

The study area for airfield and airspace cumulative impacts includes Ault Field at NAS Whidbey Island and OLF Coupeville. It should be noted that other areas mentioned in this EIS are analyzed in appropriate NEPA documents.

5.4.1.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact airspace and airfield operations include the NWTRC EIS/OEIS and the disestablishment of the VQ mission capabilities at NAS Whidbey Island by 2021. A summary of relevant impacts of each action is provided below.

Northwest Training Range Complex Final EIS/OEIS (2010)

The airspace-related activities associated with the NWTRC EIS/OEIS project included additional operations in the inshore area around NAS Whidbey Island. Inshore activities proposed under the Proposed Action would cause a training tempo increase of approximately 54 percent, resulting in more air traffic. Training included search and rescue training at the Seaplane Base and the OLF. Aircraft were already operating in this airspace, and no significant changes in the types of airspace classification and uses would occur. Aircraft transiting to the NWTRC use designated military transit routes near the NAS Whidbey Island complex that also would be used by Growler aircraft transiting between Ault Field and OLF Coupeville or to training ranges.

Disestablishment of the Fleet Air Reconnaissance Capabilities

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2021. While the full scope of this action has not been fully developed, the potential changes to airfield operations associated with this action would decrease annual EP-3 operations by approximately 4,700. Consequently, it would be expected that impacts on airspace and airfield operations would be positive. It is important to note that this project has been incorporated as an element of the No Action Alternative identified in this EIS.

5.4.1.3 Cumulative Impact Analysis

Proposed Action

Implementation of the Proposed Action would increase total airfield operations by up to 33 percent at the NAS Whidbey Island complex. The increase in operations above the No Action Alternative would range between 9,100 operations (Alternative 1, Scenario A) and 25,000 operations (Alternatives 1 and 2, Scenario C) at Ault Field. At OLF Coupeville, Alternatives 2 or 3 with Scenario C would result in a decrease of 200 operations compared to the No Action Alternative. The increase in operations at OLF Coupeville under the remaining alternatives would range from a decrease of 200 operations (Alternatives 2 and 3, Scenario C) to an increase of 18,800 operations (Alternative 1, Scenario A). None of the alternatives would require any modification to the current airspace of operational procedures or any changes to the departure and arrival route structures in order to accommodate the increased air traffic.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Each of the past projects and several of the present and reasonably foreseeable future actions listed in Table 5-1 has or will result in changes to the number of flight operations. As noted previously, there would be an inshore activity increase of 54 percent as identified in the 2010 NWTRC EIS/OEIS. When coupled with the proposed increase in aircraft operations as a result of the Proposed Action (up to 33 percent), the airspace would be used more often and could become congested at times but would remain open for civilian air traffic. No changes in the types of classification or significant impacts on civilian and commercial use of the airspace would be anticipated.

5.4.2 Noise Associated with Aircraft Operations

Construction noise generated by multiple construction, modification, expansion, and demolition projects under each alternative would result in short-term noise impacts at and near Ault Field. Since the proposed construction is located on the flight line, aircraft-related noise would likely dominate construction noise. No residential areas or other points of interest are located in the vicinity of the proposed construction activity; therefore, there would not be a significant construction-noise-related impact. There is no proposed construction at OLF Coupeville associated with the Proposed Action. Therefore, the discussion of noise impacts focuses on noise associated with aircraft operations.

5.4.2.1 Description of Geographic Study Area

The study area for noise cumulative impacts includes the land and population under the greater than 65 decibel (dB) day-night average sound level (DNL) contours of the NAS Whidbey Island complex.

5.4.2.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact noise include the NWTT EIS/OEIS and the disestablishment of the VQ mission capabilities at NAS Whidbey Island. A summary of relevant impacts of each action is described below.

Northwest Training and Testing Final EIS/OEIS

The training activities in the NWTT Final EIS/OEIS include: Anti-Air Warfare; Anti-Surface Warfare; Anti-Submarine Warfare; Electronic Warfare; Mine Warfare; Naval Special Warfare; and “Other” training

activities (Maritime Security Operations; Precision Anchoring; Small Boat Attack; Intelligence, Surveillance, and Reconnaissance; Search and Rescue; Surface Ship Sonar Maintenance; and Submarine Sonar Maintenance). As detailed in the Final EIS/OEIS (Navy, 2015d), the number of training activities would increase from 5,414 events (No Action Alternative) to 8,140 events in the offshore area, including the Olympic MOAs. Inland, these activities would decrease from 166 events to 117 events and thus would result in less noise in and around these inland areas. The proposed training and testing activities that will be analyzed in the supplement to the 2015 Final EIS/OEIS (Phase III of the NWTT) are generally consistent with those analyzed in the previous EIS/OEIS and approved in the 2016 ROD.

Disestablishment of the Fleet Air Reconnaissance Capabilities

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2021. The 2008 Final EIS and 2014 SEIS accounted for the VQ mission to be at NAS Whidbey Island beyond 2020. The full scope of this action has not been fully developed, so potential changes to the noise environment associated with this action cannot be assessed at this time. However, potential changes to airfield operations associated with this action would likely decrease by approximately 4,700 EP-3 operations annually.

5.4.2.3 Cumulative Impact Analysis

Proposed Action

The Proposed Action and alternatives would have a significant impact on the noise environment as it relates to aircraft operations at Ault Field and OLF Coupeville. There would be an increase in population within the 65 dB DNL noise contour under all alternatives and scenarios. More specifically and depending on the scenario, Alternative 1 would result in an increase of up to 17.3 percent, Alternative 2 would result in an increase of up to 15.8 percent, and Alternative 3 would result in an increase of up to 15.8 percent of the total population surrounding the two airfields.

The DNL noise contour that covered the highest estimated population was Alternative 1, Scenario E, with a total population of 13,050. However, the range of population potentially within the 65 dB DNL noise contour did not vary drastically between alternatives. The lowest estimated population was under Alternative 3, Scenario A, with a total population of 12,483 (an approximately 4.5-percent difference from the high range). Comparing the five scenarios under each alternative, Scenario A always resulted in the highest estimated population within the 65 dB DNL noise contour associated with OLF Coupeville, while the highest estimated population associated with Ault Field was always under Scenario C. This would be expected and is consistent with the proportion of field carrier landing practice (FCLP) operations assigned to those airfields under the five scenarios.

There would also be an increase in several of the supplemental metrics, including indoor and outdoor speech interference, probability of awakening, and classroom/learning interference. These varied by location and alternative/scenario. In addition, the population that may be vulnerable to permanent hearing loss increased under the Proposed Action, with more of an impact on the populations surrounding Ault Field. However, the analysis used to assess the population that may be vulnerable to potential hearing loss is based upon an extremely conservative set of parameters, including being outdoors at one's residence and exposed to all aircraft events over a 40-year period. Therefore, since it is highly unlikely for an individual to meet those criteria, the actual potential Noise Induced Permanent Threshold Shift for individuals would be far less than the values reported in Section 4.2, and hearing loss is not expected.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

While the Proposed Action is expected to have a significant impact to the noise environment around Ault Field and OLF Coupeville, the other actions (Table 5-1) would only have a minor contribution to the overall cumulative effect. Some of the other projects evaluated for cumulative impacts will result in slightly more operations, which may have a cumulative effect on the area immediately surrounding Ault Field. However, the majority of aircraft operations that would result in noise increases are expected to occur in more remote areas. Other current aircraft operations at NAS Whidbey Island and ongoing non-federal activities in the vicinity of the installation (i.e., vehicle and air traffic) would continue in the future at reasonably foreseeable current levels. These other activities are not expected to cause additional significant impacts.

5.4.3 Public Health and Safety

5.4.3.1 Description of Geographic Study Area

The study area for safety cumulative impacts is the NAS Whidbey Island complex and the immediate vicinity around it.

5.4.3.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact public health and safety are those that that have the potential to affect flight safety, Bird/Animal Aircraft Strike Hazard, and Accident Potential Zones (APZs) and Clear Zones within the NAS Whidbey Island complex. Therefore, the VQ disestablishment project is included in this analysis.

5.4.3.3 Cumulative Impact Analysis

Proposed Action

The Proposed Action would add 35 or 36 Growler aircraft and increase overall airfield flight operations at the NAS Whidbey Island complex, thereby increasing the risk of an incident. However, current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and airfield flight operations would adhere to established safety procedures. Potential aircraft mishaps are the primary safety concern with regard to military training flights. NAS Whidbey Island maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to mishaps, whether on or off the installation. While there is no proposed change planned to existing flight procedures for Ault Field or OLF Coupeville, there is an increase in air operations proposed under each of the alternatives. Therefore, the Bird/Animal Aircraft Strike Hazard risk would increase as a result of increased exposure. Impacts as a result of the increased Bird/Animal Aircraft Strike Hazard risk would be minimized through continued implementation of the standard procedures and protocols of the Bird/Animal Aircraft Strike Hazard plan. The flight operations for each alternative were combined where they generally utilized the same arrival, departure, or pattern flight tracks to determine whether new APZs would be recommended.

5.4.3.4 Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

When past, present, and reasonably foreseeable future projects are analyzed together with the Proposed Action and all action alternatives, there is the potential for additive impacts to public health and safety as a result of additional aircraft and increased operations, as applicable. Cumulatively, there would be a net increase in aircraft operations at the NAS Whidbey Island complex and within the region. This net increase in operations corresponds to a net increase in a risk to public health and safety, and Bird/Animal Aircraft Strike Hazard incidents. Aircrews would continue to follow procedures outlined in the installation's Bird/Airstrike Hazard Management Plan. Current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and airfield flight operations would adhere to established safety procedures. As such, implementation of the Proposed Action would not result in significant cumulative impacts to public health and safety.

5.4.4 Air Quality

5.4.4.1 Description of Geographic Study Area

The study area for air quality cumulative impacts is the Northwest Clean Air Agency (NWCAA) Air Quality Management Jurisdiction, which includes Island, Skagit, and Whatcom Counties. The Region in the vicinity of the NAS Whidbey Island complex would experience an increase in air emissions from construction and operations associated with the Proposed Action.

5.4.4.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact air quality primarily include projects that would increase or decrease operations at the NAS Whidbey Island complex and increase vehicle traffic in the area. These include:

Northwest Training and Testing Final EIS/OEIS

The NWTT EIS/OEIS identified emissions that would occur related to the changes in Navy training and testing activities in national and international regions in the vicinity of NAS Whidbey Island. To evaluate regional criteria pollutant impacts, total emissions within the region were estimated, while total project greenhouse gas (GHG) emissions were also calculated (See Table 5-2). The EIS analysis determined that the incremental contribution of the action would be low and would still be below applicable state, federal, and USEPA standards and guidelines (Navy, 2015d).

VQ Disestablishment

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2021. While the full scope of this action has not been fully developed, the potential changes to airfield operations associated with this action would decrease annual EP-3 operations by approximately 4,700. Consequently, it would be expected that air emissions from airspace and airfield operations would be reduced.

Table 5-2 Total Changes in Criteria Pollutant and GHG Emissions due to Proposed Actions, NWCAA Jurisdiction

Proposed Actions	Emissions (tpy)[2]						$MTCO_2e$
	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Growler Airfield Operations at the NAS Whidbey Island Complex							
Alternative 1 A	229.0	186.7	638.0	18.0	90.8	84.3	39,375
Alternative 1 B	183.3	156.2	527.0	14.5	74.7	68.2	31,899
Alternative 1 C	139.6	132.3	433.5	11.3	59.9	53.5	24,922
Alternative 1 D	214.3	178.5	606.3	16.9	85.8	79.4	37,016
Alternative 1 E	150.8	140.6	465.6	12.1	64.0	57.5	26,786
Alternative 2 A	227.4	205.4	691.2	18.1	98.6	86.6	40,250
Alternative 2 B	183.3	175.9	584.2	14.8	83.1	71.1	33,050
Alternative 2 C	141.5	152.6	493.7	11.7	68.9	56.9	26,356
Alternative 2 D	213.5	197.6	660.9	17.1	93.9	81.9	38,018
Alternative 2 E	155.7	160.6	524.8	12.7	73.8	61.7	28,627
Alternative 3 A	225.0	202.8	679.3	17.9	91.7	85.1	39,295
Alternative 3 B	183.5	180.1	590.3	14.9	77.6	71.1	32,646
Alternative 3 C	139.6	151.0	484.3	11.5	62.2	55.7	25,490
Alternative 3 D	211.1	195.1	649.2	16.9	87.0	80.4	37,070
Alternative 3 E	153.6	158.9	514.9	12.6	67.0	60.4	27,741
Northwest Training and Testing EIS/OEIS							
Changes to Training and Testing Emissions in the Olympic-Northwest Washington Intrastate (WA) AQCR (or total for GHG emissions)							
Alternative 1	53.6	8.4	102.0	10.5	1.7	1.7	47,000.0

Source: Navy, 2015d.

Key:
AQCR = Air Quality Control Region
CO = carbon monoxide
CO_2e = carbon monoxide equivalent
EIS = Environmental Impact Statement
GHG = greenhouse gas
MT = metric tons
NO_x = nitrogen oxide
OEIS = Overseas Environmental Impact Statement
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter
PM_{10} = particulate matter less than or equal to 10 microns in diameter
SO_2 = sulfur dioxide
tpy = tons per year
VOC = volatile organic compound

5.4.4.3 Cumulative Impact Analysis

Proposed Action

The Proposed Action would result in direct and indirect emissions of criteria air pollutants during construction and after implementation of the action. Changes to facilities and the maintenance of more aircraft would result in increases in stationary source emissions at NAS Whidbey Island. Although these emissions would be subject to NAS Whidbey Island's Air Operating Permit (AOP) (NWCAA, 2013), estimated emissions would be below permit thresholds for required permit modification and therefore would not require changes to the AOP. New buildings would require additional direct (natural gas) and indirect (electricity) energy use, which would result in an increase in direct and indirect emissions. Changes to aircraft operations and personnel commuting would result in an increase in annual emissions. Mobile emissions are not covered by the NAS Whidbey Island AOP; however, these emissions contribute to regional emission totals and can effect compliance with National Ambient Air Quality Standards. Implementation of the Proposed Action would also contribute directly to emissions of GHGs from the combustion of fossil fuels. Table 5-2, above, provides a summary of the increases in emissions from ongoing changes to operations for all alternatives.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Changes to Operations

The NWTT activity changes and VQ disestablishment are all recent or ongoing actions that involved the re-alignment of aircraft and changes to operations at or in the vicinity of the NAS Whidbey Island complex. The environmental review of these projects determined that each individual action would have no significant impact on local air quality. In some cases, these actions result in a reduction in emissions from the replacement of old aircraft and/or the reduction of operations (Navy, 2015d). The changes in operating emissions can be the result of aircraft operations changes and a change in the number of personnel, which would impact emissions from commuting. Table 5-2 provides a summary of estimated emissions from this action. The cumulative impacts from changes in operations at the NAS Whidbey Island complex would not be significantly different than the impacts from the Proposed Action, and some projects (such as the Replacement of Four C-9 Skytrain II Aircraft by Three C-40 Aircraft) may reduce the cumulative impacts.

Construction Projects

Construction of the Proposed Action and other construction projects would result in temporary and minor increases in air emissions from the combustion of fossil fuels in equipment and vehicles, volatile organic compound emissions from paving and painting, and emissions of fugitive dust and dirt during site ground disturbance. Due to the temporary and dispersed nature of construction emissions, it is not likely that cumulative construction emissions would result in significant impacts to air quality. Construction emissions could be reduced by using best management practices (BMPs). Exhaust emissions from construction vehicles can be reduced by using fuel-efficient vehicles with emission controls and ensuring that all equipment is properly maintained. Dust emissions from ground disturbance and road traffic should be controlled by spraying water on soil piles and graded areas and keeping roadways clean.

5.4.5 Land Use

5.4.5.1 Description of Geographic Study Area

The study area for land use cumulative impacts includes NAS Whidbey Island, OLF Coupeville, the City of Oak Harbor, the Town of Coupeville, and portions of Island County, Washington.

5.4.5.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have a potential to interact with the Proposed Action and cumulatively impact land use compatibility in the area surrounding NAS Whidbey Island include the VQ squadron disestablishment. A summary of relevant impacts of the action is described below.

Disestablishment of the Fleet Air Reconnaissance Capabilities

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2021. The full scope of this action has not been fully developed, so potential changes to the noise environment associated with this action cannot be assessed at this time. However, potential changes to airfield operations associated with this action would likely decrease by approximately 4,700 EP-3 operations annually. Therefore, it would be expected that there would not be significant impacts to land use compatibility.

5.4.5.3 Cumulative Impact Analysis

Proposed Action

Land Use Compatibility

Implementation of the Proposed Action at the NAS Whidbey Island complex would not result in any impact to on-station land use. Construction proposed under the alternatives would not result in direct or indirect impacts to regional land uses because all construction would be located entirely within the NAS Whidbey Island complex. Land use compatibility surrounding the NAS Whidbey Island complex would be impacted under each alternative. The acreage of land within the projected greater than 65 dB DNL noise contours would increase by between 9 percent and 18 percent during an average operating year. Incompatible land use (i.e., residential land) within the DNL noise contours would increase under all alternatives and scenarios, during average operating years.

The conceptual APZs at OLF Coupeville would increase under each alternative. If warranted, the APZs could be updated by completing an Air Installations Compatible Use Zones update and coordinating with local communities to provide appropriate new land use recommendations as necessary. The Navy would continue to work with Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville as necessary to plan for compatible land use development within current and proposed APZs under any alternative selected for implementation.

Recreation and Wilderness

Overall, implementation of the Proposed Action at NAS Whidbey Island would result in localized significant impacts to recreation at Ebey's Landing National Historical Reserve, various county and municipal parks and recreational areas, and private recreational facilities under some alternatives and scenarios, as a result of increased noise exposure. Implementation of the Proposed Action would result in moderate impacts on wilderness recreation and management at Williamson Rocks, which are included in the San Juan Island Wilderness, part of the San Juan Islands National Wildlife Refuge. The

Proposed Action would directly affect recreation management in the study area as a result of long-term changes in noise exposure that would affect the recreational experiences of visitors when aircraft are operating in the area.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

The VQ squadron disestablishment that could affect land use in the geographic study area would likely decrease air operations and noise contours, or have only a minor change. As such, cumulative impacts to land use, recreation, and wilderness could occur, but no significant cumulative impacts would be expected.

5.4.6 Cultural Resources

5.4.6.1 Description of Geographic Study Area

The study area for cultural resources cumulative impacts is Ault Field, areas adjacent to the installation within the Area of Potential Effect, and OLF Coupeville.

5.4.6.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable future actions that have a potential to interact with the Proposed Action and cumulatively impact cultural resources include the projects identified in Table 5-1 that occur within the Area of Potential Effects, which is defined as the area encompassed by the 65 dB DNL noise contour and is inclusive of the entire Ebey's Landing National Historical Reserve (see Figure 3.6-1). As noted on Figure 5-1, these projects include all construction projects located at Ault Field and OLF Coupeville as well as the following two projects: the NWTT EIS/OEIS and City of Oak Harbor Water System Improvements.

Construction associated with the aforementioned actions that occur on Ault Field or federally owned property or using federal funding would require some form of federal authorization or permitting if potential impacts to cultural resources may occur. Federal agency procedures would be implemented to identify cultural resources, avoid impacts, and mitigate if impacts cannot be avoided. Therefore, past, present, and reasonably foreseeable future federal actions would require appropriate consultation and permitting in order to avoid and minimize potential impacts to archaeological resources, architectural resources, cemeteries, and traditional cultural properties. Nonetheless, inadvertent impacts could occur if unidentified cultural resources are present within the footprint of those actions.

5.4.6.3 Cumulative Impact Analysis

Proposed Action

Archaeological Resources

As evaluated under NEPA, minimal to no impact would occur to known or intact archaeological resources. Per its Section 106 responsibilities, the Navy determined that no adverse effect would occur.

Architectural Resources

As evaluated under NEPA, moderate to no direct and indirect impacts are anticipated to occur to on-station historic resources during construction. Minimal indirect impacts to on-station resources are anticipated to occur during operations. No direct impacts are anticipated to occur during construction to off-station resources because activities are limited to Ault Field. Minor to moderate, temporary indirect impacts are anticipated to occur to off-station historic resources during operation. Per its Section 106

responsibilities, the Navy determined that an adverse effect would occur to historic properties due to changes to the perceptual qualities of five landscape features that contribute to the significance of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve. The Navy is consulting with the Washington State Historic Preservation Office (SHPO), American Indian tribes and nations (hereinafter referred to as "tribes"), and other consulting parties regarding a Memorandum of Agreement (MoA) as part of its National Historic Preservation Act (NHPA) Section 106 consultation.

Cemeteries

As evaluated under NEPA, no known cemeteries or human burial grounds would be subject to potential ground disturbance. Minimal to no indirect impacts would occur to these resources. Per its Section 106 responsibilities, the Navy determined an overall finding of no adverse effects to cemeteries and human burial grounds that are historic properties.

Traditional Cultural Properties

As evaluated under NEPA, no impact would occur to traditional cultural properties (TCPs) because no known TCPs have been identified. Per its Section 106 responsibilities, the Navy determined that no effect would occur to TCPs.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

When past, present, and reasonably foreseeable future projects are analyzed together with the Proposed Action, there would be potential for cumulative impacts to cultural resources. On- and off-station projects that include ground disturbance, demolition/modifications of buildings, construction of new facilities in undeveloped areas (potential visual impacts), or aircraft operations (i.e., noise) associated with other cumulative projects could impact prehistoric and historic archaeological resources, historic buildings and structures, cemeteries, and TCPs. Federal projects with potential for impacts on cultural resources would undergo Section 106 review under the NHPA, which includes consultation with the Washington SHPO and affected tribes, other interested parties, and the Advisory Council on Historic Preservation. State projects may be subject to other cultural resources reviews. Any potentially significant impacts to cultural resources would be mitigated. For these reasons, it is expected that any cumulative impacts on cultural resources would be less than significant.

5.4.7 American Indian Traditional Resources

5.4.7.1 Description of Geographic Study Area

The study area for traditional resource cumulative impacts includes Ault Field and areas within the 65 dB DNL noise contour for 2021 conditions (as defined in Section 3.7).

5.4.7.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable future actions that have a potential to interact with the Proposed Action and cumulatively impact traditional resources and/or access to usual and accustomed (U&A) grounds and stations include the projects identified in Table 5-1 that consist of federal actions and that occur within Ault Field and within the 65 dB DNL noise contour areas (including the co-use waters to the west and north of Ault Field; co-use waters in Dugualla Bay; and the co-use waters of Crescent Harbor) (see Section 3.7 for a description of the U&A grounds). These projects include the Pacific Northwest Electronic Warfare Range EA; the OLF Security Barrier EA; the NWTT EIS/OEIS; the Triton Mission Control; and the Naval Health Clinic Oak Harbor.

Federal agencies are tasked with the requirement to consider traditional resources and the interests of federally recognized tribes in their actions and policies. Therefore, projects that require federal permitting, funding, or approvals would necessitate consultation with federally recognized tribes.

Federal agencies often maintain established procedures to identify traditional resources, to avoid impacts to them, and, if needed, to mitigate impacts that cannot be avoided. Traditional resources, along with archaeological and architectural resources, are protected by various laws and their implementing regulations, such as the NHPA of 1966, as amended; the American Indian Religious Freedom Act of 1978; and the Native American Graves Protection and Repatriation Act of 1990.

The Navy, in particular, has an active consultation process in place and will continue to consult on a government-to-government basis with potentially affected tribes regarding its activities that may have the potential to significantly impact traditional resources and/or access to U&A grounds and stations.

5.4.7.3 Cumulative Impact Analysis

Proposed Action

The implementation of the Proposed Action at the NAS Whidbey Island complex would not result in significant impacts to traditional resources or access to U&A grounds and stations, as discussed in Section 4.7. Marine and terrestrial animals were considered, along with water resources and potential changes in GHG emissions. The Navy has invited government-to-government consultation with potentially affected tribes to solicit any concerns they may have so that the Navy can more fully consider the extent of any potentially significant impacts to traditional resources. Government-to-government consultation on this Proposed Action was requested by the Swinomish Indian Tribal Community on December 13, 2016; however, the tribe subsequently withdrew its request on September 27, 2017. No other tribes have requested or initiated government-to-government consultation at this point in the environmental planning process.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

When past, present, and reasonably foreseeable future projects are analyzed in concert with the Proposed Action, the potential for cumulative impacts to traditional resources would be present. On- and off-station projects that include ground or water disturbance; the demolition or alteration of buildings or objects important to tribes; construction of new facilities in undeveloped areas (due to limited access, changes to the landscape, or potential visual, auditory, or vibratory impacts); or aircraft operations (potential visual, auditory, or vibratory impacts) associated with other cumulative projects could impact traditional resources. Federal projects with the potential for impacts on traditional resources would require consultation with federally recognized tribes. If necessary, any potentially significant impacts to traditional resources would be mitigated. Therefore, the Navy anticipates that any cumulative impacts on traditional resources would be less than significant. Sections 5.4.8 (Biological Resources), 5.4.9 (Water Resources), and 5.4.16 (Climate Change and Greenhouse Gases) provide additional information on the potential for cumulative impacts associated with each respective resource.

5.4.8 Biological Resources

5.4.8.1 Description of Geographic Study Area

The study area for biological resources cumulative impacts is Ault Field, OLF Coupeville, and the surrounding vicinity.

5.4.8.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the Proposed Action and cumulatively impact biological resources include all construction projects and operational changes in progress or proposed at Ault Field and OLF Coupeville as well as the following projects: the NWTRC Final EIS/OEIS, NWTT EIS/OEIS, Naval Special Operations Training in Western Washington State, and improvements to the City of Oak Harbor's clean water facilities and water system.

Other construction projects at Ault Field and OLF Coupeville would occur in previously disturbed areas of high-volume human activity and would not result in significant impacts on terrestrial wildlife related to habitat loss. Wildlife in these areas would be expected to avoid construction sites but continue using these sites once construction is complete. Clearing 10 acres of trees northeast of the approach end of Runway 25 would result in permanent loss of a small area of woodland habitat. Similar habitat is located in the surrounding area, and given that this area is exposed to high levels of aircraft operations, no significant impacts to biological resources would result. The Navy will consult with the appropriate regulatory agencies regarding potential impacts to biological resources.

Northwest Training Range Complex Final EIS/OEIS

The airspace-related activities associated with the NWTRC EIS/OEIS project included additional operations in the on-shore area around NAS Whidbey Island; at-sea activities were reanalyzed in the NWTT EIS/OEIS addressed below.

Increased human activity during training operations would have the potential to displace terrestrial (non-marine) wildlife from localized areas. However, disruptions of wildlife behaviors and use of habitat would be temporary and intermittent, occurring only when personnel are present in an area. Training activities would not be expected to result in permanent impacts to vegetation or habitat.

The NWTRC Biological Evaluation (to include amendment) analyzed potential effects to Endangered Species Act- (ESA-) listed species as result of the Navy training and RDT&E activities occurring both in the water and on land in the northwest region as well as of overflights within Okanogan and Roosevelt MOAs in north-central Washington near the Canadian border. While some airspace-related activities associated with the NWTRC EIS/OEIS project occur within the described study area for biological resource cumulative impacts for the Growler Proposed Action, the aircraft overflights within the Okanogan and Roosevelt MOAs are outside of that study area and not considered further. Consultation with the U.S. Fish and Wildlife Service (USFWS) concluded in 2010 with the issuance of the biological opinion (BO). As part of this BO, the USFWS came to the following conclusions for on-shore species:

- **Bull Trout (*Salvelinus confluentus*)**. The effects of the action and the cumulative effects, it is the BO of the USFWS that the 2010-2015 NWTRC, as proposed, is not likely to jeopardize the continued existence of the species.

- **Marbled Murrelet (*Brachyramphus marmoratus*)**. The effects of the action and the cumulative effects, it is the BO of the USFWS that the 2010-2015 NWTRC, as proposed, is not likely to jeopardize the continued existence of the species.
- **Northern Spotted Owl (*Strix occidentalis caurina*)**. Aircraft strikes are not anticipated in any portion of the action area. Therefore, we conclude the action is not likely to adversely affect spotted owls.
- **Short-tailed Albatross (*Phoebastria albatrus*)**. It is extremely unlikely that individual albatrosses will co-occur with stressors generated by these exercises such that adverse effects would occur. Therefore, short-tailed albatrosses are not likely to be adversely affected by the Proposed Action.
- **Western Snowy Plover (*Charadrius alexandrinus nivosus*)**. Given the extremely low likelihood of species exposure to stressors associated with the Proposed Action, snowy plovers are not likely to be adversely affected.
- **Canada Lynx (*Lynx canadensis*)**. It is extremely unlikely that lynx would be exposed to sound levels that would result in a measurable effect. The short duration and infrequent timing of these overflights also minimizes the likelihood of a measurable response. For these reasons, the Proposed Action is not likely to be adversely affect the Canada lynx.
- **Grizzly Bear (*Ursus arctos*)**. In the extremely unlikely event that a grizzly bear were exposed to low-level flights during the critical spring period, alternate spring habitat with less human disturbance would be available. Therefore, the Proposed Action is not likely to adversely affect grizzly bears.
- **Gray Wolf (*Canis lupus*)**. Exposure is also considered extremely unlikely due to the small number of wolves. Therefore, the Proposed Action is not likely to adversely affect gray wolves.
- **Woodland Caribou (*Rangifer tarandus caribou*)**. It is extremely unlikely that woodland caribou will be exposed to low-level flights. Given this, woodland caribou are not likely to be adversely affected.
- **Sea Otter (*Enhydra lutris*)**. The southwest Alaska population of the northern sea otter (*Enhydra lutris kenyoni*) and the California population of the southern sea otter (*Enhydra lutris nereis*) are both listed as threatened under the Endangered Species Act (ESA), but neither population occurs within the action area and, thus, neither will be affected by the Proposed Action. There is no requirement for ESA consultation with the USFWS on the Navy's determination of may affect.

Northwest Training and Testing Final EIS/OEIS

Underwater detonations at Crescent Harbor Explosive Ordnance Disposal Training Range, located approximately 2 miles southeast of NAS Whidbey Island, would increase from two, 2.5-lb. net explosive weight charges (E3 source class) per year to three, 2.5-lb. net explosive weight charges per year under both action alternatives. The potential for birds, including the marbled murrelet, to be impacted by explosive detonations may increase slightly compared to the No Action Alternative. The total number of explosive training events in Crescent Harbor would also increase from the additional use of 18 SWAGs. The SWAG is composed of a cylindrical steel tube, 3 inches long by 1-inch-wide, containing

approximately 0.033 lb. of explosives. The single explosive is highly focused. Divers place a single SWAG on the mine that is located mid-water-column, within water depths of 10 to 12 feet. Serious injury or mortality to individual fish would be expected if present in the immediate vicinity of explosive ordnance disposal; however, despite the increase in training, impacts would be temporary and localized because the explosive training events would be infrequent and widely dispersed throughout Crescent Harbor, and the distribution of potentially affected fish would also vary.

Consultation with the National Marine Fisheries Service (NMFS) concluded on November 9, 2015, with the issuance of the BO. As part of this BO, the NMFS concluded that Navy training and testing activities in the NWTT action area and level of activity are likely to adversely affect but will not appreciably reduce the ability of the threatened and endangered species under NMFS jurisdiction to survive and recover in the wild. Therefore, the NMFS concluded that these activities were not likely to jeopardize the continued existence of any endangered or threatened species.

Consultation with the USFWS concluded on June 14, 2018, with the issuance of the BO. As part of this BO, the USFWS came to the following conclusions:

- **Bull Trout.** Implementation of the Navy's NWTT activities, as proposed, may affect, but is not likely to adversely affect, the bull trout. Critical habitat for the bull trout is designated in the action area, and the USFWS concurs with the Navy's determination that the Proposed Action is not likely to adversely affect designated critical habitat for the bull trout. Therefore, the Proposed Action is not likely to destroy or adversely modify critical habitat for the bull trout.
- **Marbled Murrelet.** Implementation of the Navy's NWTT activities, as proposed, is not likely to jeopardize the continued existence of the marbled murrelet. While critical habitat for the marbled murrelet has been designated in the action area, no effects to the critical habitat are anticipated. Therefore, the Proposed Action is not likely to destroy or adversely modify designated critical habitat for the marbled murrelet.
- **Short-tailed Albatross.** Implementation of the Navy's NWTT activities, as proposed, is not likely to jeopardize the continued existence of the short-tailed albatross.
- **Western Snowy Plover**: Implementation of the Navy's NWTT activities, as proposed, is not likely to jeopardize the continued existence of the western snowy plover.
- **Streaked Horn Lark**: Implementation of the Navy's NWTT activities, as proposed, is not likely to jeopardize the continued existence of the streaked horn lark.
- **Northern Spotted Owl**: Implementation of the Navy's NWTT activities, as proposed, is not likely to jeopardize the continued existence of the northern spotted owl.

Training and testing activities projected to occur after 2020 would generally be consistent with those analyzed in the previous EIS/OEIS and would be expected to result in similar impacts to biological resources. The Navy will analyze impacts to biological resources in the supplement to the 2015 NWTT EIS/OEIS.

Naval Special Operations Training in Western Washington State

Increased human activity during training operations would have the potential to displace marine and terrestrial wildlife from localized areas. However, disruptions of wildlife behaviors and use of habitat would be temporary and intermittent, occurring only when personnel are present in an area. No construction would be required for this project, and training activities would not be expected to result in permanent impacts to vegetation or habitat. It is unlikely that training activities would impact aquatic or

terrestrial species listed under the ESA. The Navy is preparing a separate environmental assessment to analyze the potential effects of this project, including cumulative impacts.

Improvements to the City of Oak Harbor's Water System

Construction-related noise could result from the replacement of the City of Oak Harbor's aging water system. This project could cause increased noise during the construction period, which would temporarily displace wildlife. However, this potential disruption would be expected to be short term. It is unlikely that noise from this terrestrial-based project would impact aquatic-based Endangered Species Act-listed species, in particular the marbled murrelet. Impacts to vegetation would be negligible because this is a replacement project, not construction on a green field. If any vegetation impacts were to occur, they would be temporary.

Replacement of the City of Oak Harbor's Clean Water Facilities

Construction-related noise could result from the replacement of the City of Oak Harbor's two existing water treatment facilities under the City of Oak Harbor Water Systems Improvement project. This project could cause increased noise during the construction period, which would temporarily displace wildlife. However, this potential disruption would be expected to be short term, and wildlife, including the Endangered Species Act-listed marbled murrelet, should return upon the completion of construction. The discharge of effluent into Oak Harbor as a result of improvement of the City of Oak Harbor's water supply infrastructure and the replacement of the City of Oak Harbor's two existing water treatment facilities would not be expected to impact the nearshore foraging areas used by marbled murrelets because all discharge would be treated before its release.

5.4.8.3 Cumulative Impact Analysis

Proposed Action

Potential effects on terrestrial and marine wildlife from implementation of the Proposed Action would be similar between all three alternatives but greater under Alternative 1 because it is the alternative that would result in the largest increase in aircraft operations. There would be negligible differences to impacts on biological resources between scenarios and between average year and high-tempo FCLP year conditions across all three alternatives. Differences would be attributable to the location and frequency of operations (e.g., more FCLPs proposed under Scenario C). However, the overall significance of the Proposed Action on terrestrial and marine wildlife would be expected to be similar for each alternative because the increase in operations under each of the three alternatives is very similar. The Navy will consult with the appropriate regulatory agencies. The overall significance of the Proposed Action's potential impacts on various wildlife species groups is highlighted below.

- Construction of the new facilities would occur in previously disturbed areas of high-volume human activity and is not expected to result in significant impacts on terrestrial wildlife related to habitat loss. Construction noise would not have any impacts on marine species. Additionally, the NMFS determined that the construction activities may affect, but not adversely affect, Southern Resident killer whale critical habitat. The NMFS's determination under the ESA was issued on July 20, 2017.
- In general, wildlife in the study area are already exposed to high levels of aircraft operations and other human disturbances, and the Proposed Action would result in some additional sensory disturbance impacts, particularly from noise. As previously stated, the impacts would be similar

under each alternative; however, the levels of impacts would vary between the five operational scenarios. Scenario C for both Ault Field and OLF Coupeville would be the most comparable to the No Action Alternative and constitute the smallest change in noise impacts, whereas Scenario A at OLF Coupeville would result in the greatest change in noise impacts overall.

- The NAS Whidbey Island complex reports a proportionally small number of bird/animal aircraft strikes annually (approximately 28 reported strikes per year between 2005 and 2015) relative to the high number of aircraft operations flown (84,700 annually (Section 4.1.2.1) at the complex and the large numbers of wildlife inhabiting the study area throughout the year. With the continued implementation of the NAS Whidbey Island complex's Bird/Animal Aircraft Strike Hazard plan, the Proposed Action would not significantly impact local wildlife populations (NAS Whidbey Island, 2013a).
- For Migratory Bird Treaty Act (MBTA)-protected species, U.S. Department of Defense (DoD) installations are not exempt from "take"; however, under the MBTA regulations applicable to military readiness activities (50 Code of Federal Regulations Part 21), the impacts from stressors from the Proposed Action would not result in a significant adverse effect on migratory bird populations. During construction, impacts to MBTA-protected species will be minimized by implementing appropriate conservation measures to offset adverse effects of the Proposed Action.
- The Proposed Action may adversely affect the marbled murrelet.
- The Proposed Action's increase in aircraft operations would not have significant noise impacts on federally listed fish species (i.e., bull trout, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, and yelloweye rockfish). Therefore, the Proposed Action would not significantly impact the bull trout, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, and yelloweye rockfish. In Endangered Species Act (ESA) terms, the Proposed Action may affect, but is not likely to adversely affect, the bull trout, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, and yelloweye rockfish. The NMFS's determination under the ESA was issued on July 20, 2017.
- The Proposed Action's increase in aircraft operations would not have significant noise and/or visual impacts on the Southern Resident killer whale and humpback whale. Marine mammals, including non-ESA species, exposed to fixed-wing aircraft overflights could exhibit a short-term behavioral response, but fixed-wing aircraft overflights over territorial waters would have no significant impact on marine mammals. Therefore, the Proposed Action would not significantly impact the Southern Resident killer whale and humpback whale. In ESA terms, the Proposed Action may affect, but is not likely to adversely affect, the Southern Resident killer whale and humpback whale. The Navy consulted with the NMFS regarding the effects determination for Southern Resident killer whales and humpback whales. Pursuant to the Marine Mammal Protection Act, including the 2004 military readiness amendment, no take of marine mammals is anticipated.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

The Proposed Action, when taken into consideration with currently ongoing and reasonably foreseeable future actions that would result in an increase of aircraft operations at Ault Field, OLF Coupeville, or in

the surrounding regional airspace, could result in cumulative effects to wildlife. Specifically, these effects include sensory disturbances and wildlife-aircraft strike effects.

The potential exists for additive effects when the Proposed Action is taken into consideration with the aforementioned actions that would result in increased operations. However, other actions would result in fewer operations at Ault Field and OLF Coupeville, which has the potential to offset some of these potential effects. Consequently, the Proposed Action, when considered with other past, present, and future actions, could cumulatively impact biological resources, but it would not be expected to have a significant cumulative impact.

5.4.9 Water Resources

5.4.9.1 Description of Geographic Study Area

The study area for water resources cumulative impacts includes NAS Whidbey Island, OLF Coupeville, and the surrounding area.

5.4.9.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the Proposed Action and cumulatively impact water resources and wetlands include other construction projects at Ault Field and the improvements to the City of Oak Harbor's water system and clean water facilities. A summary of relevant impacts of each action is described below.

Construction projects at Ault Field, including the Naval Health Clinic Oak Harbor and Regional Aircraft Service Facility Renovation, would occur on previously developed sites, which would minimize the amount of new impervious surface created and potential impacts resulting from increased stormwater runoff or erosion. One project, demolition of nine farmhouses at NAS Whidbey Island, would reduce the amount of impervious surface at the air station.

Clearing trees northeast of the approach end of Runway 25 would result in direct impacts to 10 acres of wetlands. This project was developed in consultation with the appropriate state and federal agencies, and no significant impacts to wetlands would result.

Improvements to the City of Oak Harbor's Water System

Construction-related water resource impacts could result from the replacement of the City of Oak Harbor's aging water system. This project would increase impervious surfaces due to the installation of a new storage tank and new road; however, this impact would be partially mitigated by the removal of an old storage tank (the Eastside tank). Water quality of nearby water bodies could potentially be impacted during initial runoff events following construction due to erosion associated with grading and clearing activities. This runoff would be temporary until cleared areas have been re-vegetated. It is unknown at this time whether wetlands would be impacted.

Replacement of the City of Oak Harbor's Clean Water Facilities

Construction-related impacts to water resources could result from the replacement of the City of Oak Harbor's existing wastewater treatment facility under the City of Oak Harbor Water Systems Improvement project. The improvement of the City of Oak Harbor's water supply infrastructure and the replacement the wastewater treatment facility owned by the City of Oak Harbor are expected to improve water quality of the effluent discharged into Oak Harbor, although the new impervious surface

will increase stormwater runoff in the area. The new wastewater treatment facility is planned to be built within a 100-year floodplain; as such, it may be elevated to avoid flooding during a 100-year flood event. Wetlands would likely be filled in the 100-year floodplain as a result of this project, but to what extent is unknown at this time. It is important to note that the Navy will take back the operation and maintenance of the lagoon wastewater treatment plant, with all Navy-related discharge going to this location and not the City of Oak Harbor's wastewater treatment facility.

5.4.9.3 Cumulative Impact Analysis

Proposed Action

Groundwater

New construction under each of the alternatives would not impact the three groundwater aquifers in the vicinity of NAS Whidbey Island because none of the proposed construction would extend below the ground surface to a depth that would impact the underlying water tables. Although the number of personnel employed or stationed at NAS Whidbey Island would increase, resulting in a corresponding increase in the demand for groundwater, this is anticipated to be minimal because NAS Whidbey Island does not use groundwater as a source of drinking water.

Surface Water

The Proposed Action would result in up to 2.3 acres of new impervious surface created by the new armament storage, mobile maintenance facility, vehicle parking, and hangar space. The increase in impervious surface would be less than 1 percent compared to the existing approximately 600 acres of impervious surface at NAS Whidbey Island.

Wetlands

Each of the three alternatives would have no direct impacts on wetlands at NAS Whidbey Island because no wetlands occur in or adjacent to the proposed construction areas.

Floodplains

No construction would occur within Federal Emergency Management Agency-mapped floodplains under any of the three alternatives. Therefore, there would be no impacts on floodplains, and all three alternatives would be fully consistent with Executive Order 11988.

Marine Waters and Sediments

The projected increase in new impervious surfaces under each alternative would increase the quantity and velocity of stormwater runoff, which would increase the susceptibility of surrounding soils to erosion and could potentially lead to impacts to marine sediments. These impacts would be minimized or avoided by implementing the BMPs described above for surface waters.

In summary, implementation of any of the Proposed Action would have no direct impacts on water resources. Indirect impacts on water resources would not be significant due to the relatively small size of ground disturbance that would occur and the relatively small amount of new impervious surfaces being created.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

While other projects impacting water resources or wetlands would implement regulatory-required mitigation, any anticipated impacts from the above-listed projects would not be considered significant because of geographic separation of wetlands, the types of waters impacted (freshwater or marine), and

temporal displacement and replacement of the resource function. Consequently, the Proposed Action when considered with other past, present, and future actions could cumulatively impact water resources and wetlands but would not be anticipated to have a significant cumulative impact.

5.4.10 Socioeconomics

5.4.10.1 Description of Geographic Study Area

The study area for socioeconomic cumulative impacts includes NAS Whidbey Island, OLF Coupeville, and Island County.

5.4.10.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the Proposed Action and cumulatively impact socioeconomics include the disestablishment of the VQ mission capabilities at NAS Whidbey Island. The relevant impacts of this action are described below.

The other actions described in Table 5-1 would cumulatively impact the socioeconomic environment of Island County, primarily as a result of the increased personnel associated with the military actions being added to the regional economy. However, these projects represent the types of actions that occur each year at a military installation or in a well-developed economy. This level of activity is not atypical for the region and could in fact be considered part of the No Action Alternative or existing level. Therefore, from an economic standpoint, these projects do not represent a cumulative change in economic activity over existing conditions.

Disestablishment of the Fleet Air Reconnaissance Capabilities

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2021. VQ-2 was disestablished in FY 12, and personnel were consolidated with VQ-1. Personnel loading for VQ-1 following consolidation was approximately 640. The loss or transfer of approximately 640 personnel and their families from NAS Whidbey Island would cause a long-term socioeconomic impact as a result of the decrease in payroll and spending in the community.

5.4.10.3 Cumulative Impact Analysis

Proposed Action

Population

Implementation of the Proposed Action would result in minor impacts on the personnel loading at the NAS Whidbey Island complex and on total population in the region. Total Growler personnel loading at the NAS Whidbey Island complex is expected to increase under Alternatives 1 through 3 when compared to the personnel loading under the No Action Alternative. In total, an estimated 794 military personnel and dependents under Alternative 1; 1,488 military personnel and dependents under Alternative 2; and 808 military personnel and dependents under Alternative 3 are expected to reside primarily in Island or Skagit Counties. Alternative 1 would result in an increase of 0.4 percent; Alternative 2 would result in an increase of 0.7 percent; and Alternative 3 would result in an increase of 0.4 percent in the total population in the two counties.

Short-term Construction-related Impacts

Implementation of the proposed alternatives would necessitate the expenditure of different levels of construction funds to support the revised mission. At present time, detailed cost estimates for each

alternative are not available. However, the Navy expects that the total construction costs would range between approximately $47.8 million and $122.5 million for each alternative, depending on the facilities constructed.

Long-term Employee Earnings and Spending Impacts

As described above, direct Navy employment at NAS Whidbey Island would expand by an additional 335 to 628 personnel under the three alternatives compared to the No Action Alternative level. As additional income is injected into the regional economy through changes in the NAS Whidbey Island complex's payroll, employment and earnings in the regional economy would be expanded or be multiplied.

Housing

All types of housing around the NAS Whidbey Island complex, including military-controlled housing, would experience an increase in demand as a result of the personnel changes associated with the proposed alternatives. However, nearly all these additional households are expected to reside off station.

Community Services

The provision of medical services and fire and rescue services and police protection are not expected to be significantly impacted. School districts, particularly the Oak Harbor School District, would be significantly affected by the proposed alternatives, with the majority of the school-aged military dependents expected to attend schools in that district. Elementary schools in the Oak Harbor School District would experience the greatest impact under all three alternatives, and there would be minor impacts to the Coupeville School District and the Anacortes School District.

Agriculture

No agricultural lands will be removed from production as a direct result of implementation of the Proposed Action, all existing farms will be allowed to continue operation, and agricultural production in the region is expected to remain unchanged. However, some minor increases in the cost of production may occur as a result of the Proposed Action. No significant impact is expected to occur to the agricultural industry as a result of the Proposed Action.

Tourism

Increased flight operations and the resulting noise exposure under Alternatives 1 through 3 may have a negative impact on some visitors' experiences at certain tourist destinations within the greater than 65 dB DNL contours. Implementation of the Proposed Action could potentially reduce attendance levels at certain tourist destinations from reaching the levels that would have occurred without the Proposed Action; however, the effect on the tourism industry as a whole is not expected to be substantial.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Personnel loading under the VQ squadron disestablishment would be expected to decrease. When this project is analyzed in combination with the Proposed Action and is examined for its context and intensity, no significant change in personnel loading at NAS Whidbey Island from affected environment conditions would occur. Each of the actions would partially offset each other with some increases and some decreases in personnel. Cumulative demographic impacts in the community similarly would be offset. In particular, the VQ squadron disestablishment would result in the loss or transfer of approximately 640 NAS Whidbey Island personnel and their families, including approximately 330 school-aged children, which would offset the increase in school-aged children that would attend the Oak Harbor, Coupeville, or Anacortes school districts under the Proposed Action. The decrease in school-

aged children that would result from the VQ squadron disestablishment would more than offset the largest estimated increase under the Proposed Action (324 school-aged children). Because these are estimates, actual changes in enrollment may vary. However, given this offset, significant cumulative impacts to local school districts as a result either of a rapid increase in enrollment or loss of a large amount of federal impact aid would not be expected. Because so few of the other actions identified in Section 5.3 would cumulatively impact socioeconomic resources, the potential cumulative effects would not be significant.

5.4.11 Environmental Justice

5.4.11.1 Description of Geographic Study Area

The study area for environmental justice cumulative impacts includes those census block groups that either fully or partially fall beneath the modeled noise contours and that were identified as having a potential environmental justice community.

5.4.11.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the Proposed Action and cumulatively impact populations of people include the training activities associated with the NWTT EIS/OEIS and the disestablishment of the VQ mission capabilities at NAS Whidbey Island. A summary of relevant impacts of each action is described below.

Northwest Training and Testing Final EIS/OEIS

Under the Proposed Action, the number of training activities occurring in the offshore area (including the Olympic MOAs) is expected to increase from 5,414 events to 8,140 events, while the number of inland training activities is expected to decrease from 166 events to 117 events. No significant impacts associated with noise, air quality, water quality, or hazardous materials or hazardous waste were expected to occur as a result of the Proposed Action. Therefore, no disproportionately high or adverse environmental or human health effects on any low-income populations or minority populations are predicted to occur as a result of implementation of these activities.

Disestablishment of the Fleet Air Reconnaissance Capabilities

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2021. Potential changes to airfield operations associated with this action would likely decrease by approximately 4,700 EP-3 operations annually. Therefore, air quality and noise impacts would likely be minor and environmentally beneficial.

5.4.11.3 Cumulative Impact Analysis

Proposed Action

Under all alternatives and scenarios, minority and low-income populations are living within the affected environment. The Navy has concluded that there are environmental justice communities within the affected area and there are significant impacts outlined within the EIS to populations living within the affected area (noise impacts to those living within the 65 dB DNL noise contours and overcrowding at Oak Harbor School District schools). However, the Navy has determined that there will be no disproportionate high and adverse human health or environmental effects from noise, Clear Zones/APZs, or school overcrowding on minority populations or low-income populations. The Navy has,

however, concluded that impacts on housing availability and housing affordability could have the potential to have a disproportionately high and adverse impact on low-income communities. The Navy further acknowledges that the increase in the cost of housing and the decrease in available properties may have a negative impact on low-income residents, who typically spend a larger proportion of their income on housing than the general population.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

When past, present, and reasonably foreseeable future projects are analyzed together with the Proposed Action and all three alternatives, there is the potential for cumulative impacts. Available information on the states of identified past, present, and reasonably foreseeable future projects shows that only minor impacts to noise and population increases are anticipated from the other projects and that none of them had disproportionately high or adverse environmental impacts or human health effects on minority populations or low-income populations when considered separately. Most of the actions identified above are expected to be completed by 2021 and would therefore be occurring at the same time as the Proposed Action. Some additional environment justice communities may be affected by the cumulative impact of these actions.

The Navy has embarked on a robust community outreach program as part of this EIS process. As detailed in Sections 1.9 and 1.10, the Navy has held eight public scoping meetings and five open house public meetings during the public comment period on the Draft EIS and has kept residents informed throughout the process with mailings (both letters and postcards), newspaper advertisements, press releases, a project website, and digital advertisements. Project documents have been made available at local public libraries as well as online at the project's website. Public outreach efforts will continue throughout the EIS process to ensure that impacted environmental justice populations are kept informed and involved in the decision-making process.

5.4.12 Transportation

5.4.12.1 Description of Geographic Study Area

The study area for transportation cumulative impacts is NAS Whidbey Island, the City of Oak Harbor, Island County, and SR 20, including segments in Skagit County.

5.4.12.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable future actions that have a potential to interact with the Proposed Action and cumulatively impact transportation include projects that involve a change (increase or decrease) in personnel stationed at or frequently accessing Ault Field; projects within the geographic study area that may add construction- or operations-related traffic to area roadways; and transportation improvement projects that may temporarily impair level of service but would improve it in the long term.

Activities such as the VQ disestablishment have already changed, or may likely involve a change, in personnel at the NAS Whidbey Island complex. Construction activities at Ault Field, including but not limited to the Naval Health Clinic Oak Harbor, would likely require additional construction-related traffic during construction activities. Similarly, additional personnel may commute to and from the installation once construction is completed.

The planned construction of roundabouts at the Sharpes Corner and Miller-Gibralter Road intersections on SR 20 in Skagit County and construction of a roundabout or traffic signal light at the Banta Road intersection on SR 20 in Island County would temporarily impair levels of service on this roadway during construction of these projects in 2018 and 2019, respectively. These projects are expected to improve level of service over the long term and reduce safety risks.

5.4.12.3 Cumulative Impact Analysis

Proposed Action

Construction activities associated with the Proposed Action under each alternative would result in short-term impacts, but project components would result in a negligible increase in traffic and would not result in a worsening of level of service (LOS) on major roadways beyond LOS standards under the No Action Alternative. Operations associated with the Proposed Action under each alternative would result in long-term and moderate increases in traffic, but they would not result in worsening of LOS on major roadways beyond LOS standards. Some local roadways and intersections near Ault Field may see significant increases in traffic, but mitigation would reduce impacts to less than significant. Therefore, implementation of the Proposed Action under any alternative would not result in significant impacts to transportation.

The Proposed Action would generate between 122 and 2,051 new trips per weekday under Alternative 1 and 229 to 3,845 new trips per weekday under Alternative 2 within the study area on major roadways (i.e., Interstate-5, SR 20, and SR 525). Additional trips from Navy personnel and dependents would be expected on other local roads and would vary depending on housing decisions. The largest increase in traffic volumes on local roads would be expected to occur on roads near Ault Field and the Seaplane Base from Navy personnel commuting to and from the installation. Implementation of the Proposed Action under any of the alternatives would not result in significant impacts to transportation

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

When past, present, and reasonably foreseeable future projects are analyzed together with the Proposed Action and all three alternatives, there would be a slight overall increase in traffic accessing NAS Whidbey Island and the surrounding communities. However, given this slight increase in personnel and associated traffic, when combined with the planned projects and their contributions to additional traffic, the cumulative impacts to transportation would not be significant. Additionally, the aforementioned improvements to roadways and the LOS improvement priority projects identified in the City of Oak Harbor's Comprehensive Plan (City of Oak Harbor, 2014a) would help offset these impacts and improve the flow of traffic and alleviate congestion on the nearby roadways and SR 20. With these roadway improvements, the cumulative traffic impacts of the Proposed Action in conjunction with the other actions identified in Table 5-1 would not be significant.

5.4.13 Infrastructure

5.4.13.1 Description of Geographic Study Area

The study area for infrastructure cumulative impacts includes NAS Whidbey Island, OLF Coupeville, and Island County, Washington, along with its outlying areas.

5.4.13.2 Relevant Past, Present, and Future Actions

The past, present, or reasonably foreseeable future actions that have a potential to interact with the Proposed Action and cumulatively impact infrastructure include those that would add personnel to NAS Whidbey Island, thereby adding demand, as well as other development projects that increase impervious surface at NAS Whidbey Island and the surrounding vicinity. These include the following projects: VQ disestablishment; City of Oak Harbor Water System Improvements and Clean Water Facilities Planning; and all planned construction projects at Ault Field.

5.4.13.3 Cumulative Impact Analysis

Proposed Action

Potable Water

The City of Oak Harbor is expected to have sufficient capacity under the current agreement with the City of Anacortes to meet projected demand for the City of Oak Harbor and NAS Whidbey Island until 2024. Improvements to existing wells that would permit maximum allowable water withdrawals based on water rights would allow Oak Harbor to meet projected demand until 2060 (City of Oak Harbor, 2014b). However, the current water service contract between the Navy and Oak Harbor requires the city to have capacity to transmit no less than 4.5 million gallons per day (mgd) to NAS Whidbey Island (Navy, 1971). The increase in military personnel and dependents in the study area would result in an increased demand for potable water. However, NAS Whidbey Island, Oak Harbor, and Anacortes currently have additional water capacity. Therefore, each alternative is expected to have a negligible impact on potable water sources.

Wastewater

The total combined maximum monthly flow for the City of Oak Harbor wastewater system (including Seaplane Base) was 2.9 mgd in 2011 (Carollo Engineers, 2013). The city projects total maximum monthly flow in 2030 to be 3.9 mgd, assuming no additional growth at the Seaplane Base. The existing contract between the city and the Navy allows the Navy to discharge up to 0.85 mgd into the lagoon. The city is currently in the process of constructing a new wastewater plant to replace the aging facilities that will be unable to handle expected population growth and increasing water quality standards (Carollo Engineers, 2013). The new facility is expected to increase the city's wastewater capacity by 2.7 mgd (City of Oak Harbor, 2015b) and to be online in 2018 (City of Oak Harbor, 2017). The increase in military personnel and dependents in the study area would result in an increased production of wastewater. However, NAS Whidbey Island, Oak Harbor, and Anacortes all currently have additional wastewater treatment capacity. Therefore, the Proposed Action, regardless of alternative selected, is expected to have an impact, but not a significant one, on wastewater treatment.

Stormwater

The Proposed Action would result in an increase in total impervious surface area at NAS Whidbey Island. Specifically, 2.3 acres of new impervious surface area would be created on NAS Whidbey Island as a result of new armament storage, the mobile maintenance facility, vehicle parking, and hangar space. The 2.3 acres of impervious surface area would be an increase of less than 1 percent over the existing approximately 600 acres of existing impervious surface at NAS Whidbey Island.

Solid Waste Management

An increase in total solid waste generation is expected at NAS Whidbey Island and within the City of Oak Harbor and other areas of Island and Skagit Counties under the Proposed Action. However, regional

landfill facilities have sufficient capacity. Therefore, no significant impact on solid waste management is expected.

Energy

An increase in total energy consumption at NAS Whidbey Island and within the City of Oak Harbor and other areas of Island and Skagit Counties would be expected under each alternative. However, projections anticipate sufficient energy supply for the foreseeable future. Therefore, no significant impact to energy supply is expected under any of the alternatives.

Communication

The Proposed Action is expected to result in an increased use of the bandwidth of existing communication systems at NAS Whidbey Island from the increased number of personnel and operations. Existing capacity does not currently keep up with peak demand. Renovation or construction of new facilities under the alternatives would include new or upgraded communication networks for facilities, such as fiberoptic and copper cables to support alarms, telephones, video teleconferencing, processing, perimeter security, enterprise land mobile radio, legacy applications, environmental controls, and information assurance and cyber security.

Facilities

Existing facilities at NAS Whidbey Island would need to be modified, and new facilities would be constructed in order to support the necessary training, maintenance, and operational requirements under each alternative. Approximately 55,500 square feet (Alternatives 1 and 3) to 93,000 square feet (Alternative 2) of new facilities would be constructed.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

When past, present, and reasonably foreseeable future projects are analyzed together, there would be an overall increase to the demand on utilities that service NAS Whidbey Island and the surrounding communities. The Proposed Action, combined with several of the planned projects, would result in cumulative impacts to utilities and infrastructure. However, based on improvements planned for these utilities, it is anticipated that these utilities would continue to expand and be upgraded as needed to accommodate the future growth and development of the region. None of the proposed projects involve excessive construction/paving activities that would drastically increase impervious surface at NAS Whidbey Island or within Island County. Therefore, based on the planned utility improvements likely to be implemented along with the future projects, there would be no significant cumulative impact to utilities.

5.4.14 Geological Resources

5.4.14.1 Description of Geographic Study Area

The study area for cumulative impacts to geological resources includes NAS Whidbey Island, OLF Coupeville, and the immediate surrounding vicinity.

5.4.14.2 Relevant Past, Present, and Future Actions

The past, present, and reasonably foreseeable future actions that have a potential to impact geological resources at the NAS Whidbey Island complex include those projects that would involve earth-moving activities and/or could result in soil erosion. Therefore, the planned construction projects at Ault Field

(the Next Generation Jammer, Naval Health Clinic Oak Harbor, and Regional Aircraft Service Facility) are considered in this analysis.

5.4.14.3 Cumulative Impact Analysis

Proposed Action

Topography

The Proposed Action would have no impact on topography because new construction would be conducted in generally level areas.

Geology

Under the Proposed Action, construction would not include grading, clearing, or blasting of earth or rock. Therefore, no significant impacts on geology would occur.

Seismic Activity

In the event of an earthquake, seismic hazards including liquefaction may result in damage to buildings or other structures. Potential for damage from ground shaking is highest in local areas that contain artificial fill, areas underlain by peat, existing landslides, and valley floors underlain by unconsolidated alluvial sediments. Much of the runway and airfield areas at Ault Field were constructed on artificial fill. However, all buildings constructed under the Proposed Action would be designed to conform to the seismic provisions of the Washington State Building Code. In the event of an earthquake, there is also the potential for spills to occur. However, a spill prevention, control and countermeasures plan would be developed and implemented in order to help prevent spills and to control and clean up spills in the event that they did occur. Therefore, if a seismic event were to occur, human health and safety would be protected to the maximum extent practicable.

Soils

Under the Proposed Action, impacts to soils during construction could include compaction and rutting from vehicle traffic and an increase in erosion. Up to 2.3 acres of new impervious surfaces would increase the quantity and velocity of stormwater runoff, which would increase the susceptibility of surrounding soils to erosion. These impacts would be minimized or avoided by using standard soil erosion- and sedimentation-control techniques at the construction site such as a silt barrier (filter fabric) and appropriate revegetation techniques upon completion.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

The aforementioned construction projects at Ault Field would likely impact soil resources within the activity footprint. Erosion and sedimentation plans would be developed for each project, and the impacts would be managed through the use of appropriate BMPs for each site. The Proposed Action would also impact soils, and, as such, erosion and sedimentation plans would be developed, and BMPs would be used to manage impacts to soils. Due to the minimal impacts anticipated under any of the alternatives coupled with the use of BMPs and impact minimization measures, there would be no significant cumulative impacts to geological resources.

5.4.15 Hazardous Materials and Wastes

5.4.15.1 Description of Geographic Study Area

The study area for cumulative impacts to hazardous materials and wastes includes NAS Whidbey Island, OLF Coupeville, and the immediate surrounding vicinity.

5.4.15.2 Relevant Past, Present, and Future Actions

The past, present, and reasonably foreseeable future actions that have a potential to use hazardous materials or generate hazardous waste at the NAS Whidbey Island complex include those projects that require building demolition/modification that may require disposal of small quantities of asbestos-containing material or lead-based paint. Projects with the potential for cumulative impacts to hazardous materials and waste include those with ground disturbance and demolition/modification. Therefore, the planned construction projects at Ault Field (the Next Generation Jammer, Naval Health Clinic Oak Harbor, and Regional Aircraft Service Facility Renovation) are considered in this analysis.

5.4.15.3 Cumulative Impact Analysis

Proposed Action

Operation and maintenance of additional Growler aircraft would not introduce any new hazardous materials and/or waste streams at Ault Field. While the addition of 35 or 36 Growler aircraft would increase the amount of hazardous materials handled and generate increased amounts of hazardous wastes, this increase would be managed by existing hazardous material and waste management functions and facilities at Ault Field and would not result in significant impacts with regard to the handling, use, storage, or disposal of fuel, oils, and lubricants at Ault Field. All hazardous wastes would continue to be collected and managed on site in accordance with the installation's Hazardous Waste Management Plan. Appropriate procedures for handling of hazardous materials and BMPs for the management of hazardous substances and spill response at Ault Field would be applied. Hazardous waste management activities would follow existing procedures for the safe handling, use, and disposal of hazardous substances and waste. Therefore, the Proposed Action under any alternative would have no impact to hazardous materials and the waste management program at Ault Field.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

When past, present, and reasonably foreseeable future projects are analyzed together, there may be an overall increase of the amount of hazardous materials handled and amounts of hazardous wastes generated. However, as stated above, the Proposed Action under any alternative would have no impact to hazardous materials and the waste management program at Ault Field. Similarly, any hazardous materials and wastes associated with the other construction and demolition projects planned at Ault Field would continue to be collected and managed on site in accordance with the installation's Hazardous Waste Management Plan. Similarly, they would follow existing procedures for the safe handling, use, and disposal of hazardous substances and waste. Therefore, there would be no significant cumulative impact to hazardous materials and wastes.

5.4.16 Climate Change and Greenhouse Gases

The potential effects of climate change and GHG emissions are, by nature, global and cumulative impacts. While individual sources of GHG emissions are not large enough to have an appreciable effect on climate change, the global accumulation of GHG emissions is resulting in global and local impacts on

the climate. The cumulative totals of GHG emissions as described in Section 5.4.4 would not likely contribute to global warming to any discernible extent or have a significant impact on the State of Washington's GHG emission goals as described in Section 4.16.

The direct and indirect effects analysis of GHG emissions as discussed in Sections 3.16 and 4.16 adequately addresses cumulative impacts for climate change, and a separate cumulative analysis is not needed. Global climate change threatens ecosystems, water resources, coastal regions, crop and livestock production, and human health. The continuing increase in GHG concentrations in the Earth's atmosphere will likely result in a continuing increase in global annual average temperature and climate change effects. Global, federal, and state initiatives to reduce GHG emissions have been implemented to reduce the severity of climate change impacts in the future. The Proposed Action would result in an increase in GHG emissions, primarily from the increase in the use of jet fuel for military aircraft operations. The Navy and the DoD have implemented other programs and policies to reduce GHG emissions from other sources. The Navy, the DoD, and the State of Washington have implemented laws, policies, and programs to address the impacts of climate change in the future.

6 Other Considerations Required by the National Environmental Policy Act

6.1 Consistency with Other Federal, State, and Local Laws, Plans, Policies, and Regulations

In accordance with 40 Code of Federal Regulations section 1502.16(c), analysis of environmental consequences shall include discussion of possible conflicts between the Proposed Action and the objectives of federal, regional, state, and local land use plans, policies, and controls. Table 6-1 identifies the principal federal and state laws and regulations that are applicable to the Proposed Action and describes briefly how compliance with these laws and regulations would be accomplished.

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
The National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] section 4321 et seq.); Council on Environmental Quality NEPA implementing regulations (40 Code of Federal Regulations parts 1500-1508; Navy procedures for Implementing NEPA (32 Code of Federal Regulations part 775)	Navy	This Environmental Impact Statement (EIS) has been prepared in accordance with NEPA, Council of Environmental Quality regulations implementing NEPA, and Navy NEPA procedures. Public participation and review are being conducted in compliance with NEPA	Entire EIS

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
Executive Order 13045, Environmental Health Risks and Safety Risks to Children	Navy	Based on the limited scientific literature available, there is no proven positive correlation between noise-related events and physiological changes in children. Additionally, the aircraft noise associated with the action alternatives is intermittent; therefore, the Navy does not anticipate any significant disproportionate health impacts to children caused by aircraft noise. No schools are located within the Accident Potential Zones (APZs) at Ault Field and Outlying Landing Field (OLF) Coupeville under any of the alternatives or scenarios; therefore, there is no disproportionate environmental health and safety risk to children as a result of possible aircraft mishaps.	Sections 3.3 and 4.3, Public Health and Safety
Clean Air Act (CAA) (42 U.S.C. section 7401 et seq.)	U.S. Environmental Protection Agency (USEPA)	The air quality analysis in the EIS concludes that proposed emissions contribute to regional emission totals and can affect compliance with National Ambient Air Quality Standards. The region is currently in attainment for all National Ambient Air Quality Standards, and the Northwest Clean Air Agency continues to monitor ambient air emission levels to confirm continued compliance.	3.4 and 4.4, Air Quality

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
Coastal Zone Management Act (CZMA) (16 U.S.C. section 1451 et seq.)	Washington State Department of Ecology	The Navy has determined that the Proposed Action to the maximum extent practicable is consistent with the enforceable policies of the State of Washington under this act. A Coastal Zone Consistency Determination was prepared and submitted as part of this EIS. The outcome of the federal consistency process is presented in this EIS. On September 20, 2017, the Washington State Department of Ecology concurred with the Navy's determination that the proposed work is consistent with Washington's Coastal Zone Management Plan (see Appendix C).	3.5 and 4.5, Land Use Compatibility; 3.9 and 4.9, Water Resources; and Appendix G.
Town of Coupeville Zoning Ordinance (2016)	Coupeville	This EIS considers the areas outside of the installation fenceline that are impacted by Navy actions. The Navy has no impact on zoning determinations; however, through an AICUZ Update process, the Navy would coordinate with local municipalities.	3.5 and 4.5, Land Use Compatibility

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
National Historic Preservation Act (Section 106, 54 U.S.C. 300101 et seq.)	Navy, Washington State Historic Preservation Office (SHPO), American Indian tribes and nations (herein after referred to as "tribes"), and interested parties	The Navy determined an overall finding of adverse effect to historic properties. The Navy is consulting with the Advisory Council on Historic Preservation, the Washington State Historic Preservation Officer, federally recognized tribes, and other interested parties regarding the development of a Memorandum of Agreement (MoA). Consultation was conducted in accordance with established operating procedures as noted in the Integrated Cultural Resources Management Plan (ICRMP) (Navy, 2016c).	3.6 and 4.6, Cultural Resources
Archaeological and Historic Preservation Act (AHPA) of 1974	Navy in coordination with the National Park Service (NPS)	The Navy concluded that, overall, moderate to no impacts will occur to archaeological resources and architectural resources located on station and off station. In the event of an inadvertent discovery within NAS Whidbey Island, the Navy would adhere to the measures described in the ICRMP as Standard Operating Procedure No. 4: Accidental Discovery of Archaeological Sites (Navy, 2016c).	3.6 and 4.6, Cultural Resources

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
American Indian Religious Freedom Act of 1978	Navy and tribes	As part of this EIS, the Navy considered the potential presence of sacred/religious sites and evaluated the potential of its action to impact access for members of tribes. The Navy consulted with potentially affected tribes to solicit any concerns so the Navy could more fully consider the extent of any potentially significant impacts to these resources. Consultation was conducted consistent with existing policies, including COMNAVREG NW Instruction 11010.14.	3.6 and 4.6, Cultural Resources; 3.7 and 4.7, American Indian Traditional Resources
Archaeological Resources Protection Act (ARPA) of 1979	Navy	The Navy concluded that, overall, moderate to no impacts will occur to archaeological and architectural resources located on station and off station. If further cultural resource investigations are needed, the Navy would adhere to the measures described in the ICRMP as Standard Operating Procedure No. 3: Compliance with the Archaeological Resources Protection Act of 1979 (Navy, 2016c).	3.6 and 4.6, Cultural Resources; Appendix C, Federal and State Agency Coordination

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
Native American Graves Protection and Repatriation Act (NAGPRA) of 1990	Navy and tribes	As part of this action, no artifacts or remains attributed to tribes located within NAS Whidbey Island are anticipated to be impacted. The Navy conducted consultation with tribes as part of its responsibilities for government-to-government consultation. Consultation was also conducted as per Section 106. In order to ensure compliance with this act, if items are identified, the Navy would adhere to the measures described in the ICRMP as Standard Operating Procedure No. 6: Compliance with the Native American Graves Protection and Repatriation Act of 1990 (Navy, 2016c).	3.6 and 4.6, Cultural Resources; 3.7 and 4.7, American Indian Traditional Resources
Executive Order 13007, Indian Sacred Sites	Navy and tribes	The Navy consulted with potentially affected tribes to solicit any concerns so the Navy could more fully consider the extent of any potentially significant impacts to these resources. Consultation was conducted consistent with existing policies, including COMNAVREG NW Instruction 11010.14.	3.6 and 4.6, Cultural Resources; 3.7 and 4.7, American Indian Traditional Resources
Indian Graves and Records (Revised Code of Washington [RCW] 27.44)	Navy, State of Washington SHPO, and tribes	No off-station resources of this nature will be directly impacted by the Proposed Action.	3.6 and 4.6, Cultural Resources
Archaeological Sites and Resources (RCW 27.53)	Navy and State of Washington SHPO	No off-station resources of this nature will be directly impacted by the Proposed Action.	3.6 and 4.6, Cultural Resources
Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60)	Navy and State of Washington SHPO	No off-station resources of this nature will be directly impacted by the Proposed Action.	3.6 and 4.6, Cultural Resources

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
Archaeological Site Public Disclosure Exemption (RCW 42.56.300)	Navy and State of Washington SHPO	Per its ICRMP and in observance of other cultural resource laws, the Navy has guidance in place to allow for the protection of sensitive information, including for archaeological sites (Navy, 2016c).	3.6 and 4.6, Cultural Resources
Discovery of Human Remains (RCW 27.44)	Navy, State of Washington, and tribes	No off-station resources of this nature will be directly impacted by the Proposed Action.	3.6 and 4.6, Cultural Resources
Executive Order 13175, Consultation and Coordination with Indian Tribal Governments	Navy	The Navy conducted government-to-government consultation with tribes. Results of the consultation are provided in the EIS (see Appendix C).	3.7 and 4.7, American Indian Traditional Resources
Endangered Species Act (16 U.S.C. section 1531 et seq.)	U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS)	The Navy has consulted the NMFS and determined that the Proposed Action may affect, but is not likely to adversely affect, the humpback whale or Southern Resident killer whale and ESA-listed fish species under the NMFS jurisdiction (i.e., green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, and yelloweye rockfish). The NMFS concurred with the Navy's finding for the humpback whale and southern resident killer whale on July 20, 2017, and for NMFS ESA-listed fish species on April 23, 2018. The Navy also consulted with the USFWS, which concluded in its June 14, 2018, Biological Opinion that the Proposed Action is not likely to jeopardize the continued existence of the marbled murrelet and may affect, but is not likely to adversely affect, the bull trout.	3.8 and 4.8, Biological Resources

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
Marine Mammal Protection Act (16 U.S.C. section 1361 et seq.)	NMFS	The Navy has determined that the Proposed Action under each of the three alternatives would not result in reasonably foreseeable "takes" of marine mammals by harassment, injury, or mortality as defined under the Marine Mammal Protection Act (MMPA), including the 2004 military readiness amendment.	3.8 and 4.8, Biological Resources
Migratory Bird Treaty Act (16 U.S.C. sections 703-712)	USFWS	This EIS considers all impacts on MBTA-protected birds. For military readiness activities, DoD installations are exempt from the MBTA. The Proposed Action would not have significant impacts on MBTA-protected species at the population level. During construction, impacts on birds would be largely avoided and minimized and would not rise to the level of take.	3.8 and 4.8, Biological Resources
Executive Order 13186, Responsibilities of the Federal Agencies to Protect Migratory Birds	Navy	This EIS considers all impacts on migratory birds. The Navy has a current Memorandum of Understanding with the USFWS with respect to this executive order.	3.8 and 4.8, Biological Resources
Bald and Golden Eagle Protection Act (16 U.S.C. section 668-668d)	USFWS	This EIS considers all impacts on eagles protected under this act and found that the Proposed Action would not have any significant impacts on eagles.	3.8 and 4.8, Biological Resources
Washington Administrative Code (WAC) 232-12-297 (WAC 232-12-014 and WAC 232-12-297)	Washington Department of Fish and Wildlife (WDFW), Natural Heritage Program	This EIS considers all impacts to protected species under this code. The WDFW Natural Heritage Program commented on the Draft EIS, and responses to comments are provided in the EIS (Appendix M).	3.8 and 4.8, Biological Resources
Island County Critical Areas Ordinance (17.02)	Island County, WA	This EIS considers all habitat protected pursuant to this ordinance. Island County was provided an opportunity to comment on this EIS. Responses to comments are provided in the EIS (Appendix M).	3.8 and 4.8, Biological Resources

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
Clean Water Act (33 U.S.C. section 1251 et seq.)	USEPA; U.S. Army Corps of Engineers (USACE)	The Proposed Action is compliant to the extent practicable with the Clean Water Act.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Executive Order 11988, Floodplain Management	Navy	The Proposed Action would not impact floodplains or floodplain management.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Energy Independence and Security Act (EISA), Section 438	U.S. Department of Energy	Under the EISA, the Navy is following design requirements for development and redevelopment projects.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Safe Drinking Water Act of 1974	USEPA	This EIS considers impacts to groundwater and concludes that there will be no significant impacts to groundwater and aquifers from the Proposed Action.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Executive Order 11990, Protection of Wetlands	Navy	The Proposed Action would not impact wetlands.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Section 10 of the Rivers and Harbors Act	USACE	The Proposed Action would not impact waters of the U.S.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
National Wild and Scenic Rivers Act (16 U.S.C. 12771 et seq.)	U.S. Department of the Interior, Bureau of Land Management; National Park Service; USFWS; and U.S. Forest Service	The Proposed Action would not impact national wild or scenic rivers.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Farmland Protection Policy Act (FPPA) (7 U.S.C. 4201, et seq.)	U.S. Department of Agriculture, Natural Resources Conservation Service	The Proposed Action would not impact prime farmland.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Water Resources Act of 1971 (Chapter 90.54 RCW)	State of Washington, Department of Ecology	The Proposed Action would not impact water resources covered under this act.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Water Code, enacted in 1917 (90.03 RCW),	State of Washington, Department of Ecology	The Proposed Action would not impact water resources covered under this code.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Washington National Pollutant Discharge Elimination System stormwater program	State of Washington, Department of Ecology	The Proposed Action is compliant to the extent practicable with the Clean Water Act (CWA).	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
Water Pollution Control Act, Model Toxic Control Act, and Puget Sound Water Quality Authority Act; the Sediment Management Standards established standards for the quality of surface sediments	State of Washington	The Proposed Action is compliant to the extent practicable with the CWA.	3.9 and 4.9, Water Resources; 3.13 and 4.13, Infrastructure
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations	Navy	The Navy has concluded that minority and low-income populations are living within the affected area (environmental justice communities), and there are significant impacts outlined within the EIS to populations living within the affected area (noise impacts to those living within the 65 dB DNL noise contours and overcrowding at Oak Harbor School District schools). However, the Navy has determined that there will be no disproportionate high and adverse human health or environmental effects from noise, Clear Zones/APZs, or school overcrowding on minority populations or low-income populations. Impacts on housing availability and housing affordability could have the potential to have a disproportionately high and adverse impact on low-income communities. The Navy further acknowledges that the increase in the cost of housing and the decrease in available properties may have a negative impact on low-income residents who typically spend a larger proportion of their income on housing than the general population.	3.10 and 4.10, Socioeconomics; 3.11 and 4.11, Environmental Justice

Table 6-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal, State, Local, and Regional Land Use Plans, Policies, and Controls	*Regulatory Authority*	*Status of Compliance*	*Section of the EIS*
RCW 36.70A: The 1990 Growth Management Act requires that level of service (LOS) standards be established for all arterials and transit routes	Washington State Department of Transportation (WSDOT)	This EIS concludes that there would be no roads that would reach an LOS below the previously identified standard.	3.12 and 4.12, Transportation
Chapter 15.01, Stormwater Management Program	Island County, Washington	The Navy will comply with all local laws and any additional regulations as required during construction.	3.13 and 4.13, Infrastructure
Chapter 15.03, Management of Surface Water Drainage	Island County, Washington	The Navy will comply with all local laws and any additional regulations as required during construction.	3.13 and 4.13, Infrastructure
Defense Environmental Restoration Program (DERP) Installation Restoration Program	Department of Defense	The Navy will continue to comply with the DERP.	3.15 and 4.15, Hazardous Materials and Waste
Executive Order 13834, Efficient Federal Operations	Department of Defense	The Departments of Defense and Navy are reviewing current guidance to assess the need and plan to modify, replace, or rescind guidance to facilitate implementation of this order.	Section 3.16, Climate Change and Greenhouse Gases

6.2 Irreversible or Irretrievable Commitments of Resources

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Implementation of the Proposed Action would involve human labor; the consumption of fuel, oil, and lubricants during construction of facilities and operation of the new aircraft. Implementation of the Proposed Action would not result in significant irreversible or irretrievable commitment of resources.

6.3 Unavoidable Adverse Impacts

This Environmental Impact Statement (EIS) has determined that the alternatives considered may result in significant impacts with respect to noise and education from implementation of the alternatives. Avoidance and minimization of adverse impacts were integrated into the development of the alternatives and existing Navy policy to the greatest extent practicable and were successful in many resource areas where there are impacts to the resource, but with compliance with local regulations and/or existing Navy management strategies, these impacts were minimized or not determined to be

significant. Significant adverse impacts may not always be completely avoided, as with impacts to education and impacts on the community from noise from implementation of the alternatives. These impacts are summarized by resource area below. All impacts from the implementation of the alternatives are described in detail in Chapter 4 of this EIS.

6.3.1 Noise Associated with Aircraft Operations

Implementation of the Proposed Action would increase noise perceived in the region. New areas that were not previously impacted by noise generated by Navy aircraft operations would be under the 65 decibel (dB) day-night average sound level (DNL) noise contour. Although some of these areas are over water, others are over land and would therefore result in additional people living within the 65 dB DNL noise contour.

Additional supplemental metrics were utilized to identify potential impacts from noise exposure that could be realized under the alternatives. These include additional events of indoor and outdoor speech interference, an increase in the number of events causing classroom/learning interference, an increase in the probability of awakening, and an increase in the population that may be vulnerable to potential hearing loss of 5 dB or more.

With respect to recreation, noise may detract from the experience and enjoyment of visitors to parks and their perception of a landscape. Studies of the effects of aircraft noise on outdoor recreation outside of wilderness areas are limited; however, aircraft noise has been found to be a primary environmental factor causing visitors to parks to become annoyed and may detract from their overall experience of a park or recreational activity. Studies of aircraft noise effects on outdoor recreationists show that reported annoyance by outdoor recreationists or changes in their use of parks and other outdoor recreation areas depend upon multiple factors such as their frequency of use of the recreation area, the recreation activities in which they are engaged, and the degree of change in noise exposure. People who use a park less frequently are more likely to change their patterns of use in response to changes in noise exposure. The type of activity also plays a role in response to noise, with outdoor recreationists who value natural experiences more likely to change their patterns of use in response to aircraft operations. Overall, implementation of the Proposed Action at Naval Air Station (NAS) Whidbey Island would result in localized significant impacts to recreation as a result of increased noise exposure at Ebey's Landing National Historical Reserve, various county and municipal parks and recreational areas, and private recreational facilities under some alternatives and scenarios when aircraft are operating in the area (see Table 4.17-1).

6.3.2 Education

In Oak Harbor by 2021, it is estimated that enrollment of the elementary schools will again exceed the designed capacity by approximately 600 students (Gibbon, 2016). Given this serious overcrowding issue already facing the Oak Harbor School District, the potential increase of between 121 and 226 additional students would further exacerbate the overcrowding problem and have a substantial negative impact on the district. The majority of the additional students would be elementary-school-aged, further skewing the district's enrollment in favor of the younger grades. Additional portable classrooms would have to be purchased, and additional staff would need to be hired to accommodate these students. Because state aid and federal impact aid have been at a static or declining per-pupil level, additional local funding sources would likely be required to finance the additional expenditures, if present programming is to be

maintained. This EIS assumes all military personnel and their families are living off-base; therefore, some additional revenues would be collected in mortgage and rental payments.

6.3.3 Mitigation

This EIS does not identify any mitigation measures considering the degree of environmental impacts for the implementation of alternatives but does identify measures that could be taken to develop suggested mitigation techniques, including, but not limited to, stormwater retention practices. During the National Environmental Policy Act (NEPA) process, through comments received during public and regulatory agency review of the EIS, there is the potential to identify and develop new mitigation measures. Appendix H (Noise Mitigation) provides an overview of existing, voluntary noise-mitigation measures that are in place at the NAS Whidbey Island complex. Appendix H also describes potential noise-mitigation measures that are being evaluated for potential future implementation as the Navy takes a proactive approach to noise mitigation and addressing community concerns. Under the Section 106 process, further consultation and development of a Memorandum of Agreement (MoA) to address adverse effects on historic resources is ongoing. The Navy is consulting with the Washington State Historic Preservation Office, the Advisory Council on Historic Preservation, tribes, and consulting parties regarding the MoA. If additional mitigation measures are identified during this process, they would be identified in the Record of Decision. These measures would be funded, and efforts to ensure their successful completion or implementation would be treated as compliance requirements.

6.4 Relationship between Short-Term Use of the Environment and Long-Term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development site reduces future flexibility in pursuing other options or that using a parcel of land or other resources often eliminates the possibility of other uses at that site.

In the short-term, effects to the human environment with implementation of the Proposed Action would primarily relate to the construction activity itself. Construction activities under the alternatives as well as relocation of personnel and aircraft would temporarily increase air pollution emissions and noise in the immediate vicinity the affected area and would be short term in nature. Depending on their location, humans and animals would experience increased levels of noise during airfield operations. Terrestrial wildlife, including small mammals, reptiles and amphibians, and breeding birds, and marine species are not expected to see changes in long-term productivity from the implementation of the Proposed Action because local wildlife are already exposed to a high level of long-term air operations and other human-made disturbances. The wildlife has presumably habituated to the very high level of noise and visual disturbances at NAS Whidbey Island. There would be minimal habitat and vegetation removal from construction activities because all construction would occur along the existing flight line.

Implementation of any of the alternatives would increase the flight activity in and around NAS Whidbey Island airspace. Implementation of the alternatives may require development of Accident Potential Zones at Outlying Landing Field Coupeville and would increase noise in the area at both Ault Field and Outlying Landing Field Coupeville during operations. Through implementation of the Air Installations Compatible Use Zone update process, areas may be identified to have future land use restrictions in

order to remain compatible with the Navy's mission. These restrictions have the potential to impact future development in the area.

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9 Distribution List

This Environmental Impact Statement (EIS) was distributed to 104federal, state, and local elected officials and agencies, as well as eight federally recognized tribes and 19 non-governmental organizations (NGOs). In addition, 2,164 concerned citizens from around the country were notified of the release of the EIS. While the distribution list numbers have changed over time, the Navy continues to reach out to all interested parties.

Table 9-1 identifies the number of agencies, elected officials, tribes, NGOs, and concerned citizens on the project distribution list. Concerned citizens are members of the public who requested to be added to the project distribution list either through the project website or during the public scoping process.

Table 9-1 Distribution List

Category	***Number of agencies and tribes on distribution list***
Federal agency contacts	31
Federal elected officials	5
Federally recognized tribes	8
State agency contacts	18
State elected officials	16
Local agency contacts	2
Local elected officials	24
Total agencies, elected officials, and tribes	**104**
Category	***Number of non-governmental organizations (NGOs) on distribution list***
Total NGOs	**19**
Area	***Number of citizens on distribution list[1,2]***
Island County	1062
Skagit County	182
Outside of Island and Skagit Counties but within Washington State	778
Outside of Washington State	142
Total citizens[2]	**2,164**
Total overall	***Total agencies/people on distribution list***
Total overall	**2,287**

Note:

1 Concerned citizens who asked to be added to the mailing or distribution list via the project website or during the public scoping process.

2 1,263 postcards for the Draft EIS were delivered to concerned citizens on the distribution list; 59 postcards were marked as undeliverable. From the publication of the Draft EIS through mid-September 2018, 1,083 citizens have added their name to the distribution list, giving a current distribution list total of 2,342 concerned citizens.

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The Honorable Molly Hughes, Mayor
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The Honorable Laurie Gere, Mayor
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The Honorable Jill Boudreau, Mayor
City of Mount Vernon
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910 Cleveland Avenue
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The Honorable Steve Sexton, Mayor
City of Burlington
833 S. Spruce Street
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The Honorable Ramon Hayes, Mayor
Town of La Conner
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The Honorable Deborah Stinson, Mayor
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