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

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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:	November 2016

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 to support all flight operations of other aircraft at the NAS 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 action alternatives consider options for increasing the number of additional Growler aircraft, as appropriated by Congress, at the NAS Whidbey Island complex. Each action alternative contains further analysis of three operational scenarios that involve different distributions of annual field carrier landing practice airfield operations between Ault Field and Outlying Landing Field Coupeville. Each action alternative evaluates the effects resulting from each of these three 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 2017, 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 to support 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 (U.S.C.), 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. The Navy also reviewed comments received through the public scoping 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 40-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

Based on the considerations mentioned above, the Navy is analyzing three action alternatives, each of which has three 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. More details on the alternative selection process are found in Section 2.2 (Development of the Range of Action Alternatives). The action 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 aircraft to be purchased
- number of aircraft assigned per squadron
- number of expeditionary squadrons
- number of personnel
- distribution of aircraft operations at Ault Field and OLF Coupeville

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 Environmental Impact Statement (EIS), the Navy is using the year 2021 as representative of the No Action Alternative because it represents the conditions when 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.

Action Alternative 1

Alternative 1 would expand carrier capabilities by adding three additional aircraft to each of the existing nine carrier squadrons and augmenting the Fleet Replacement Squadron (FRS) with eight additional aircraft (a net increase of 35 aircraft). Alternative 1 would add 371 Navy personnel and 509 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 to each of the nine existing carrier squadrons, and augmenting the FRS with eight additional aircraft (a net increase of 36 aircraft). Alternative 2 would add 664 Navy personnel and 910 dependents to the region.

Action Alternative 3

Alternative 3 would expand expeditionary and carrier capabilities by adding three additional aircraft to each of the three existing expeditionary squadrons, adding two additional aircraft to each of the nine existing carrier squadrons, and augmenting the FRS with nine additional aircraft (a net increase of 36 aircraft). Alternative 3 would add 377 Navy personnel and 894 dependents to the region.

This EIS evaluates three operational scenarios for each of the action alternatives for a total of nine alternatives analyzed:

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.

The above three scenarios (A, B, and C), in combination with the alternatives, provide a total of nine operational conditions that are fully evaluated in this EIS analysis. The Secretary of the Navy will be able to select a final alternative/scenario combination from the range of nine analyzed in this EIS.

Scenarios are based on the distribution of 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. 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 three operational scenarios at the expense of ideal training.

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 2.5 (Alternatives Considered but Not Carried Forward for Further Analysis).

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 by approximately 46 percent (Alternatives 2 and 3) to 47 percent (Alternative 1) over the No Action Alternative to support the addition of 35 or 36 new aircraft assigned to Ault Field. The increase in total annual airfield operations at the NAS Whidbey Island complex would range from approximately 40,100 (Alternative 3, Scenarios B and C) to 41,400 (Alternative 1). The increase in annual airfield operations at Ault Field would range from 12,300 (Alternative 1, Scenario A) to 38,700 (Alternative 1, Scenario C), while the increase in annual airfield operations at OLF Coupeville would range from 2,200 (Alternative 3, Scenario C) to 29,000 (Alternative 1, Scenario A). Airfield operations may include aircraft arrival and departure, interfacility flights, and closed-loop flights (such as FCLP). These operational conditions 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 may experience scheduling difficulty under Scenario C of all three of the action alternatives, because approximately 80 percent of FCLPs would be conducted at Ault Field under that scenario. 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). 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, and is the lower analysis range for this analysis. There would be new areas impacted by noise 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 2,514 (Alternative 1, Scenario C) to a low of 1,651 (Alternative 2, Scenario A) for the entire NAS Whidbey Island complex. When examined by individual airfield, Ault Field would have the largest increase of individuals within the 65 dB DNL noise contour under Scenario C (up to 1,979 people for Alternative 1, Scenario C), while the lowest increase would be 395 individuals under Alternative 2, Scenario A. For OLF Coupeville, the largest increase of individuals within the 65 dB DNL noise contour would be under Scenario A (up to 1,316 people for Alternative 1, Scenario A), while the lowest increase would be 512 individuals under Alternative 2, Scenario C. Additionally, supplemental metrics were used to identify potential impacts from noise exposure that could be realized under the action 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. Therefore, the Proposed Action would have a significant impact on the noise environment as it relates to aircraft operations at Ault Field and OLF Coupeville.

It is Commanding Officer, NAS Whidbey Island 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 Section 3.2. 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 Air Installation Compatible Use Zone (AICUZ) update process, including Alternative 1, Scenario A; Alternative 1, Scenario B; Alternative 2, Scenario A; Alternative 2, Scenario B; Alternative 3, Scenario A; and Alternative 3, Scenario B. 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. The Navy will perform an AICUZ update upon completion of this EIS and share official recommendations with the community.

Under Executive Order (EO) 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 426 children under Alternative 1, Scenario A, to a high of 678 children under Alternative 3, 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 action 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 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 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 action alternatives would result in an increase in the land area within the projected greater than 65 dB DNL noise contours (range of 14 percent to 19 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 8 percent (Alternative 1, Scenario A) to 17 percent (Alternative 1, Scenario C) at Ault Field and an increase of 26 percent (Alternative 2, Scenario C) to 48 percent (Alternative 1, Scenario A, and Alternative 3, Scenario A) at OLF Coupeville.

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, but it would have an impact on regional land use controls. Land within the conceptual APZs at OLF Coupeville would increase under Scenarios A and B of each action alternative. Conceptual APZs at OLF Coupeville would impact 1,301 acres of residential

land under Scenario A and 503 acres under Scenario B under all three action alternatives, if developed. 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.

With regard to recreation and wilderness areas, there would be minor impacts from use of recreation areas as a result of increased demand under all alternatives. Due to increased noise exposure from Growler operations, a range of impacts from long-term minor to long-term moderate would be expected at the federal, state, and local recreation areas and parks located within the greater than 65 dB DNL noise contour. Alternative 1, Scenarios A and B; Alternative 2, Scenarios A and B; and Alternative 3, Scenarios A and B would have localized significant impacts on a county park (Driftwood Park) as a result of increased annual average noise levels. Alternative 3, Scenario C, would have localized significant impacts on a municipal park (Oak Harbor Off-leash Dog Park) as a result of increased annual average noise levels. Alternative 1, Scenario C, and Alternative 2, Scenario C, would have no significant impacts on the management or use of recreational areas. There are no wilderness areas within the study area, and therefore there would be no impact on them. For more information on land use, see Sections 3.5 and 4.5.

Cultural Resources. Archaeological and architectural resources 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 may occur within those areas where construction will take place on the installation. Indirect effects are those that may occur within the 65 dB DNL noise contours, and those that result from construction (on station) at Ault Field or from aircraft operations (on and off station)[1] occurring at both Ault Field and OLF Coupeville.

With regard to archaeological resources, minimal to no impact would result to known or intact archaeological sites within Ault Field during construction and operation. In accordance with Section 106 of the NHPA, the Navy is consulting with the Washington State Historic Preservation Office (SHPO), Advisory Council on Historic Preservation, American Indian tribes and nations, and consulting parties regarding archaeological resources. A full list of consulting parties is provided in Section 3.6.2.4.

With regard to architectural resources, potential direct and indirect impacts during construction would be likely to occur to and in proximity to Building 2737 (Hangar 12); however, the hangar has been determined not eligible for listing in the National Register of Historic Places under the Cold War Era historic context statement. Indirect impacts, including visual, auditory, and/or vibratory impacts, may be experienced in the immediate proximity of construction activities on Ault Field and in those areas on and off the installation within the 65 dB DNL noise contours 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 action alternatives), 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

[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 effect.

compared to Scenarios B and C. Under Scenario B, resources that are proximate to both Ault Field and OLF Coupeville may experience a higher level of impact. Under Scenario C, resources that are proximate to Ault Field (and not OLF Coupeville) may experience a higher level of impact and OLF Coupeville a lower level of impact. In accordance with Section 106 of the NHPA, the Navy is consulting with the Washington SHPO, Advisory Council on Historic Preservation, American Indian tribes and nations, and consulting parties regarding architectural resources. A full list of consulting parties is provided in Section 3.6.2.4. 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 would not result in significant impacts to 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. 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 American Indian tribes and nations 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

To date, no tribes have requested government-to-government consultation on the Proposed Action. 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 a high level of long-term aircraft operations and other human-made disturbances to which they have presumably habituated. 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, this EIS concludes that the Proposed Action may affect, but is not likely to adversely affect, the Southern Resident killer whale, humpback whale, bull trout, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, canary rockfish, and yelloweye rockfish. The Proposed Action may affect the marbled murrelet, and the Navy will consult with the U.S. Fish and Wildlife Service. In accordance with the Endangered Species Act, the Navy will consult with the U.S. Fish and Wildlife Service and National Marines Fisheries Service, as appropriate. For Migratory Bird Treaty Act-protected species, U.S. Department of Defense installations are exempt from “take” because aircraft operations would not have a significant impact at the population level. During construction, impacts on Migratory Bird Treaty Act-protected species would be largely avoided and minimized and would not rise to the level of take. For more information on biological resources, see

Sections 3.8 and 4.8. The Navy has determined that the Proposed Action is not expected to result in injury or harassment of any marine mammal as defined by the Marine Mammal Protection Act.

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 880 people under Alternative 1 to 1,574 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 371 (Alternative 1) to 664 (Alternative 2) personnel in the region spending money. The increase in local government tax receipts would range from $235,000 in Island County and $59,000 in Skagit County under Alternative 1 to $421,000 in Island County and $105,000 in Skagit County under Alternative 2. Up to between 371 (Alternative 1) and 664 (Alternative 2) households would relocate to the area. In 2015, a housing study completed for the NAS Whidbey Island complex found that there was a surplus of 591 acceptable family housing units in the area. Under Alternative 2, the regional housing supply may not have sufficient vacancies to handle the influx of households (664 households), causing a moderate impact on the housing market. Under Alternatives 1 and 3, regional housing would be able to handle the increase in demand (371 and 377 households, respectively) and therefore have a minor impact on housing. 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 191 students under Alternative 1 to 341 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 although 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), these impacts do not disproportionately impact environmental justice communities. 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 171 to 2,321 new trips per weekday on major roadways off base, and under Alternative 2, there would be an estimated 306 to 4,154 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 231 daily trips under Alternative 3 and 407 daily trips under Alternative 2; however, a traffic signal will be installed there by 2021. An increase in gate traffic of approximately 3 percent to 8 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 (371 additional households in the region) and highest under Alternative 2 (664 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 1 percent (Alternatives 1 and 3) to 3 percent (Alternative 2) under the action alternatives when compared to the No Action Alternative. Mobile GHG emissions would increase by between 39 percent (Alternative 3, Scenario C) and 58 percent (Alternative 2, Scenario A) under the action alternatives when compared to the No Action Alternative. For more information on climate change and GHGs, see Sections 3.16 and 4.16.

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 action alternatives analyzed. This EIS does not identify any mitigation measures for the implementation of action alternatives but does identify measures that could be taken to develop suggested mitigation techniques, including, but not limited to, stormwater retention practices. As the NEPA process continues, mitigation measures may be developed and altered based on comments received during public and regulatory agency review of the EIS. If mitigation measures are identified during this process, they will be identified in the Final EIS or 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 and agency comments during two scoping 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, in Lopez Island, Washington
- December 4, 2014, in Port Townsend, Washington

Comments received during the two scoping periods were considered in preparing this EIS. Specifically, the Navy solicited scoping comments from elected officials, federally recognized American Indian tribes and nations, agencies, and the general public to determine the scope of this EIS. Section 1.9.4.1 provides a summary of scoping comment topics.

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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
ABD	Average Busy Day
ACHP	Advisory Council on Historic Preservation
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
AOP	air operating permit
APE	Area of Potential Effect
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
ATC	air traffic control
ATCAA	Air Traffic Controlled Assigned Airspace
BASH	Bird-animal Aircraft Strike Hazard
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act
CCAR	Climate Change Adaptation Roadmap
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNG	Cascade Natural Gas Corporation
CNO	Chief of Naval Operations
CO	carbon monoxide
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
DERP	Defense Environmental Restoration Program
DNL	day-night average sound level
DoD	United States Department of Defense
DoDI	United States Department of Defense Instruction
DPS	Distinct Population Segment
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMS	emergency medical service
EO	Executive Order
EOD	explosive ordnance disposal

Acronym	Definition
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCLP	field carrier landing practice
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FRS	Fleet Replacement Squadron
FWHCAs	Fish and Wildlife Habitat Conservation Areas
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 Rules
in/sec	inches per second
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Conservation
ITPO	Island Transportation Planning Organization
JLUS	joint land use study
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
LSO	Landing Signal Officer
LTO	landing and takeoff operation
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
µPa	Micropascal
mgd	million gallons per day
MMA	Mission Maritime Aircraft
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
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAF	Naval Air Facility
NAS	Naval Air Station
Navy	The U.S. Department of the Navy

Acronym	Definition
NAWS	Naval Air Weapons Station
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
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
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
ODO	Operations Duty Officer
OEIS	Overseas Environmental Impact Statement
OLF	outlying landing field
OPAREA	operating area
OPNAVINST	Office of the Chief of Naval Operations Instruction
OU	Operable Unit
PFC	perfluorinated compound
PFOA	perfluorooctanic acid
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
ROD	Record of Decision
RTIP	Regional Transportation Improvement Program
RTPO	Regional Transportation Planning Organization
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 Countermeasure
SR	State Route
STIP	Statewide Transportation Improvement Program
SUA	Special Use Airspace
TCP	traditional cultural property
T&G	touch-and-go

Acronym	Definition
U&A	usual and accustomed
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
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VFR	Visual Flight Rules
VOC	volatile organic compound
VQ	Fleet Air Reconnaissance
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WGMA	Washington State Growth Management Act
WSDOT	Washington State Department of Transportation

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 2017, 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 to support 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 2017. 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 Navy has prepared this EIS in accordance with NEPA, as implemented by the Council on Environmental Quality (CEQ) regulations and Navy regulations for implementing NEPA.

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 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.

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

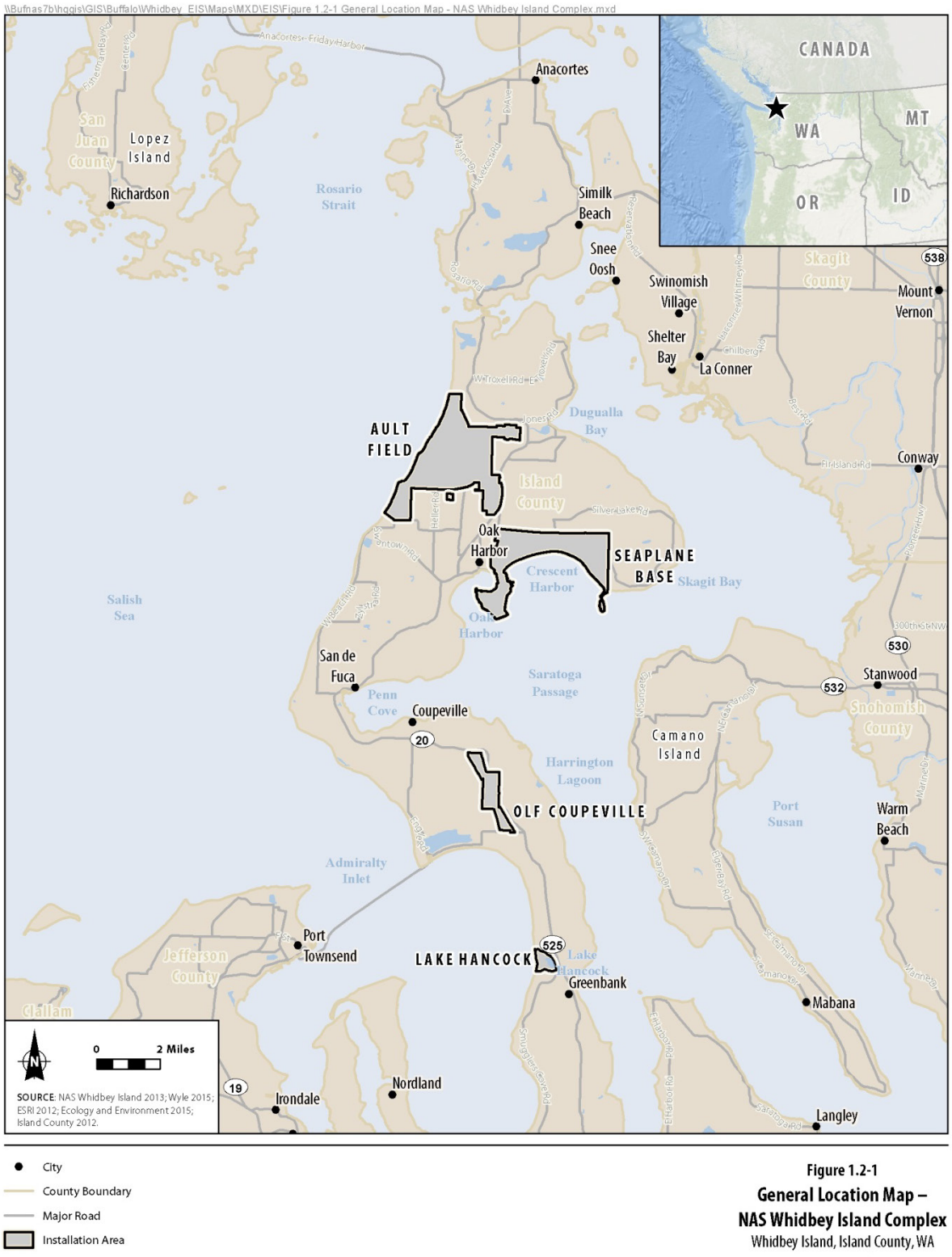


Figure 1.2-2 General Location Map, Aerial, Ault Field

Figure 1.2-3 General Location Map, Aerial – OLF Coupeville

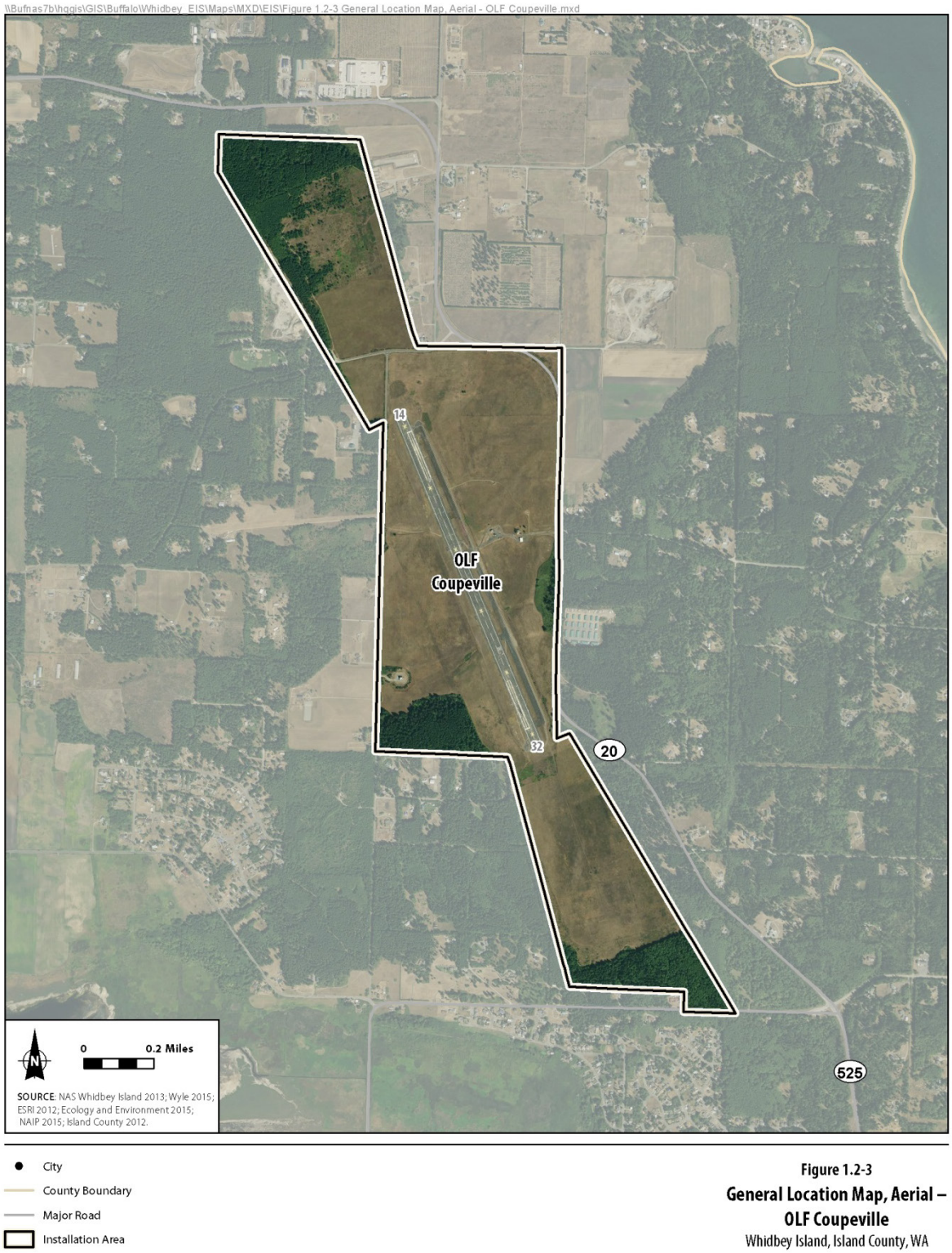


Figure 1.2-3
General Location Map, Aerial – OLF Coupeville
Whidbey Island, Island County, WA

1.3 Purpose of and Need for the Proposed Action

> 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."

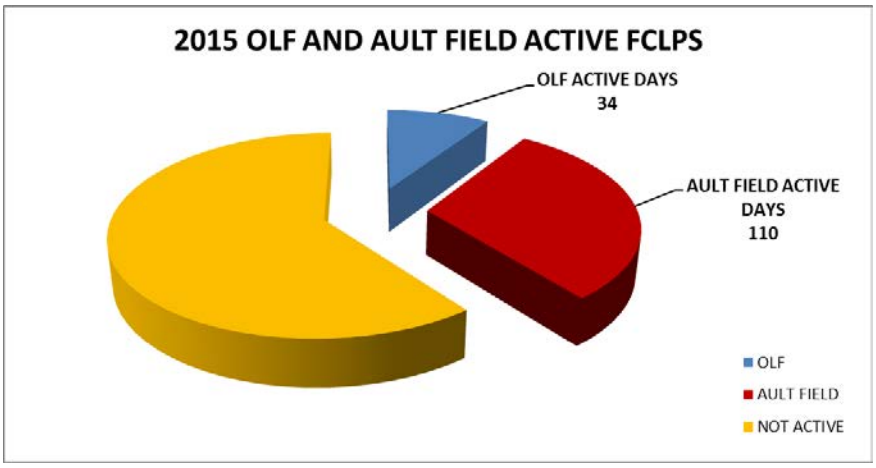
The purpose of the Proposed Action is to augment the Navy's existing Electronic Attack community at NAS Whidbey Island by operating additional Growler aircraft as appropriated by Congress. The Navy needs to effectively and efficiently increase electronic attack capabilities in order to counter increasingly 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 (U.S.C.), Section 5062.

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

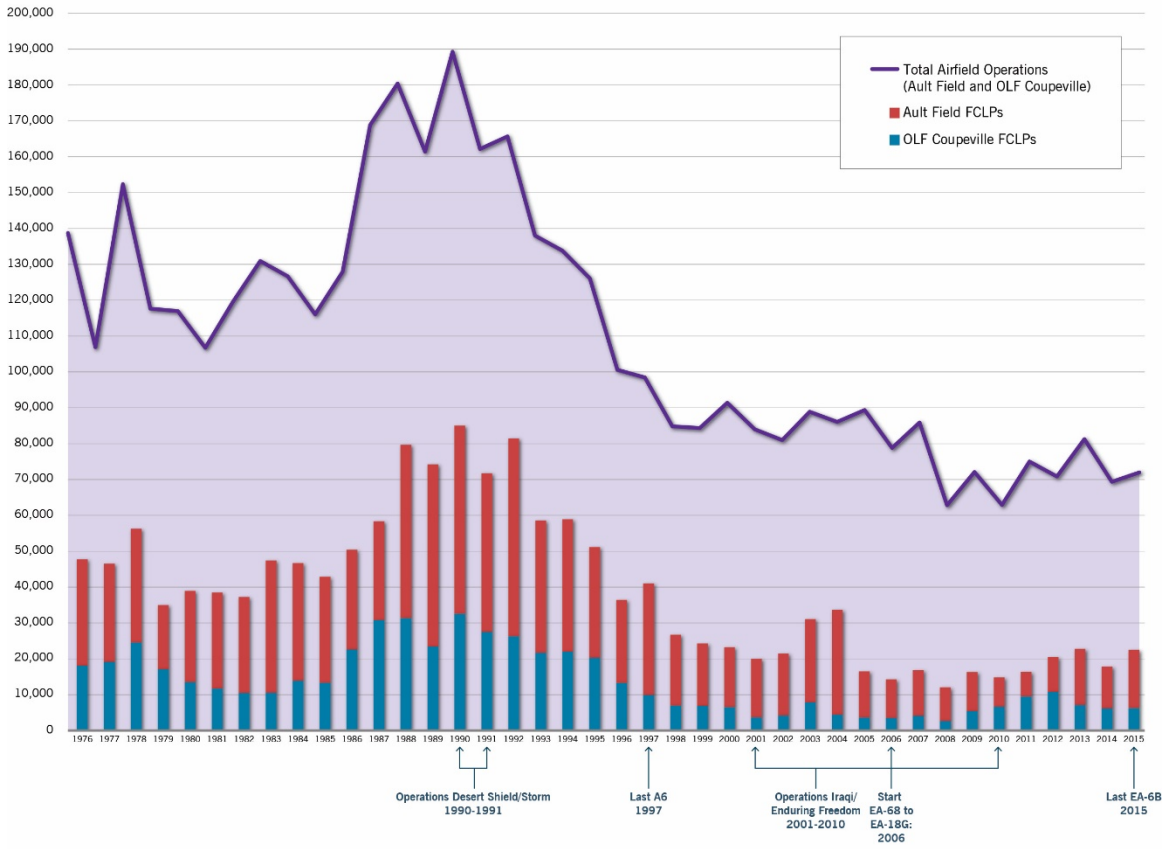
Commissioned in 1942 as part of NAS Whidbey Island, Ault Field is the only Naval air station in the Pacific Northwest. It has supported Naval aviation for more than 70 years and served as the primary home base location for the Navy's Electronic Warfare community for more than 45 years. Ault Field and 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 40 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 graph represents approximate and best available aircraft operations data for Ault Field and OLF Coupeville as recorded through tracking methods at the time.



Previous Airfield Operations for Ault Field and OLF Coupeville



Ault Field is the home base location of the Navy's entire 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. The training squadron 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. The Secretary of Defense directed that the tactical Airborne Electronic Attack mission is the exclusive responsibility of the Navy. As a result, the Navy is the only U.S. military service to 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 the Growler community, Ault Field is the West Coast home to the Maritime Patrol community and a Fleet Air Reconnaissance squadron consisting of three P-3C Orion squadrons, one reserve P-3C Orion squadron, and one EP-3 squadron. Maritime Patrol and Fleet Air Reconnaissance aircraft conduct airfield operations at Ault Field but do not conduct any airfield operations at OLF Coupeville. 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.

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.

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 and 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 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 and increases operational costs to the Navy. 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. 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; however, Growlers do not normally land at OLF Coupeville. 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 for the training.

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, 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: Appendix A, Draft Aircraft Noise Study; Appendix B, Air Emissions Calculations; Appendix C, Section 106 Documentation; 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, Coastal Consistency Determination; and Appendix H, Civilian Airfield Analysis.

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 analysis in 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 (MOAs). 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 signals to aircraft for aircrew to detect, locate, and identify. The ground-based emitters are intended to improve flight training by providing air crews with more varied signal locations. This EA analyzes only the impacts associated with use of the ground-based emitters and does not cover the flight training that already occurs in the existing MOAs. The existing flight training in the MOAs is analyzed in separate NEPA documents and would continue in the same locations and in the same manner as they have for many years. The Navy completed the EA and issued a FONSI on August 28, 2014. The Navy has applied for a permit from the U.S Forest Service to drive the mobile emitter vehicles on existing roads and cutouts and is coordinating with the Washington State Department of Natural Resources for similar authorization on state lands.

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 Final EIS/OEIS was publicly released on October 2, 2015, and is awaiting a ROD.

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 Draft EIS was released in September 2012. The Final EIS was released publicly on December 18, 2015, and a 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), which requires an environmental analysis of major federal actions that have the potential to significantly impact the quality of the human environment
- CEQ Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] parts 1500-1508)
- Navy regulations for implementing NEPA (32 CFR part 775), which provides Navy policy for implementing CEQ regulations and NEPA
- 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 306108 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
- Emergency Planning and Community Right to Know Act
- Pollution Prevention Act of 1990
- 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 13693, Planning for Federal Sustainability in the Next Decade

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

Regulations from the CEQ (40 CFR Section 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. The Navy solicited agency comments during two scoping periods and conducted a total of eight scoping meetings. Elected officials and federal and state agencies were invited to attend public meetings, submit comments, and participate in the development of this EIS. The Navy is coordinating with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Washington State Department of Ecology regarding the Proposed Action. Based on early coordination with these federal and state agencies supporting documentation and consultation items will be prepared and submitted as needed (e.g., Biological Assessment). A National Historic Preservation Act Section 106 consultation process will be completed with the State Historic Preservation Office and the Advisory Council on Historic Preservation, as needed. A Coastal Consistency Determination will be prepared and submitted to the Washington State Department of Ecology. The following federally recognized American Indian tribes and nations 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

1.9.1 Public Scoping

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 issues and concerns of particular interest to affected communities. Comments received during the public comment periods were considered in preparing the Draft EIS. Specifically, the Navy solicited scoping comments from elected officials, American Indian tribes and nations, 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 1.9.4.1 provides a summary of scoping comment topics. The Navy will hold public meetings and solicit public comments on the Draft EIS. The locations and dates of these meetings will be published in a Notice of Public Meetings in the *Federal Register* and in local newspapers and other outlets.

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.

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

[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).

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, as communicated to the public, focused on 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.

1.9.2 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 distribution list for these mailings.

1.9.3 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 issues 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

1.9.4 Scoping Comments

Comments were received from elected officials, American Indian tribes and nations, 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. Any comments pertaining to this project but submitted during other regional NEPA project public involvement efforts were collected and have been 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

	2013-2014 Scoping[3]	*2014-2015 Re-scoping*[4]
Method of Comment Submittal	***Number of Comments Received***[5]	
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

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

	2013-2014 Scoping[3]	*2014-2015 Re-scoping*[4]
Method of Comment Submittal	***Number of Comments Received***[5]	

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 issues or 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

1.9.4.1 Summary of Comment Issues and Commenters

Table 1.9-5 provides a summary of all comments received by issue or 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 issues 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 Issues 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/Issue/Concern	*Number of Comment Topics/Issues/Concerns*	
	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.

In addition to the above-referenced issues, specific comment topics were identified during the two scoping efforts. Each topic is detailed below, with information provided on how this issue is considered within the EIS analysis.

- **Best Available Science and Analysis Methodology.** Some commenters requested that the EIS document peer-reviewed studies and articles, particularly those related to potential health effects (nonauditory) of aircraft noise on humans and wildlife. A comprehensive 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. Although there is no consensus within the scientific community that supports a relationship between aircraft noise exposure and nonauditory health impacts for residents living near military or civilian airfields, a discussion of the research on nonauditory health impacts is included in Section 4.2 (Noise) and in the noise study (Appendix A).

- **Fuel Dumping**. The issue of fuel dumping (the release of aviation fuel during flight operations) was raised by some commenters during scoping. Fuel release procedures are governed by the Federal Aviation Administration and Navy rules. Navy pilots are prohibited from dumping fuel at altitudes below 6,000 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).
- **Noise Mitigation.** Commenters requested information on the measures that would be taken by the Navy to mitigate potential noise impacts as a result of implementing the Proposed Action. The Navy has an active Air Installations Compatible Use Zones program in place at the NAS Whidbey Island complex; the 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. The Navy will continue to address local concerns about aircraft noise through implementation of this long-standing program in coordination with the community. Additionally, the installation frequently corresponds with numerous media outlets and utilizes its webpage and social media, such as the station's Facebook page, to share flight schedules and other information and to solicit public feedback. Where 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 continuously reviews flight procedures to determine whether there are any changes that could help reduce noise on the surrounding population. The installation will continue to publish FCLP schedules and issue notifications for additional activities, such as weekend festivals. 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:
    - **Chevrons.** The Navy is testing the use of chevrons (ceramic strips placed in the exhaust nozzle of a jet engine for sound reduction). Chevron testing in October 2014 confirmed that this technology has some positive effect, but it also disclosed that some redesign of the exhaust nozzle chevrons will be necessary to achieve noise reduction benefits in the Super Hornet and Growler. The Navy will continue to explore different technologies to reduce the noise impacts from aircraft.
    - **MAGIC CARPET.** MAGIC CARPET (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 process easier. 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. Initial capabilities of MAGIC CARPET 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. The full capabilities of MAGIC CARPET will be released in 2019 timeframe. While this system's impact on future training has not been fully realized, it has the potential to significantly reduce training requirements for FCLPs.

Sections 3.2 and 4.2 (Noise) provide details on the affected environment and analysis relevant to this Proposed Action.

- **Cumulative Impacts of Ongoing Regional NEPA Studies.** Multiple Navy actions are ongoing within the Pacific Northwest Region; several commenters inquired about each action and how they are connected to one another. All such NEPA actions and their potential cumulative impacts are identified and addressed in Chapter 5 (Cumulative Effects) of this EIS.
- **Previous NEPA Studies.** Because multiple Navy actions have previously occurred at the NAS Whidbey Island complex, several commenters inquired about how earlier studies are related to the current Proposed Action. Section 1.6 (Key Documents) provides details 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.
- **Segmentation.** Some commenters raised the issue of segmentation (i.e., analyzing impacts of connected actions independently instead of collectively in the same NEPA document), feeling that this Proposed Action may be improperly segmented under NEPA from other proposed actions in the Pacific Northwest. 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 (e.g., the Northwest Training and Testing EIS/OEIS) focus on training activities occurring within a range complex or 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. The Navy does consider the impacts from past, present, and reasonably foreseeable future actions in Chapter 5 (Cumulative Impacts).
- **Flight Tracks**. During scoping, some commenters requested additional information on the flight tracks used by Growler aircraft at the NAS Whidbey Island complex. Air Traffic Control (ATC) services to 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. This EIS examines existing airspace conditions in Section 3.1 and impacts to airspace under each alternative in Section 4.1.
- **Explanation of Operations Types and Training Needs**. During scoping, some commenters requested 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., alternatives to home basing and conducting FCLP). 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).

- **Points of Interest.** Concern over Growler-associated noise was raised by commenters during public scoping. As part of the noise modeling and supplemental noise analysis associated with this EIS, a variety of points of interest (POIs) were identified and modeled around the installation and surrounding communities to provide broad coverage and context to compare the No Action Alternative with the action alternatives. These POIs include residential neighborhoods, schools, hospitals, and recreational areas. POIs have been selected for analysis throughout Island County, as well as in the surrounding counties of San Juan, Jefferson, Clallam, Snohomish, and Skagit. In addition, one POI was identified in British Columbia, Canada. This POI is illustrated on Figure 3.2-6 and listed in Table 3.2-4 of this EIS.
- **Australian Air Force Operations**. Comments on the Navy's three-year training program for pilots in the Australian Air Force were received during the scoping efforts. This training activity is not part of the Proposed Action; however, these operations are included as part of the affected environment analysis as they are in progress and ongoing (see Sections 3.1, Airspace and Airfields, and 3.2 Noise).
- **Sonic Booms**. Sonic booms (the sound created by an object traveling faster than the speed of sound, or when aircraft are traveling at or above Mach 1.0.) were identified during scoping as an issue of 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. Since 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 noise study (Appendix A) was prepared for this EIS, and impacts associated with noise are further analyzed in Section 4.2.
- **Seasonal Impacts on Airfield Operations.** As noted by some commenters during scoping, airfield operations at the NAS Whidbey Island complex can be affected by weather delays and other seasonal issues (such as longer daylight hours during the summer months or shifts in the prevailing wind direction). Current airfield operations are illustrated in Section 3.1.2 of this EIS, and changes to operations under the various action alternatives are examined in Section 4.1.

1.9.5 Other Noise Reports

The Navy continues to evaluate noise reports that have been developed by independent sources and review their findings in conjunction with this EIS analysis. The following noise reports have been reviewed:

- National Park Service Report for Ebey's Landing National Historic Reserve (2016)

  In 2016, the National Park Service performed acoustical monitoring for the Ebey's Landing National Historic Reserve. The conditions measured by this study were actual aircraft noise over a 28-day period in June and July 2016. Although this differs from the affected environment modeled for calendar year 2021 in this EIS, the results of the study appear consistent with the Navy's previous noise analyses. Furthermore, the National Park Service'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 aircraft noise above 60 dB (normal conversation levels) occurred less than 1 percent of the time during the study period.

- Dalhgren Report on Combat Jet Noise from Landing and Taking Off at Whidbey Island OLF Coupeville (2015)

  In 2015, this opinion paper was developed by Dr. Dahlgren, a toxicologist, to support litigation by providing his opinion regarding the impact on public health from aircraft noise based on his review of the research on aircraft noise and on surveys from individuals expressing their opinion regarding their health. The report relies on conclusions on individual health that are not based on reviews of the medical records of 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 Noise Study for this EIS and provides a detailed discussion of its findings in Section 3.2.

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

  In 2013, JGL drafted a report in support of litigation that purported to compare limited short-term aircraft noise measurements with noise impacts reported in the 2005 Growler EA, which served as part of Dr. Dahlgren's opinion report. The JGL report, however, contained methodological flaws that make it unreliable for purposes of relating those short-term measurements to the annual conditions assessed in the 2005 EA. It also did not result in any findings that question the validity of Navy modeling.

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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 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 United States (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 two additional Growler expeditionary squadrons (13 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 has 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. Congress may elect to purchase more aircraft in the future; therefore, the Navy is maintaining the current Proposed Action as reflected in this document.

Beginning as early as 2017, 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. The Navy prepares separate National Environmental Policy Act (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.

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 40-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

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.
- 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 2.4 describes alternatives that meet the purpose of and need for the Proposed Action and are analyzed in this EIS. Section 2.5 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 Council on Environmental Quality (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

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 aircraft operations at Ault Field and OLF Coupeville (Scenarios A, B, and C for each action alternative)

Furthermore, each force structure alternative has different facility construction needs and personnel numbers, each of 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. Alternative 1 would add three aircraft to each of the nine existing squadrons, while Alternatives 2 and 3 would add two aircraft. Depending on the alternative selected, each carrier squadron would consist of five to eight aircraft and nine to 16 aircrews.

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. Under Alternative 1, there would be no change to the existing configuration of the three expeditionary squadrons. Alternative 2 would create five expeditionary squadrons, and Alternative 3 would increase the number of aircraft assigned to the three existing expeditionary squadrons. Depending on the alternative selected, an expeditionary squadron would consist of five to eight aircraft and 10 to 16 aircrews.

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. All alternatives would add aircraft to the FRS.

Action Alternative 1

Alternative 1 would expand carrier capabilities by adding three additional aircraft to each of the existing nine carrier squadrons and augmenting the FRS with eight additional aircraft (a net increase of 35 aircraft). Alternative 1 would add an estimated 371 Navy personnel and 509 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 to each of the nine existing carrier squadrons, and augmenting the FRS with eight additional aircraft (a net increase of 36 aircraft). Alternative 2 would add an estimated 664 Navy personnel and 910 dependents to the region.

Action Alternative 3

Alternative 3 would expand expeditionary and carrier capabilities by adding three additional aircraft to each of the three existing expeditionary squadrons, adding two additional aircraft to each of the nine existing carrier squadrons, and augmenting the FRS with nine additional aircraft (a net increase of 36 aircraft). Alternative 3 would add an estimated 377 Navy personnel and 894 dependents to the region.

This EIS analyzes the distribution of annual FCLPs between Ault Field and OLF Coupeville resulting from the three action 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 these aircraft train and operate, which has differing impacts on the environment (i.e., the squadron type determines its FCLP requirement). 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.

In order to determine how the distribution of operations might affect noise impacts at OLF Coupeville and Ault Field, this EIS evaluates the following three sub-alternatives, which are operational scenarios for each action 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

The above three scenarios (A, B, and C), in combination with the alternatives described in Table 2.3-1 (Alternatives 1, 2, and 3), provide a total of nine operational conditions that are fully evaluated in this EIS analysis. The Secretary of the Navy will be able to select a final alternative/scenario combination from the range of nine analyzed in this EIS.

Scenarios are based on the distribution of 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. 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 three operational scenarios at the expense of ideal training.

Table 2.3-1 Summary of EA-18G Growler Aircraft Changes 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]
No Action Alternative (No additional Growler Aircraft)	• None	• None	82	88,600
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	Ault Field • Scenario A: 94,400 • Scenario B: 107,500 • Scenario C: 120, 800 OLF Coupeville • Scenario A: 35,500 • Scenario B: 22,300 • Scenario C: 9,200 Total • Scenario A: 129,900 • Scenario B: 129,800 • Scenario C: 130,000
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	Ault Field • Scenario A: 95,100 • Scenario B: 107,700 • Scenario C: 120,300 OLF Coupeville • Scenario A: 34,000 • Scenario B: 21,400 • Scenario C: 8,800 Total • Scenario A: 129,100 • Scenario B: 129,100 • Scenario C: 129,100
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	Ault Field • Scenario A: 94,900 • Scenario B: 107,400 • Scenario C: 120,000 OLF Coupeville • Scenario A: 33,900 • Scenario B: 21,300 • Scenario C: 8,700 Total • Scenario A: 128,800 • Scenario B: 128,700 • Scenario C: 128,700

Table 2.3-1 Summary of EA-18G Growler Aircraft Changes 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]

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. Detailed airfield operations broken out by airfield and alternative/scenario are provided in Sections 3.1 and 4.1.

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

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

Alternative	*Ault Field*	*OLF Coupeville*	*Total FCLPs*
Alternative 1			
Scenario A (20/80 FCLP Split)	8,700	35,100	43,800
Scenario B (50/50 FCLP Split)	21,900	21,900	43,800
Scenario C (80/20 FCLP Split)	35,100	8,800	43,900
Alternative 2			
Scenario A (20/80 FCLP Split)	8,400	33,600	42,000
Scenario B (50/50 FCLP Split)	21,000	21,000	42,000
Scenario C (80/20 FCLP Split)	33,600	8,400	42,000
Alternative 3			
Scenario A (20/80 FCLP Split)	8,400	33,500	41,900
Scenario B (50/50 FCLP Split)	21,000	20,900	41,900
Scenario C (80/20 FCLP Split)	33,500	8,300	41,800
No Action Alternative	***14,700***	***6,100***	***20,800***

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. Training requirements may require FCLPs that fall within a range of these percentages.

2.3.3 Description of Alternatives

2.3.3.1 Aircraft and Personnel Loading

The action alternatives would add an additional 35 or 36 aircraft to the existing Growler community at Ault Field as compared to No Action Alternative, for a total of 117 or 118 Growler aircraft. 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 action alternatives would range from 371 to 664 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)	• 633 Officer • 3,842 Enlisted	4,475 (+371)	6,136 (+509)
Alternative 2	• 9 carrier squadrons (63 aircraft) • 5 expeditionary squadrons (25 aircraft) • 1 Reserve Squadron (5 aircraft) • 1 training squadron (25 aircraft)	118 (+36)	• 655 Officer • 4,113 Enlisted	4,768 (+664)	6,537 (+910)
Alternative 3	• 9 carrier squadrons (63 aircraft) • 3 expeditionary squadrons (24 aircraft) • 1 Reserve Squadron (5 aircraft) • 1 training squadron (26 aircraft)	118 (+36)	• 633 Officer • 3,848 Enlisted	4,481 (+377)	6,144 (+894)

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. The Proposed Action would add an additional 35 or 36 Growler aircraft to the existing Electronic Attack community at Ault Field, for a total of 117 or 118 Growler aircraft. 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

45 percent to 46 percent (depending on the alternative and scenario selected) over the No Action Alternative to support the addition of 35 or 36 new aircraft assigned to Ault Field.

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 action 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 individual aircraft and provide 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, and maintenance of squadron aircraft as well as emergency shelter for operational 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 August 2016 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. All three action alternatives would require repairs to inactive

Figure 2.3-1 Ault Field Planned Construction under Alternatives 1, 2, and 3

taxiways 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 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.

For hangar space under Alternative 2, a two-squadron hangar would be constructed on the flight line adjacent to Hangar 5. For all three action alternatives, Hangar 12 would be expanded to accommodate additional training squadron aircraft. Table 2.3-4 provides a summary of the planned land disturbance for construction activities under all alternatives and the total amount of new impervious surface that would be generated. Once constructed, facilities and parking would add up to approximately 2 acres of new impervious surface at the installation.

Table 2.3-4 Total Facility Construction and New Impervious Surface for Proposed Construction Activities under All Alternatives

	Alternative 1	*Alternative 2*	*Alternative 3*	*No Action Alternative*
Additional Growler Aircraft to Support	***35***	***36***	***36***	***0***
Total Facility Construction (acres)	6.6	7.4	6.6	0
Total New Impervious Surface (acres)	2.1	2.1	2.1	0

2.4 Alternatives Considered but Not Carried Forward for Further Analysis

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

2.4.1 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. It would be unreasonable to continue considering alternatives that evaluate fewer aircraft than Congress has appropriated; therefore, these alternatives were removed from further analysis.

2.4.2 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. The Secretary of Defense directed that the tactical Airborne Electronic Attack mission be the exclusive responsibility of the Navy. The DoD has directed the Navy to provide Electronic Attack capability, initially with the Prowler and now with the Growler, to all combatant commanders and services. 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. 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. The elimination of alternatives that considered moving some or all of the Growler community to other locations remains consistent with historical Navy decisions. Specifically, the Navy decided in 2005 and 2012, when analyzing the replacement of the EA-6B "Prowler" with the Growler, and again when analyzing maintaining the expeditionary Electronic Attack mission, that any alternative that divided or split the unique Electronic Attack community into multiple sites did not meet the purpose and need of the Proposed Action because it would reduce the efficiency and effectiveness of the 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. Single-siting the Growler community at Ault Field provides:

Operational synergy

Having a single hub for the Growler community promotes success 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 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.
- **Improved interactions on a daily basis.** Success in the Growler community is assisted by the concentration in one place of Growler squadrons and schools. 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.
- **Community-wide efficiencies.** Efficiencies are realized through shared maintenance and logistics efforts, flight line service support, and sharing aircraft and personnel when necessary. Mutual support is important to ensure efficient reassignment of resources between squadrons when necessary--including personnel (aircrew and maintenance), parts, and aircraft.
- **Enhanced training and squadron support.** Growler personnel receive specialized training specific to their mission as part of the training squadron syllabus. Once personnel complete this 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 aircraft, including the replacement of squadron personnel.
- **Effective knowledge transfer within the Growler community.** New aircraft support the same mission and require the same expertise that resides currently at Ault Field. New members to the Growler community will learn from personnel already residing in the community.
- **Personnel efficiencies.** Costs associated with "permanent change of station" moves account for a large 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 by rendering as unnecessary disruptive moves, thus allowing service members to be more readily deployable. Co-location of carrier, expeditionary, and training squadrons at the same station reduces the number of relocations for service members undergoing training prior to assignment to the Fleet.

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 MTRs to support Growler training, including the 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 40 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 System 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 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 nm^2 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.

Efficient Use of Existing Infrastructure

Ault Field maintains all of 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 aircrew simulators**
  The Navy currently has six Growler aircrew simulators, and all of them are located at Ault Field. Aircrew 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 purchase 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.

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 the additional 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 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). Additionally, split-siting introduces substantial inefficiencies in community management and training without any corresponding operational benefit. 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:

- **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. So, 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 Federal Aviation Administration activities 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.

- **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. Home basing aircraft at NAF El Centro would fundamentally change the nature of the facility and would prove cost prohibitive as demonstrated by the analysis conducted in the U.S. Navy F-35C West Coast Home Basing EIS in 2014. 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. 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.
- **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.

- **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.
- **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 would be subsumed by the imminent home basing of U.S. Marine Corps F-35B Lightning II aircraft. 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, significantly adverse impacts to the surrounding environment.

In summation, other than Ault Field, no other 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.

2.4.3 Conducting FCLP Elsewhere

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

- **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.

- **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 Federal Aviation Administration 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 (Appendix H, Civilian Airfield Analysis).
- **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. Detachment training increases operational and training costs 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.[4]
- **Construct a new OLF**
  Constructing a new OLF is highly speculative and would require years, if not decades, to accomplish. There is no statutory authority (i.e., requiring an Act of Congress) to purchase the land and easements necessary to construct a multi-million-dollar airfield, and it is unclear how to justify funding when OLF Coupeville fully satisfies the Navy's requirements. 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. Although moving FCLPs away from OLF Coupeville to a new OLF may reduce noise impacts to the community immediately surrounding OLF Coupeville, it would result in significantly more adverse impacts to the environment by result in significant new construction in another

[4] 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.

location. Moreover, any potential reduction of noise 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. In addition, it would migrate noise impacts 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 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 would 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. This would also adversely impact the socioeconomic resources of the locality that would lose a tax base once that land transfers to federal ownership. The amount of additional new construction would result in more adverse environmental impacts than 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 around OLF Coupeville; and locations to the north would not be feasible due to the presence of the San Juan Islands National Monument and the Canadian border.

- **Anchor an aircraft carrier off the coast**
  FCLP is conducted at 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. FCLP is conducted by pilots during their initial Growler training syllabus and by more experienced pilots renewing their training before carrier-landing qualification flights. Finally, per Navy regulations, pilots may not land on an aircraft carrier at sea without completing FCLP on land.
- **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. 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 dangerous 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.

2.5 Summary of Alternatives Considered

Table 2.5-1 provides an overview of the No Action Alternative and the three action alternatives considered in this EIS.

Table 2.5-1 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 (Percent of FCLP at Ault Field vs. OLF Coupeville)*		
Alternative	*New Squadrons/ Increase in Aircraft*	*Total Operations at NAS Whidbey Island Complex*	*Net Change in Number of Growler Personnel and Dependents*	*Scenario A*	*Scenario B*	*Scenario C*
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)	88,600	No new personnel (existing personnel 4,104, existing dependents 5,627)	N/A	N/A	N/A
Action Alternative 1 (+35 Additional Growler Aircraft)	• 3 new aircraft to each existing carrier squadron 8 new training aircraft for FRS	Ault Field • Scenario A: 94,400 • Scenario B: 107,500 • Scenario C: 120, 800 OLF Coupeville • Scenario A: 35,500 • Scenario B: 22,300 • Scenario C: 9,200 Total • Scenario A: 129,900 • Scenario B: 129,800 Scenario C: 130,000	+371 personnel +509 dependents	20/80	50/50	80/20

Table 2.5-1 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 (Percent of FCLP at Ault Field vs. OLF Coupeville)*	
Alternative	***New Squadrons/ Increase in Aircraft***	***Total Operations at NAS Whidbey Island Complex***	***Net Change in Number of Growler Personnel and Dependents***	***Scenario A***	***Scenario B***	***Scenario C***	
Action 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	Ault Field • Scenario A: 95,100 • Scenario B: 107,700 • Scenario C: 120,300 OLF Coupeville • Scenario A: 34,000 • Scenario B: 21,400 • Scenario C: 8,800 Total • Scenario A: 129,100 • Scenario B: 129,100 • Scenario C: 129,100	+664 personnel +910 dependents	20/80	50/50	80/20	

Table 2.5-1 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 (Percent of FCLP at Ault Field vs. OLF Coupeville)*	
Alternative	*New Squadrons/ Increase in Aircraft*	*Total Operations at NAS Whidbey Island Complex*	*Net Change in Number of Growler Personnel and Dependents*	*Scenario A*	*Scenario B*	*Scenario C*	
Action 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	Ault Field • Scenario A: 94,900 • Scenario B: 107,400 • Scenario C: 120,000 OLF Coupeville • Scenario A: 33,900 • Scenario B: 21,300 • Scenario C: 8,700 Total • Scenario A: 128,800 • Scenario B: 128,700 Scenario C: 128,700	+377 personnel +894 dependents	20/80	50/50	80/20	

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

Chapter Guide		
Section Title/Number	Page Number	Reader Notes
Airspace and Airfield Operations 3.1		Airfield operations, airspace classification, and flight tracks
Regulatory Setting	3-1	
Affected Environment Discussion	3-3	
Noise Associated with Aircraft Operations 3.2		Noise metrics and modeling; noise effects, DNL noise contours and supplemental noise analysis (e.g. potential effects from noise)
Noise Metrics and Modeling	3-16	
Affected Environment Discussion	3-23	
Public Health and Safety 3.3		Flight safety, Bird/Animal Aircraft Strike Hazard, and accident potential zones
Regulatory Setting	3-41	
Affected Environment Discussion	3-45	
Air Quality 3.4		Regulations and standards for Criteria Pollutants, Hazardous Air Pollutants, and Greenhouse Gas Emissions, permitting and existing emissions, general conformity
Regulatory Setting	3-52	
Affected Environment Discussion	3-56	
Land Use 3.5		On-station and regional land uses, land use compatibility, recreation and wilderness areas
Regulatory Setting	3-60	
Affected Environment Discussion	3-60	
Cultural Resources 3.6		Section 106 discussion, historic properties, area of potential effect, archaeological and architectural resources and Traditional Cultural Properties
Regulatory Setting	3-76	
Affected Environment Discussion	3-79	
American Indian Traditional Resources 3.7		American Indian Traditional Resources discussion
Regulatory Setting	3-98	
Affected Environment Discussion	3-100	
Biological Resources 3.8		Protected areas, terrestrial wildlife, marine species, threatened and endangered species, migratory birds
Regulatory Setting	3-103	
Affected Environment Discussion	3-106	
Water Resources 3.9		Groundwater, surface water, wetlands, floodplains, marine and water sediments
Regulatory Setting	3-142	
Affected Environment Discussion	3-145	
Socioeconomics 3.10		Population, economy, employment and income, housing, government revenue and expenditures and community services
Regulatory Setting	3-148	
Affected Environment Discussion	3-148	
Environmental Justice 3.11		Minority, Hispanic or Latino origin, low-income, and child populations
Regulatory Setting	3-163	
Affected Environment Discussion	3-164	
Transportation 3.12		Study area and methodology, road network and access, traffic conditions
Regulatory Setting	3-168	
Affected Environment Discussion	3-169	
Infrastructure 3.13		Study area and methodology, potable water, wastewater, stormwater, energy, and solid waste.
Regulatory Setting	3-178	
Affected Environment Discussion	3-178	

Chapter Guide		
Section Title/Number	Page Number	Reader Notes
Geological Resources 3.14		Topography, geology, soils
Regulatory Setting	3-186	
Affected Environment Discussion	3-186	
Hazardous Materials and Waste 3.15		Hazardous materials and waste, and Defense Environmental Restoration Program
Regulatory Setting	3-189	
Affected Environment Discussion	3-190	
Climate Change and Greenhouse Gases 3.16		Discussion of federal, agency, and state regulations and initiatives to address climate change, existing regional and action specific greenhouse gas emissions.
Regulatory Setting	3-192	
Affected Environment Discussion	3-193	

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. 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. 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).

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 under separate NEPA documentation listed in Section 1.6.

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 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)[5] 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 (MTR)**
  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 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)

[5] 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

Airspace Classification and Flight Tracks

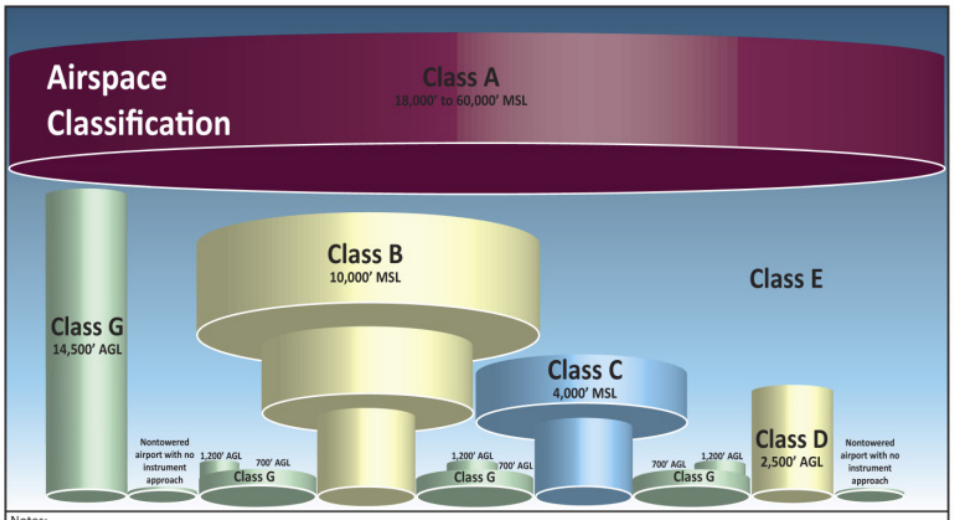
Ault Field

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.

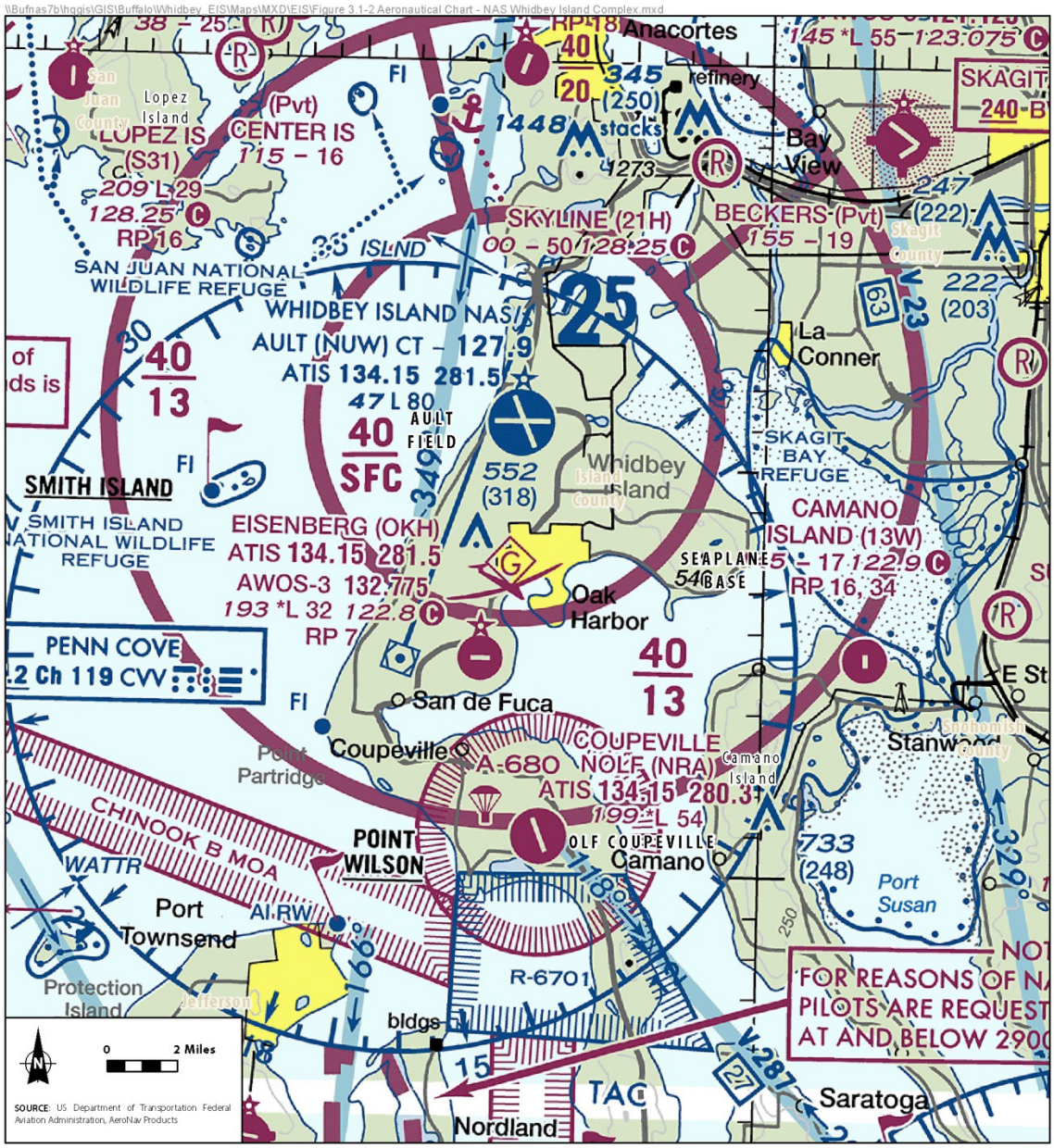
Figure 3.1-1 Cross Section of Controlled and Uncontrolled Airspace Classes



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

Figure 3.1-2 Aeronautical Chart NAS Whidbey Island Complex



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 is:

- the airspace around OLF Coupeville that extends upward from the surface to 3,000 feet above MSL and within a 1.5-nm radius of the airport in all directions

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 (18,566 km^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 Station Training Facility Boardman and is the Navy's primary training range on the west coast for conducting low-altitude air-combat maneuvers.

Military Training Routes

There are six VFR MTRs (VR-1350, VR-1351, VR-1352, VR-1353, VR-1354, and VR-1355) and six IFR MTRs (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 VFR MTRs 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 VFR MTRs (VR) 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 IFR MTRs (IR) 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 Meteorologic Conditions. The IFR MTRs (IR) 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 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**

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)*	*SEL[2] (dBA)*	
			Underneath Flight Path	*1 Mile to Either Side of Flight Path*
200	400	84.5[1]	116	77
500			109	82
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 (SEL) 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

Airfield Operations

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 the aircraft operating at both airfields. Although flight tracks are represented as single lines on maps, they actually depict the predominant path of the aircraft over the ground. The actual path of an aircraft over the ground is affected by aircraft performance, pilot technique, other air traffic, and weather conditions. 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.

Key Point: Although flight tracks are represented as single lines on maps, they depict the predominant path of the aircraft 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.

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 Aircraft Arrival and Departure Flight Tracks at NAS Whidbey Island Complex

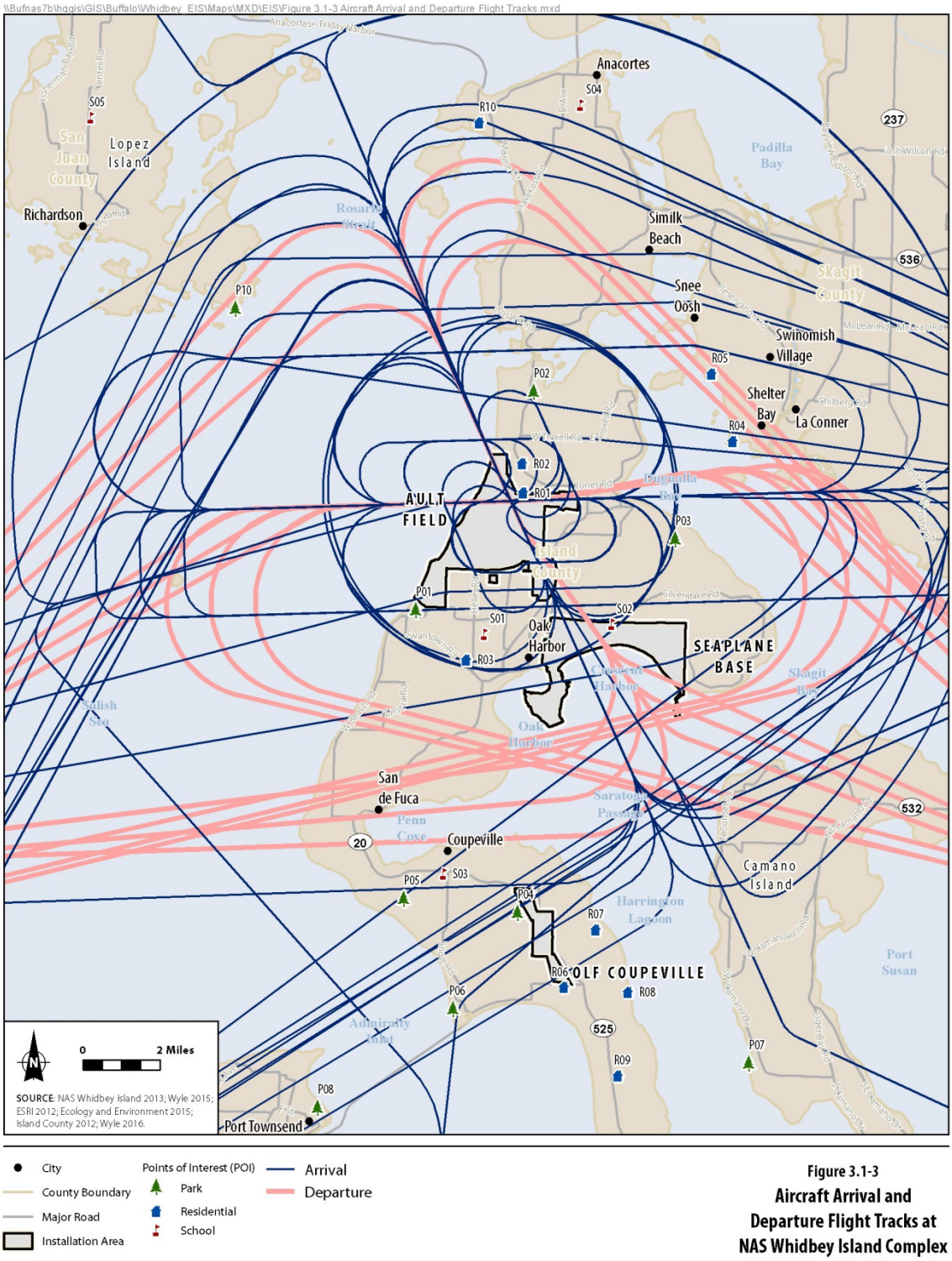


Figure 3.1-3
Aircraft Arrival and Departure Flight Tracks at NAS Whidbey Island Complex
Whidbey Island, Island County, WA

Figure 3.1-4 Interfacility and FCLP Flight Tracks

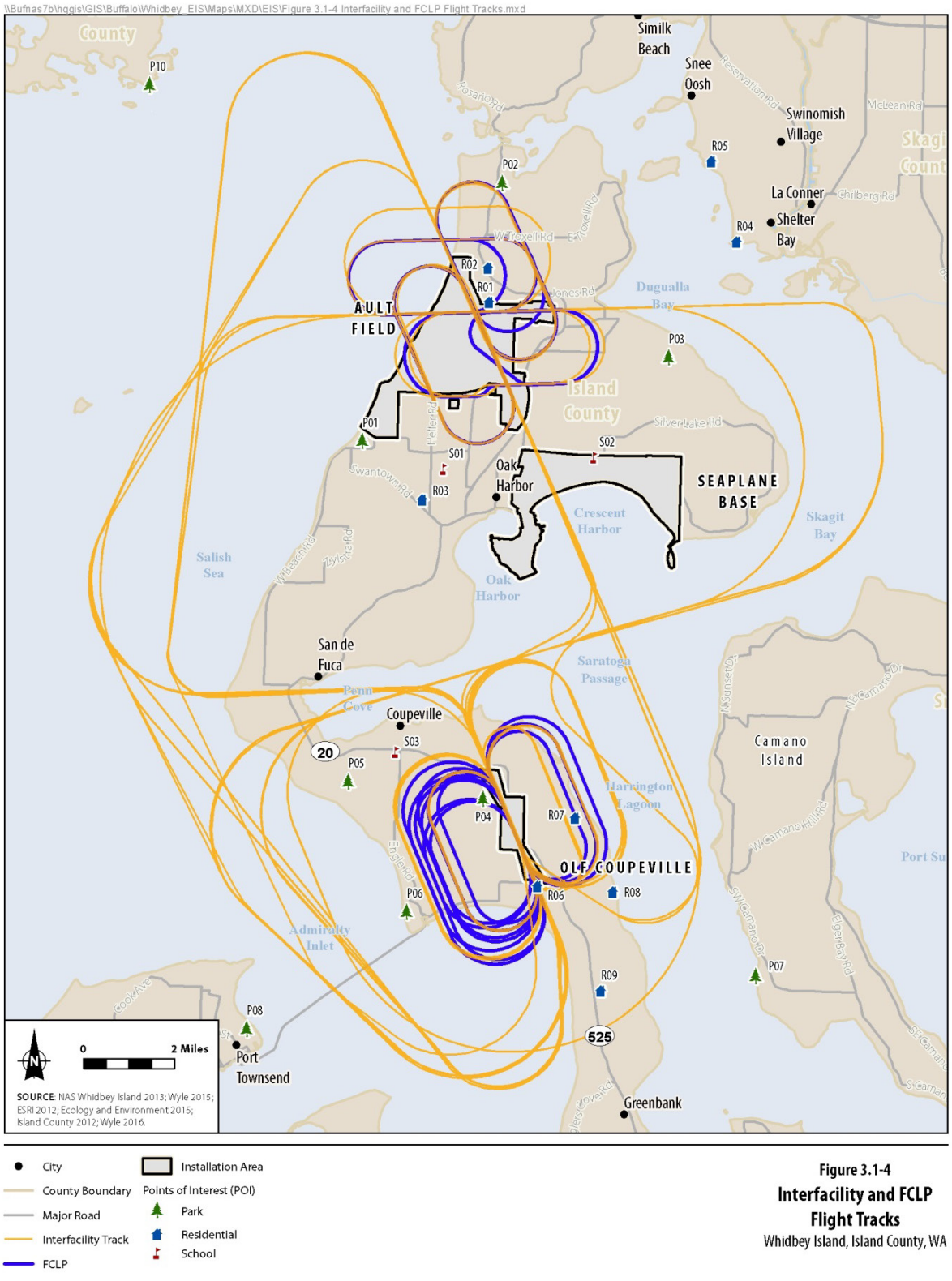


Figure 3.1-4
Interfacility and FCLP Flight Tracks
Whidbey Island, Island County, WA

Figure 3.1-5 Pattern Operations Flight Tracks

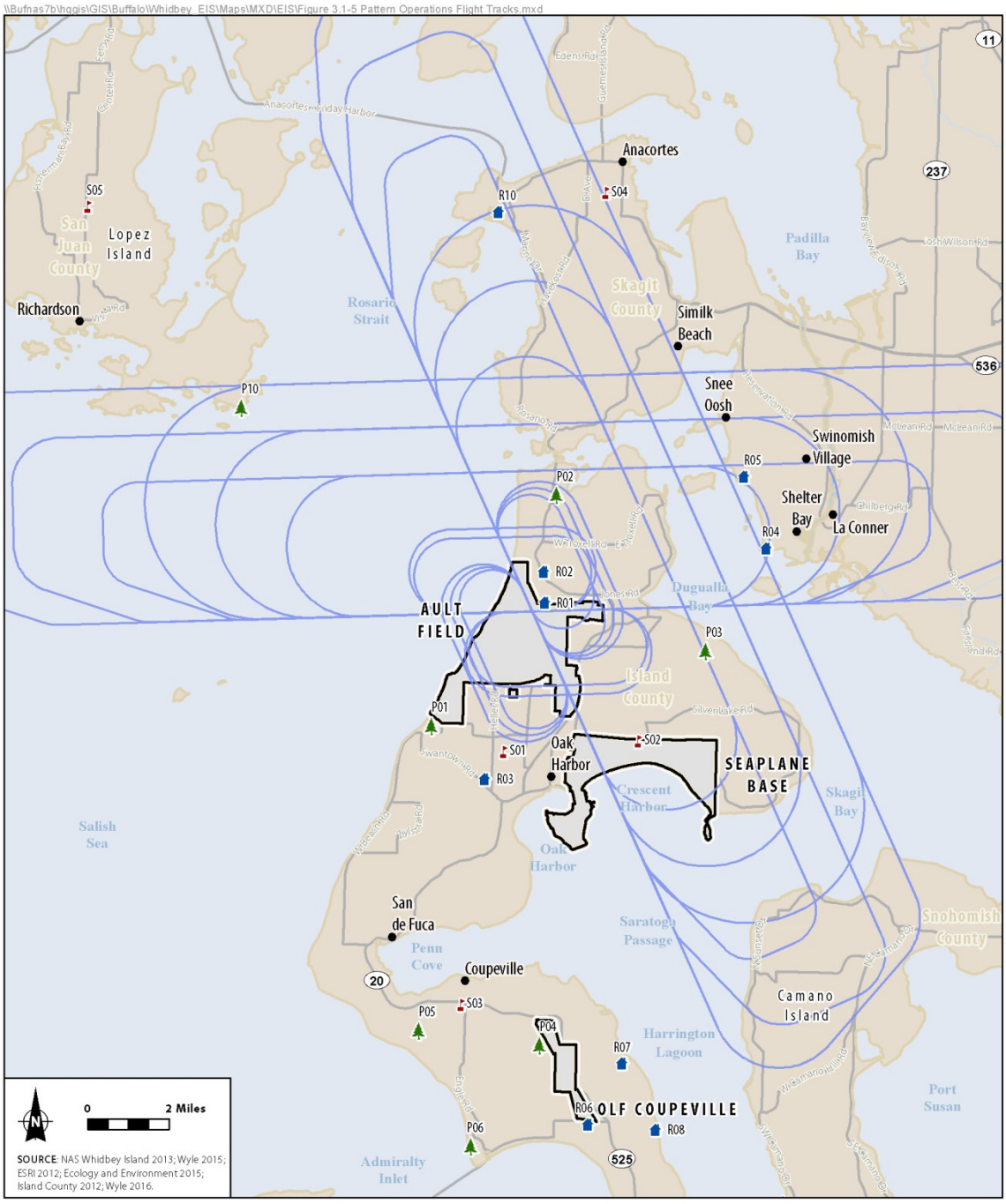


Figure 3.1-5
Pattern Operations Flight Tracks
Whidbey Island, Island County, WA

OLF Coupeville consists of one runway, Runway 14/32. The runway is 5,400 feet long and 200 feet wide. OLF Coupeville is available for use 7 days per week, 24 hours per day, although in recent years operations at OLF Coupeville have not been conducted on 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 pattern requires an unacceptably steep angle of bank for the Growler due to performance differences from the former Prowler flying the pattern.

As squadrons prepare for deployment on an aircraft carrier, activity at OLF Coupeville significantly increases. This high tempo of activity is then followed by periods of reduced or no operations. Use of OLF Coupeville is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules, and, as such, the number of operations at OLF Coupeville is less than at Ault Field.

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. The pattern should simulate, as closely as practicable, the conditions aircrews would encounter during actual carrier landing operations at sea.
    - **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.

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.

The affected environment (2021) for airfield flight operations is reflected in Table 3.1-3. These aircraft flight operations would be the affected environment aircraft operations for an average year at Ault Field and OLF Coupeville. During scoping, some commenters suggested that the noise analysis for OLF Coupeville should use a different metric. Specifically, these commenters suggested that the Navy should use a concept found in the Navy's Air Installations Compatibility Use Zones (AICUZ) Instruction (Chief of Naval Operation Instruction 11010.36B) 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 encroachment upon the flying mission of a Navy airfield, which 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 can result in overstated noise impacts. The intent of this EIS is not to directly support the AICUZ program, but to use best available science as required under NEPA to develop an accurate analysis of potential noise impacts from the Proposed Action. Thus, while related, the AICUZ standard is not necessarily an appropriate NEPA standard. Using ABD would greatly overstate the nature of the noise impacts at OLF Coupeville, thus providing decision makers and the public with an inaccurate analysis. 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. In fact, 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, yearly average noise levels, known as Average Annual Day, 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 program. 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	14,700	53,100	67,800
P-8	0	10,600	10,600
H-60	0	900	900
C-40	0	1,000	1,000
Transient[2]	0	1,300	1,300
Total Airfield Operations	**14,700**	**66,900**	**81,700**
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	20,800	53,100	73,900
P-8	0	10,600	10,600
H-60	0	1,300	1,300
C-40	0	1,000	1,000
Transient	0	1,300	1,300
Total Airfield Operations	**20,800**	**67,400**	**88,600**

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

Aircraft Type	*FCLP*	*Other Operations[3]*	*Total*

Source: Wyle, 2015

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 modeled projections for airfield operations in 2021 at Ault Field and OLF Coupeville, aircrews would perform approximately 81,700 flight operations annually at Ault Field during an average year. As shown on Table 3.1-3, approximately 83 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 day-night average sound level (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, Draft 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-depth background information on noise, including its effect on many facets of the environment, is provided in Appendix A, Draft 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

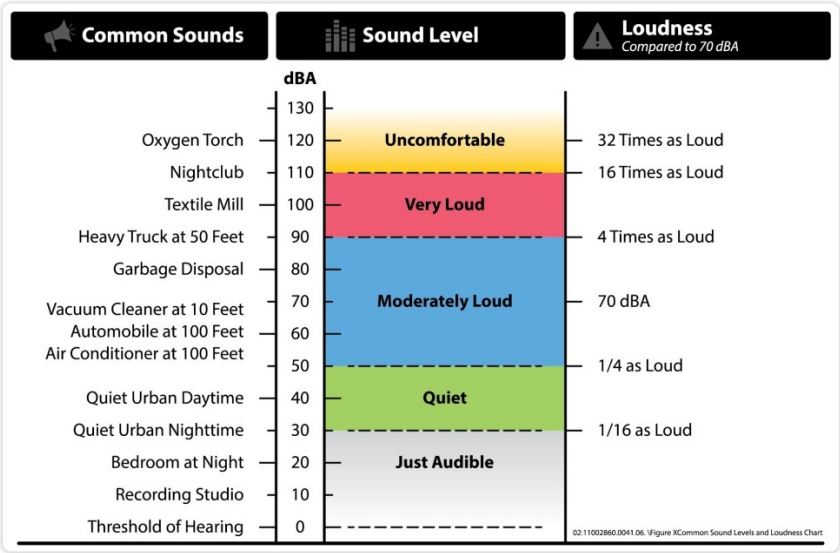
Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic: twice or half as loud
20 dB	Striking: a four-fold change

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, Draft 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 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 this EIS was modeled using a program called NOISEMAP Version 7.2 (October 29, 2015), developed by Wyle Laboratories. NOISEMAP draws from a library of actual aircraft noise measurements obtained in a controlled environment and 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 that contribute to the noise environment (see Appendix A, Draft Aircraft Noise Study). The U.S. Department of Defense (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 Dundoradale, 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; U.S. Environmental Protection Agency [USEPA], 1978). As such, 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 U.S. Department of Housing and Urban Development, FAA, the USEPA, and U.S. Department of Defense (DoD) for assessing aircraft noise exposure.

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 Department of Defense Instruction (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, Draft 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. These 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 (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, Draft Aircraft Noise Study.

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).

Speech Interference

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).

Classroom/learning Interference

A review of the scientific literature (see Appendix A, Draft 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 $L_{eq(h8r)}$, 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 $L_{eq(8hr)}$, 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.

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 the American National Standards Institute and the Acoustical Society of America in 2008 (American National Standards Institute, 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).

Potential Noise Effects on Recreation

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, 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 65 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 recreationists.

Potential Hearing Loss

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.

> 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)

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 at least 8 hours per day, every day, for 40 years. 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.

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). A review of existing literature addressing nonauditory health effects from aircraft noise exposure is summarized below; a more in-depth review is provided in Appendix A.

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 (2000) to conclude that there was only a weak association between long-term noise exposure and hypertension and cardiovascular effects. 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 can 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.

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, Draft 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, it does not include the additional Growlers associated with the Proposed Action. 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.

Figure 3.2-2 Engine Run-Up Locations at Ault Field

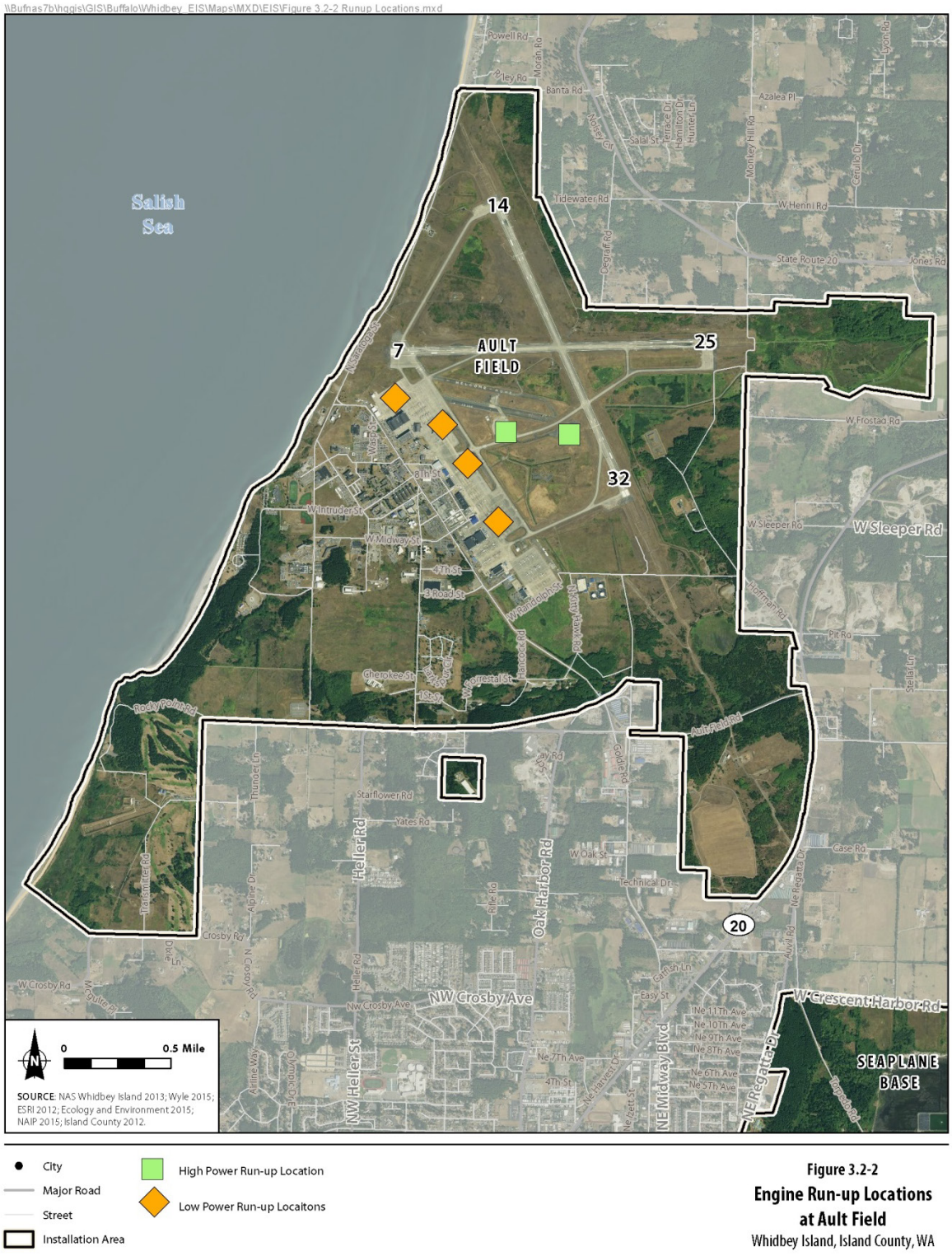


Figure 3.2-2
Engine Run-up Locations at Ault Field
Whidbey Island, Island County, WA

3.2.4.1 DNL Noise Contours

The Growler aircraft replaced the EA-6B Prowler aircraft (as discussed in Section 1.4), with a full transition timeframe of 2016. Therefore, the noise modeled within this analysis assumes the EA-6B Prowler has been fully replaced, thereby isolating the noise to that from the changes in the operational environment for this Proposed Action. DNL noise contours were modeled for an "average year" at Ault Field and OLF Coupeville[6]. 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, thereby isolating the changes in the noise environment to this Proposed Action.

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, 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.

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.

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, it is estimated that there would be approximately 1.1 percent more land area covered, with approximately 5.2 percent more population within the contours.

[6] 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

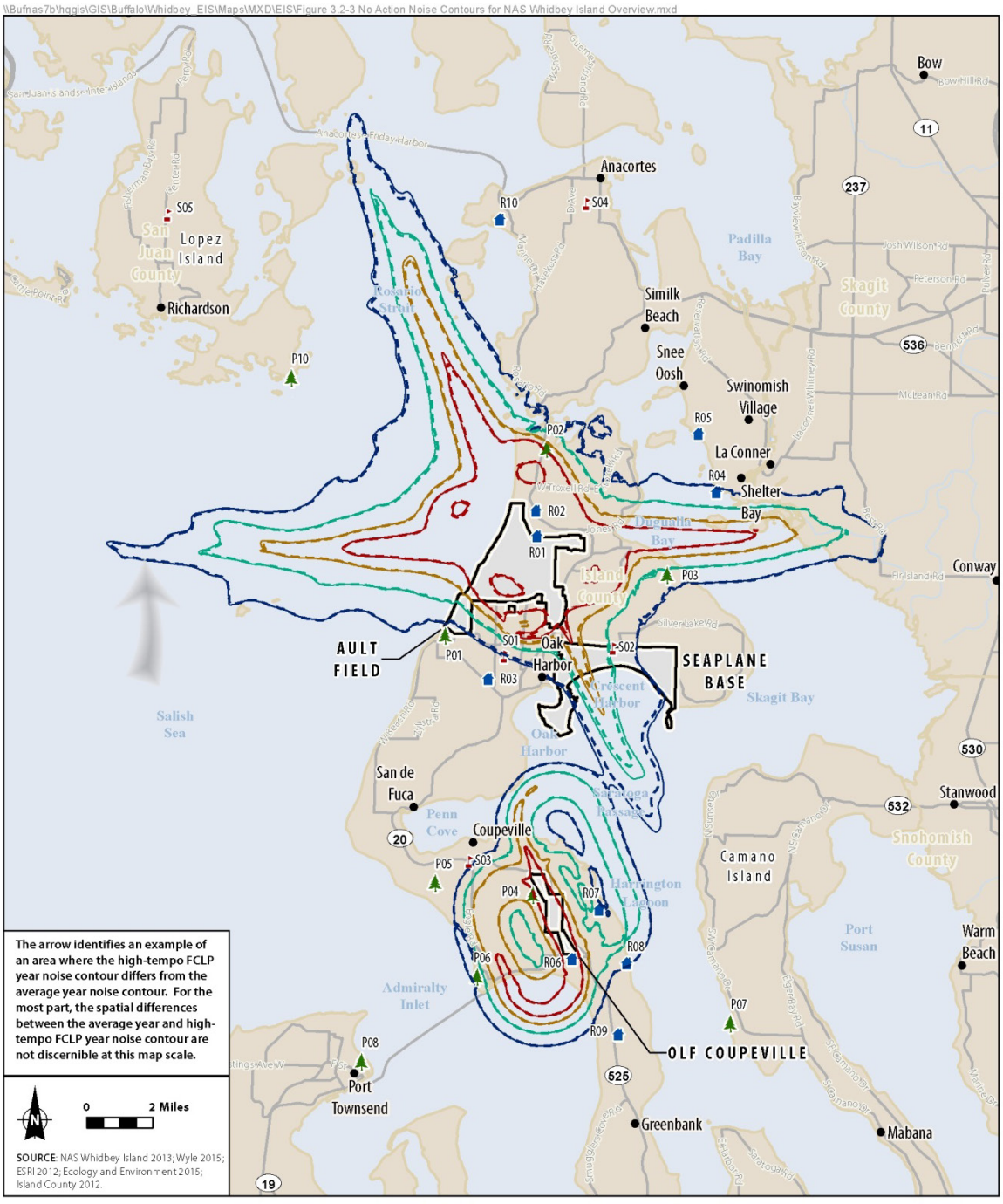


Figure 3.2-3
No Action Environment for NAS Whidbey Island Overview
Whidbey Island, Island County, WA

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

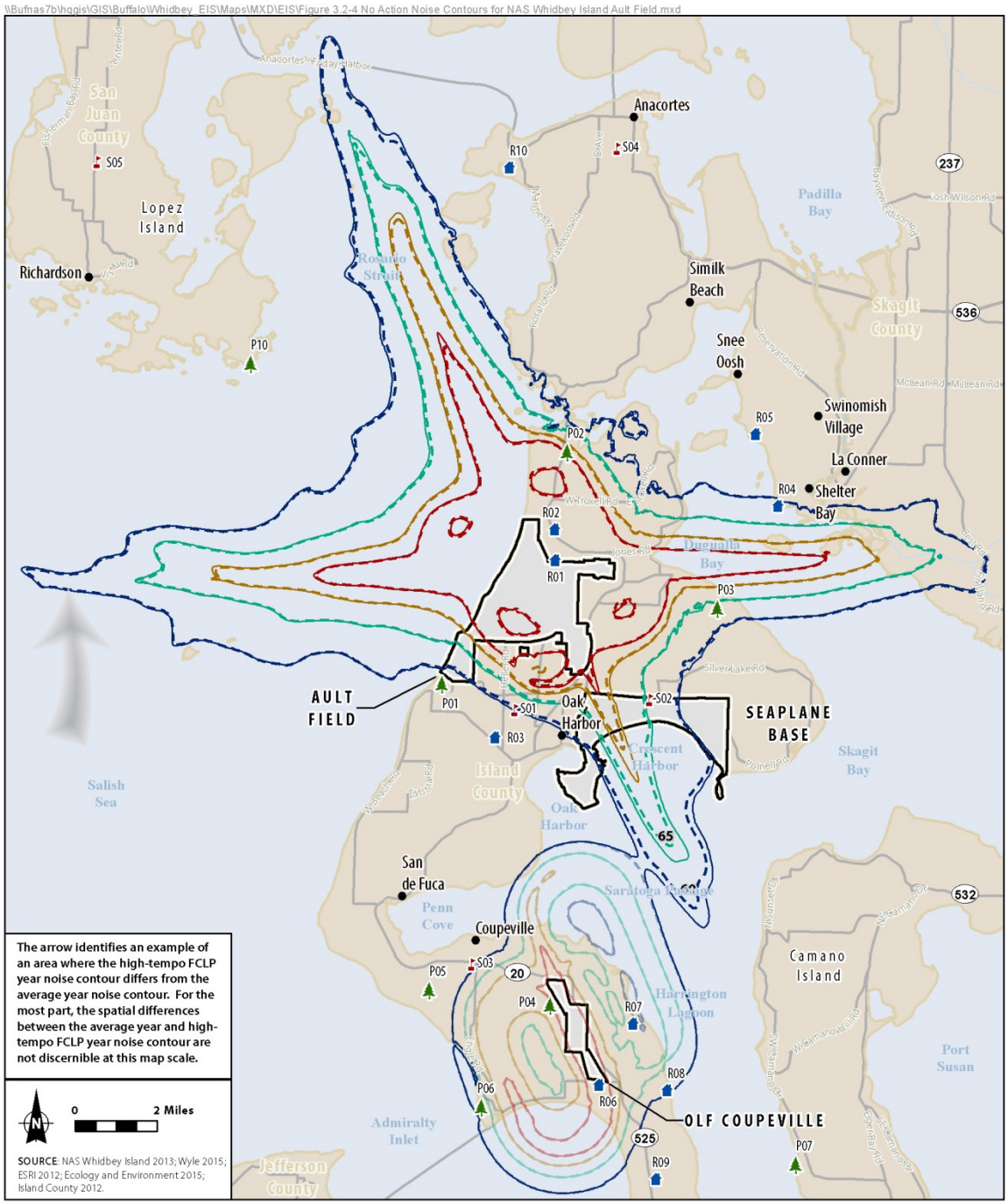


Figure 3.2-4
No Action Environment for Ault Field, NAS Whidbey Island Complex
Whidbey Island, Island County, WA

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

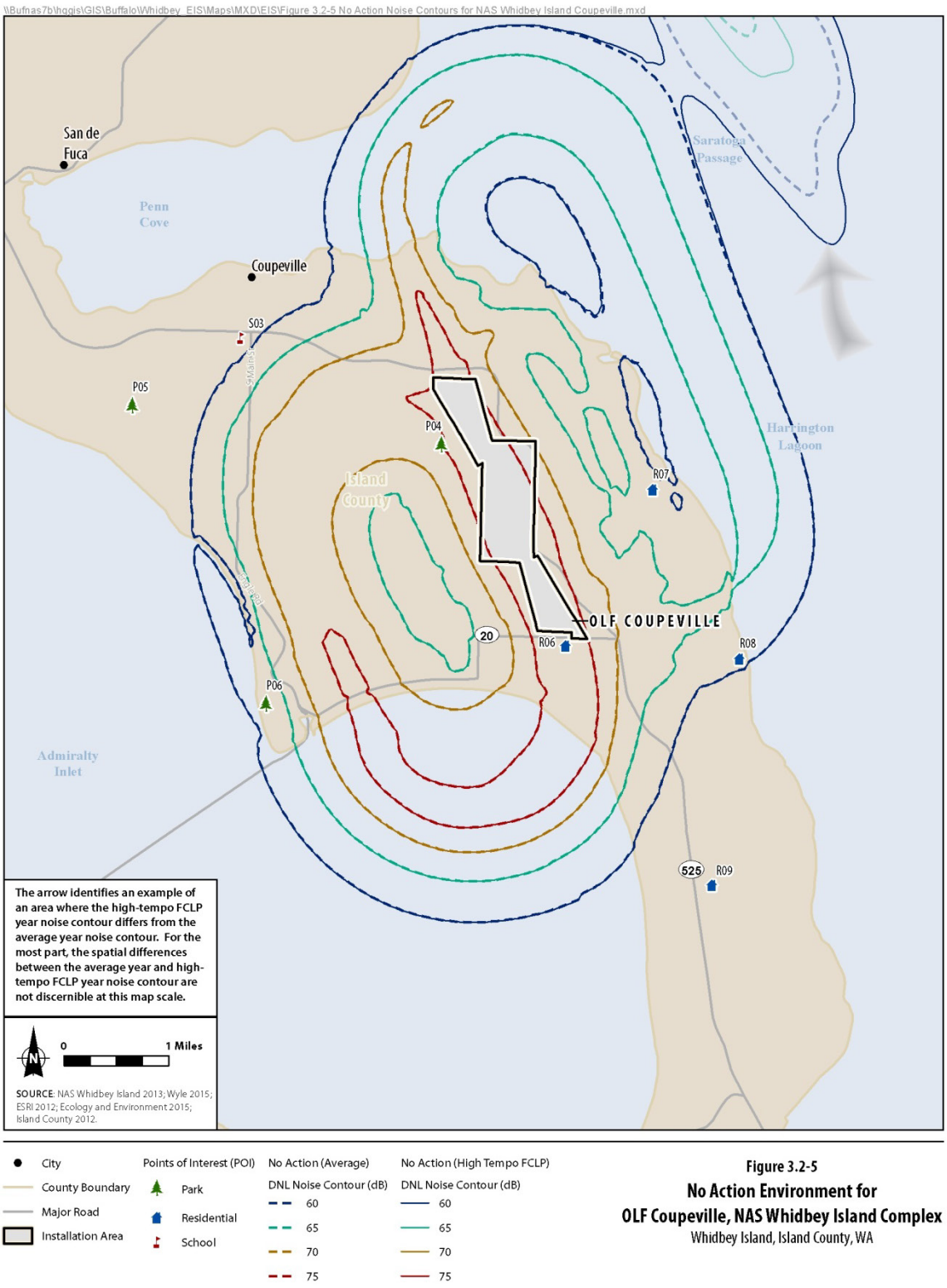


Figure 3.2-5
No Action Environment for
OLF Coupeville, NAS Whidbey Island Complex
Whidbey Island, Island County, WA

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	3,557	2,995	3,030	2,345	5,587	3,377	12,174	8,717
OLF Coupeville	3,742	880	3,181	820	836	616	7,759	2,316
Total[3]	**7,299**	**3,875**	**6,211**	**3,165**	**6,423**	**3,993**	**19,933**	**11,033**

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). In addition, a 5.4 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, 2012). 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

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	0.2%	8.8%	-2.5%	5.4%	4.8%	5.2%	1.6%	6.5%
OLF Coupeville	0.3%	0.5%	0.1%	0.1%	0.7%	0.2%	0.3%	0.3%
Total	**0.2%**	**6.9%**	**-1.2%**	**4.0%**	**4.3%**	**4.4%**	**1.1%**	**5.2%**

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 65 to <70 dB DNL contour range, which includes an increase of 8.8 percent (or approximately 263 people).

Existing Noise Mitigation

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 System Training Facility Boardman, and the numerous northwest instrument and visual military training routes 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 3710.7Z 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 3710.7Z, March 9, 2015 et seq.) include:

- 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 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.
- Due to noise-abatement procedures, 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 and wilderness 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.

The Navy 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.

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.

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 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 air traffic control 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 on the command's webpage news section. 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 Supplemental Noise Analyses

To conduct the supplemental noise analyses to evaluate the noise effects described in Section 3.2.3, a variety of points of interest (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.

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.

Single Event Noise by Aircraft Type

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. In addition, the average number of annual events (i.e., number of times per year) for the flight operation that produces the maximum SEL/L_{max} values is noted in the last column of the table. Under the No Action Alternative, the maximum SEL/ L_{max} values vary widely depending on the location of the POI and the proximity to the airfields and flight tracks. The events that would produce the maximum SEL/ L_{max} values also have a large range, depending on the POI (see Table 3.2-4). For example, on the high end, at Snee-Oosh Point (R05), a person would be exposed to the maximum SEL/ L_{max} an average of approximately two times per day compared to the low end, such as at Cama Beach State Park (P07), where a person would be exposed to the maximum SEL/ L_{max} an average of approximately once every two to three months. The SEL and L_{max} values for all POIs are presented in Table 3.2-4 under projected operations in 2021, which are then compared to the SEL and L_{max} values under the three action alternatives in Section 4.2, as well as the average number of annual events that produces these values.

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

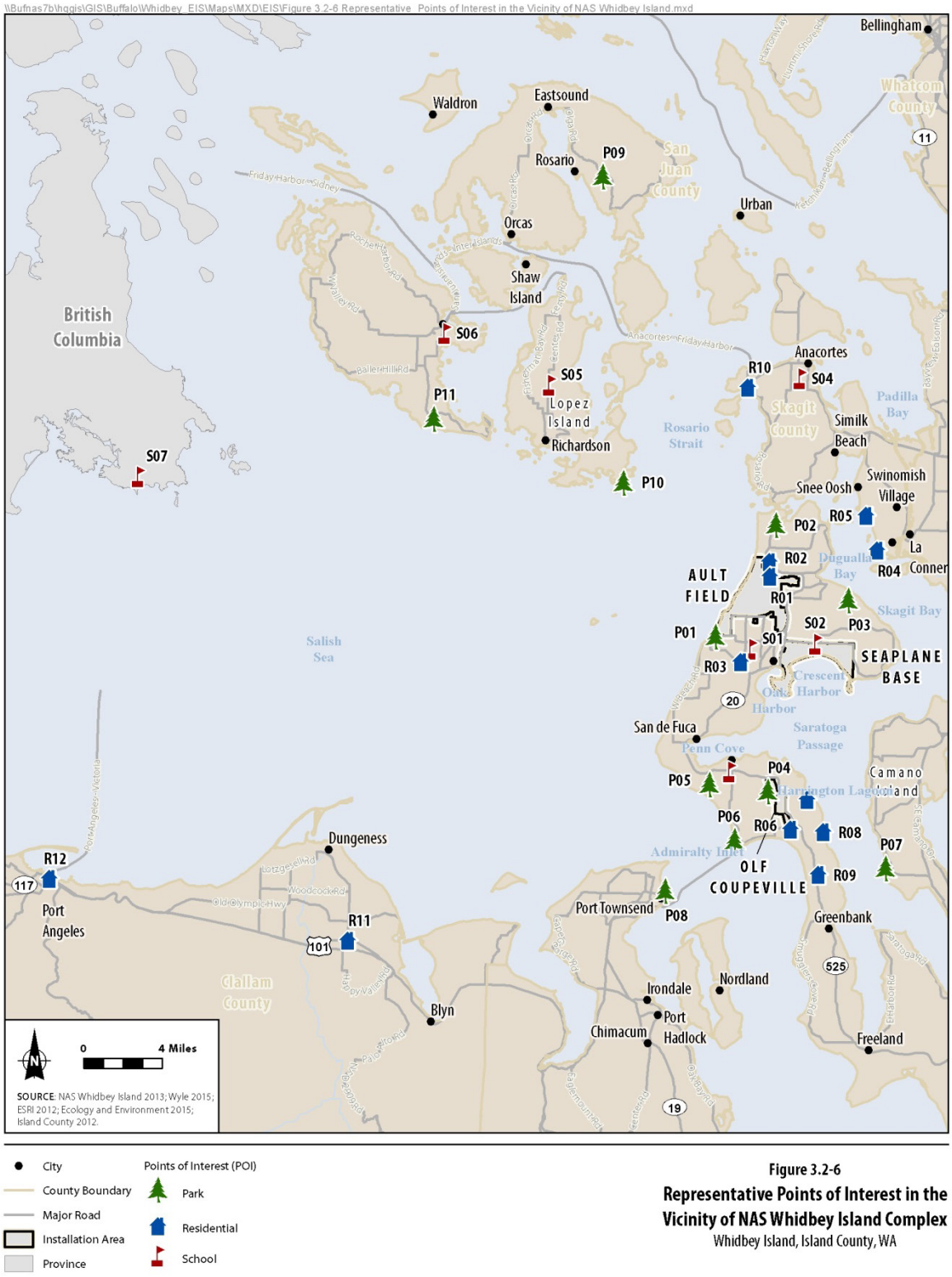


Table 3.2-4 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)

POI ID	Description of POI	Maximum SEL (dB)	L_{max} (dB) [1]	Number of Annual Events [1]
	Residences			
R01	Sullivan Road	121	114	26
R02	Salal Street and N. Northgate Drive	109	96	12
R03	Central Whidbey	101	93	34
R04	Pull and Be Damned Point	96	88	208
R05	Snee-Oosh Point	92	84	733
R06	Admirals Drive and Byrd Drive	118	114	267
R07	Race Lagoon	114	106	55
R08	Pratts Bluff	112	105	75
R09	Cox Rd and Island Ridge Way	92	82	72
R10	Skyline	100	90	261
R11	Sequim	73	60	74
R12	Port Angeles	75	65	208
	Schools			
S01	Oak Harbor High School	99	90	26
S02	Crescent Harbor Elementary School	102	94	178
S03	Coupeville Elementary School	98	90	367
S04	Anacortes High School	93	83	112
S05	Lopez Island School	76	68	110
S06	Friday Harbor Elementary School	53	39	26
S07	Sir James Douglas Elementary	62	52	147
	Parks			
P01	Joseph Whidbey State Park	93	82	34
P02	Deception Pass State Park	110	104	161
P03	Dugualla State Park	105	98	110
P04	Ebey's Landing - Rhododendron Park	112	106	267
P05	Ebey's Landing - Ebey's Prairie	88	77	367
P06	Fort Casey State Park	96	85	267
P07	Cama Beach State Park	83	73	5
P08	Port Townsend	85	n/a	24
P09	Moran State Park	62	51	61
P10	San Juan Islands National Monument	95	85	372
P11	San Juan Island Visitors Center	63	50	147

Note:

[1] 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

Speech Interference

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 3.2-5 presents the results of the speech interference analysis for the CY 21 affected environment conditions for 12 of the POIs that are in the residential category, as well as seven schools (commonly located in residential areas).

Table 3.2-5 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (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	7
R03	Central Whidbey	2	-
R04	Pull and Be Damned Point	4	2
R05	Snee-Oosh Point	2	-
R06	Admirals Drive and Byrd Drive	1	1
R07	Race Lagoon	-	-
R08	Pratts Bluff	-	-
R09	Cox Rd and Island Ridge Way	1	-
R10	Skyline	-	-
R11	Sequim	-	-
R12	Port Angeles	-	-
Schools			
S01	Oak Harbor High School	5	1
S02	Crescent Harbor Elementary School	4	1
S03	Coupeville Elementary School [4]	1	1
S04	Anacortes High School	-	-
S05	Lopez Island School	-	-
S06	Friday Harbor Elementary School	-	-
S07	Sir James Douglas Elementary	-	-

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 Whidbey General Hospital 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 Whidbey General Hospital.

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 $L_{eq(8hr)}$ metric. The $L_{eq(8hr)}$ 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 3.2-6 contains the results of the classroom/learning interference analysis for the nine school locations (including the two surrogates) identified for analysis.

Table 3.2-6 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	Outdoor $L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour[4]	$L_{eq(8h)}$ (dB)	Events per Hour[4]
School Surrogates[5]						
R03	Central Whidbey	57	<45	2	<45	-
R11	Sequim	<45	<45	-	<45	-
Schools						
S01	Oak Harbor High School	58	<45	5	<45	1
S02	Crescent Harbor Elementary School	64	49	4	<45	1
S03	Coupeville Elementary School	53	<45	1	<45	-
S04	Anacortes High School	46	<45	-	<45	-
S05	Lopez Island School	<45	<45	-	<45	-
S06	Friday Harbor Elementary School	<45	<45	-	<45	-
S07	Sir James Douglas Elementary	<45	<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

Under the No Action Alternative, the outdoor $L_{eq(8h)}$ 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 3.2-6). With the windows closed, the number of events per hour decreases to a point where the high is one event per hour at both Oak Harbor High School (S01) and Crescent Harbor Elementary School (S02).

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 3.2-7 presents the results of the sleep disturbance analysis for the 19 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 69-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 53-percent chance that an individual would awaken at least once.

Table 3.2-7 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	69%	53%
R02	Salal Street and N. Northgate Drive	51%	37%
R03	Central Whidbey	21%	10%
R04	Pull and Be Damned Point	25%	12%
R05	Snee-Oosh Point	20%	6%
R06	Admirals Drive and Byrd Drive	13%	8%
R07	Race Lagoon	6%	3%
R08	Pratts Bluff	6%	3%
R09	Cox Rd and Island Ridge Way	4%	3%
R10	Skyline	7%	2%
R11	Sequim	0%	0%
R12	Port Angeles	0%	0%
Schools (near residential areas)[4]			
S01	Oak Harbor High School	27%	16%
S02	Crescent Harbor Elementary School	27%	16%
S03	Coupeville Elementary School	7%	4%
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%

Table 3.2-7 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]

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.

Potential Noise Effects on Recreation

The analysis of potential noise effects on recreation 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 65 dB outdoors (to capture outdoor speech interference). Table 3.2-8 presents the results of the analysis for the affected environment (CY 21) for the 11 POIs that are considered parks or recreational centers with primarily outdoor features. The metric used for this analysis is "NA65 L_{max}," which means the number of noise events per daytime hour that are above the maximum sound level of 65 dB L_{max} outdoors. This metric has been used previously by the U.S. Air Force in similar studies related to noise and parks.

Table 3.2-8 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex (CY 21)[1]

ID	Description	Annual Average Outdoor Daily Daytime Events per Hour NA65 L_{max} [(2)]
P01	Joseph Whidbey State Park	5
P02	Deception Pass State Park	6
P03	Dugualla State Park	7
P04	Ebey's Landing - Rhododendron Park	1
P05	Ebey's Landing - Ebey's Prairie	1
P06	Fort Casey State Park	1
P07	Cama Beach State Park	-
P08	Port Townsend	-
P09	Moran State Park	-
P10	San Juan Islands National Monument	2
P11	San Juan Island Visitors Center	-

Notes:
1 Hyphens (-) indicate result equals zero.
2 Number of events at or above an outdoor maximum single event sound level (L_{max}) of 65 dB; reflects potential for outdoor speech interference.

Key:
NA65 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 65 dB L_{max}

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 relative to the airfields and flight tracks. On the high end of the range, there is the potential for an average of seven events per hour that could cause outdoor speech interference and disturb individuals at the Dugualla State Park (P03). Other POIs average fewer events per hour, and, in four out of the 11 cases, it is expected that there would not be any events that would cause outdoor speech interference.

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 3.2-9 (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.).

Table 3.2-9 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	-	67	67
76-77	1.0	4.5	143	55	198
77-78	1.5	5.0	274	51	325
78-79	2.0	5.5	131	36	167
79-80	2.5	6.0	81	16	97
80-81	3.0	7.0	71	4	75
81-82	3.5	8.0	51	-	51
82-83	4.0	9.0	34	-	34
83-84	4.5	10.0	25	-	25
84-85	5.5	11.0	16	-	16
85-86	6.0	12.0	12	-	12
86-87	7.0	13.5	5	-	5
87-88	7.5	15.0	4	-	4
88-89	8.5	16.5	1	-	1
89-90	9.5	18.0	-	-	-
90-91	10.5	19.5	-	-	-
91-92	11.5	21.0	-	-	-

Table 3.2-9 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

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, every day, 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. A 5.4-percent growth factor was applied to the 2010 census statistics to account for projected population changes between 2010 and 2020 census surveys based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2012). 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

The table also reports the average noise induced permanent threshold shift (NIPTS) for the population with an average sensitivity to noise and the 10th percentile NIPTS for the population most sensitive to noise. 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 at least 8 hours per day, every day, for 40 years. 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 3.2-9 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 Leq(24) range and above. At this level and above, an estimated 38 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 3.2-9 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. There are no individuals residing around OLF Coupeville at noise levels where there could be a noticeable shift in their threshold of hearing, assuming average sensitivity to noise.

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 3.2-9 and the column identified as the 10^{th} 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 7 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.

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

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 air traffic control 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.

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 3.3.1.2 and 4.3.1.2).

Aircraft mishaps are classified based on the extent of property damage, loss of life, or disability they cause. Mishap rates are typically calculated in number of 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.

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 (DoD Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*) (DoD, 2011).

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.

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.

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

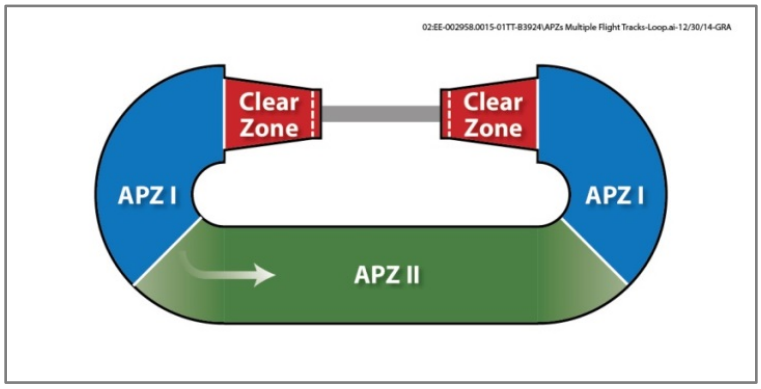
In the 1970s and 1980s, recognizing the need to identify areas of accident potential, the armed services conducted studies of historical aircraft accidents throughout the U.S. The studies showed that most aircraft mishaps occurred on or near the runway, with mishaps diminishing in likelihood with distance. Based on these studies, the Navy and other services have identified APZs. APZs do not predict where mishaps are likely to occur; they represent areas of higher risk based on historical mishap data at multiple airfields. 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 action alternative determine whether changes may be warranted under the AICUZ program.

3.3.1.4 Environmental Health Risks and Safety Risks to Children

The president 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

Potential aircraft mishaps are the primary safety concern with regard to military training flights. The NAS Whidbey Island complex's course rules are designed to promote safety in air operations and to meet Fleet training requirements (Navy, 2014c). 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.

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.

3.3.2.2 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 (Navy, 2013). 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 had three BASH incidents in 2015, seven in 2014, and seven in 2013 (Naval Safety Center, 2015a).

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 has only Clear Zones but no APZs because projected flight activity in the 2005 AICUZ fell below the required 5,000 annual operations on any flight track to warrant designation of an APZ. 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

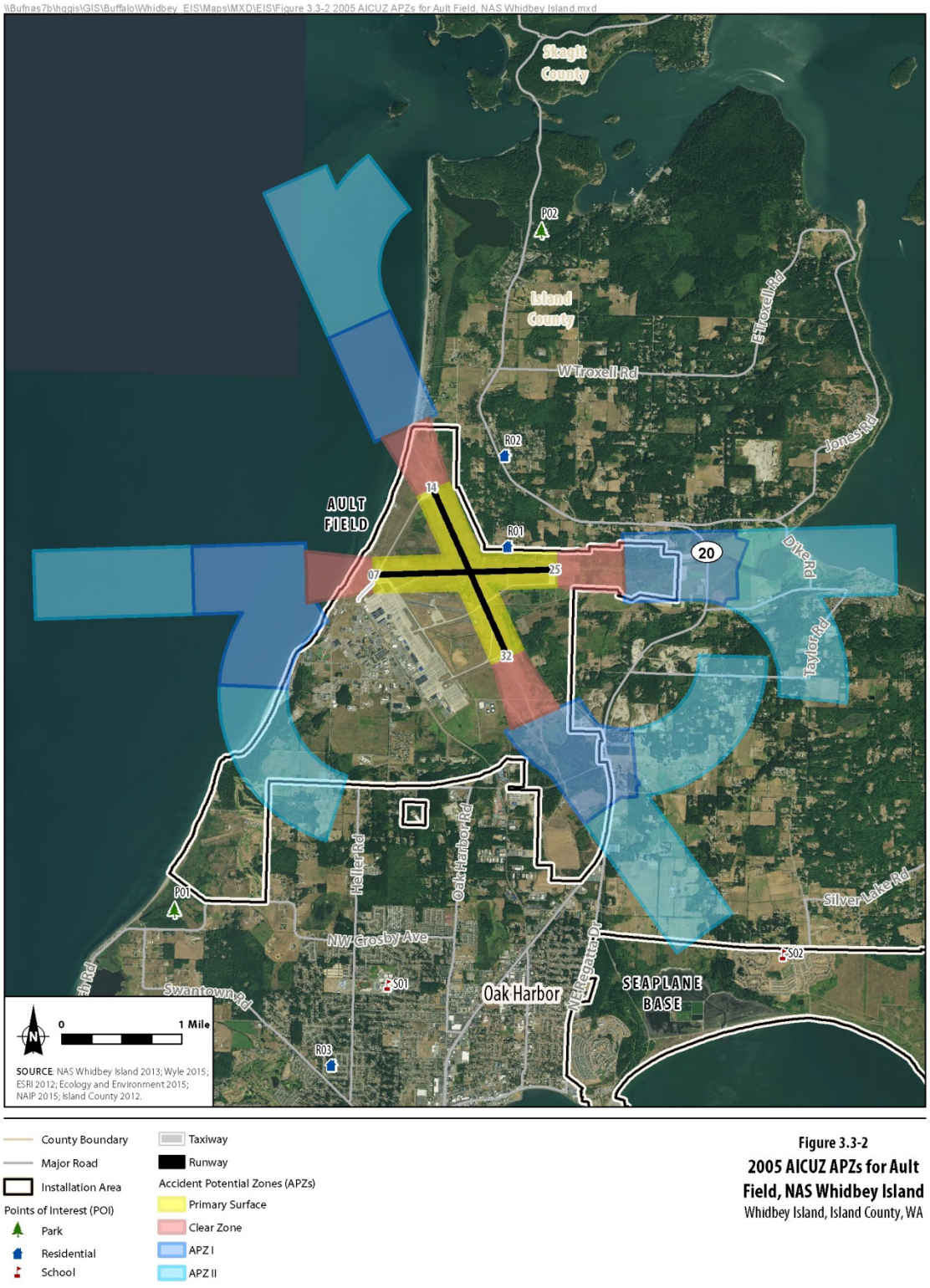


Figure 3.3-2
2005 AICUZ APZs for Ault Field, NAS Whidbey Island
Whidbey Island, Island County, WA

Figure 3.3-3 2005 AICUZ Clear Zones for OLF Coupeville

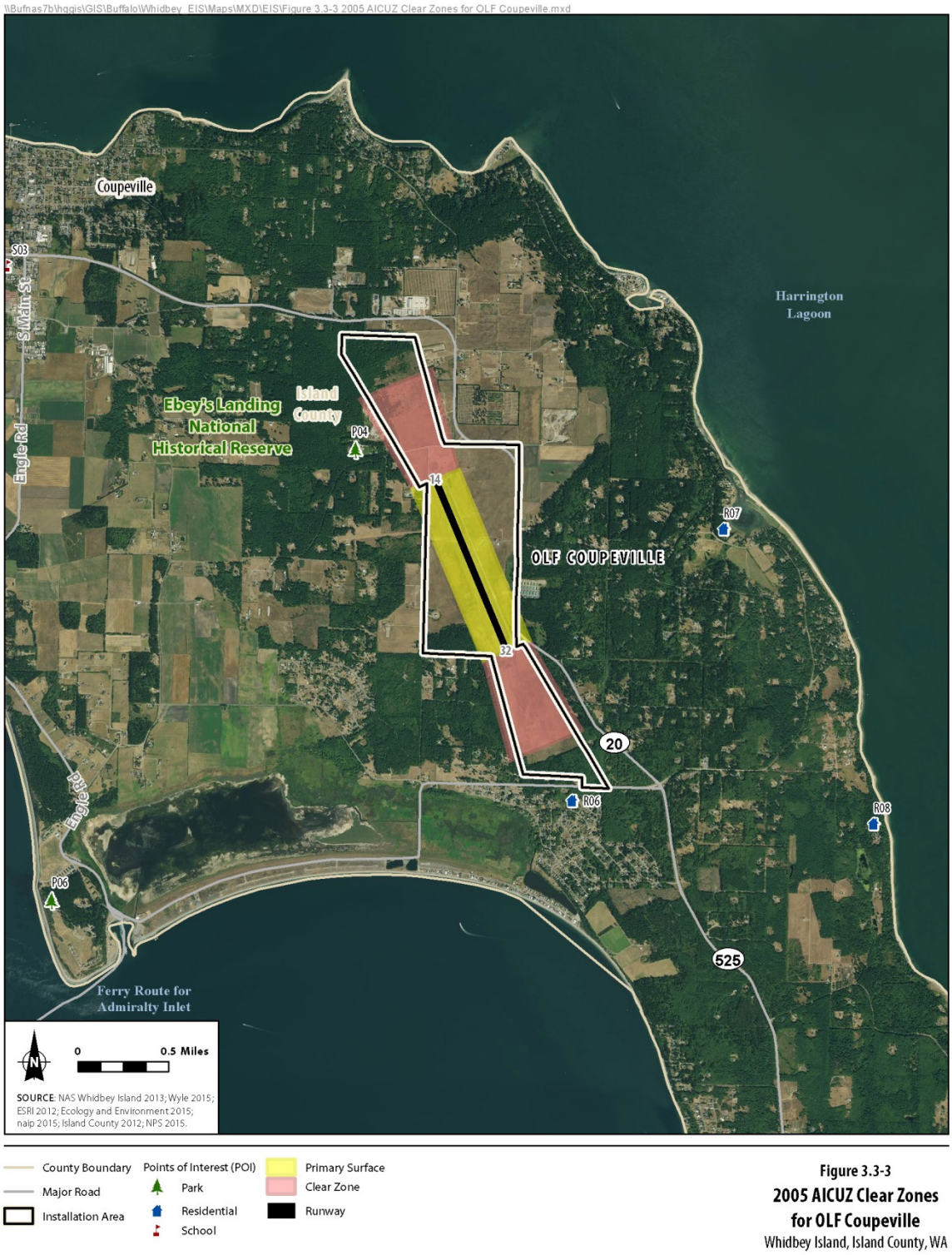


Figure 3.3-3
2005 AICUZ Clear Zones for OLF Coupeville
Whidbey Island, Island County, WA

3.3.2.4 Environmental Health Risks and Safety Risks to Children

To identify potential health and safety risks to children, the Navy first identifies the number of children in the affected environment and then analyzes the potential impacts on that population.

As described throughout this EIS, noise impacts are expected to be the primary negative environmental and human health impact associated with the Proposed Action. Another impact described in this EIS that has the potential to impact children is the increased risk of an aircraft mishap with the increased number of aircraft operation. Therefore, the study area for the analysis of environmental health risks and safety risks to children is defined as the census block groups that either fully or partially fall beneath the modeled No Action Alternative DNL contours. The potential safety risks associated with the APZs are covered under this geographical area because the APZs fall fully within the DNL noise contours. Table 3.3-1 presents 2010 data for residents 19 years of age and younger, living in census block groups affected by the No Action Alternative DNL contours for Ault Field and OLF Coupeville. 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], the Seaplane Base, and OLF Coupeville) have been excluded from the analysis.

Table 3.3-1 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		26.1%
Block Group 2, Census Tract 9701	1,502		21.2%
Block Group 1, Census Tract 9702	1,633		16.2%
Block Group 1, Census Tract 9703	791		26.3%
Block Group 2, Census Tract 9703	1,203		26.7%
Block Group 3, Census Tract 9703	1,044		22.1%
Block Group 1, Census Tract 9704	951		30.3%
Block Group 2, Census Tract 9704	2,256		28.8%
Block Group 1, Census Tract 9706.01	1,299		27.9%
Block Group 1, Census Tract 9708	1,484		26.8%
Block Group 1, Census Tract 9710	1,470		17.5%
Block Group 1, Census Tract 9711	2,019		21.1%
Block Group 2, Census Tract 9711	1,270		16.7%
Block Group 3, Census Tract 9713	1,762		11.7%
Skagit County			
Block Group 2, Census Tract 9521	658		21.0%
Block Group 3, Census Tract 9527	906		24.3%

Table 3.3-1 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*

Source: USCB 2012h

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.

Shaded cells identify census block groups with a higher percentage of children/justice population than the county within which the census block group is located.

Assuming that the population affected by the No Action Alternative DNL contours has similar demographic characteristics to the population of its census block groups as a whole, an estimated 2,680 children 19 years of age and younger would reside in areas affected by noise within the No Action Alternative DNL contours in 2020. This figure equates to approximately 25.0 percent of the total population within the No Action Alternative DNL contours (see Table 3.3-2).

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. 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). As described in Section 3.3.1.3, APZs represent areas of higher risk of incidents based on historical mishap data at multiple airfields. 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, there are no schools located within the existing APZs at Ault Field and OLF Coupeville.

Table 3.3-2 Number and Percent of Children 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*
65-70 DNL	3,830	959	25.0%
70-75 DNL	3,008	759	25.2%
75+ DNL	3,900	962	24.7%
Total Affected Population	10,738	2,680	25.0%

Table 3.3-2 Number and Percent of Children 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*

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 5.4-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, 2012).

Key:
DNL = day-night average sound level
OLF = outlying landing field

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 Greenhouse Gas (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

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 to attain the standards for each area designated nonattainment for a NAAQS. 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.

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 Northwest Washington Intrastate Air Quality Control Region (AQCR). The Northwest Clean Air Agency (NWCAA) and the Washington Department of Ecology are responsible for implementing and enforcing state and federal air quality regulations in Washington. Island County is classified by the USEPA as unclassified/attainment for all criteria pollutants (USEPA, 2016b). Therefore, a General Conformity evaluation is not required.

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

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. In 2001, USEPA issued its first MSAT Rule, which identified 201 compounds as being HAPs that require regulation. A subset of six of the MSAT compounds was identified as having the greatest influence on health and included benzene, butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter (USEPA, 2015a). February 2007, USEPA issued a second MSAT rule that generally supported the findings in the first rule and provided additional recommendations of compounds having the greatest impact on health. The rule also identified several engine emission certification standards that must be implemented (40 CFR parts 59, 80, 85, and 86. 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 mobile source air toxics by 330,000 tons and volatile organic compound (VOC) emissions (precursors to ozone and fine particulate matter less than or equal to 2.5 microns in diameter) by over 1 million tons (USEPA, 2015a).

3.4.1.1 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 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 ($\mu g/m^3$) 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, 2016).

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.

On August 1, 2016, the CEQ issued final guidance on the consideration of GHG emissions and climate change in NEPA review (CEQ, 2016). The guidance clarifies that NEPA review requires federal agencies to consider the effects of GHG emissions and climate change when evaluating proposed actions: "Analyzing a proposed action's GHG emissions and the effects of climate change relevant to a proposed action—particularly how climate change may change an action's environmental effects—can provide useful information to decision makers and the public" (CEQ, 2016).

The guidance also emphasizes that agency analyses should be commensurate with projected GHG emissions and climate impacts, and should employ appropriate quantitative or qualitative analytical methods to ensure useful information is available to inform the public and the decision-making process in distinguishing between alternatives and mitigation measures

USEPA 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. The USEPA continues to add sources and refine methodologies for reporting (USEPA, 2016c). 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 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, 2016d). 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.

3.4.2 Air Quality, Affected Environment

The most recent emissions inventory for the Northwest Washington AQCR is 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; however, Navy aircraft emissions are not included in the inventory.

Table 3.4-2 Northwest Washington Intrastate Air Quality Control Region Air Emissions Inventory, 2011

Location	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
Island County	2,872	2,523	14,944	848	1,174	647
Skagit County	10,197	8,423	40,153	1,140	3,470	1,724
Whatcom County	10,396	9,943	77,028	8,011	5,683	3,078
Northwest Washington AQCR Total	**23,466**	**20,888**	**132,124**	**9,999**	**10,326**	**5,449**

Source: USEPA, 2015b

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

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, 2013). 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 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, 2013). Therefore, the NAS Whidbey Island complex has an Air Operating Permit (AOP). 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 reported emissions for 2007 to 2014 are provided in Table 3.4-3.

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	9	35	13	4	17	15
2014	8	30	12	2	15	14

Sources: NWCAA, 2013; NAS Whidbey Island, 2013, 2014, 2015

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, 2013). 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]	*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

Sources: NWCAA, 2013; NAS Whidbey Island, 2013, 2014, 2015

Notes: Measurements in metric tons CO_2e per year totals may not sum because of rounding.

[1] 2010-2013 global warming potential (GWP) of CH_4 = 21; 2014 GWP for CH_4 = 25

[2] 2010-2013 GWP of N_2O = 310; 2014 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
GWP = global warming potential
N_2O = nitrous oxide
NR = not reported

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. Mobile emissions are not included in emission totals reported for the AOP. Emissions estimates were developed using the Navy's Aircraft Environmental Support Office emission factors for aircraft emissions (AESO 2014, 2015a and b) and the USEPA's Motor Vehicle Emission Simulator (MOVES2014) (EPA 2015e) emission factors for Island County for personnel commuting emissions. 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.

Because of the low levels of aircraft emissions of, HAPs are not further evaluated in this EIS. Additionally, 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	*NOx (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
Ault Field EA-18G Aircraft	417.14	522.23	1,985.45	62.09	182.95	18.29
OLF EA-18G Aircraft	47.69	1.10	32.71	5.43	12.44	1.24
POV (Personnel Commuting)	12.10	42.68	85.70	2.30	9.09	0.91
Maintenance Operations	8.88	1.63	75.07	0.07	88.56	9.81
Total Existing Mobile Emissions	485.81	567.65	2,178.93	69.88	293.05	30.26

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

3.5 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[7], Industrial, Open Space/Forest, Parks, Residential, Rural[8], and Transportation[9].

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 in a state's coastal zone 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 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,*

[7] NAS Whidbey Island complex boundaries are included within the Federal category.

[8] Rural 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. Parcel properties with 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) were re-categorized as "Residential" to more accurately assess impacts.

[9] 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.

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 Integrated Natural Resources Management Plan (INRMP) (2012)

- NAVFAC Land Use Controls Implementation Plan – NAS Whidbey Island (2009)
- NAS Whidbey Island Integrated Cultural Resources Management Plan (ICRMP) (2014)
- 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 (2012)

In January 2006, the DoD, USFWS, and the Association of Fish and Wildlife Agencies entered into a Memorandum of Understanding for a cooperative program of INRMP development. Under this program, the INRMP is updated on a continuous basis to achieve mutually agreed upon fish and wildlife conservation objectives in compliance with the Sikes Act (16 U.S.C. 670a *et seq.*). The Navy prepared an updated INRMP for the NAS Whidbey Island complex in compliance with DoD Instruction 4715.3 and the Sikes Act. A Final INRMP was issued on January 11, 2012 (NAS Whidbey Island, 2012). 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 (2009)

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, 2016e). 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, 2016e).

NAS Whidbey Island Integrated Cultural Resources Management Plan (2014)

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, 2014a).

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:

- 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)

NAS Whidbey Island AICUZ Update (2005)

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. Refer to Section 3.3 for a more robust discussion of the AICUZ program.

The AICUZ Study Update for NAS Whidbey Island's Ault Field and OLF Coupeville, Washington (Navy, 2005a) analyzes Calendar Year 2003 (CY 03) data as existing conditions and a projected condition for calendar year 2013 (CY 13). The 2005 AICUZ Study Update also 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. In addition, the 2005 AICUZ update identifies noise zones and APZs. Land use compatibility within the noise zones around Ault Field and OLF Coupeville is evaluated in Section 4.5.2.1.

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.

Island County Comprehensive Plan (2011, 2016 revision anticipated) 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, and land use and parks and recreation elements of the plan, were completed in 2011. The next revision to this plan is expected in June 2016 to comply with WGMA requirements.

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 and rural agricultural 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 Figures 3.5-1 and 3.5-2). 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). 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.

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 gives notice to prospective buyers, renters, or lessees that the property of interest is subject to aircraft noise for the northern two-thirds of Island County. 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.

Figure 3.5-1 Island County, Skagit County, Oak Harbor, and Coupeville Land Use

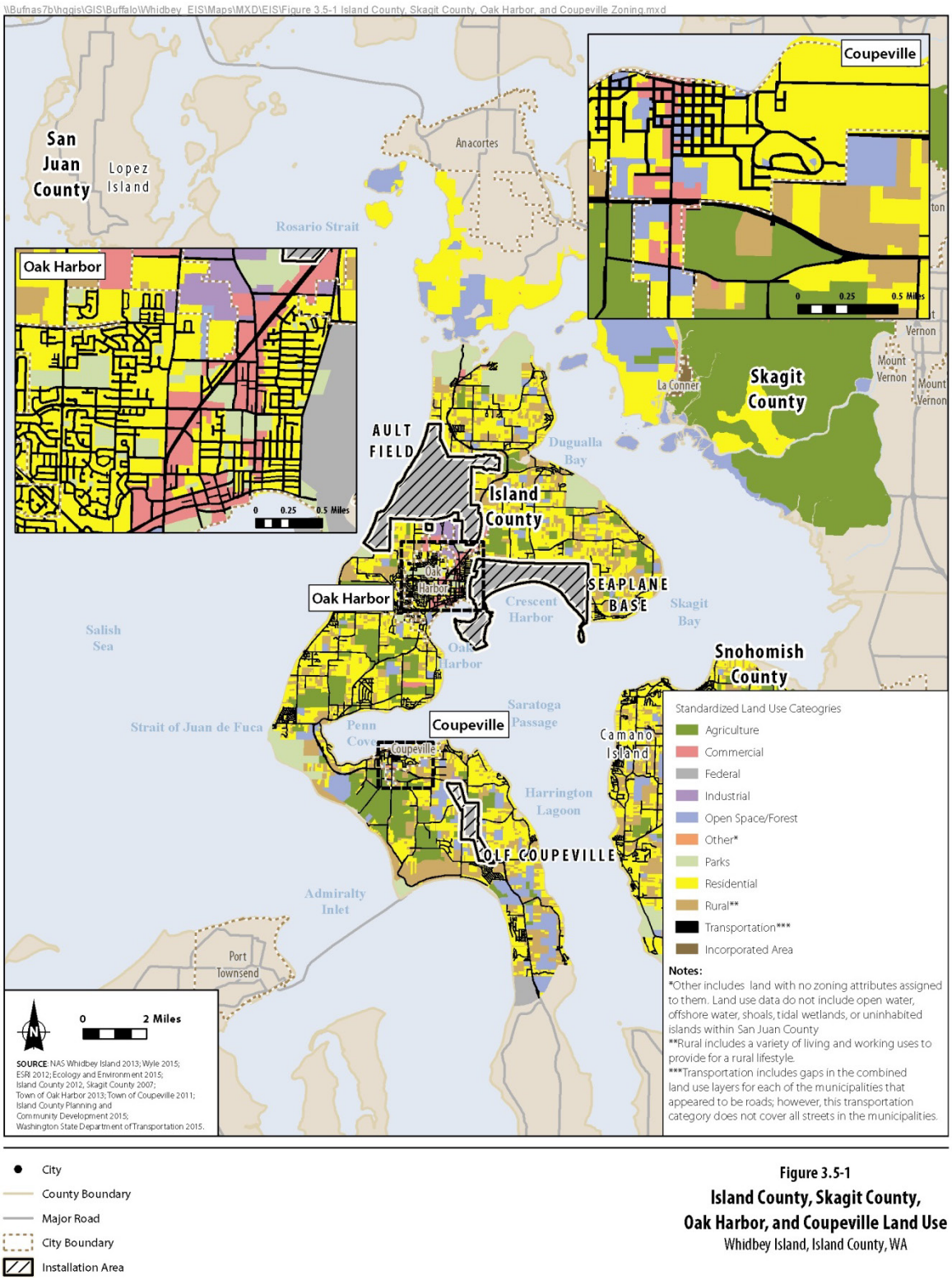


Figure 3.5-2 Island County Adopted APZs

Figure 3.5-2
Island County Adopted APZs
Whidbey Island, Island County, WA

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

City of Oak Harbor Comprehensive Plan (2010, 2016 anticipated) 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 has 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. The City of Oak Harbor has 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 (Figure 3.5-1) 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.

The plan was revised and updated in June 2016 to comply with WGMA requirements. In addition, the City of Oak Harbor has adopted a noise disclosure statement and 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).

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. Existing zoning within the Town of Coupeville is shown on Figure 3.5-1.

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.

3.5.2.3 Land Use Compatibility Assessment

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 3.5-1 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.

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.

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.

Table 3.5-1 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]
	65-69 dB DNL	70-74 dB DNL	>75 dB DNL	
Ault Field				
Agriculture	369	284	412	1,065 (5%)
Commercial	53	225	60	338 (2%)
Federal[2]	1	0	12	13 (<1%)
Industrial	14	318	230	562 (3%)
Open Space/Forest	608	295	179	1,082 (5%)
Parks	462	160	300	922 (5%)
Residential	1,504	1,210	2,692	5,406 (27%)
Rural[3]	422	432	1,354	2,208 (11%)
Transportation[4]	113	106	348	567 (3%)
Other[5]	11	0	0	11 (<1%)
Subtotal	3,557	3,030	5,587	12,174 (61%)
OLF Coupeville				
Agriculture	796	810	33	1,639 (8%)
Commercial	1	0	0	1 (<1%)
Federal[2]	0	2	8	10 (<1%)
Industrial	0	11	16	27 (<1%)
Open Space/Forest	409	274	132	815 (4%)
Parks	48	6	0	54 (<1%)
Residential	1,418	1,081	262	2,761 (14%)
Rural[3]	928	910	331	2,169 (11%)
Transportation[4]	137	87	54	278 (1%)
Other[5]	5	0	0	5 (<1%)
Subtotal	3,742	3,181	836	7,759 (39%)
TOTAL	**7,299**	**6,211**	**6,423**	**19,933**

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 **"**Rural" 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. Parcel properties with 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) were re-categorized as "Residential" to more accurately assess impacts.

4 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.

5 "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.

6 "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 Recreation and Wilderness Areas

Wilderness Areas

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 Range Management Plan process; the San Juan Islands National Monument Range Management Plan is expected to be complete in the spring of 2018 (BLM, n.d.[b]).

Recreation

Land use analysis also considers the effects of noise on special management areas, such as national parks. Special management areas in the vicinity of the NAS Whidbey Island complex are managed by different federal and state agencies, including the National Park Service (NPS), BLM, U.S. Forest Service (USFS), and Washington State Parks and Recreation Commission. Laws and regulations applicable to federal and state special management areas vary in scope and authority depending on the purposes for which these areas were designated. For example, under the National Park Service Organic Act of 1916 (16 U.S.C. 1 *et seq.*), the NPS is responsible for managing national parks in a manner that conserves their cultural and natural resources, providing for their enjoyment by future generations.

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 (The White House Office of the Press Secretary, 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 (The 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" (§ 2002).

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]).

For state parks, 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 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).

Table 3.5-2 lists the federal, state, and local parks and public recreational areas that are located within or partially within the affected environment DNL noise contour footprint associated with the NAS Whidbey Island complex and the agencies that own and/or manage these areas (Figure 3.5-3). Selected properties are described following the table, 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 3.5-2 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 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 State Park (San Juan County)[2]
County	Island County	Parks and Trails: Moran Beach, Cornet Bay, Driftwood Park, Crockett Blockhouse, Rhododendron Park, Patmore Pit, and low-tide recreational trails between Keystone Spit and Hill Road
	Skagit County	Ika Island (designated Open Space of Regional and Statewide Importance), and the Skagit Wildlife Area, including Goat Island, Fir Island Farms Reserve, and Skagit Bay Estuary
Municipal	City of Oak Harbor	Parks: Off-leash Dog Park and Ridgewood Park
	Coupeville	Parks and Trails: Parker Road Trail Public Schools: Coupeville High School

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, 2006; Skagit County, 2007b, 2015; WDFW, 2016; City of Oak Harbor, n.d., 2012; Town of Coupeville, 2013

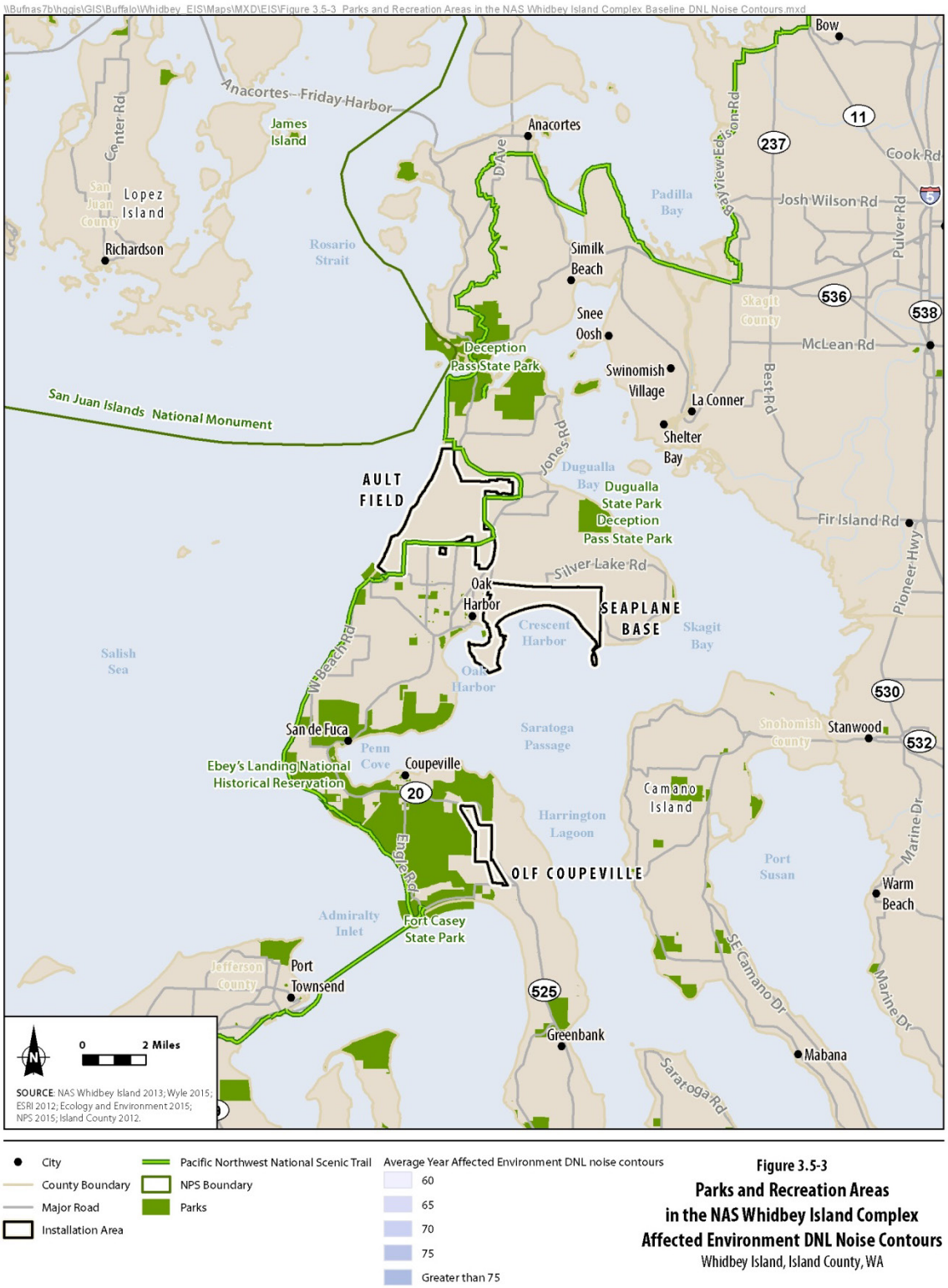
Notes:

[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 portions of the monument's water areas are within the greater than 65 dB DNL noise contour.

[2] No portions of James Island State Park fall within the greater than 65 dB DNL noise contour. The state park is introduced here and described below because the park would fall within the DNL noise contours under some of the action alternatives. Those conditions are described in Section 4.5.

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

Figure 3.5-3 Parks and Recreation Areas in the NAS Whidbey Island Complex Affected Environment DNL Noise Contours



A. San Juan Islands National Monument

The San Juan Islands National Monument, created by presidential proclamation in 2013, 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 (The 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.). Visitor numbers for the national monument are not publicly available.

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" (The 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.

B. Ebey's Landing National Historical Reserve

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 the national historical reserve in 1978 through passage of Public Law 95-625, Section 508, to "preserve and protect a rural community which provides an unbroken historical record from nineteenth century exploration and settlement in the Puget Sound to the present" (McKinley, 1993). The 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 the reserve, including historic homes and farms, is privately owned and still occupied by farmers and other residents (NPS, n.d.[a], n.d.[b]).

The reserve sees approximately 1 million visitors annually (NPS, 2009).Recreational opportunities in public and some private areas of the 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 the reserve are located within the affected environment DNL noise contours for the NAS Whidbey Island complex.

C. Pacific Northwest National Scenic Trail

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 designated a National Scenic Trail by Congress in 2009 and is managed by the USFS. 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.

D. Washington State Parks

State parks near the NAS Whidbey Island complex, including Deception Pass (established [est.] in 1923) and Dugualla (est. 1992) state parks, Joseph Whidbey State Park, Fort Casey State Park (est. 1980), and James Island State Park (est. 1974), offer a variety of recreational activities such as hiking, biking, horseback riding, picnicking and camping, boating, shellfish harvesting and fishing, 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). Most of James Island 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]).

Deception Pass State Park, located approximately 1.3 miles north of Ault Field, "is the busiest state park in Washington state" and sees about 2 million visitors per year, up from approximately 1.5 million visitors per year prior to 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 most state parks decreased; however, visitors to Deception Pass State Park increased (Beahm, 2014).

E. County and Municipal Parks

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.

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)

In addition to the public parks and recreation areas discussed above, privately owned recreational facilities, such as golf courses, horse stables, and other facilities, are located in the communities

surrounding the NAS Whidbey Island complex and may be within the affected environment DNL noise contours.

Potential Noise Effects on Recreation

Section 3.2, Noise, includes a discussion of potential noise effects on recreation from aircraft operations at the NAS Whidbey Island complex. The analysis is based on the number of events at 11 regional parks or recreational areas per daytime hour that are greater than the maximum sound level of 65 dB outdoors (to capture outdoor speech interference). Table 3.2-8 presents the results of this analysis.

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 three 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.
- Traditional cultural properties (TCPs) may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that American Indian tribes and nations 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 (NHPA)**
  This act established a program for the preservation of historic properties and created the National Register of Historic Places (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 American Indian tribes and nations 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 NHPA, as amended and as implemented by 36 C.F.R. 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 Part 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 structures 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.

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).

In consideration of 36 C.F.R. 800, 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.

3.6.1.2 Area of Potential Effects

The affected environment for cultural and traditional resources is also referred to as the area of potential effects (APE). The APE must be defined in order to assess the effects of a proposed action on a historic property. 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 C.F.R. 800.16[d]).

In accordance with Section 106, the Navy has determined that the APE includes the area encompassed by the 65 dBA DNL noise contour that would exist in 2021 as represented by the No Action Alternative. The 65 dBA DNL is a standard accepted for the evaluation of historic properties near airports and is consistent with environmental documentation previously completed for Navy operations because noise levels below 65 dBA are considered to be equivalent to background noise or conversational speech.[10] The APE will be refined through consultation with the SHPO, consulting parties, American Indian tribes and nations, and other interested parties (see Figure 3.6-1). This APE accounts for potential changes that may occur to the viewsheds both to and from existing historic properties.

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.

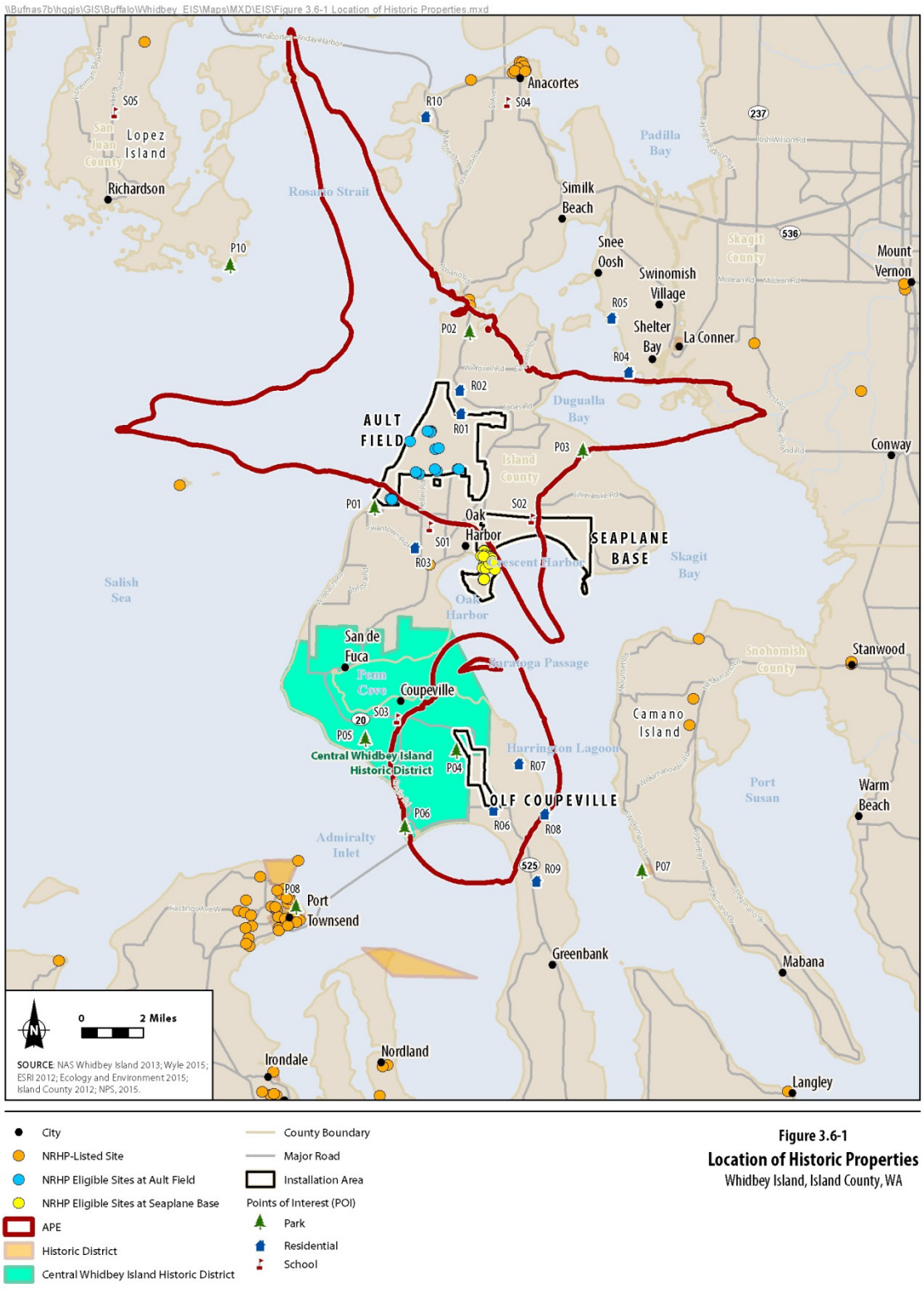
Of note, APE boundaries will be updated as consultation continues between the SHPO, consulting parties, American Indian tribes and nations, and other interested parties. The 65 dBA noise contour is used in this DEIS. If the APE is adjusted, changes may be needed to identify resources located within the revised APE and will be presented in the FEIS.

3.6.2 Cultural Resources, Affected Environment

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, south to the head of Puget Sound, and 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, 2014a).

[10] The use of the 65 dBA DNL is consistent with existing federal regulations, including 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 dBA DNL.

Figure 3.6-1 Location of Historic Properties



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 exploited 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, thimbleberry, trailing blackberry, blackcap, serviceberry, salal berry, red huckleberry, blueberry, and red and blue elderberry (Navy, 2014a; 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, 2014a). 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. George Vancouver 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, 2014a).

During the mid-1800s, the number of Euro-American settlements increased in the Washington Territory, which caused some conflict with the local American Indian tribes and nations. 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, which established reservations for tribes in the region from the lands retained after tribal lands were ceded to the U.S. The tribes also reserved their right to continue traditional activities on lands beyond these reserved areas.

Industries such as timber and commercial fishing developed during the second half of the nineteenth century, as tribal members slowly moved onto reservations. Starting in 1895, Dutch homesteaders began to arrive and settle in the Oak Harbor area. This community of Dutch settlers began potato and dairy farms on Whidbey Island (Navy, 2014a). By the turn of the nineteenth 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, 2014a).

The Naval buildup 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 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, 2014a).

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, 2014a). OLF Coupeville, located on the south side of Penn Cove, originally contained 19 lots before its acquisition by the Navy in 1944 (Navy, 2014a).

NAS Whidbey Island was intended to provide the minimum number of operational buildings and necessary utilities for re-arming seaplanes. The outbreak of World War II brought more activity to Whidbey Island, leading to the air station becoming an important training center. 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 complement 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, 2014a).

During the early 1960s, the Seaplane Base continued as an active facility, but it was placed on standby status by 1966. Between 1965 and 1969, NAS Whidbey Island received the A6 Intruder squadrons, which transformed it into the sole training and operation center in the Pacific. This action increased air operations at Ault Field. In 1967, OLF Coupeville was reactivated for FCLPs (Navy, 2014a). Since that year, 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).

In 1970, the Seaplane Base patrol operations were ended. By 1971, NAS Whidbey Island became the home base of tactical electronic warfare squadrons for Naval aviation forces, a role that continues today (Navy, 2014a). 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, 2014a).

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. NAS Whidbey Island then functioned as the main homeport for the Pacific Fleet of Prowler squadrons, some of which began the transition to Growler aircraft in 2008. The Seaplane Base has continued as a support facility to Ault Field (Navy, 2014a). The following discussion presents information on current resources located within the APE; unless otherwise noted, the APE generally contains the same resources for all alternatives.

3.6.2.1 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, 2014a). 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.

In addition, various archaeological and architectural investigations have identified a number of cultural resources at NAS Whidbey Island. Eighteen archaeological surveys have been conducted on the NAS Whidbey Island complex and resulted in the recordation of 17 prehistoric archaeological sites and 12 historic sites. Among these, 10 sites were recommended as eligible for the NRHP (Navy, 2014a).

Archaeological resources within the APE typically are considered only within those areas, which have the potential for ground disturbance. Under each of the three alternatives, all construction would occur on the north end of the flight line at Ault Field; no construction would be required at OLF Coupeville. The following discussion provides an overview of the archaeological resources located within Ault Field.

Ault Field

Ault Field is the largest facility and primary airfield for NAS Whidbey Island complex operations. It is built on 4,325 acres of land and is located approximately 5 miles northwest of the Seaplane Base on the west coast of Whidbey Island, bordered by the Strait of Juan de Fuca (EDAW, 1997; Stell, 2013).

Approximately 23 percent of Ault Field is developed (Navy, 2013). 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).

Due to its extensive disturbance as a result of airfield construction, Ault Field generally is not within an archaeologically sensitive area.[11] Through 2015, approximately four archaeological surveys had been completed within 500 yards of the airfield. As part of these surveys, six archaeological sites were identified within and near Ault Field. These sites are listed in Table 3.6-1.

Table 3.6-1 Archaeological Sites Located within and Near Ault Field at the NAS Whidbey Island Complex

Site Number	*Type of Site*	*NRHP Status*
45-IS-243	Historic	Unevaluated; recommended for further testing.
45-IS-283	Historic Foundations	Unevaluated; no formal eligibility determination
45-IS-284	Historic Foundations	Not eligible; SHPO concurred
45-IS-286	Historic Foundations	Unevaluated; no formal eligibility determination
45-IS-323	Historic Foundation and Scatter	Determined not eligible
45-IS-324	Historic Debris Scatter	Determined not eligible

Sources: Navy, 2014a; Schwartz, 2016

Two sites were identified along the shoreline near the main airfield. These included 45-IS-283 and 45-IS-284, both of which were recommended as not eligible for the NRHP, although no formal determination has been made on 45-IS-283 (Rudolph, Leary, and Nelson, 2009; Navy, 2014a). Other nearby sites include 45-IS-243, 45-IS-286, 45-IS-323, and 45-IS-324. Among these four sites, one (45-IS-243) was recommended for further testing to determine its eligibility for the NRHP (Navy, 2014a).

Racon Hill is a small, 4-acre site immediately south of Ault Field; it accommodates two potable water reservoirs, a water distribution building, and radar and communications facilities. No previously identified archaeological sites are at Racon Hill.

OLF Coupeville

One archaeological site has been identified at OLF Coupeville. Site 45-IS-316, known as the Keystone Road Historic Site, consists of a historic farmstead that dates prior to 1943. Structural remains consist of a concrete slab foundation and a low cinderblock wall that may have been part of a garage or pump house. The site was recommended not eligible for listing in the NRHP; however, no formal eligibility determination has been made by the Navy, and concurrence has not been sought from the SHPO (Navy, 2014a).

Seaplane Base

Eighteen archaeological sites have been previously identified within the Seaplane Base. The sites are listed in Table 3.6-2. As shown, nine of these sites were recommended as eligible for the NRHP. One,

[11] 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 2014).

Site 45-IS-82, received SHPO concurrence. Three sites were not evaluated, and five sites were recommended as not eligible for the NRHP.

Table 3.6-2 Archaeological Sites Located within the Seaplane Base at the NAS Whidbey Island Complex

Site Number	*Type of Site*	*NRHP Status*
45-IS-42	Prehistoric Shell Midden	Recommended eligible; no formal determination of eligibility
45-IS-43	Prehistoric Shell Midden	Recommended not eligible; no formal determination of eligibility
45-IS-79	Prehistoric Shell Midden	Recommended eligible; no formal determination of eligibility
45-IS-80	Prehistoric Shell Midden	Recommended eligible; no formal determination of eligibility
45-IS-81	Prehistoric Shell Midden	Recommended eligible; no formal determination of eligibility
45-IS-82	Prehistoric Shell Midden	Recommended eligible; SHPO concurred
45-IS-201	Prehistoric Shell Midden	Recommended eligible; no formal determination of eligibility
45-IS-204	Prehistoric Shell Midden	Recommended eligible; no formal determination of eligibility
45-IS-210	Historic Scatter	Unevaluated; no formal determination of eligibility
45-IS-236	Historic Foundation	Recommended not eligible; no formal determination of eligibility
45-IS-237	Prehistoric Shell Midden	Recommended eligible; no formal determination of eligibility
45-IS-239	Historic Foundations	Recommended not eligible; no formal determination of eligibility
45-IS-240	Prehistoric Shell Midden	Unevaluated; no formal determination of eligibility
45-IS-241	Historic Scatter	Recommended not eligible; formal eligibility determination by Navy, and SHPO concurrence not sought
45-IS-242	Prehistoric Shell Midden	Unevaluated; no formal determination of eligibility
45-IS-285	Historic Foundation	Recommended not eligible; no formal determination of eligibility
45-IS-293	Prehistoric Shell Midden	Recommended eligible; no formal determination of eligibility
45-IS-294	Prehistoric Shell Midden	Recommended eligible; no formal determination of eligibility

Source: Navy, 2014a

Key:
SHPO = State Historic Preservation Office

3.6.2.2 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).

According to the 2014 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, 2014a). 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, 2016). In addition, 539 buildings and structures are covered under Program Comment[12] and are addressed through a Programmatic Agreement for Public/Private Venture Housing (Navy, 2014a). The Navy does not anticipate any additional recommendations for eligibility because many of the Cold War buildings have been evaluated.

In 1994, a cultural resources inventory resulted in only preliminary recommendations of NRHP eligibility for buildings built in the World War II era or earlier (Dames and Moore, 1994). The first intensive survey of these buildings was completed in 1997 and consisted of buildings and structures built in 1945 or earlier (EDAW, 1997). This investigation resulted in the NRHP-eligibility determination of the Seaplane Base Historic District (SPBHD), two individually NRHP-eligible buildings at the Seaplane Base (Buildings 12 and 13), and the Victory Homes Historic District at the Seaplane Base (now demolished except for Buildings 613 and 614).

In June 2009, the 1997 survey was updated and expanded to include Cold War-era resources built through the end of 1989 (Hampton and Burkett, 2010). This architectural survey evaluated pre-1989 buildings, structures, and landscape features at the Seaplane Base and Ault Field. As a result of this investigation and in consultation with the Washington SHPO, the Navy determined that 37 buildings, structures, and landscape features are NRHP eligible, either individually or as contributing resources of the NRHP-eligible SPBHD. The SPBHD was redefined in January 2010, thereby extending its limits from the fuel farm to the Victory Homes at the top of the hill on Coral Sea Drive.

In 2013, a Cold-War study was conducted at Ault Field, Racon Hill, OLF Coupeville, and the Seaplane Base. This study was conducted in two phases, the first to provide a historic context and the second to document and inventory 88 Cold War-era resources. As a result of this study, four architectural resources were recommended for inclusion in the NRHP (Navy, 2014a).

Architectural resources are considered throughout the entire APE. The following discussion provides an overview of the architectural resources located within Ault Field, OLF Coupeville, the Seaplane Base, and throughout Island County. Due to the numerous architectural resources located within the APE, this evaluation generally focuses upon those resources that are either listed or eligible for listing in the

[12] Program Comments are an alternate method for federal agencies to meet their Section 106 obligations. As part of this method, agency officials may request the ACHP to comment on a category of undertakings in lieu of conducting individual reviews under 36 CFR §§ 800.4 through 800.6. The Navy has Program Comments in order to address Cold War-era Unaccompanied Personnel Housing and ammunition storage.

NRHP. In locations in which few extant buildings are present, all of them, regardless of NRHP status, are discussed.

Ault Field

Over two-hundred architectural resources have been evaluated for NRHP eligibility at Ault Field. Of these, 17 resources were recommended as eligible for the NRHP and have received SHPO concurrence (Navy, 2016).

The following structures at Ault Field are considered to be eligible for listing on the NRHP:

- **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 2014 ICRMP and a 2010 Environmental Assessment, this building is planned for demolition. The Navy has consulted with the SHPO and is working on the completion of stipulations from the Memorandum of Agreement (MoA) (Navy, 2010a; Navy, 2014a). Building 112 will be demolished as part of the military construction for the P-8A operations prior to the initiation of the Proposed Action.
- **Buildings 457 and 458 (Ready Lockers)**
  These structures have been used for storage of munitions. 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, 2014a). They are planned for demolition per the 2010 Environmental Assessment (Navy, 2010a).
- **Building 118 (Skywarrior Theater)**
  This building, which has surviving Art Moderne architectural details, served as the station theater. It played an important role in the social life of the station, such as maintaining the morale of the military personnel deployed away from home during wartime. Live shows and theatrical performances were staged here, and it also served as the movie theatre. Renovations were completed in 1980. This building is eligible for listing in the NRHP under Criterion A within both the World War II and Cold War contexts (Hampton and Burkett, 2010; Thursby, Bryant, and Ross et al., 2013; Thursby, Bryant, and Meiser et al., 2013). The Washington SHPO concurred with the Navy's determination in 2010 (Navy, 2014a).
- **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.
- **Building 410 (Hangar 6)**
  Hangar 6 is recommended as eligible for the NRHP under Criteria A and C. The hangar is one of the most important buildings associated with the conversion of Ault Field to a Master Jet Station

under the Woods Act of 1951 and under Criterion C, as it is the only example of the Brunswick Hangar in Washington State (Hampton and Gissendanner, 2008). The SHPO concurred with this finding (Hampton and Burkett, 2010). Hangar 6 is currently undergoing renovations per stipulations within a MoA with the Washington SHPO.

- **Building 920 (920 Larkspur Drive)**
  This building was constructed in 1952 and was recommended as eligible for the NRHP. The SHPO concurred with the eligibility recommendation in April 2014. Building 920 is associated with the Riksen family. This structure is anticipated to be demolished; the Navy is consulting with the Washington SHPO on a MoA.
- **Building 920-1ST (Quarters O/920 West First Street)**
  This building was constructed in 1900 (Navy, 2014a) and is one of 11 remaining pre-Navy farm houses. It was built by the Henry Riksen family and is a 1.5-story single-family house in a cruciform plan. It is eligible for inclusion in the NRHP under Criteria A for its association with World War II and the initial development of NAS Whidbey Island's mission (Sackett, 2013). The SHPO concurred with the eligibility recommendation in April 2014 (Navy, 2016). This structure is anticipated to be demolished; the Navy is consulting with the Washington SHPO on a MoA.
- **Building 1140 (Quarters P/1140 W. Clover Valley)**
  This building was constructed in 1900 (Navy, 2014a) and is one of the pre-Navy farm houses. It is a 1.5-story single-family house with a T-shaped plan. It is eligible for inclusion in the NRHP under Criteria A for its association with World War II and the initial development of NAS Whidbey Island's mission (Sackett, 2013). The SHPO concurred with the eligibility recommendation in April 2014 (Navy, 2016). This structure is anticipated to be demolished; the Navy is consulting with the Washington SHPO on a MoA.
- **Building 2700 (Naval Ocean Processing Facility)**
  This building was recommended as eligible under Criterion A under the Cold War context and under Criterion Consideration G for its association with Integrated Undersea Surveillance System and Sonar and Navy intelligence during the Cold War. This structure was built in 1986 near a relatively isolated location in the west-central part of Ault Field next to the Strait of Juan de Fuca (Thursby, Bryant, and Ross et al., 2013; Thursby, Bryant, and Meiser et al., 2013). The building is a one-story concrete building with a finished basement and warehouse space (Hampton and Burkett, 2010). The Washington SHPO concurred with the eligibility recommendation in April 2014 (Navy, 2016).
- **Building 2860 (Quarters J/2860 N. Cowpens Road)**
  This building was originally located at the corner of Golf Course Road and Crosby Road. It was purchased from Henry Looff. The Navy used the building as officers' quarters after its relocation. It is a one-story single-family house with an L-shaped plan (Sackett, 2013). The SHPO concurred with the eligibility recommendation under Criterion A in April 2014 (Navy, 2016). This structure is anticipated to be demolished; the Navy is consulting with the Washington SHPO on a MoA.
- **Building 2870 (Quarters I/2870 N. Cowpens Road)**
  This building was constructed in 1930 (Navy, 2014a) and was moved from its original location at West Beach and Crosby, no later than 1943. It is a 1.5-story single-family house once used for officers' quarters (Sackett, 2013). It was purchased from Charles Christenson. The SHPO

concurred with the eligibility recommendation under Criterion A in April 2014 (Navy, 2016). This structure is anticipated to be demolished; the Navy is consulting with the Washington SHPO on a MoA.

- **Building 2885 (Quarters K/2885 N. Cowpens Road)**
  This building was constructed in 1895 (Navy, 2014a; Sackett, 2013) and was owned by Jake Capaan at the time the Navy acquired it. It is one of the last pre-Navy farm houses used to provide officer housing during Ault Field's World War II build-up; it remains in its original location. It is a single-family house organized in a 1.5-story irregular cruciform plan. It is eligible for inclusion in the NRHP under Criteria A for its association with World War II and the initial development of NAS Whidbey Island's mission (Sackett, 2013). The Washington SHPO concurred with the eligibility recommendation under Criterion A in April 2014 (Navy, 2016). The Navy will retain this building as an example of officer housing.
- **Building 3220 (Quarters R/3220 N. Saratoga Street)**
  This building was constructed in 1930 (Navy, 2014a). It is a single-family, 1.5-story house with an L-shaped plan. Quarters R was moved by the Navy in 1951 to accommodate expansion of the runways (Sackett, 2013). The Washington SHPO concurred with the eligibility recommendation under Criterion A in April 2014 (Navy, 2016). This structure is anticipated to be demolished; the Navy is consulting with the Washington SHPO on a MoA.
- **Building 3230 (Quarters G/3230 N. Saratoga Street)**
  This building was constructed in 1935 (Navy, 2014a) and was moved in 1951 from its original location in order to accommodate runway expansion of Runway 25. The Navy used this building as officers' quarters after it was moved. The building is a single-family house with a semi-detached garage (Sackett, 2013). The Washington SHPO concurred with the eligibility recommendation under Criterion A in April 2014 (Navy, 2016). This structure is anticipated to be demolished; the Navy is consulting with the Washington SHPO on a MoA.
- **Building 3295 (Quarters E/3295 N. Goldie Road)**
  This building was constructed in 1935 (Navy, 2014a) as a one-story, single-family house with a T-shaped plan. The building was remodeled in 1985 to provide new executive officer's quarters (Thursby, Bryant, and Meiser et al., 2013). It is one of the last pre-Navy farm houses that was adapted to officer housing; it has not been moved from its original location. It is eligible for inclusion in the NRHP under Criteria A for its association with World War II and the initial development of NAS Whidbey Island's mission (Sackett, 2013). The Washington SHPO concurred with the eligibility recommendation in April 2014 (Navy, 2016). This structure is anticipated to be demolished; the Navy is consulting with the Washington SHPO on a MoA.
- **Building 3305 (Quarters F/3305 N. Goldie Road)**
  This building was constructed in 1935 (Navy, 2014a). Quarters F is a 1.5-story single-family house with a rectangular plan, and it remains in its original location. It is one of the last pre-Navy farm houses. It was purchased by the Navy in 1942 and remodeled for use as officer housing. It is eligible for inclusion in the NRHP under Criteria A for its association with World War II and the initial development of NAS Whidbey Island's mission (Sackett, 2013). The Washington SHPO concurred with the eligibility recommendation in April 2014 (Navy, 2016). This structure is anticipated to be demolished; the Navy is consulting with the Washington SHPO on a MoA.

All of these properties are located within the APE for the Proposed Action for each of the three alternatives (see Figure 3.6-2).

While Racon Hill contains six facilities that are located within the APE for the Proposed Action for each of the three alternatives, none of the facilities are considered eligible for the NRHP (Hampton and Burkett, 2010; Navy, 2014a, 2016).

OLF Coupeville

OLF Coupeville, which was established in 1944, is located on a relatively wide area of the central portion of Whidbey Island, 3 miles south of Coupeville, Washington. It is located approximately 10 miles south of Ault Field and is used primarily for FCLPs. In addition to the 5,400-foot- long landing strip, small control 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). OLF Coupeville was originally used for emergency and practice landings until 1946; while use continued through 1963, 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, 2014a). Operations at OLF Coupeville, like Ault Field, have continued since that time, with periods of high and low activity dependent on Navy mission requirements.

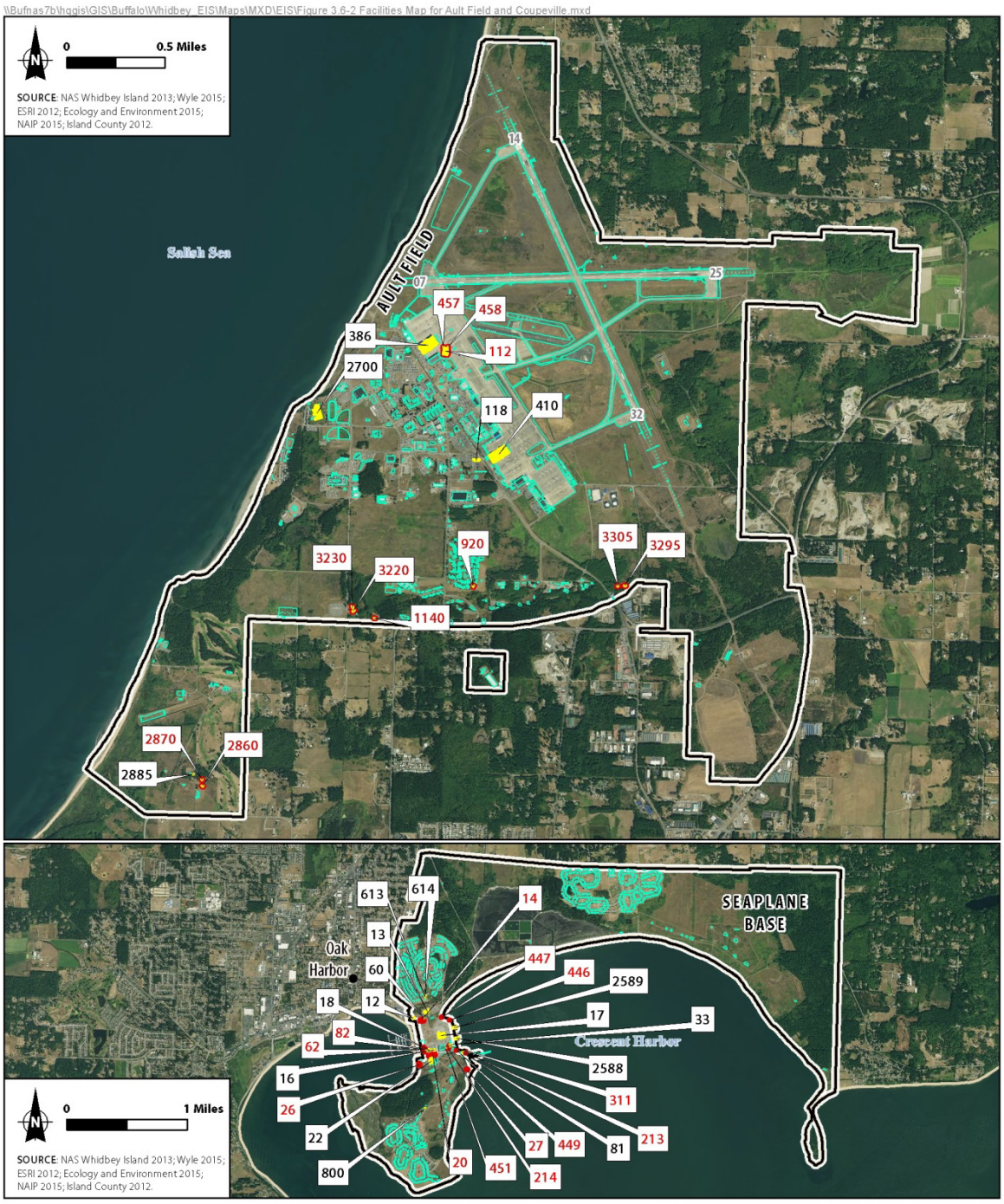
As noted in a 2010 Phase 1 architectural survey, three resources were documented at OLF Coupeville. These consisted of Facility 1 (Control Tower), Facility 2 (Airfield Operations Building), and the runway (14-32). All three date to World War II; however, none were recommended as eligible for the NRHP. The SHPO has concurred with these recommendations (Hampton and Burkett, 2010).

In a 2013 study, an additional six resources were documented. These included Building 2709 (Crash Truck Shelter), Facility 201422 (Taxiway), Facility 201926 (E-5 Chain Gate Arrest Gear), Facility 201927 (Carrier Deck Lighting), Facility 201929 (Runway Edge Lighting), and Facility 201961 (Optical Landing System). Three other facilities are located within OLF Coupeville that have been evaluated for their NRHP eligibility. These consist of Facility 10 (Runway Lighting Vault), Facility 11 (Potable Water Well Pump House), and Building 2807 (Radome Dome). None of these facilities are eligible for the NRHP (Navy, 2016).

As such, OLF Coupeville has no existing historic districts or properties individually eligible for the NRHP. All of these resources are located within the APE for the Proposed Action for each of the three alternatives (see Figure 3.6-3).

The northern portion of OLF Coupeville, however, is located within the Central Whidbey Island Historic District (NRHP #73001869). The district generally overlaps the boundaries of the Ebey's Landing National Historical Reserve (NRHP #01000229), which also is listed in the NRHP. 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 for historic aboriginal, agricultural, architectural, commercial, and military qualities. 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). Today, the district includes 104 buildings, 268 structures, and one object (NRHP [National Register of Historic Places], n.d.).

Figure 3.6-2 Facilities Map for Ault Field and Seaplane Base



Installation Area
On-Base Facility*
NRHP Eligible Sites
Scheduled for Demolition; SHPO has been consulted

*The Navy has scheduled the demolition of other facilities within Ault Field and Seaplane Base in accordance with a 2010 Environmental Assessment (Navy 2010a). Only those that are eligible or listed in the NRHP are depicted.

Figure 3.6-2
Facilities Map for Ault Field and Seaplane Base
Whidbey Island, Island County, WA

Figure 3.6-3 Location of Off-Installation Historic Properties

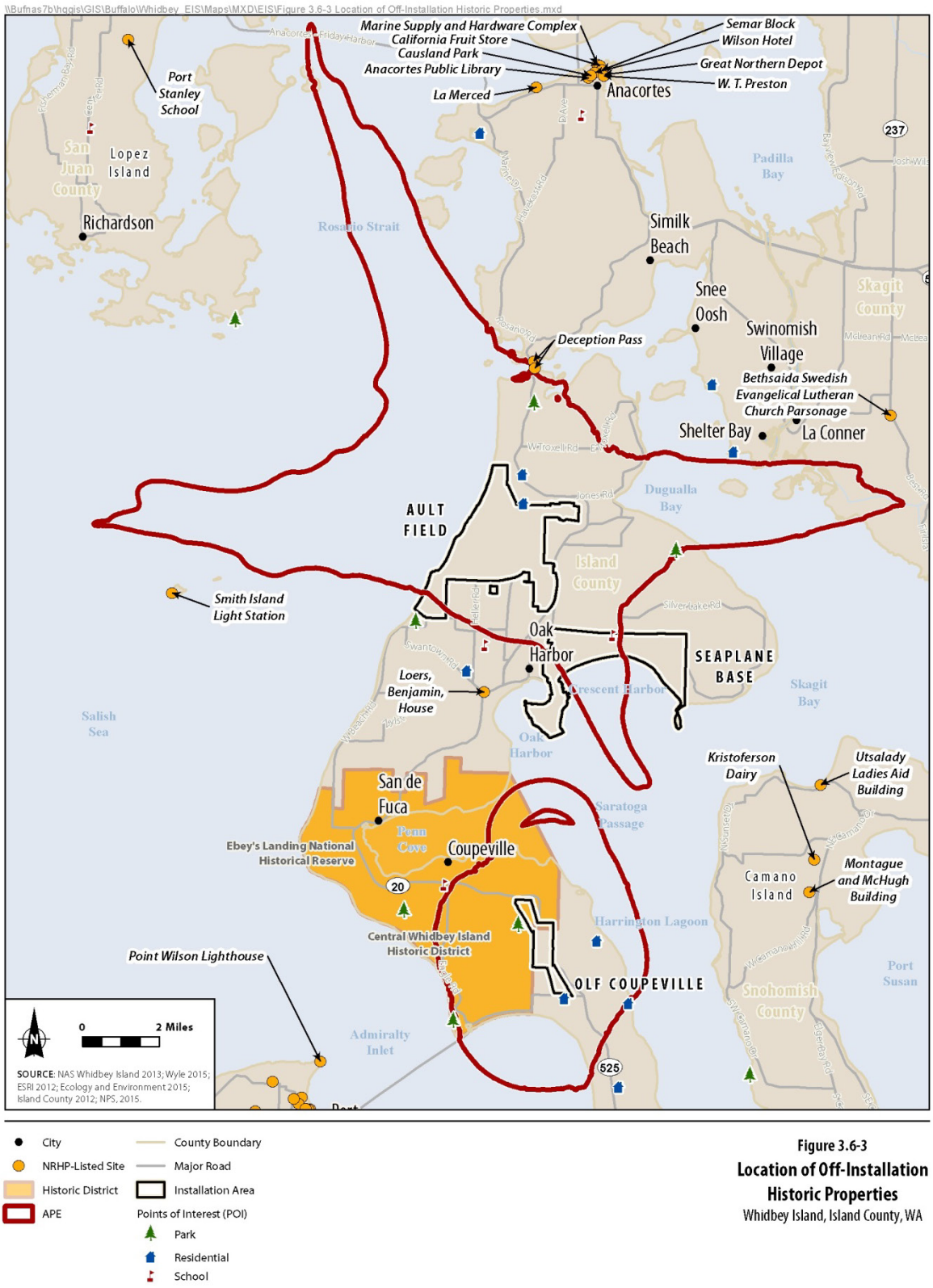


Figure 3.6-3
Location of Off-Installation Historic Properties
Whidbey Island, Island County, WA

In partnership with the Town of Coupeville, Island County, and Washington State Parks, the NPS manages the 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, 2006). A total of 35 archaeological sites have been recorded, all of which are in the vicinity of Penn Cove with the exception of one in the vicinity of Ebey's Landing. Fourteen primary farm clusters in the reserve are present at Ebey's, Crockett, and Smith Prairies; an additional cluster is at Fort Casey (NPS, 2006).

The purpose of Ebey's Landing National Historical Reserve 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). Part of the cultural landscape of the reserve was influenced by the military history of Fort Casey and Fort Ebey, which protected the mouth of Puget Sound (NPS, 2010).

None of the buildings or structures that are part of this district are located within OLF Coupeville (Dames and Moore, 1994). However, OLF Coupeville and portions of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve are within the APE for all three alternatives.

Seaplane Base

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 have been documented, along with two historic districts, the SPBHD and Victory Homes Historic District.

The SPBHD is eligible for listing in the NRHP. The boundaries of the SPBHD include a collection of 13 contributing and individually eligible buildings, structures, and landscape features that are related to the Seaplane Base's historic military mission and operations (Washington Department of Archaeology and Historic Preservation [WDAHP], 2010; Navy, 2016). These properties are listed in Table 3.6-3, along with other NRHP-listed properties located outside of the SPBHD.

Within the Seaplane Base, Buildings 49, 94, 98, and 215 were demolished; the SHPO was consulted prior to their demolition (Navy, 2016). In addition, Buildings 14, 20, 26, 27, 62, 82, 213, 214, 311, 446, 447, 448, 449, and 451 were assessed for demolition as part of a 2010 Environmental Assessment. The SHPO was consulted with regard to those buildings, which are either listed or eligible for the listing in the NRHP. The Navy is currently implementing measures agreed upon as part of the consultation efforts for those extant buildings (Navy, 2010a).

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).

Table 3.6-3 NRHP-Eligible Buildings at the Seaplane Base of the NAS Whidbey Island Complex

Building Number	*Name/Function*	*Date built*	*Contributes to Seaplane Base Historic District?*
12[1]	NAS Whidbey Command Display	1942	Yes
13	Multi-Use Building	1943	Yes
16	SPB Fire Station	1943	Yes
17	Navy Exchange	1942	Yes
18	Contractor Transportation	1942	Yes
22	NEX Warehouse/EOD 11	1942	Yes
33	EODMU-11 Office/Shops	1942/43	Yes
60	PCB/Hazardous Waste Storage	1943	Yes
81	Boat Shop	1943	Yes
613[2]	613 Briar Court	1942	Yes
614[2]	614 Briar Court	1942	Yes
800	Quarters A/7 Coral Sea	1934	No
2588	Boat Launching Ramp SB	1943	Yes
2589	Boat Launching Ramp SB	1943	Yes
201705	Seawall	1942	Yes

Sources: Navy, 2014a, 2016

Notes:
[1] The addition to this building has been demolished after consultation with the SHPO as part of a stipulation of an MoA.
[2] Part of the Victory Homes Historic District, as well as contributing to the SPBHD.

Key:
EOD = explosive ordnance disposal
MoA = Memorandum of Agreement
SPBHD = Seaplane Base Historic District

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 (Hampton and Burkett, 2010; Navy, 2014a).

Portions of the Seaplane Base are located within the APE for the Proposed Action for each of the three alternatives.

Island County

Over 1,500 resources are identified within the Washington Information System for Architectural and Archaeological Records Data for Island County. Among these, seven NRHP-listed sites are present, in addition to those that are components of Ebey's Landing National Historical Reserve (NPS, 2015). These are the following:

- Utsalady Ladies Aid Building, 79 Utsalady Road, Camano Island
- Cama Beach Resort, 1880 Southwest Camano Drive, Camano Island
- Site 45-IS-2, Address Restricted, Camano Island
- Olympic Club, 230 1st Street, Langley
- Loers, Benjamin, House, 2046 Swantown Road, Oak Harbor
- Smith Island Light Station, West of Ault Field, Island County
- Kristoferson Dairy, 393 N. East Camano Drive, Camano Island

Among these resources, only portions of the Ebey's Landing National Historical Reserve are located within the 65 dBA noise contour for all alternatives (see Figure 3.6-3).

Consultation with the SHPO and other parties is ongoing. Additional information may be added to this section in the Final EIS as consultation occurs.

3.6.2.3 Traditional Cultural Properties

TCPs are places of traditional religious and cultural importance. They often are associated with American Indian tribes and nations, but they can be attributed to other cultural groups. A TCP can be 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, 2014a).

Within proximity to OLF Coupeville, two places have been identified in the NPS management plan as culturally important to tribes and tribal members with traditional associations to the Ebey's Landing National Historical Reserve. One is the Snaklin Monument, a 5-foot-tall stone obelisk, located within a small chain link fenced enclosure on private land near Parker Road in the northeast section of the Ebey's Landing National Historical Reserve. The other is an area shown on a plat map as a "USA Indian Cemetery." The site of the cemetery is on a wooded hillside approximately 0.25 mile northwest of the Snaklin Monument (NPS, 2006).

3.6.2.4 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.

Additional consultation was initiated with the following communities and organizations:

- Advisory Council on Historic Preservation (ACHP): 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): The 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.
- 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 Citizens of Ebey's Reserve 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 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 800.

Responses were received on September 1, 2016, from the Citizens of Ebey's Reserve concerning the noise data; 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 of NEPA and the NHPA, the determination of effect, and the potential for drafting resolution documentation.

Documentation of the correspondence with the SHPO and other consulting parties is provided in Appendix C.

The Navy also has initiated Section 106 consultation with the eight federally recognized American Indian tribes and nations regarding the Proposed Action and its effects on historic properties at NAS Whidbey Island on October 10, 2014.

The following American Indian tribes and nations 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 American Indian tribes and nations 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 American Indian tribes and nations 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 800.

No other responses have been received to date from the other American Indian tribes and nations.

Documentation of the correspondence with the American Indian tribes and nations is provided in Appendix C. Consultation with the SHPO and other parties is ongoing. Additional information may be added to this section in the Final EIS as consultation occurs.

3.7 American Indian Traditional Resources

Protected tribal resources, as defined in Department of Defense (DoD) Instruction 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 dBA Day Night Average Sound Level (DNL) noise contour areas for 2021 conditions (see Figure 3.2-3). Noise levels below 65 dBA DNL are considered to be equivalent to background noise or conversational speech.[13] Within this study area, several types of traditional resources are present: within the 65 dBA 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 American Indian tribes and nations 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

[13] The use of the 65 dBA 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 dBA DNL.

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 American Indian tribes and nations. The Secretary of the Navy Instruction (SECNAVINST) 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 (COMNAVREGNW) 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 American Indian tribes and nations 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 American Indian tribes and nations 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 American Indian tribes and nations when proposed actions may have the potential to significantly affect 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

Government-to-government consultation on this Proposed Action has not been requested or initiated by a tribe at this point in the environmental planning process.

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 American Indian tribes and nations 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 American Indian tribes and nations. 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 American Indian tribes and nations 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 dBA 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.[14]

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 dBA 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.

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,

[14] 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.).

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 are 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 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.

3.8.1.1 Federal Regulations

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 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, 2012), 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.

Migratory Bird Treaty Act and Executive Order 13186

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-718) 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.

The National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314, 116 Stat. 2458) 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 to take 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.

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.” Additionally, the BGEPA prohibits activities around an unoccupied nest site if, upon the eagle’s return, the activities are shown to have resulted in an adverse impact on the eagle. 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).

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 (*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." Military readiness activities are no longer subject to the MMPA provisions of harassment, removing the "specified geographic area" requirement, as well as the small numbers provision as applied to military readiness activities or scientific research activities conducted by or on behalf of the federal government. 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

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 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.

3.8.1.4 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.

3.8.1.5 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 § 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 State Park and other small rocky islands.

3.8.1.6 Jefferson County Critical Areas Ordinance

The Jefferson County Critical Area Ordinance (18.22) provides for the protection of FWHCAs and areas of critical importance to endangered, threatened, or sensitive species of fish, wildlife, and/or plants, or species of local importance. FWHCAs include 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 overlaps with Jefferson County only in offshore waters of Puget Sound.

3.8.1.7 Snohomish County Critical Areas Ordinance

The Snohomish County Critical Areas Ordinance (30.62) as amended in 2015 (15-034) allows for designation and protection of critical areas, including FWHCAs (Policy NE 3.A.1). The amendment to the Critical Areas Ordinance was accompanied by Addendum No. 2 to the Final EIS for Snohomish County Critical Area Regulations. FWHCAs include lakes, streams, rivers, and marine waters and habitat areas for species listed as endangered, threatened, sensitive, or of local importance. The study area overlaps with only a minor portion of Snohomish County and includes only offshore waters of Skagit Bay.

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). This study area is also detailed in Chapter 4.

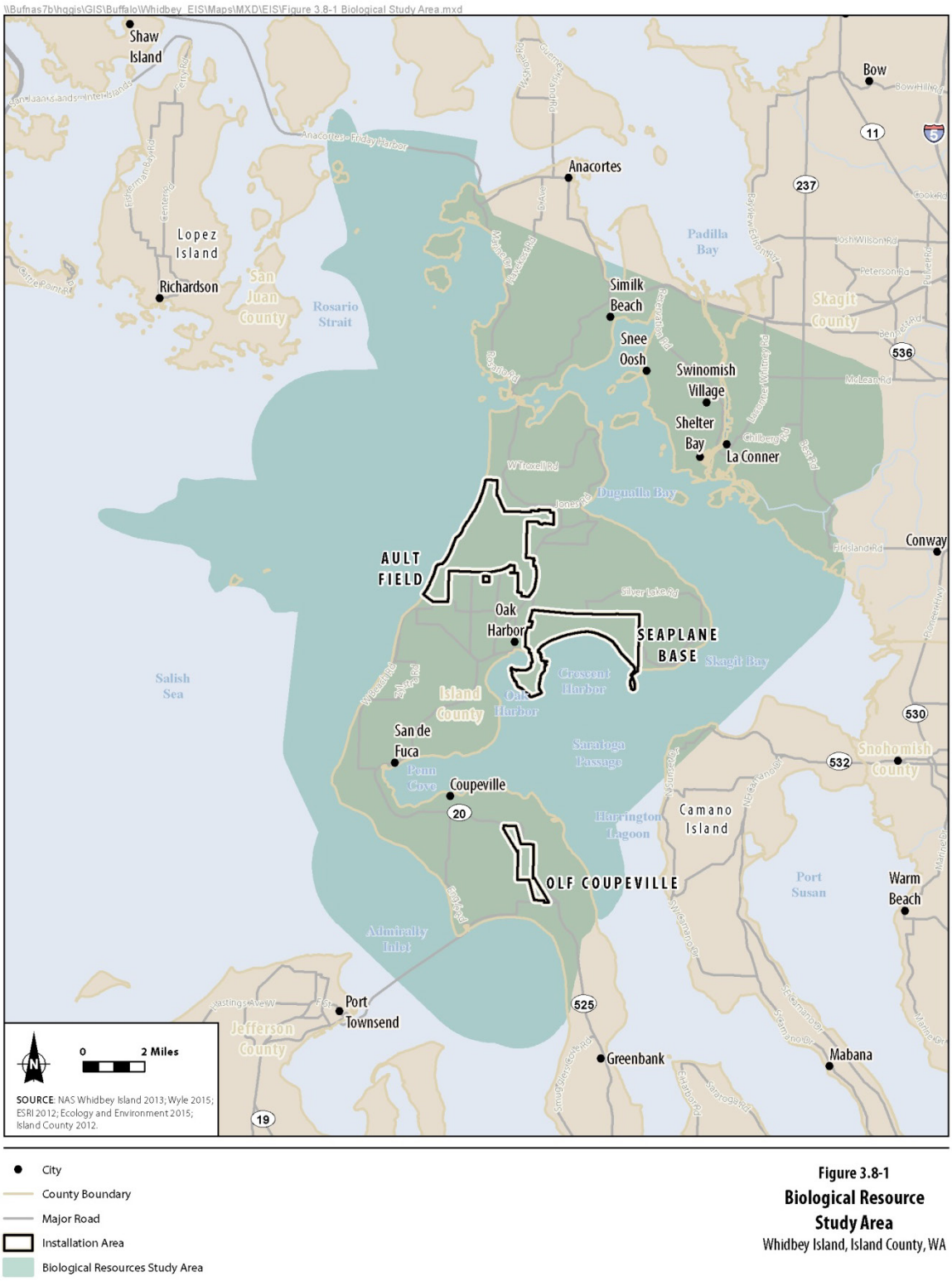
3.8.2.1 Terrestrial Wildlife and Vegetation

Terrestrial wildlife includes all vegetation, invertebrates, reptiles, amphibians, birds, and mammals that are associated primarily with terrestrial habitats. Fish that inhabit freshwater are included under the umbrella term "terrestrial" for this discussion. Bull trout (*Salvelinus confluentus*) and Dolly Varden (*Salvelinus malma)*, while managed by the USFWS, 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.

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.

Figure 3.8-1 Biological Resource Study Area



Reptiles and Amphibians

Within the study area, there are six reptile and nine amphibian species that potentially occur (Table 3.8-1) (NAVFAC, 2015b). The American bullfrog (*Lithobates catesbeianus*) is a non-native species (Washington Herp Atlas, 2005, 2013; NatureServe, 2015). Ault Field provides potentially suitable habitat for all reptiles and amphibians found in the study area (Table 3.8-1) (NAS Whidbey Island, 2012). 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	
Western pond turtle	*Clemmys (Actinemys) marmorata*
Western fence lizard	*Sceloporus occidentalis*
Northern alligator lizard	*Elgaria coerulea*
Common garter snake	*Thamnophis sirtalis*
Northwestern garter snake	*Thamnophis ordinoides*
Terrestrial garter snake	*Thamnophis elegans*
Amphibians	
Long-toed salamander	*Ambystoma macrodactylum*
Northwestern salamander	*Ambystoma gracile*
Rough-skinned newt	*Taricha granulosa*
Ensatina	*Ensatina eschscholtzii*
Western redback salamander	*Plethodon vehiculum*
Western toad	*Anaxyrus boreas*
Northern Pacific chorus frog	*Pseudacris regilla*
American bullfrog	*Lithobates catesbeianus*
Northern red-legged frog	*Rana aurora*

Source: NAVFAC, 2015b

Birds

Most bird species that occur in the study area are protected under the MBTA and are discussed in the "Special Status Terrestrial Wildlife" section 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, 2012; 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.

Mammals

Within the study area, 36 species of terrestrial mammals potentially occur (NAS Whidbey Island, 2012; 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. Specific to Ault Field, all 36 species may potentially occur. Refer to "Special Status Terrestrial Species" below for a discussion of species protected by state and federal regulations.

3.8.2.2 Special Status Terrestrial Species

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, 2016a). Nine terrestrial wildlife species were identified by IPaC (Table 3.8-2) and are discussed individually below.

Table 3.8-2 Federally Listed[15] 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				
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.
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.
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 over 10 miles to the northwest, on mainland Washington outside the study area.

[15] 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, 2016a).

Table 3.8-2 Federally Listed[15] Terrestrial Species and Critical Habitats Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Federal Status*	*Critical Habitat Present?*	*Occurrence*
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, 2016a; WDFW, 2015a; Hallock, 2013

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, 2012). 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 these species occurs within the proposed construction areas. No loss of any unique or regionally significant vegetation communities would occur. Therefore, there would be no measurable impacts to vegetation or the golden paintbrush specifically, and they will not be discussed in Chapter 4.

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, 2015c). 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, 2015c). For the Taylor's checkerspot butterfly, DoD lands are exempt from critical habitat designations. 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.

Island Marble Butterfly

The island marble butterfly (*Euchloe ausonides insulanus*) is a candidate for listing under the ESA. In 2106, the USFWS found that listing the species was warranted, but listing was precluded by higher priority actions (USFWS, 2016a). The island marble butterfly uses grassland, sand dunes, and shoreline habitats and is a host of three plants in the mustard family. This species is currently only known from one population on San Juan Island outside the study area (USFWS, 2016a; Miskelly, 2000).

The Proposed Action would have no effect on this species because it is not known to occur in the study area; therefore, it will not be discussed in Chapter 4.

Oregon Spotted Frog

The Oregon spotted frog (*Rana pretiosa*) was listed as threatened under the ESA in 2014. This species was historically distributed in southwestern British Columbia to northeastern California (Hallock, 2013). Oregon spotted frogs use emergent marsh wetland complexes that are greater than 10 acres in size (Pearl and Hayes, 2004). In Washington, these wetland habitats are often connected to riverine systems. Nearest to the study area, Oregon spotted frogs are only known to occur in the Sumas River, Black Slough, and Samish River. These occurrences are approximately 15 miles or more from the study area. The Proposed Action would have no effect on this species because it is not known to occur in the study area; therefore, it will not be discussed in Chapter 4.

Figure 3.8-2 Taylor's Checkerspot Butterfly Designated Critical Habitat within the Study Area

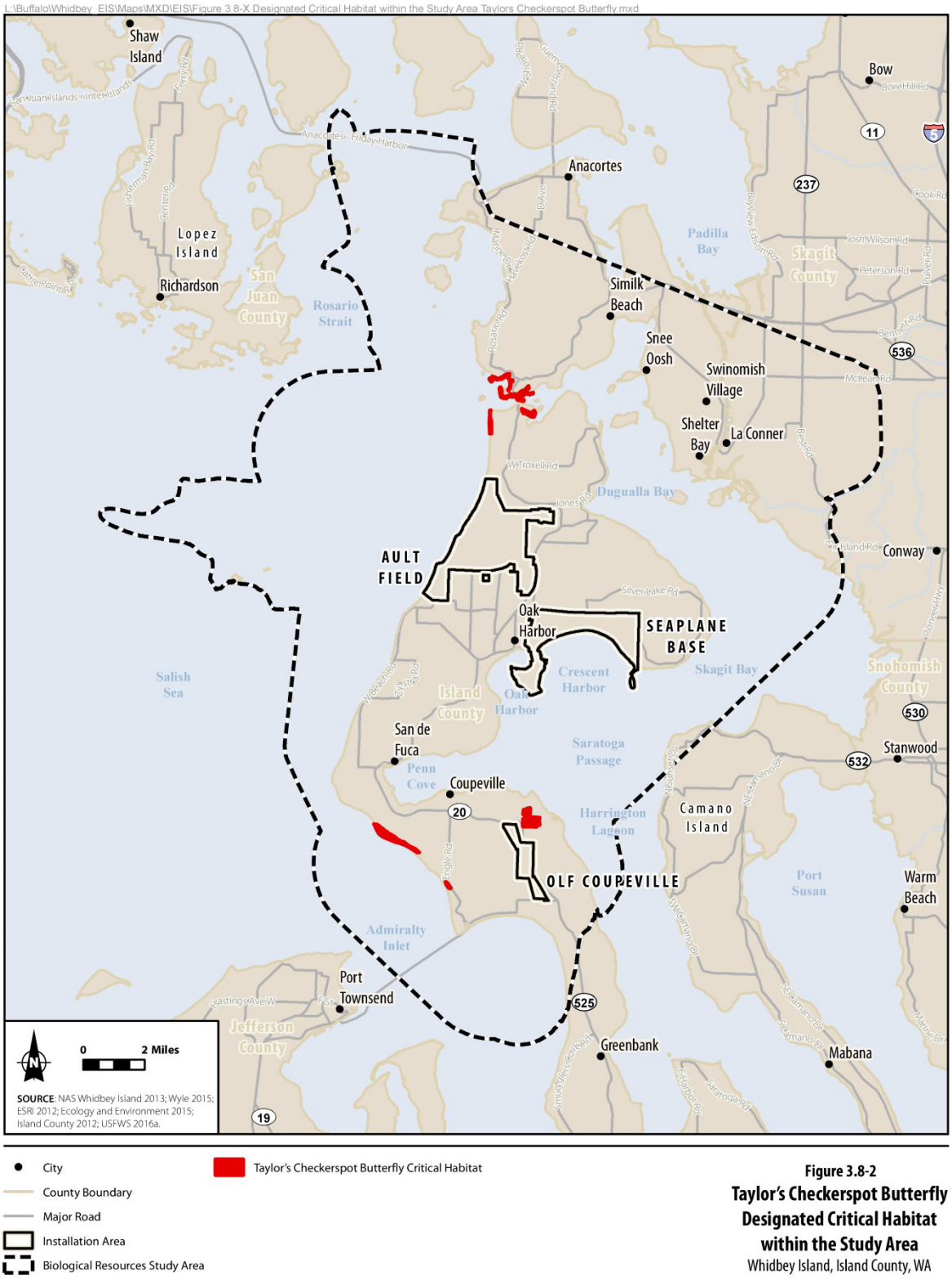


Figure 3.8-2
Taylor's Checkerspot Butterfly Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

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 great than or equal to 32 inches in diameter), percent slope, density of dominant trees, and mean diameter of western hemlock (Hamer, 1995; Nelson, 1997). 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 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 many 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 (Sanzenbacher et al., 2014). 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 (Stumpf et al., 2011). Sanzenbacher et al. (2014) found that flight heights vary greatly between coastal areas and inland areas (Sanzenbacher et al., 2014). 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 19,617 individuals in 2013. The population trended downward between 2001 and 2013 by 1.2 percent annually (WDFW, 2015b). In Washington, the estimated 2014 breeding season population was 4,998 individuals. The annual rate of decline in Washington between 2001 and 2014 was -5.13 percent. The study area lies within Conservation Zone 1, which had an estimated 2014 population of 2,822 individuals. The annual rate of decline in Conservation Zone 1 between 2001 and 2014 was -5.40 percent (Lance and Pearson, 2015).

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). These were the only two study strata falling within the Proposed Action's study area.

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, 2012). Small amounts of suitable habitat occur in 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). Marbled murrelets are present in the marine waters surrounding Whidbey Island year-round. Observations of marbled murrelets were reported relatively consistently throughout the year, according to eBird data (eBird, 2015a). The Puget Sound Ambient Monitoring Program reported a 1.84-fold increase in densities between summer and winter (Nysewander et al., 2005). Densities begin increasing in late fall/early winter and start to decline in late winter/early spring (Miller et al., 2006).

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.

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.

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.

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.

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, 2012). 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.

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, 2012; 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[16], 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, 2012; 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.

[16] 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 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, 2012; 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.

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, 2012; 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 and habitat areas that are important to MBTA-protected species are further detailed in the sections below.

Birds of Conservation Concern

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). Seventeen BCCs for BCR 5 occur annually within the study area (Table 3.8-3) (USFWS, 2008; NAS Whidbey Island, 2012; eBird, 2015a; Seattle Audubon Society, 2015).

Table 3.8-3 Birds of Conservation Concern Occurring Annually within the Study Area

Common Name[1]	*Scientific Name*	*Seasonal Occurrence*	*Habitat*
Yellow-billed loon[2]	*Gavia adamsii*	Winter resident and migrant	Nearshore marine waters
Western grebe[2]	*Aechmophorus occidentalis*	Year-round	Large, open waterbodies; marshes with open water
Bald eagle	*Haliaeetus leucocephalus*	Year-round	Forested areas adjacent to large bodies of water
Black oystercatcher	*Haematopus bachmani*	Year-round	Rocky shorelines
Lesser yellowlegs[2]	*Tringa flavipes*	Migrant	Wide range of wetland habitats
Whimbrel[2]	*Numenius phaeopus*	Migrant	Wide range of open terrestrial and coastal habitats
Marbled godwit[2]	*Limosa fedoa*	Winter resident and migrant	Coastal habitats
Red knot (*roselaari* subspecies)[2]	*Calidris canutus roselaari*	Migrant	Sandy coastal habitats
Short-billed dowitcher[2]	*Limnodromus griseus*	Migrant	Tidal flats, beaches, salt marshes, sewage ponds, and flooded agricultural fields
Caspian tern	*Hydroprogne caspia*	Breeder and migrant	Coastal estuaries, salt marshes, and barrier islands
Black swift	*Cypseloides niger*	Migrant	Coastal lowlands
Rufous hummingbird	*Selasphorus rufus*	Breeder and migrant	Broad range of habitats, including secondary succession communities and openings, mature forests, parks, and residential areas
Peregrine falcon	*Falco peregrinus*	Year-round	Broad range of natural and artificial habitats
Olive-sided flycatcher	*Contopus cooperi*	Breeder and migrant	Coniferous forest
Willow flycatcher	*Empidonax traillii*	Breeder and migrant	Moist, shrubby areas
Purple finch	*Haemorhous purpureus*	Year-round	Breeds in coniferous and mixed forests; winters in a wider variety of habitats

Sources: USFWS, 2008; eBird, 2015a; Seattle Audubon Society, 2015; Rodewald, 2015

Notes:
1 Species are listed by taxonomic order.
2 Indicates species is non-breeding in Bird Conservation Region 5.

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[17]). A number of other IBAs are outside of the study area but within 10 miles of Whidbey Island, including Samish/Padilla Bays (Global), Protection Island (Global), Point No Point (Global), Indian-Marrowstone Island/Oak Bay (State), Dee 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).

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).

[17] 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 National Audubon Society.

Figure 3.8-3 Important Bird Areas and National Wildlife Refuges in the Study Area

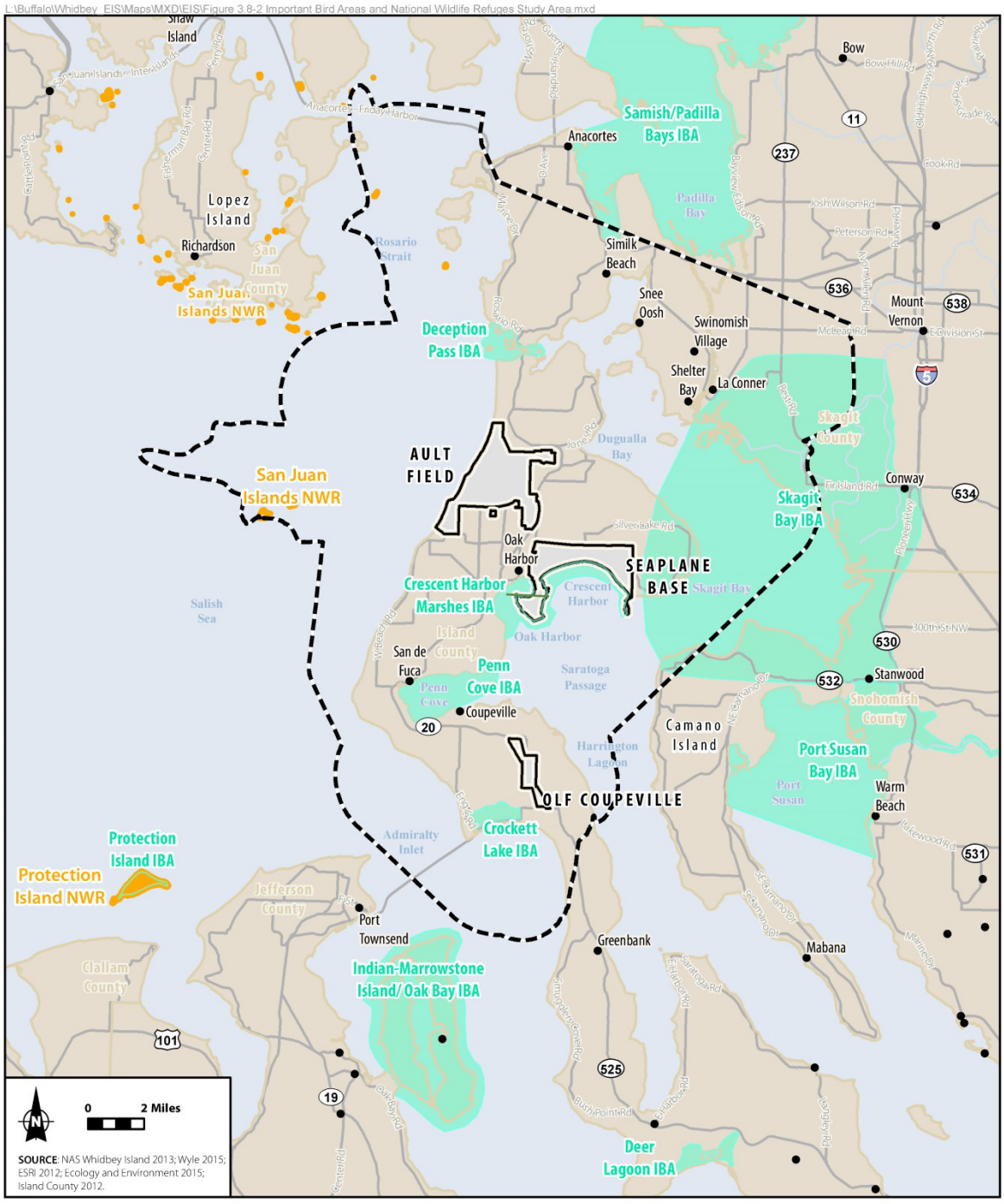


Figure 3.8-3
Important Bird Areas and National Wildlife Refuges in the Study Area
Whidbey Island, Island County, WA

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).

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.

National Wildlife Refuges

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 four islands within the study area: 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.

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, 2012; eBird, 2015a; NAVFAC [Naval Facilities Engineering Command] 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, 2012; 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, 2012; 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, 2012); 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).

State Threatened and Endangered Species

Nine 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 3.8-4). 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 3.8-4.

Three state-listed plant species were identified as potentially occurring within the study area (Table 3.8-4). 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.

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 3.8-4), 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.

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 3.8-4), the Skagit County's Critical Areas Ordinance (14.24) Habitats and Species of Importance include 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.

Table 3.8-4 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				
Taylor's checkerspot butterfly	*Euphydryas editha taylori*	Endangered	See text under "Federal Threatened and Endangered Species"	
Island marble butterfly	*Euchloe ausonides insulanus*	Candidate	See text under "Federal Threatened and Endangered Species"	
Amphibians				
Oregon spotted frog	*Rana pretiosa*	Endangered	See text under "Federal Threatened and Endangered Species"	
Birds				
Common loon	*Gavia immer*	Sensitive	Open water	Common year-round
American white pelican	*Pelecanus erythrorhynchos*	Endangered	Open water, shores	Rare year-round
Brown pelican	*Pelecanus occidentalis*	Endangered	Open water, shores	Rare in fall/early winter
Bald eagle	*Haliaeetus leucocephalus*	Sensitive	See text in "Bald and Golden Eagles"	
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	See text under "Federal Threatened and Endangered Species"	
Tufted puffin	*Fratercula cirrhata*	Endangered	Offshore islands, open marine water	Uncommon in summer
Sandhill crane	*Grus canadensis*	Endangered	Meadows, wetlands, open grasslands, agricultural fields	Uncommon in fall
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
Streaked horned lark	*Eremophila alpestris strigata*	Endangered	See text under "Federal Threatened and Endangered Species"	

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

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 3.8-4), 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 State Park is a Fish and Wildlife Habitat Conservation Area, pursuant to the county's Critical Areas Ordinance.

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.

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.

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 3.8-5. Federally listed marine fish are discussed separately in Section 3.8.2.4, below.

Table 3.8-5 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 (order Anguilliformes, order 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.
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 in 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.

Table 3.8-5 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*
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, 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.
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.

Marine Mammals

Twelve species of marine mammals potentially occur within the study area (Table 3.8-6) (NAS Whidbey Island, 2012; Burke Museum of Natural History and Culture, 2013; WDFW, 2013; Carretta et al., 2016).

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: 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 (Jefferies 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, 2012). 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.

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 (discussed below under Section 3.8.2.4). It is important to note that 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. Of the marine mammal species that might occur in the adjacent waters of Whidbey Island, the most commonly occurring is the gray whale (NAS Whidbey Island, 2012).

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. Transients may occur in inland waters in any month (Orca Network, 2010), 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. The number of West Coast Transient killer whales in Washington inland waters at any one time is probably fewer than 20 individuals (Wiles, 2004). 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., in preparation). 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, 2012; 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, 2012). 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 41 sightings of the Minke whale in Admiralty Inlet and two sightings within the Saratoga Passage area between January 2005 and August 2012 (Orca Network, 2012).

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; Washington State Department of Fish and Wildlife, 2012), 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). 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.

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). It is highly unlikely that any individuals 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 mammal 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 a 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.

Dall's porpoise occur 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 [Washington Department of Fish and Wildlife], 2008; Nysewander et al., 2005).

Table 3.8-6 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 raredepending on waterbody
Harbor porpoise	*Phocoena phocoena*	Likely to rare
Dall's porpoise	*Phocoenoides dalli*	Likely to rare

Sources: NAS Whidbey Island, 2012; Burke Museum of Natural History and Culture, 2013; WDFW, 2013; Carretta et al., 2016

3.8.2.4 Special Status Marine Wildlife

Federal Threatened and Endangered Marine Species

Federally endangered and threatened marine species are managed by the NMFS. Seven 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 3.8-7).

Table 3.8-7 NMFS-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.
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	See Bull Trout for "Similarity in Appearance."
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.
Canary rockfish (Puget Sound/Georgia Basin DPS)	*Sebastes pinniger*	Threatened	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

Table 3.8-7 NMFS-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*
Killer Whale (Southern Resident)	*Orcinus orca*	Endangered	Yes	Confirmed: May occur in Puget Sound. Likely to rare depending on water body

Sources: USFWS, 2016a; Carretta et al. 2016.

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 green sturgeon Southern DPS was designed in 2009 and includes waters off the western shore of the NAS Whidbey Island complex.

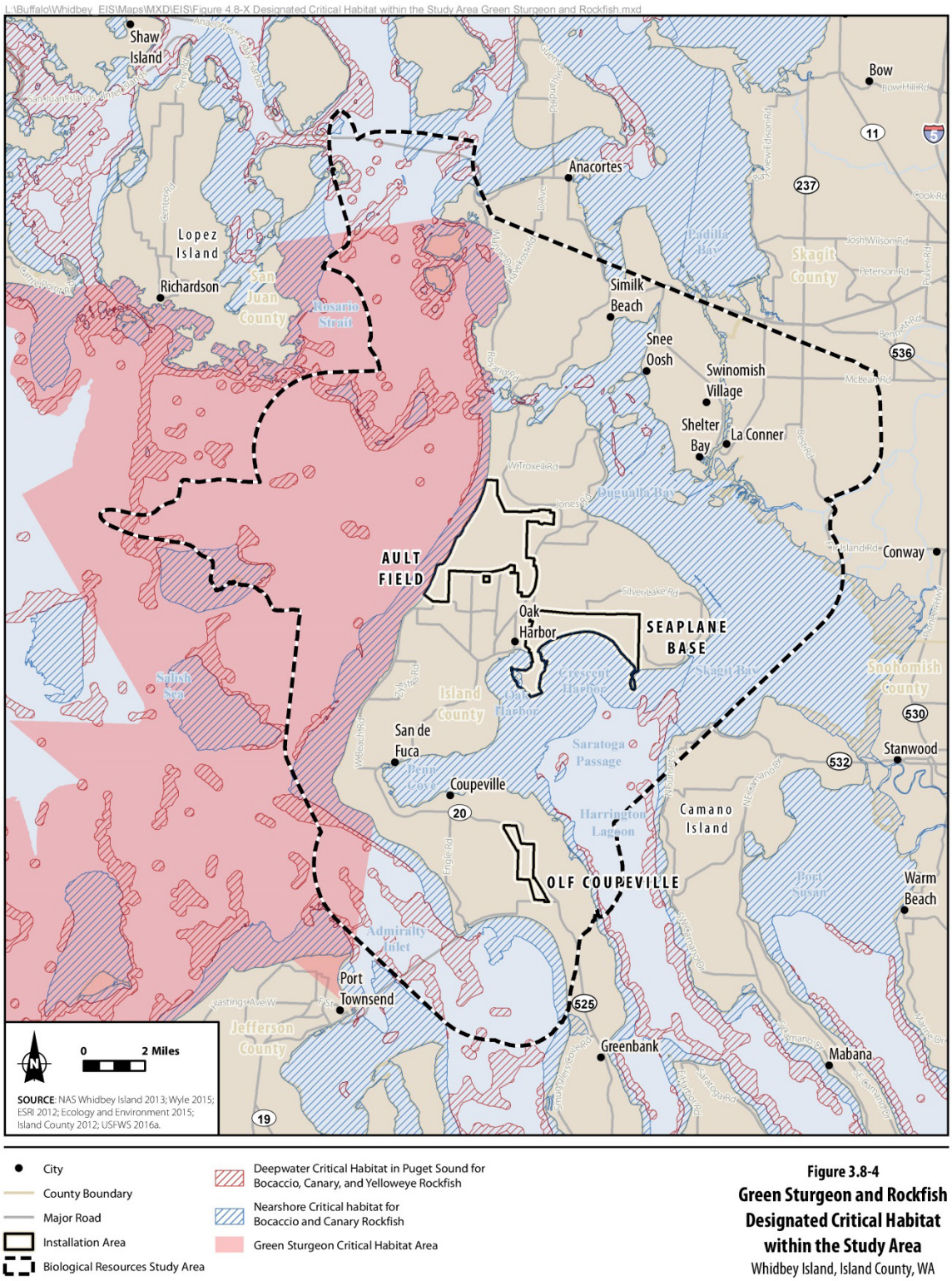
Green sturgeon spawn in freshwater, inland rivers. Reproductive males and females ranged from 15 to 28 years old and 19 to 34 years old, respectively (Van Eenennaam et al., 2006). Green sturgeon spawn are believed to spawn every 3 to 5 years from March through July (Moyle, Foley, and Yoshiyama, 1992). 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



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 their 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 is 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, 2016; 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, Greys 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.

Salmonids

There are seven species of Pacific salmonids (or salmon) in the Puget Sound and four federally listed salmon species that 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 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).

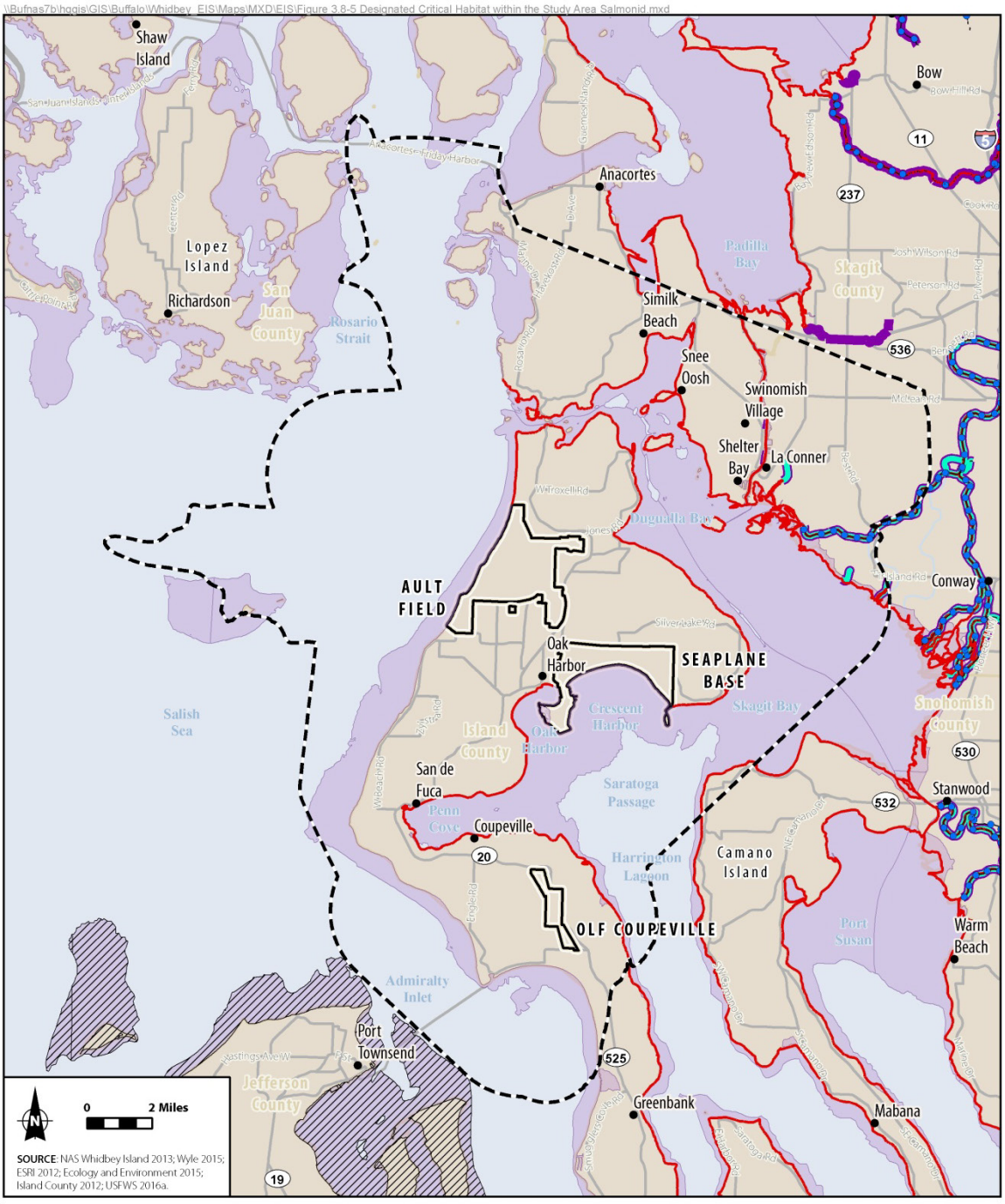
Once reproductively mature, adult salmon migrate back to their natal rivers and complete their lifecycle. Chinook salmon Puget Sound ESU mature at ages 3 to 4 years (Myers et al., 1998), Hood Canal summer-run chum mature at ages 2 to 4 years (Ames, Graves, and Weller, 2000), and steelhead Puget Sound 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 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 exempted from water restricted areas off of Ault Field and Crescent Harbor off the Seaplane Base, based on probable national security impacts (NAS Whidbey Island, 2012). 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.

The Hood Canal summer-run chum 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 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. 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 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. Steelhead may occur in the offshore waters around Whidbey Island; however, there are no suitable spawning streams on the island.

Figure 3.8-5 Salmonid Designated Critical Habitat within the Study Area



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 (USFWS, 2010). 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 is excluded.

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, 2012).

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.

Rockfish

There are three federally listed rockfish species that have the potential or are known to occur within the study area: bocaccio rockfish, canary 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). Canary rockfish are distributed from the western Gulf of Alaska to the Baja, California. Yelloweye rockfish range from the Aleutian Island 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, the canary rockfish Puget Sound/Georgia Basin DPS was listed as threatened, and the yelloweye rockfish Puget Sound/Georgia Basin DPS was listed as threatened. On July 6, 2016, it was proposed to remove the Puget Sound/Georgia Basin DPS of canary rockfish from the

ESA and to update the listing descriptions of the bocaccio rockfish and yelloweye rockfish. At the time of this publication, these species were still listed and will be discussed as such.

Bocaccio, canary, 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 (Buonaccori et al., 2002; Drake et al., 2010). In Puget Sound, records of juvenile bocaccio, canary, 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 species (Love, Yoklavich, and Thorsteinson, 2002; NMFS, 2014b).

As bocaccio, canary, and yelloweye rockfish age, they move to deeper waters within Puget Sound and surrounding waters. Adult bocaccio and canary 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 rockfish, canary rockfish, and bocaccio generally occupied habitats from approximately 90 to 1,400 feet.

Adult bocaccio and canary 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 life spans exceeding 50 years. Yelloweye rockfish have been documented up to 118 years old.

In November 2014, the NMFS designated critical habitat for the three rockfish species together: 590 square miles of nearshore habitat was designated for canary rockfish and bocaccio rockfish, and 414 square miles of deepwater habitat was designated for yelloweye rockfish, canary rockfish, and bocaccio rockfish (Figure 3.8-4). The NAS Whidbey Island complex is bounded by nearshore critical habitat for canary rockfish and bocaccio. There are deepwater critical habitats for all three rockfish species within the study area.

Adult rockfish are expected to use deepwater habitats away from the Whidbey Island shore. Juvenile rockfish, especially canary rockfish and bocaccio rockfish, may occur nearshore to Whidbey Island and within the study area.

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). 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).

Killer Whale (Southern Resident)

Killer whales are the most widely distributed marine mammal, occurring in all of the world's oceans (NMFS, 2015b). The killer whale populations of the eastern North Pacific Ocean comprise three distinct forms, all with notable morphological, ecological, genetic, and behavioral differences. The three types include resident, transient, and offshore, and they do not appear to interbreed despite partially overlapping ranges. All three forms regularly occur in Washington, including the Southern Resident population (WDFW, 2013). The Southern Resident population consists of about 80 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*).

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 (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.

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 ten gray whales visit the marine waters near Whidbey Island each year, arriving beginning in January and staying until summer (WDFW, 2013).

Figure 3.8-6 Southern Resident Killer Whale Designated Critical Habitat within the Study Area

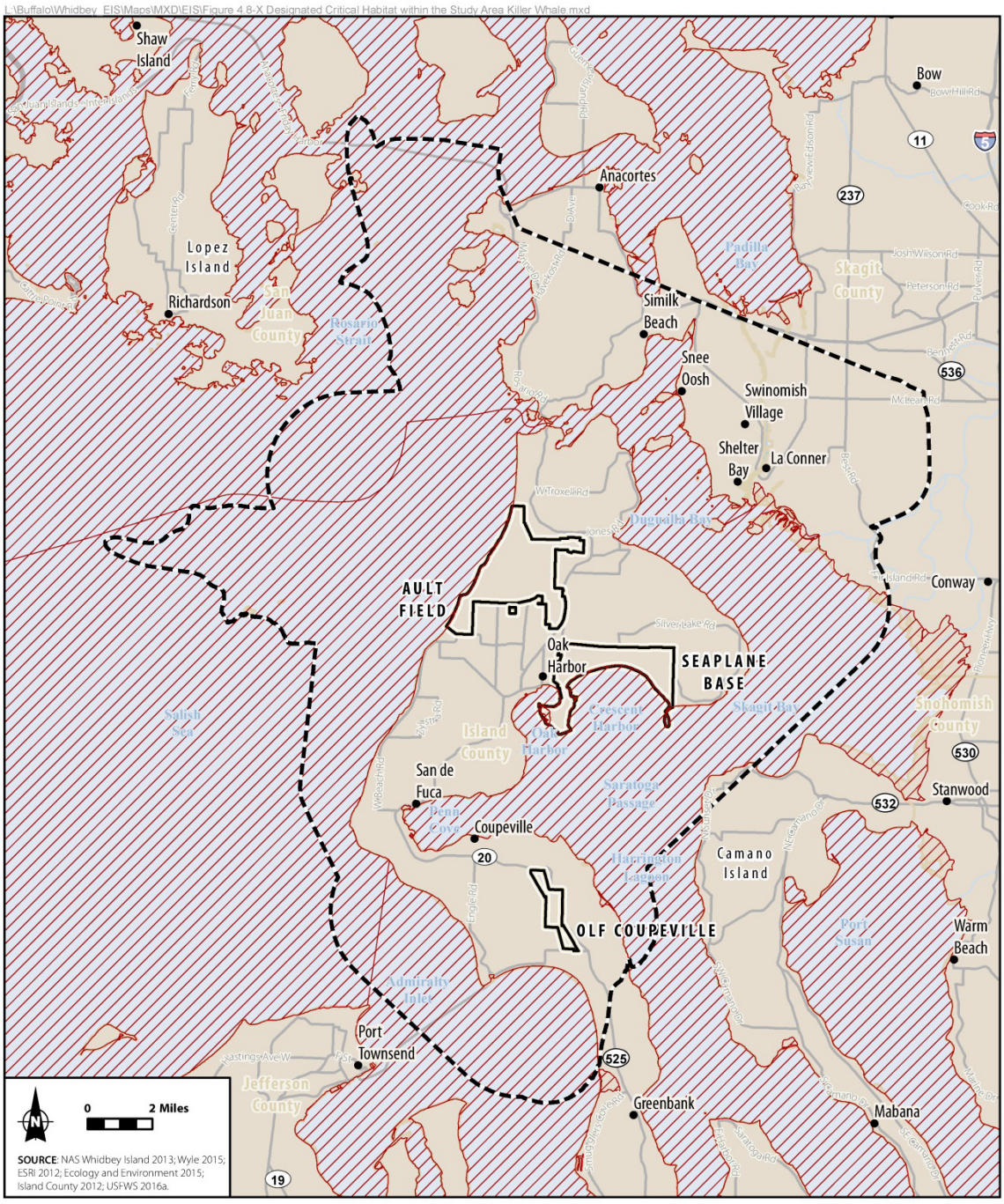


Figure 3.8-6
Southern Resident Killer Whale Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

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 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

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 under Section 404 of the Clean Water Act (CWA), as amended, and are regulated by the USEPA and USACE.

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 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.

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).

3.9.2.2 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 (Navy, 2012). 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. 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

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.

3.10.2.1 Population, Affected Environment

NAS Whidbey Island Complex

In Fiscal Year (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 (37.0 percent) as well as those renting or owning homes in the neighborhoods surrounding the station. The City of Oak Harbor was home to more than 44 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	37.0
City of Oak Harbor	44.6
Town of Coupeville	3.7
Subtotal	85.3
Skagit County	
Anacortes	4.8
Mount Vernon	3.2
Subtotal	8.0
Other (municipalities in various counties each with <3%)	6.7
Total	**100**

Source: Navy, 2005b

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 2013, total population in Island County increased by approximately 10.1 percent, while population in the City of Oak Harbor increased by 11.5 percent and population in the Town of Coupeville increased 6.3 percent during the same time period. Skagit County experienced a slightly greater rate of population increase. Between 2000 and 2013, total population in Skagit County increased by 14.2 percent. During the same time period, the total population in the City of Anacortes increased by 9.1 percent, and the total population in the City of Mount Vernon increased by 18.2 percent. The State of Washington as a whole experienced a population increase of approximately 15.7 percent from 2000 through 2013 (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

	Total Population				
Geographic Area	*2000 (actual)*	*2010 (actual)*	*2013 (estimated)*	*2020 (projected)*	*2030 (projected)*
Washington State	5,894,121	6,724,540	6,819,579	7,411,977	8,154,193
Island County	**71,558**	**78,506**	**78,806**	**82,735**	**87,621**
Coupeville	1,723	1,831	1,997	N/A	N/A
Oak Harbor	19,795	22,075	22,178	N/A	N/A
Skagit County	**102,979**	**116,901**	**117,641**	**128,249**	**136,410**
Anacortes	14,557	15,778	15,879	N/A	N/A
Mount Vernon	26,232	31,743	32,059	N/A	N/A

Sources: USCB, 2002, 2012a, 2012b, n.d.[a], n.d.[b]; Washington State Office of Financial Management, 2012

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 87,621 residents, and total population in Skagit County is expected to reach 136,410 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, 2012).

3.10.2.2 Economy, Employment, and Income, Affected Environment

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).

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, and defense contractors played an important role in the local economy. The largest employment sector in 2013 in Island County was the "educational services, and health care and social services" sector, which provided jobs to approximately 21.1 percent of the employed civilian work force. Other large industrial sectors in the county during the same time period included the retail trade sector; manufacturing; public administration; 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 2013 in Skagit County were the educational services, and health care and social services sector; the retail trade sector; and the manufacturing sector (see Table 3.10-4).

The two counties in the study area also vary greatly in terms of income and unemployment levels. In 2013, Island County had income levels that were comparable to those in the State of Washington as a whole. In 2013, the county had a per capita income of $30,941 and a median household income of $58,455. During the same time period, the State of Washington had an overall per capita income of $30,742 and an overall median household income of $59,478. 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).

In contrast, both per capita and median household income levels in Skagit County were significantly less than comparable statewide levels. In 2013, Skagit County had a per capita income level of $27,065 and a median household income level of $55,925 (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 9.0 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 17.3 percent of their populations living below the poverty level, while the City of Anacortes had 9.1 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 2014 of only 6.9 percent, while Skagit County had a 2014 average annual unemployment rate of 7.4 percent. In comparison, the State of Washington had an average annual unemployment rate of 6.2 percent during the same time period (see Table 3.10-5).

Table 3.10-4 Civilian Employment by Industrial Sector for Communities within the Study Area Surrounding the NAS Whidbey Island Complex in 2013

	Washington State	*Island County*	*Coupeville*	*Oak Harbor*	*Skagit County*	*Anacortes*	*Mount Vernon*
Agriculture, forestry, fishing and hunting, and mining	2.60%	0.70%	2.00%	0.70%	3.40%	1.40%	4.10%
Construction	6.20%	7.80%	3.30%	4.90%	7.20%	6.20%	6.40%
Manufacturing	10.60%	10.60%	3.00%	7.10%	10.90%	11.30%	9.70%
Wholesale Trade	3.00%	1.80%	2.90%	2.20%	2.70%	1.80%	3.70%
Retail Trade	11.70%	11.10%	8.10%	10.70%	13.60%	11.00%	15.80%
Transportation and warehousing, and utilities	5.10%	4.60%	6.30%	5.30%	5.20%	6.40%	3.30%
Information	2.30%	1.90%	0.60%	0.40%	1.20%	1.40%	1.10%
Finance and insurance, and real estate and rental and leasing	5.70%	5.10%	2.40%	5.00%	5.10%	4.70%	4.60%
Professional, scientific, and management, and administrative and waste management services	12.10%	10.10%	15.70%	6.90%	8.10%	9.20%	7.10%
Educational services, and health care and social assistance	21.50%	21.10%	33.10%	22.20%	21.90%	21.70%	20.40%
Arts, entertainment, and recreation and accommodation and food services	9.00%	9.90%	8.30%	13.30%	10.60%	14.00%	14.30%
Other services, expect public administration	4.80%	5.40%	8.30%	4.20%	4.90%	5.00%	4.90%
Public Administration	5.50%	10.10%	5.90%	17.20%	5.40%	5.80%	4.80%

Sources: USCB, n.d.[c], n.d.[d]

Note: Totals may not add up to 100 percent due to rounding.

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 (2014)*	*Per Capita Income (2013)*	*Median Household Income (2013)*	*Percent of Population with Incomes below the Poverty Level (2013)*
Washington State	6.2%	$30,742	$59,478	13.4%
Island County	6.9%	$30,941	$58,455	9.0%
Coupeville	N/A	$27,421	$49,125	17.3%
Oak Harbor	N/A	$22,846	$48,955	10.6%
Skagit County	7.4%	$27,065	$55,925	13.5%
Anacortes	N/A	$31,930	$59,116	9.1%
Mount Vernon	7.5%	$21,647	$48,240	17.3%

Sources: USCB, n.d.[c], n.d.[d]; USBLS, 2015a, 2015b, 2015c

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

3.10.2.3 Housing, Affected Environment

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 within the communities surrounding the station. 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).

During FY 15, a total of 3,402 military families at the NAS Whidbey Island complex required housing units. In that time, a total of 3,993 adequate family housing units were available to military families in the area, including 1,518 family housing units under military control and 2,475 acceptable private housing units in the community. 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, there was an effective housing surplus of 591 units for military families. In other words, more than enough adequate family housing was available on station and in the community to accommodate personnel at the NAS Whidbey Island complex in FY 15. FY 15 family housing requirement data were the most current information available at the time of publication (see Table 3.10-6).

Table 3.10-6 Total Military Family Housing Requirements and Available Assets at the NAS Whidbey Island Complex in FY 15

NAS Whidbey Island Complex	*FY 15*
Total Military Family Housing Requirement	3,402
Military-controlled Units	1,518
Adequate Private Housing Units	2,475
Surplus/(Deficit) of Military Family Housing Assets	591

Source: Griswold, 2015 (DD Form 1523)

Key:
FY = Fiscal Year

By May 2016, there was a total of 1,495 military-controlled public-private venture family housing units at the NAS Whidbey Island complex, including 242 enlisted two-bedroom units; 693 enlisted three-bedroom units; 330 enlisted four-bedroom units; 146 E7 to O5 three-bedroom units; and 84 E7 to O6 four-bedroom units. 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 2021 (Switalski, 2016).

Island and Skagit Counties

Table 3.10-7 provides information on the regional housing market surrounding the NAS Whidbey Island complex in 2013. 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 105,144 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 more renter-occupied units than owner-occupied units. In 2013, homeowner vacancy rates ranged from 0.0 percent in the Town of Coupeville to 4.1 percent in the City of Mount Vernon. Likewise, rental vacancy rates ranged from a low of 2.7 percent in the City of Anacortes to a high of 5.9 percent in Skagit County (see Table 3.10-7).

Property values in the three-county region varied greatly, with the median value of owner-occupied housing units ranging from a low of $225,700 in the City of Oak Harbor to a high of $317,500 in the City of Anacortes. Rental prices also vary throughout the region. In 2013, the median gross rent ranged from $899 per month in the City of Mount Vernon to $1,074 in the City of Oak Harbor (see Table 3.10-7).

Since 2013, property values and rental rates have risen in Island and Skagit Counties, and fewer homes have been listed for sale. In 2013, the median sale prices of housing units were $285,800 and $243,900 in Island and Skagit Counties, respectively. By 2015, these prices had increased to $313,200 in Island County and $268,300 in Skagit County (University of Washington, n.d.).

In addition, the number of housing units listed for sale at the end of the fourth quarter has shrunk since 2013. At the end of the fourth quarter of 2015, only 330 housing units were listed for sale in Island County. During the same time, only 428 housing units were listed of sale in Skagit County. In comparison, 555 units had been listed for sale at the end of the fourth quarter of 2013 in Island County and 628 units in Skagit County. The length of time that a housing unit stayed on the market declined

between 2013 and 2015. In 2013, there was a 5.4-month supply of housing units available in Island County; by 2015, this number had declined to a 2.8-month supply of housing units. Likewise, in 2013 there was a 4.7-month supply of housing units in Skagit County; by 2015, this number had declined to a 3.2-month supply (University of Washington, n.d.).

Table 3.10-7 Selected Housing Characteristics for the Communities in the Study Area Surrounding the NAS Whidbey Island Complex in 2013

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	2,899,538	1,661,427	967,699	2.0%	5.3%	$262,100	$973
Island County	**40,279**	**22,986**	**10,110**	**2.4%**	**5.6%**	**$292,100**	**$1,069**
Coupeville	969	423	470	0.0%	5.2%	$270,100	$943
Oak Harbor	9,808	4,017	4,941	1.3%	3.6%	$225,700	$1,074
Skagit County	**51,434**	**30,600**	**14,693**	**2.4%**	**5.9%**	**$261,400**	**$952**
Anacortes	7,465	4,483	2,312	2.7%	2.7%	$317,500	$1,001
Mount Vernon	12,321	6,452	4,920	4.1%	6.9%	$219,100	$899

Sources: USCB, n.d.[a], n.d.[e]

Note:
[1] Total number of housing units equals the total owner-occupied units, total renter-occupied units, and total vacant units.

In March 2016, 342 single-family homes and 20 condominiums in Island County were listed for sale with the Northwest Multiple Listings Service, 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, 2016b).

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).

3.10.2.4 Local Government Revenues and Expenditures, Affected Environment

In FY 12-13, the Island County government collected approximately $57.5 million in revenues, with more than 28 percent of this revenue coming from property taxes. Other large revenue sources for the county included intergovernmental revenues, which also accounted for 28 percent of total revenues; licenses, permits, charges for services, fines, and forfeits, which accounted for 23 percent of total

revenues; and retail sales and use taxes, which accounted for 13 percent of total revenues (see Table 3.10-8).

During the same time period, the Skagit County government raised $120.6 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; intergovernmental revenue; and sales and use taxes. Property taxes provided 35 percent of total revenues in Skagit County during FY 12-13 (see Table 3.10-8).

Table 3.10-8 Total County Government Revenues by Source for Fiscal Year 2012-2013 in the Area Surrounding the NAS Whidbey Island Complex

	Island County	*Skagit County*
Property Taxes	$16,346,000	$41,982,000
Retail Sales and Use Taxes	$7,635,000	$14,622,000
All Other Taxes	$3,392,000	$5,168,000
Intergovernmental Revenues	$15,863,000	$33,950,000
Licenses, Permits, Charges for Services, Fines and Forfeits	$12,963,000	$20,944,000
All Other Revenue	$1,276,000	$3,894,000
Total Revenues	**$57,475,000**	**$120,560,000**

Source: Washington State Office of Financial Management, 2014

During FY 12-13, total county government expenditures were $51.8 million in Island County and $118.2 million in Skagit County. Large expense categories included general government, public security, transportation, and health services (see Table 3.10-9). See Table 3.10-9 for a breakdown of expenditures by category by county.

Table 3.10-9 Total County Government Expenditures by Category for Fiscal Year 2012-2013 in the Area Surrounding the NAS Whidbey Island Complex

	Island County	*Skagit County*
General Government	$10,864,000	$26,494,000
Public Security	$9,269,000	$25,639,000
Physical Environment	$7,344,000	$12,101,000
Transportation	$7,980,000	$16,916,000
Health Services	$4,594,000	$9,344,000
All Other Expenditures (including debt service)	$11,790,000	$27,730,000
Total Expenditures	**$51,841,000**	**$118,224,000**

Source: Washington State Office of Financial Management, 2014

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 90 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.

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 by 2018, the elementary buildings will exceed their designed capacity during the 2016-2017 school year by 28 classrooms or by approximately 675 students. These students will be housed in 28 portable classrooms in the coming school year (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 will reconfigure 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. 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 is complete, the middle schools will switch from having surplus capacity to exceeding their designed capacity. By 2017, the middle schools will 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 $8,979 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 middle school (grades 6 through 8) is anticipated to open in 2017, and a new 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 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 $9,870 per student (Washington State Office of the Superintendent of Public Instruction, n.d.[d])

Medical Facilities, 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, 2016). 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, 2016).

Currently, approximately 27,000 beneficiaries fall within Naval Hospital Oak Harbor area of operation; approximately 20,300 of these beneficiaries have 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, 2016).

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 Whidbey General Hospital 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 Whidbey General Hospital in

Coupeville, Island Hospital in Anacortes, or Skagit Valley Hospital in Mount Vernon (Naval Hospital Oak Harbor, 2015a).

Whidbey General Hospital is located 13 miles south of the NAS Whidbey Island complex in the Town of Coupeville. Established in 1970, the 25-bed hospital has more than 70 physicians, 80 registered nurses, and an estimated 650 professional staff (Whidbey General Hospital, 2011a, 2011b; Consumer Reports, 2015). The hospital operates a Trauma Level III Emergency Department and two community clinics: one in North Whidbey and one in South Whidbey (Whidbey General Hospital, 2011b).

Island Hospital is located approximately 18 miles north of the NAS Whidbey Island complex in the City of Anacortes. 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, 2013a). In 2011, Island Hospital had an occupancy rate of 61 percent (Island Hospital, 2013b). Island Hospital also operates seven family-care clinics: five in Anacortes and two in San Juan County (Island Hospital, 2013a).

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 402 health care professionals on the medical staff. The Skagit Valley Hospital receives approximately 36,000 visits to its emergency department annually. The hospital also operates 10 clinics, with locations in Mount Vernon, Anacortes, Arlington, Camano Island, Oak Harbor, Sedro-Woolley, and Stanwood (Skagit County Regional Health, 2014).

Fire and Emergency Services, Affected Environment

Fire and emergency services at the NAS Whidbey Island complex are currently provided by the Navy Region Northwest Fire & Emergency Services (NRNW F&RS). NRNW F&RS 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&RS 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&RS 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&RS responds to approximately 1,110 calls for service at the NAS Whidbey Island complex. Currently, the department meets DoD Instruction 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 with the arrival of the P-8A Poseidon aircraft (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&RS 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&RS 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, 2015b). 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 9.5-square-mile city and its estimated 22,136 residents (City of Oak Harbor, 2015a). In 2014, the department employed 10 career and 34 paid-on-call firefighters and had mutual aid agreements with all emergency service providers on Whidbey Island, including NAS Whidbey Island Fire (Oak Harbor Fire Department, 2015). In 2014, the department responded to 1,123 emergency incidents and had an average response time of 4 minutes and 8 seconds. The fire department has four fire engines, one ladder truck, one rescue unit, two sport utility vehicles, six support and disaster vehicles, and a number of trailers (City of Oak Harbor, 2015a; Oak Harbor Fire Department, 2015).

North Whidbey Fire and Rescue consists of six fire stations and serves 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, 2015b). It has a mutual aid agreement with NAS Whidbey Island Fire and other Whidbey Island fire departments. As of 2012, the department's personnel consisted of one fire chief, five administrative staff, 10 officers, 26 duty crew, 15 trainees, and 37 volunteer firefighters. In 2012, it received 1,690 calls for service (North Whidbey Fire & Rescue, 2012).

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, 2015a). The department serves a total of 8,264 residents in Coupeville, Greenbank, and Central Whidbey Island and covers approximately 50 square miles. The department provides emergency medical services as well as technical-level marine rescue and other services (Central Whidbey Fire, 2015a). The department is staffed by nine full-time employees, 10 part-time employees, and 17 volunteers (Central Whidbey Fire, 2015b).

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 7th 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 2008, the Island County Sheriff's Department had 63 employees and a $7 million budget (Washington State Sheriff's Association, 2008a).

Police protection is also provided by the Oak Harbor Police Department, which is located on S.E. Barrington Drive, and the Coupeville Police Department, which is located on 7th Street. The Oak Harbor Police Department has a total of 39 personnel (three personnel in the administrative division, 20 in the special operations division, and 16 in the patrol division) (City of Oak Harbor, 2015c). The Coupeville Police Department consists of five personnel, a town marshal, and four deputy marshals (Town of Coupeville, 2013).

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, 2016i.

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

In order to assess the impacts to minority and low-income communities, the Navy must first identify 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 are 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 is determined, the Navy then must assess the impacts from the Proposed Action and determine whether these impacts would have a disproportionately high and adverse effect on these populations. This analysis involves 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 and Hispanic or Latino 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. For this analysis, "meaningfully greater" is defined as demographic statistics that differ by more than 15 percent from those of the community of comparison.

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 (or equal to) 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.

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 and Hispanic/Latino 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 seven census block groups where the percentage of residents with low incomes is greater than or equal to that of the communities of comparison. These seven census block groups located around OLF Coupeville do not have a "meaningfully greater" concentration of minority residents and do not have a greater than or equal concentration of low-income residents compared to the community of comparison. Therefore, these areas are not considered environmental justice communities.

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	*Total Population*[1]	*Percent Minority*[2]	*Percent Hispanic or Latino Origin*[3]	*Percent Low Income*[4]
Island County – County Total	***78,506***	***13.9%***	***5.5%***	***8.0%***
Block Group 1, Census Tract 9701	1,102	16.5%	4.3%	14.1%
Block Group 2, Census Tract 9701	1,502	11.3%	3.5%	14.1%
Block Group 1, Census Tract 9702	1,633	27.9%	12.8%	23.4%
Block Group 1, Census Tract 9703	791	20.7%	9.4%	4.4%
Block Group 2, Census Tract 9703	1,203	10.4%	8.5%	4.4%
Block Group 3, Census Tract 9703	1,044	11.0%	4.4%	4.4%
Block Group 1, Census Tract 9704	951	30.5%	14.2%	8.6%

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	*Total Population*[1]	*Percent Minority*[2]	*Percent Hispanic or Latino Origin*[3]	*Percent Low Income*[4]
Block Group 2, Census Tract 9704	2,256	27.2%	8.5%	8.6%
Block Group 1, Census Tract 9706.01	1,299	36.1%	9.9%	11.2%
Block Group 1, Census Tract 9708	1,484	22.0%	6.7%	8.7%
Block Group 1, Census Tract 9710	1,470	10.1%	4.7%	6.3%
Block Group 1, Census Tract 9711	2,019	11.2%	7.3%	2.9%
Block Group 2, Census Tract 9711	1,270	6.1%	2.4%	2.9%
Block Group 3, Census Tract 9713	1,762	4.3%	3.5%	6.8%
Skagit County - County Total	***116,901***	***16.6%***	***16.9%***	***11.7%***
Block Group 2, Census Tract 9521	658	10.3%	10.0%	9.1%
Block Group 3, Census Tract 9527	906	10.6%	12.9%	7.3%

Sources: USCB 2012e, 2012f, 2012g, 2012h, n.d.[f]

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 dB DNL contours because in most 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.

[3] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census Bureau surveys. This population definition is based on ethnicity and not race.

[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 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 than (or equal to) 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.

Figure 3.11-1 Census Tracts and Census Block Groups in the Environmental Justice Study Area

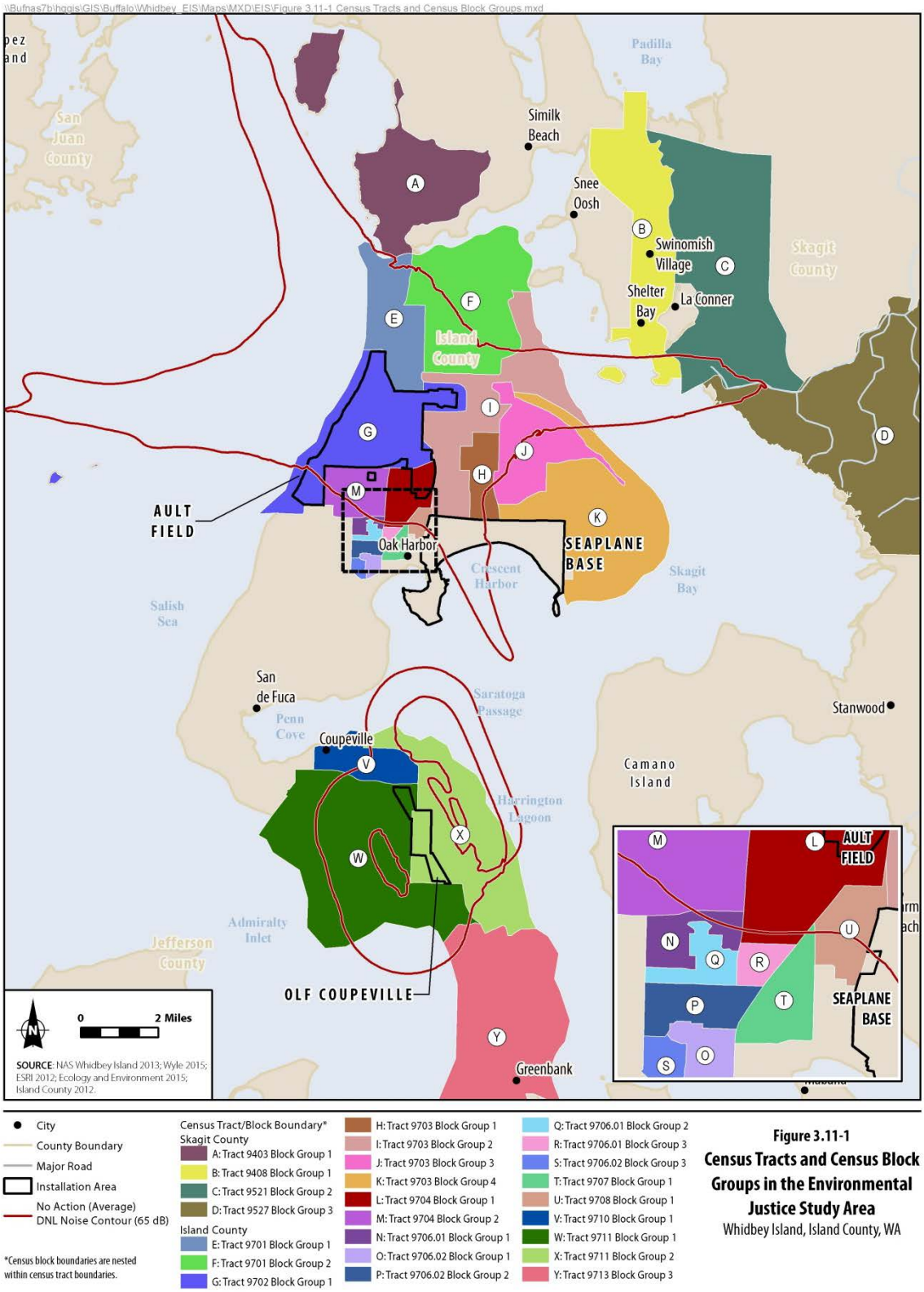


Figure 3.11-1
Census Tracts and Census Block Groups in the Environmental Justice Study Area
Whidbey Island, Island County, WA

Based on the most current data available, an estimated total population (both environmental justice communities and non-environmental-justice communities) of 11,033 persons are affected by noise within the No Action Alternative dB DNL contours at Ault Field and OLF Coupeville. Approximately 18.1 percent of this population (2,002 persons) would be minorities; approximately 7.3 percent of this population (809 persons) would be of Hispanic or Latino origin; and approximately 7.7 percent of this population (854 persons) would be low-income populations (see Table 3.11-2).

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 Hispanic or Latino[4] Population*	*Percent Hispanic or Latino[4] Origin*	*Total Low Income[5] Population*	*Percent Low Income[5]*
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**

Sources: USCB 2012d, 2012e, 2012f, 2012g, n.d.(g)

Notes:

1 All population estimates for affected areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

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.

4 Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

5 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

A. 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. The level of service (LOS) standards 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.

B. 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 Transportation Planning Organization (ITPO) was formed as a separate RTPO for Island County and as an alternative to the former sub-RTPO (Island County, 2016b). SCOG and ITPO 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). The 2015-2020 Skagit/Island RTIP currently serves as the RTIP for both SCOG and ITPO.

SCOG developed the Metropolitan and Regional Transportation Plan for both Island and Skagit Counties, and it presents a strategic framework for addressing the region's transportation needs. Relevant local regulations and policies include:

- The Regional Transportation Plan calls for new development to mitigate transportation impacts (SCOG, 2011).

C. 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 (Lochner, 2000).
- LOS standards are set 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 (Lochner, 2000).
- 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 (AADT) 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, 2007a).

The Street Division of the Oak Harbor Department of Public Works maintains city streets and rights of way (City of Oak Harbor, 2015f). The Planning Division of the Development Services Department was responsible for the creation of the city's comprehensive plan. Relevant local regulations and policies 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, 2014a).

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
- 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. These intersections and roadways are depicted on Figures 3.12-1 and 3.12-2.

Figure 3.12-1 Local and Regional Traffic Circulation – Ault Field

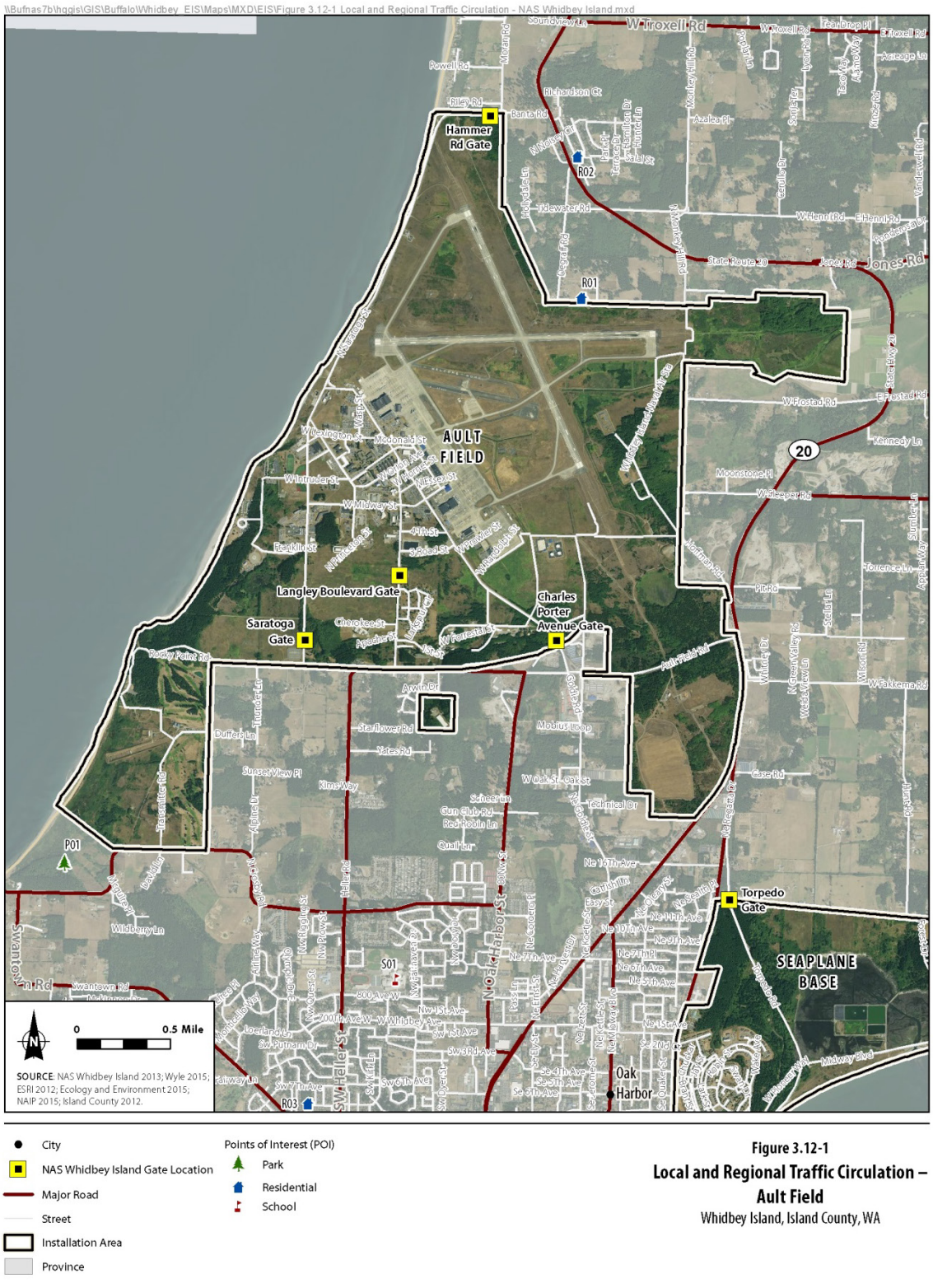


Figure 3.12-1
Local and Regional Traffic Circulation – Ault Field
Whidbey Island, Island County, WA

Figure 3.12-2 Local and Regional Traffic Circulation – Seaplane Base

Figure 3.12-2
Local and Regional Traffic Circulation – Seaplane Base
Whidbey Island, Island County, WA

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 were obtained from the WSDOT and 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 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.

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.

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 (SCOG, 2011).

- 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).
- 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.

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 (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 within the study area along with an estimate of existing LOS. Estimated ADT volumes and LOS under 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.

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	69,000	B
North of SR 20	54,000	C
Road: State Route 20 (SR 20)		
Municipality: Burlington		
Under I-5	23,000	B
Municipality: Skagit County		
East of Pulver Road	23,000	B
East of Avon Allen Road	24,000	B
West of Avon Allen Road	22,000	B
East of SR 536	21,000	B
West of SR 536	31,000	B
East of LaConner Whitney Road	31,000	B
West of LaConner Whitney Road	31,000	B
East of March Point Road	31,000	B
West of March Point Road	31,000	B
Road enters Anacortes		
North of Rosario Drive	14,000	D
South of Rosario Drive	16,000	D
Road enters Island County		
Municipality: Anacortes		
East of SR 20 Spur	31,000	B
South of SR 20 Spur	16,000	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	11,000	C
South of Libbey Road	11,000	C
Road enters Coupeville		
East of Quail Trail Lane	8,000	B

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 SR 525 and Race Road	6,600	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	17,000	D
North of Goldie Street	15,000	C
South of SE Midway Boulevard	17,000	C
North of SE Sixth Avenue	21,000	C
South of SE Sixth Avenue	21,000	C
North of SE Barrington Avenue	20,000	C
North of SE Pioneer Way	16,000	C
West of Beeksma Drive	18,000	C
North of Swantown Road	21,000	C
South of Swantown Road	14,000	C
Municipality: Coupeville		
West of Main Street	9,900	C
East of Main Street	7,900	B
Road: State Route 525 (SR 525)		
Municipality: Island County		
South of SR 20	7,000	B
North of Ellwood Drive	6,600	B
Road enters Freeland		
West of Bayview Road	12,000	C
West of Maxwelton Road	11,000	C
East of Maxwelton Road	9,700	C
West of Campbell Road	9,000	C
East of Cedar Vista Drive	9,000	C
West of Humphrey Road	8,400	C
East of Humphrey Road	7,000	C
At Clinton Ferry Dock	5,900	C
Municipality: Freeland		
West of Honeymoon Bay Road	6,500	B
East of Honeymoon Bay Road	11,000	C
West of Fish Road	13,000	C

Source: WSDOT, 2014

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

3.12.2.3 Transit, Pedestrian, and Bicycle Facilities

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 Anacortes 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, 2015a). 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, 2015b). 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, 2015c).

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.).

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

Federal Regulations

EO 13693, Planning for Federal Sustainability in the Next Decade, requires federal departments and agencies to enact specific actions and operations outlined within the EO to reduce agency direct GHG emissions by at least 40 percent over the next decade. Improved environmental performance and federal sustainability will be achieved by reducing energy use and cost. Pursuing clean sources of energy will improve energy and water security. EO 13693 requires federal agencies to meet emission-reduction goals associated with energy use, water use, building design and utilization, Fleet vehicles, and procurement and acquisition decisions. The CEQ provided federal agencies with implementation guidance and plans to meet these new goals in June 2015 (CEQ, 2015).

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 (DOE) 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 Greenhouse Gas (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.

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.

3.13.2.1 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.

3.13.2.2 Utilities

Potable Water

Water Supply and Distribution System

Island County has 229 public water systems serving over 78,000 individuals (USEPA, n.d.[a]). 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, 1998). 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, 2005).

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, n.d.[a]). 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 40 public water systems (USEPA, n.d.[b]). 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, n.d.[b]). The Anacortes system provides water for 15,734 residents in Anacortes in addition to selling water to Oak Harbor and NAS Whidbey Island. Anacortes' water treatment plant is located in Mount Vernon. The treatment plant was built in 2013 and replaced the previous facility that was located on the same site (City of Anacortes, 2015a).

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, 2015a). OLF Coupeville is considered self-sufficient regarding water and is served by two wells located at the site (NAVFAC, 2015a). The installation also maintains two wells used for emergency purposes, but the majority of potable water is received from Oak Harbor (NAVFAC, 2015a). 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, 2015a). The system has four active storage tanks and two reservoirs with a distributed capacity of 4.9 million gallons (NAVFAC, 2015a). The reservoirs are located at the Racon Hill property just south of Ault Field and 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, 2015a). 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.

Water Supply Capacity and Usage

The City of Anacortes obtains its drinking water from the Skagit River (City of Anacortes, 2015a). The new treatment plant has a capacity of 42 mgd and is expandable to 55 mgd (City of Anacortes, 2015a). 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, 2015e).

Oak Harbor receives 99.7 percent of its potable drinking water from Anacortes, and Oak Harbor is committed to 1 billion gallons per year (City of Oak Harbor, 2014b). 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. Average daily demand is 1.4 mgd. The NAS Whidbey Island Water System Plan states that average daily demand for water is expected to increase to 0.77 mdg by 2034 (NAVFAC, 2015a). 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, 2015). 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, 2015b).

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

Wastewater

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).

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.

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 (Carollo Engineers, 2013). The new facility is expected to increase the city's wastewater capacity by 2.7 mgd (City of Oak Harbor, 2015d) and to be online in 2018 (City of Oak Harbor, 2015e).

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).

Stormwater

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

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).

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).

Solid Waste Management

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).

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).

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, 2015c). 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).

Energy

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, 1998; PSE, 2015a).

PSE serves approximately 35,000 customers on Whidbey Island. The Island contains over 360 miles of underground distribution lines, 320 miles of overhead distribution lines, and 112 miles of high-voltage transmission lines. Ten distribution substations and three transmission substations are located on the island. Whidbey Island relies on power from Skagit County and the mainland. The U.S. Energy Information Administration reports that 114,172,916 megawatt-hours of electricity was generated in Washington in 2013 (EIA, 2015). Washington's major source of electricity generation is hydroelectric

power (68 percent), with additional generation from natural gas (10 percent), nuclear (7.4 percent), wind (6.1 percent), coal (5.9 percent), and small amounts from other sources. The prominence of renewable sources in Washington's electricity generation system, 76 percent in all, results in the State of Washington achieving the lowest average CO_2 emission rate (242 lbs CO_2/megawatt-hours) in the U.S. (EIA, 2015).

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, 1998; CNG, 2012a). 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, 2014b).

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).

Energy Capacity and Usage

PSE anticipates the electric demand within its service area to grow between 1.1 percent and 2.2 percent annually between 2016 and 2035. Customer growth in Skagit and Island Counties is expected to grow by 0.8 percent to 1.2 percent per year on average (PSE, 2015b). PSE's Integrated Resource Plan indicates it will need to change its resource strategy to avoid an energy deficit projected to occur beginning in 2021 (this projection does not take into consideration changes in usage under the action alternatives) (PSE, 2015b).

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, 2012b). Extension of natural gas service must be requested by customers; however, properties must be within a reasonable distance to main lines (Island County, 1998).

Communications

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, 2015d). Local telephone service in South Whidbey Island and parts of Central Whidbey Island is provided by Whidbey Telecom. 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). 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, 2015d).

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).

3.13.2.3 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 related to seismic events.

3.14.1 Geological Resources, Regulatory Setting

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, 2014c). 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, 2014c). 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

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), Utsaladay 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 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. 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).

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, 2014c). 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 (Navy, 2012).

  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 (Navy, 2012).

- **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 (Navy, 2012).

  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 (Navy, 2012).

- **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 (Navy, 2012).

- **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 (Navy, 2012).

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 (Navy, 2012).

- **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 (Navy, 2012).
- **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” (Navy, 2012).

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 Defense Environmental Restoration Program (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 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, 2014c).

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, 2014c).

3.15.2.3 Defense Environmental Restoration Program

Ault Field has 21 sites in various stages of investigation and remediation under the DERP (Navy, 2014c). The proposed construction areas under all alternatives are outside of any of the 21 DERP sites.

Perfluorinated Compounds

Certain perfluorinated compounds (PFCs) have been identified as emerging contaminants by the USEPA, and the Navy is evaluating their presence at NAS Whidbey Island under the DERP. These compounds are

environmentally persistent, so they have been detected in environmental samples long after releases occurred.

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).

In May 2016, the USEPA issued drinking water health advisories for two PFCs (perfluorooctanoic acid [PFOA] and perfluorooctane sulfonate) in accordance with the Safe Drinking Water Act (Federal Register, 2016; USEPA 2016j, 2016k, 2016l). PFCs 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. The Navy is identifying for removal and destruction all legacy perfluorooctane sulfonate (and PFOA) containing AFFF. The Navy is testing current AFFFs (most of which were developed to comply with the EPA 2010/2015 PFOA Stewardship Program) to confirm chemical formulations, with the goal of identifying suitable replacements for existing stocks.

The Navy is conducting a review of potential historic use of legacy AFFF and release of PFCs at Ault Field and OLF Coupeville to identify possible groundwater impacts. Although there are no specific records that indicate OLF Coupeville used legacy AFFF, it is likely that emergency response equipment was tested at the site; therefore, to address the potential for public exposure to PFCs in groundwater, the Navy is including OLF Coupeville in its investigation. This investigation is not part of the Proposed Action for this EIS.

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, 2016f). 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, 2016f). 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, 2016f).

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, 2016g), 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, 2016h).

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. President Obama issued EO 13653, Preparing the U.S. for the Impacts of Climate Change (EO 13653, 2013), which establishes task forces, research funding, and state, local, private-sector, and nonprofit sector support to address climate preparedness, resilience, and adaptation. EO 13693, Planning for Federal Sustainability in the Next Decade (2015) requires federal agencies to meet emission-reduction goals associated with energy use, water use, building design and utilization, Fleet vehicles, and procurement and acquisition decisions.

Federal agencies are required to consider GHG emissions and climate change in environmental assessment in accordance with NEPA. On August 1, 2016, the CEQ issued final guidance on the consideration of GHG emissions and climate change in NEPA review (CEQ, 2016). The guidance clarifies that NEPA review requires federal agencies to consider the effects of GHG emissions and climate change when evaluating Proposed Actions: “Analyzing a proposed action’s GHG emissions and the effects of climate change relevant to a proposed action—particularly how climate change may change an action’s environmental effects—can provide useful information to decision makers and the public.” (CEQ, 2016).

The guidance also emphasizes that agency analyses should be commensurate with projected GHG emissions and climate impacts, and should employ appropriate quantitative or qualitative analytical methods to ensure useful information is available to inform the public and the decision-making process in distinguishing between alternatives and mitigations (CEQ, 2016).

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 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, 2016)

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, 2016f):

- 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, 2016f).

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. [g]).

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.[h]). 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.[i]). 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.[j]).

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. Washington's anthropogenic GHG emissions for the period from 1990 to 2011 (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. The most recent inventory was published in December 2012, although summary data that will be reported in December 2016 are the latest data available (Washington State Department of Ecology, 2016). Data are available from the USEPA on the county level; however, these data do not include military aircraft operations.

Table 3.16-1 Washington State Annual Greenhouse Gas Air Emissions Inventory

Million Metric Tons CO_2e	*1990*	*2008*	*2009*	*2010*	*2011*	*2012*
Electricity, Net Consumption-based	***16.9***	***19.1***	***19.6***	***20.7***	***15.7***	***15.2***
Coal	16.8	15.1	14.7	15.8	12.8	12.1
Natural Gas	0.1	3.9	4.8	4.8	2.8	3.0
Petroleum	-	0.1	0.1	0.1	0.1	0.1
Residential/Commercial/Industrial	***18.6***	***20.9***	***19.8***	***19.7***	***20.8***	***20.5***
Transportation	***37.5***	***45.2***	***42.6***	***42.2***	***41.9***	***42.5***
Onroad Gasoline	20.4	22.6	22.6	21.9	21.3	21.2
Onroad Diesel	4.1	9.6	8.2	8.0	8.0	7.4
Marine Vessels	2.6	3.0	2.9	3.0	3.3	4.1
Jet Fuel and Aviation Gasoline	9.1	8.5	7.7	8.1	7.6	8.0
Natural Gas Industry	***0.5***	***0.7***	***0.7***	***0.7***	***0.7***	***0.7***
Industrial Process	***7.0***	***3.8***	***3.8***	***4.1***	***4.1***	***4.6***
Waste Management	***1.5***	***2.8***	***2.8***	***3.8***	***3.4***	***3.5***
Agriculture	***6.4***	***5.9***	***5.9***	***5.2***	***5.5***	***5.0***
Total Gross Emissions	***88.4***	***98.4***	***95.2***	***96.4***	***92.1***	***92.0***

Bold values are included in the total gross emissions; all other rows and values included are subsets of the category above.

Source: Washington State Department of Ecology, 2016

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. Using methods and emissions factors described in Section 3.4, the total GHG emissions from NAS Whidbey Island's Growler aircraft operations are currently 89,849 metric tons (MT) CO_2e per year, and GHG emissions from current Growler aircraft personnel are 9,091 MT CO_2e per year (Refer to Appendix B for complete air emissions calculations).

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 MT 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

Sources: NWCAA, 2013; NAS Whidbey Island 2013, 2014, 2015

Note: Measurements in metric tons (MT) CO_2e per year totals may not sum because of rounding.

[1] 2010-2013 Global warming potential of CH_4 = 21, 2014 GWP for CH_4 = 25.
[2] 2010-2013 Global warming potential of N_2O = 310, 2014 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

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• Potable Water • Wastewater • Stormwater • Solid Waste Management • Energy • Communications • Facilities	4-271	• Evaluation of demand for additional potable water to support new facilities and households • Evaluation of demand for additional wastewater treatment to support new facilities and households • Discussion of impervious surfaces and associated stormwater runoff impacts • Evaluation of additional solid waste impacts • Evaluation of demand for energy to support new facilities and households • Evaluation of communication network to support new facilities and households • Discussion of renovation/construction of facilities
Geological Resources 4.14		
• Topography/Geology • Seismic Activity Events • Soils	4-282	• Evaluation of topography and geology related to construction • Discussion of a potential seismic event buildings • Evaluation of topography and geology related to construction
Hazardous Materials and Wastes 4.15		
• Hazardous Materials and Wastes	4-284	• Evaluation of hazardous materials and waste and associated management practices

Chapter Guide		
Section Title/Number	**Page Number**	**Reader Notes**
Climate Change and Greenhouse Gases 4.16		
• Climate Change • GHG Emissions	4-286	• Evaluation of the impacts of climate change resulting from the action and to the action and NAS Whidbey Island, included a description of Navy actions designed to address climate change • Evaluation of the GHG emissions associated with the action
Summary of Potential Impacts to Resources 4.17		
• Summary of mitigation measures • Summary of potential impacts to resources	4-298	• Summary of potential impacts and mitigation measures identified an analyzed throughout Chapter 4.

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 (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] part 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 2017. 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 when events at Ault Field for aircraft loading, facility and infrastructure assets, personnel levels, and number of aircraft unrelated to the 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, 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).

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 Naval Air Station (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 airfield (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 field carrier landing practice (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

Airspace and Airfield Operations

Net increase of 35 or 36 Growler aircraft; total annual airfield operations for the NAS Whidbey Island complex (Ault and OLF Coupeville) would increase up to approximately 130,000 operations, a 47-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.

4.1.1 Airspace and Airfield Operations, No Action Alternative

Under the No Action Alternative, the 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.

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 (a net increase of 35 aircraft).

4.1.2.1 Airspace and Airfield Operations, Potential Impacts under Alternative 1

Airspace

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 System Training Facility [NWSTF] Boardman Okanogan A/B/C Military Operations Area, Olympic A/B MOAs, Roosevelt A/B MOAs, W-237 A/B/C/D/E/F/G/H/J, and 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 W-237 airspace is analyzed in the 2010 Northwest Training and Testing FEIS/OEIS. Growler training within the Olympic MOAs was analyzed in the 2010 NWTRC EIS/OEIS. The 2015 NWTT EIS/OEIS analyzed a small increase in Growler training in the Olympic MOAs.

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 aircraft that train in the MOAs and NWSTF Boardman arrive in the SUA via established, standard flight routes under the direct control of the 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 16,000 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 an 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 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**

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

Airfield Operations

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; total annual airfield operations for the NAS Whidbey Island complex would increase to approximately 130,000, a 47-percent increase. This increase represents a level of operation similar to historic levels of operations experienced over the life of the airfield (see Section 1.4). 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 are depicted in Figure 4.1-1. 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 12,300 projected operations under Scenario A, when 20 percent of all FCLPs would be conducted at Ault Field, to an increase of 38,700 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 and B, impacts related to airspace congestion may be experienced with greater frequency under Scenario C at Ault Field. The numbers above represent the average year conditions. Overall, Alternative 1 would not result in significant adverse impacts to airspace at Ault Field from proposed Growler operations. There would be a minor impact to operations when 80 percent of operations are conducted at Ault Field (Scenario C) due to instances of pattern congestion.

In order to provide a more transparent analysis for the public, high-tempo year FCLP data are provided in Appendix A. The high-tempo 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).

Table 4.1-2 Comparison of Modeled No Action and Alternative 1, Scenarios A, B, and C (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8]

Aircraft Type	*FCLP[2]*	*Other Operations[3]*	*Total*	*Total Change from No Action[6]*
Average Year Scenarios for Ault Field				
No Action	14,700	67,400	82,100	
Alternative 1, Scenario A (20% of FCLPs at Ault Field)				
Growler	8,700	71,500	80,200	
All Other Aircraft[4, 6]	0	14,200	14,200	
Total Airfield Operations	8,700	85,700	94,400	+12,300
Alternative 1, Scenario B (50% of FCLPs at Ault Field)				
Growler	21,900	71,400	93,300	
All Other Aircraft[4, 6]	0	14,200	14,200	
Total Airfield Operations	21,900	85,600	107,500	+25,400
Alternative 1, Scenario C (80% of FCLPs at Ault Field)				
Growler	35,100	71,800	106,900	
All Other Aircraft[4, 6]	0	13,900	13,900	
Total Airfield Operations	35,100	85,700	120,800	+38,700
Average Year Scenarios for OLF Coupeville				
No Action	6,100	400	6,500	
Alternative 1, Scenario A (80% of FCLPs at OLF Coupeville)				
Growler	35,100	0	35,100	
All Other Aircraft[4, 6]	0	400	400	
Total Airfield Operations	35,100	400	35,500	+29,000
Alternative 1, Scenario B (50% of FCLPs at OLF Coupeville)				
Growler	21,900	0	21,900	
All Other Aircraft[4, 6]	0	400	400	
Total Airfield Operations	21,900	400	22,300	+15,800
Alternative 1, Scenario C (20% of FCLPs at OLF Coupeville)				
Growler	8,800	0	8,800	
All Other Aircraft[4, 6]	0	400	400	
Total Airfield Operations	8,800	400	9,200	+2,700
Average Year Scenarios for the NAS Whidbey Island Complex				
No Action Total	20,800	67,800	88,600	
Alternative 1, Scenario A				
Total Airfield Operations	43,800	86,100	129,900	+41,300
Alternative 1, Scenario B				
Total Airfield Operations	43,800	86,000	129,800	+41,200
Alternative 1, Scenario C				
Total Airfield Operations	43,900	86,100	130,000	+41,400

Table 4.1-2 Comparison of Modeled No Action and Alternative 1, Scenarios A, B, and C (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8]

Aircraft Type	*FCLP*[2]	*Other Operations*[3]	*Total*	*Total Change from No Action*[6]

Source: Wyle, 2015

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.

5 An operation is defined as one arrival or one departure.

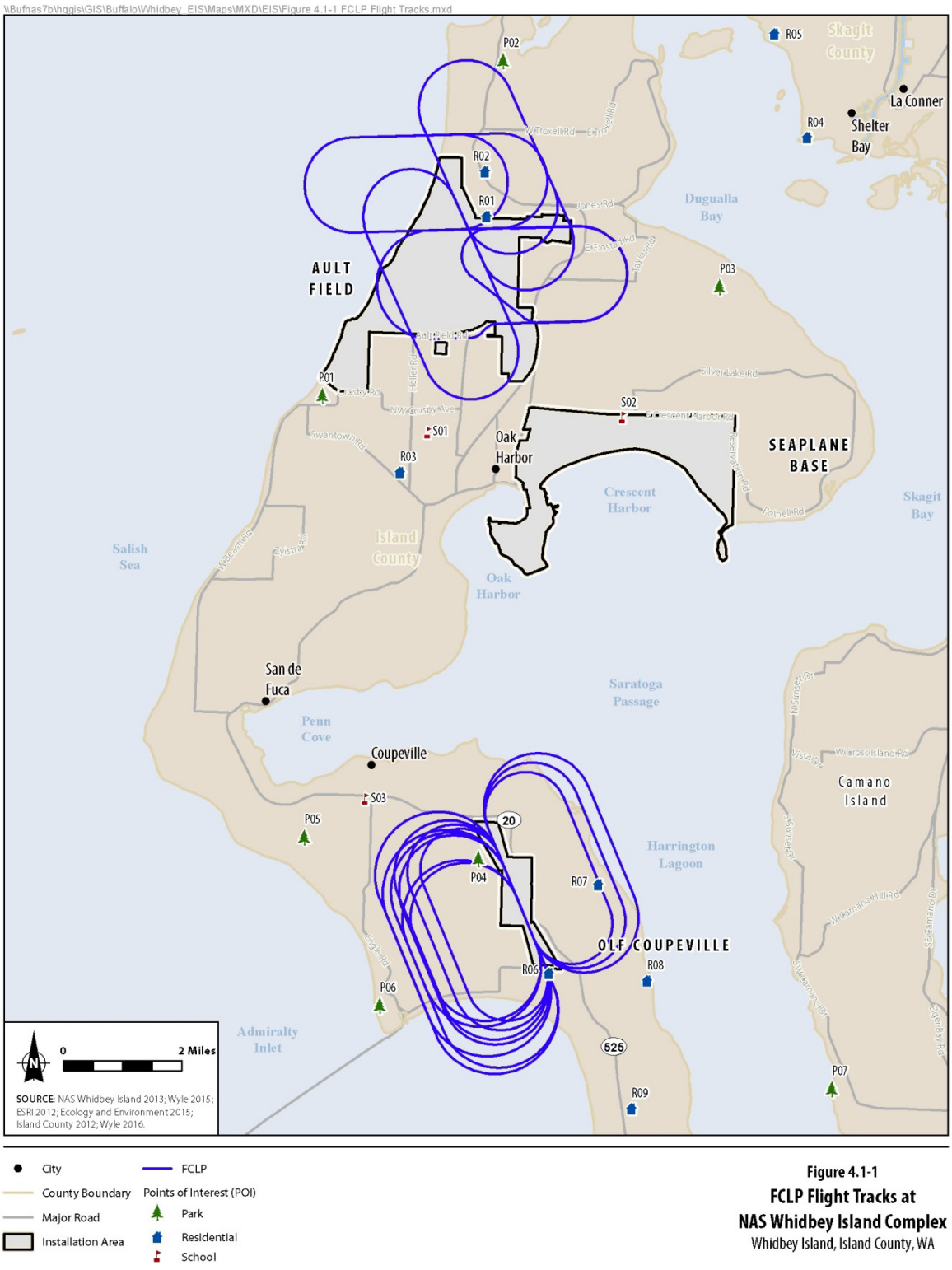
6 The numbers of operations fluctuate slightly from alternative to alternative due to randomness inherent in modeling.

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; Scenario C: 80 percent of FCLPs conducted at Ault Field.

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

Figure 4.1-1 FCLP Flight Tracks at NAS Whidbey Island Complex



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 are depicted in Figure 4.1-1. At OLF Coupeville, annual airfield operations would result in an increase of 29,000 operations during an average year under Scenario A, when 80 percent of the FCLPs would be conducted at OLF Coupeville, to an increase of 2,700 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 2 would not result in significant adverse impacts to airspace at OLF Coupeville from proposed Growler operations. There would be a negligible impact to operations when 80 percent of operations are conducted at Ault Field (Scenario A) due to instances of pattern congestion.

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. This narrower pattern requires an unacceptably steep angle of bank for the Growler due to performance differences from the Prowler flying the pattern. The proposed OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-1; under Alternative 1 (and all action alternatives), these patterns will be used in order to improve the standardization of training and enable more use of Runway 14. The standard FCLP patterns will result in runway use percentages based on the prevailing winds rather than aircraft performance and quality of training. 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.

Implementation of Alternative 1 would increase total airfield operations by up to 45 percent above the No Action Alternative. However, this action alternative 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 year FCLP data are provided in Appendix A. The high-tempo data represent years when the number of events may increase due to operational needs. During a high-tempo FCLP year, total airfield operations could increase approximately 10 to 11 percent at OLF Coupeville based on the operational scenarios selected as compared to the corresponding alternative (see Appendix A).

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 a minor impact to operations when 80 percent of operations are conducted at Ault Field due to instances of pattern congestion. There would be an increase of 12,300 to 38,700 annual aircraft operations at Ault Field and an increase of 2,700 to 29,000 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.

4.1.3 Airspace and Airfield Operations, Alternative 2

Under Alternative 2, expeditionary and carrier capabilities would be expanded by adding two expeditionary squadrons and aircrew to existing expeditionary squadrons at Ault Field; adding two additional aircraft to each existing carrier squadron; and augmenting the FRS with eight additional aircraft (a net increase of 36 aircraft).

4.1.3.1 Airspace and Airfield Operations, Potential Impacts under Alternative 2

The potential impacts and analysis are identical 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 may 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 the potential for 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 aircraft training occurring at Ault Filed 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.

Airspace

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.

Airfield Operations

The projected number of aircraft operations at the NAS Whidbey Island complex under Alternative 2 is compared to the No Action Alternative presented in Table 4.1-3. 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 Control Approach [GCA]/CCA patterns) as

depicted in Figures 3.1-3 to 3.1-5. FCLPs for Ault Field are depicted in Figure 4.1-1. 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 13,000 projected operations under Scenario A, when 20 percent of all FCLPs would be conducted at Ault Field, to an increase of 38,200 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 and B, impacts related to airspace congestion may be experienced with greater frequency under Scenario Cat Ault Field. 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 a minor impact to operations when 80 percent of operations are conducted at Ault Field (Scenario C) due to instances of pattern congestion.

In order to provide a more transparent analysis for the public, high-tempo year FCLP data are provided in Appendix A. The high-tempo data represent years when the number of events increase due to operational needs. During a high-tempo FCLP year, total airfield operations at Ault Field increase approximately 1 to 4 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 are depicted in Figure 4.1-1. At OLF Coupeville, annual airfield operations would result in an increase of 27,500 operations during an average year under Scenario A, when 80 percent of the FCLPs would be conducted at OLF Coupeville, to an increase of 2,300 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 would be a negligible impact to operations when 80 percent of operations are conducted at Ault Field (Scenario A) due to instances of pattern congestion.

The OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-1; 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.

Table 4.1-3 Comparison of Modeled No Action and Alternative 2, Scenarios A, B, and C (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8]

Aircraft Type	*FCLP*	*Other Operations*[2]	*Total*	*Total Change from No Action*
Average Year Scenarios for Ault Field				
No Action	14,700	67,400	82,100	
Alternative 2, Scenario A (20% of FCLPs at Ault Field)				
Growler	8,400	72,500	80,900	
All Other Aircraft[3, 5]	0	14,200	14,200	
Total Airfield Operations	8,400	86,700	95,100	+13,000
Alternative 2, Scenario B (50% of FCLPs at Ault Field)				
Growler	21,000	72,500	93,500	
All Other Aircraft[3, 5]	0	14,200	14,200	
Total Airfield Operations	21,000	86,700	107,700	+25,600
Alternative 2, Scenario C (80% of FCLPs at Ault Field)				
Growler	33,600	72,600	106,200	
All Other Aircraft[3, 5]	0	14,100	14,100	
Total Airfield Operations	33,600	86,700	120,300	+38,200
Average Year Scenarios for OLF Coupeville				
No Action	6,100	400	6,500	
Alternative 2, Scenario A (80% of FCLPs at OLF Coupeville)				
Growler	33,600	0	33,600	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	33,600	400	34,000	+27,500
Alternative 2, Scenario B (50% of FCLPs at OLF Coupeville)				
Growler	21,000	0	21,000	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	21,000	400	21,400	+14,900
Alternative 2, Scenario C (20% of FCLPs at OLF Coupeville)				
Growler	8,400	0	8,400	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	8,400	400	8,800	+2,300
Average Year Scenarios for the NAS Whidbey Island Complex				
No Action Total	20,800	67,800	88,600	
Alternative 2, Scenario A				
Total Airfield Operations	42,000	87,100	129,100	+40,500
Alternative 2, Scenario B				
Total Airfield Operations	42,000	87,100	129,100	+40,500
Alternative 2, Scenario C				
Total Airfield Operations	42,000	87,100	129,100	+40,500

Table 4.1-3 Comparison of Modeled No Action and Alternative 2, Scenarios A, B, and C (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8]

Aircraft Type	*FCLP*	*Other Operations[2]*	*Total*	*Total Change from No Action*

Source: Wyle, 2015

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.
5. An operation is defined as one arrival or one departure.
6. The numbers of operations fluctuate slightly from alternative to alternative due to 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; Scenario C: 80 percent of FCLPs conducted at Ault Field.

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

Implementation of Alternative 2 would increase total airfield operations by up to 46-percent above the No Action Alternative. However, this action alternative 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 year FCLP data are provided in Appendix A. The high-tempo data represent years when the number of events increase due to operational needs.

During a high-tempo FCLP year, total airfield operations would increase approximately 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 4.1-1; 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.

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 13,000 to 38,200 annual aircraft operations at Ault Field and an increase of 2,300 to 27,500 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 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.

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, and augmenting the FRS with nine additional aircraft (a net increase of 36 aircraft).

4.1.4.1 Airspace and Airfield Operations, Potential Impacts under Alternative 3

The potential impacts and analysis are identical 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 may 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 the potential for 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 aircraft training occurring 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.

Airspace

No changes are proposed to existing airspace under Alternative 3, and analysis is identical 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 2 would not result in significant impacts to airspace.

Airfield Operations

In Table 4.1-4, the projected number of aircraft operations at the NAS Whidbey Island complex under Alternative 3 is compared to the No Action Alternative. 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.

Table 4.1-4 Comparison of Modeled No Action and Alternative 3, Scenarios A, B, and C (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8]

Aircraft Type	*FCLP*	*Other Operations[2]*	*Total*	*Total Change from No Action*
Average Year Scenarios for Ault Field				
No Action	14,700	67,400	82,100	
Alternative 3, Scenario A (20% of FCLPs at Ault Field)				
Growler	8,400	72,400	80,800	
All Other Aircraft[3, 5]	0	14,100	14,100	
Total Airfield Operations	8,400	86,500	94,900	+12,800
Alternative 3, Scenario B (50% of FCLPs at Ault Field)				
Growler	21,000	72,500	93,500	
All Other Aircraft[3, 5]	0	13,900	13,900	
Total Airfield Operations	21,000	86,400	107,400	+25,300
Alternative 3, Scenario C (80% of FCLPs at Ault Field)				
Growler	33,500	72,500	106,000	
All Other Aircraft[3, 5]	0	14,000	14,000	
Total Airfield Operations	33,500	86,500	120,000	+37,900
Average Year Scenarios for OLF Coupeville				
No Action	6,100	400	6,500	
Alternative 3, Scenario A (80% of FCLPs at OLF Coupeville)				
Growler	33,500	0	33,500	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	33,500	400	33,900	+27,400
Alternative 3, Scenario B (50% of FCLPs at OLF Coupeville)				
Growler	20,900	0	20,900	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	20,900	400	21,300	+14,800
Alternative 3, Scenario C (20% of FCLPs at OLF Coupeville)				
Growler	8,300	0	8,300	
All Other Aircraft[3]	0	400	400	
Total Airfield Operations	8,300	400	8,700	+2,200
Average Year Scenarios for the NAS Whidbey Island Complex				
No Action Total	20,800	67,800	88,600	
Alternative 3, Scenario A				
Total Airfield Operations	41,900	86,900	128,800	+40,200
Alternative 3, Scenario B				
Total Airfield Operations	41,900	86,800	128,700	+40,100
Alternative 3, Scenario C				
Total Airfield Operations	41,800	86,900	128,700	+40,100

Table 4.1-4 Comparison of Modeled No Action and Alternative 3, Scenarios A, B, and C (Average Year), Aircraft Operations at the NAS Whidbey Island Complex[1, 5, 7, 8]

Aircraft Type	*FCLP*	*Other Operations[2]*	*Total*	*Total Change from No Action*

Source: Wyle, 2015

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).
   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.
5. An operation is defined one arrival or one departure.
6. The numbers of operations fluctuate slightly from alternative to alternative due to 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; Scenario C: 80 percent of FCLPs conducted at Ault Field.

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

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 are depicted in Figure 4.1-1. 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 12,800 projected operations under Scenario A, when 20 percent of all FCLPs would be conducted at Ault Field, to an increase of 37,900 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 and B, impacts related to airspace congestion may be experienced with greater frequency under Scenario C at Ault Field. 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 a minor impact to operations when 80 percent of operations are conducted at Ault Field (Scenario C) due to instances of pattern congestion.

In order to provide a more transparent analysis for the public, high-tempo year FCLP data are provided in Appendix A. The high-tempo data represent years when the number of events increase due to operational needs. During a high-tempo FCLP year, total airfield operations at Ault Field would increase approximately 1 to 3 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 are depicted in Figure 4.1-1. At OLF Coupeville, annual airfield operations would result in an increase of 27,400 operations during an average year under Scenario A, when 80 percent of the FCLPs would be conducted at OLF Coupeville, to an increase of 2,200 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 would be a negligible impact to operations when 80 percent of operations are conducted at Ault Field (Scenario A) due to instances of pattern congestion.

The OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-1; 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 46 percent above the No Action Alternative. However, this action alternative 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 year FCLP data are provided in Appendix A. The high-tempo data represent years when the number of events increase due to operational needs. During a high-tempo FCLP year, total airfield operations would increase approximately 10 to 11 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 4.1-1; 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. 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.

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 12,800 to 37,900 annual aircraft operations at Ault Field and an increase of 2,200 to 27,400 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.

4.1.5 Airspace and Airfield Operations Conclusion

Airspace Summary

Implementation of Alternatives 1 through 3 would increase total airfield operations by up to 47 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 to a total of approximately 120,800 total annual airfield operations (Alternative 1, Scenario C). Likewise, operations at OLF Coupeville would increase in operations with a total of approximately 35,500 operations (Alternative 1, Scenario A). However, none of the action 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 1 to 2 flights per day).

Table 4.1-5 Comparison of Alternatives, Scenarios A, B, and C (Average Year), and No Action 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]
Average Year Scenarios			
Alternative 1			
Scenario A	94,400	35,500	129,900
Scenario B	107,500	22,300	129,800
Scenario C	120,800	9,200	130,000
Alternative 2			
Scenario A	95,100	34,000	129,100
Scenario B	107,700	21,400	129,100
Scenario C	120,300	8,800	129,100
Alternative 3			
Scenario A	94,900	33,900	128,800
Scenario B	107,400	21,300	128,700
Scenario C	120,000	8,700	128,700
No Action Alternative			
No Action	81,700	6,500	88,600

Table 4.1-5 Comparison of Alternatives, Scenarios A, B, and C (Average Year), and No Action 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]*

Source: Wyle, 2015

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 numbers of operations fluctuate slightly from alternative to alternative due to 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.

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 action 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 all three action alternative would not result in significant impacts to airspace.

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 4.1-1. 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 may be adversely impacted under the action alternatives with 80 percent or more of the FCLPs conducted at Ault Field. An expected increase in scheduling challenges and the potential for 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). 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, Draft Aircraft Noise Study. The noise levels analyzed and described within this study are from computer-modeled noise and not actual 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.

Noise Associated with Aircraft Operations

New areas that were not previously within the 65 dB DNL noise contour generated by Navy aircraft operations under the No Action Alternative would be under the 65 dB DNL noise contour associated with the action alternatives. Although some of these areas are over water, others are over land and would therefore result in some additional people living within the 65 dB DNL noise contour.

Other supplemental metrics utilized in the analysis show 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 experiencing potential hearing loss of 5 dB or more.

This section presents potential noise impacts related to aircraft operations for the No Action Alternative and the three action alternatives.

The methodology and metrics used for evaluating potential noise impacts associated with the Proposed Action was developed based on guidance from the Department of Defense Noise Working Group as well as public scoping comments received on this project. The analysis contained within this section, by alternative, is presented in two parts, discussed below.

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 effects. The data associated with the supplemental noise metrics are presented utilizing the following outputs:

- single event noise levels for 30 points of interest (POIs)
- indoor speech Interference for 19 POIs (residences and schools)
- classroom/learning interference for nine POIs (schools, residences [where schools may be located])

- sleep disturbance for 19 POIs (residences, schools [in residential locations])
- potential noise effects on recreation for 11 POIs (parks)
- Potential hearing loss for populations within the 80 decibel (dB) DNL contour

In addition, a review of existing literature addressing nonauditory health effects from aircraft noise exposure is summarized in Section 3.2.3, with a more in-depth review provided in Appendix A, Draft Aircraft Noise Study.

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, 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 action alternatives.

Construction Noise

Construction noise generated by multiple construction, modification, expansion, and demolition projects under each action 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. Therefore, the DNL noise contours presented in Section 3.2.4, Noise Affected Environment, were modeled based upon the anticipated aircraft operating levels for Calendar Year 2021 (CY21). 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 potential hearing loss 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}), sound exposure level (SEL), maximum A-weighted sound level (L_{max}), and the number of events above a threshold, which are used to evaluate such noise effects as community noise exposure, indoor and outdoor speech interference, sleep disturbance, classroom/learning interference, and potential hearing loss. Additional information on the noise metrics is also available in Appendix A, Draft Aircraft Noise Study.

4.2.2.1 Noise Potential Impacts, Alternative 1

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).

4.2.2.1.1 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 action 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 three 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 Scenarios A, B, and C under Alternative 1. This overview figure of the NAS Whidbey Island complex (both Ault Field and OLF Coupeville) presents the 65 dB DNL contour for Scenarios A, B, and C for comparison.

Figures 4.2-2 through 4.2-4 present the three scenarios separately for Ault Field, and Figures 4.2-5 through 4.2-7 present the three scenarios separately for OLF Coupeville. In these sets of figures, the projected 60 dB, 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 above ground level 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 Scenarios A, B, and C. Generally speaking, around Ault Field, the 65 dB DNL contours associated with Scenario C extend the farthest from the airfield and cover the most area (14,355 acres, compared to 13,247 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 area (10,563 acres, compared to 8,613 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 differences are more prominent at Ault Field toward the ends of the four lobes of the noise contour, which is commonly located over water. The difference in noise contours at OLF Coupeville between the scenarios is more pronounced than at Ault Field due to the larger proportional difference of operations at OLF Coupeville than at Ault Field.

Table 4.2-1 presents an overall comparison of the number of 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, Scenarios A, B, and C. 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 442 and 1,979 at Ault Field, depending on the scenario and, for OLF Coupeville, increases from the No Action Alternative by between 535 and 1,316, depending on the scenario.

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, Draft Aircraft Noise Study. Figures 4.2-2 through 4.2-7 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.

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	3,557	2,995	3,030	2,345	5,587	3,377	12,174	8,717
Alternative 1								
Scenario A (20/80 FCLP split)	4,164 (+607)	3,563 (+568)	3,239 (+209)	2,117 (-228)	5,844 (+257)	3,479 (+102)	13,247 (+1,073)	9,159 (+442)
Scenario B (50/50 FCLP split)	4,172 (+615)	3,776 (+781)	3,069 (+39)	2,382 (+37)	6,539 (+952)	3,886 (+509)	13,780 (+1,606)	10,044 (+1,327)
Scenario C (80/20 FCLP split)	4,257 (+700)	4,087 (+1,092)	2,970 (-60)	2,343 (-2)	7,128 (+1,541)	4,266 (+889)	14,355 (+2,181)	10,696 (+1,979)
OLF Coupeville								
No Action Alternative								
Average Year	3,742	880	3,181	820	836	616	7,759	2,316
Alternative 1								
Scenario A (20/80 FCLP split)	1,574 (-2,168)	687 (-193)	3,013 (-168)	850 (+30)	5,976 (+5,140)	2,095 (+1,479)	10,563 (+2,804)	3,632 (+1,316)
Scenario B (50/50 FCLP split)	1,698 (-2,044)	513 (-367)	3,820 (+639)	1,133 (+313)	4,325 (+3,489)	1,609 (+993)	9,843 (+2,084)	3,255 (+939)
Scenario C (80/20 FCLP split)	3,543 (-199)	1,008 (+128)	3,649 (+468)	1,081 (+261)	1,421 (+585)	762 (+146)	8,613 (+854)	2,851 (+535)
NAS Whidbey Island Complex								
No Action Alternative								
Average Year	7,299	3,875	6,211	3,165	6,423	3,993	19,933	11,033
Alternative 1								
Scenario A (20/80 FCLP split)	5,738 (-1,561)	4,250 (+375)	6,252 (+41)	2,967 (-198)	11,820 (+5,397)	5,574 (+1,581)	23,810 (+3,877)	12,791 (+1,758)
Scenario B (50/50 FCLP split)	5,870 (-1,429)	4,289 (+414)	6,889 (+678)	3,515 (+350)	10,864 (+4,441)	5,495 (+1,502)	23,623 (+3,690)	13,299 (+2,266)
Scenario C (80/20 FCLP split)	7,800 (+501)	5,095 (+1,220)	6,619 (+408)	3,424 (+259)	8,549 (+2,126)	5,028 (+1,035)	22,968 (+3,035)	13,547 (+2,514)

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 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).

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). In addition, a 5.4-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, 2012). 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

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 4.2-2 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	0.7%	1.3%	0.5%	2.9%	1.8%	1.5%	1.1%	1.7%
Scenario B	0.8%	1.8%	-0.1%	1.0%	1.9%	1.9%	1.1%	1.6%
Scenario C	0.6%	2.4%	-1.0%	-1.1%	2.7%	4.2%	1.3%	2.3%
OLF Coupeville								
Scenario A	3.9%	8.3%	-8.0%	-8.2%	6.6%	5.3%	2.0%	2.7%
Scenario B	-6.0%	0.4%	-1.0%	-3.0%	5.3%	5.0%	0.9%	1.5%
Scenario C	-0.6%	-1.1%	-0.2%	0.1%	5.0%	2.2%	0.5%	0.2%
NAS Whidbey Island Complex								
Scenario A	1.6%	2.5%	-3.6%	-0.3%	4.2%	2.9%	1.5%	2.0%
Scenario B	-1.2%	1.6%	-0.6%	-0.3%	3.2%	2.7%	1.0%	1.6%
Scenario C	0.1%	1.7%	-0.6%	-0.7%	3.0%	3.9%	1.0%	1.9%

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 65 dB DNL Noise Contours for the NAS Whidbey Island Complex

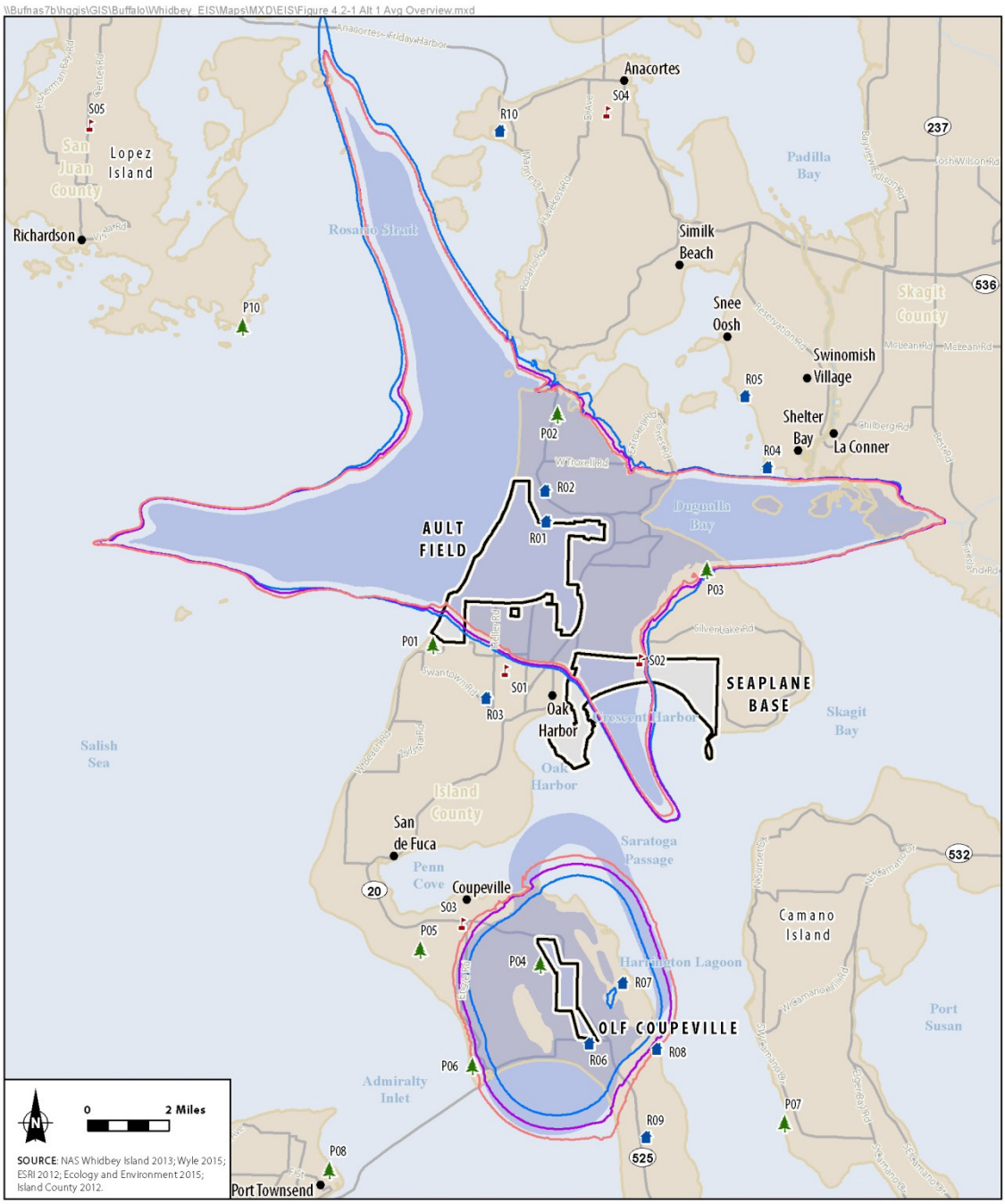


Figure 4.2-1
Alternative 1 Overview of the 65 dB DNL Noise Contours for the NAS Whidbey Island Complex
Whidbey Island, Island County, WA

Figure 4.2-2 Alternative 1A DNL Noise Contours for Ault Field

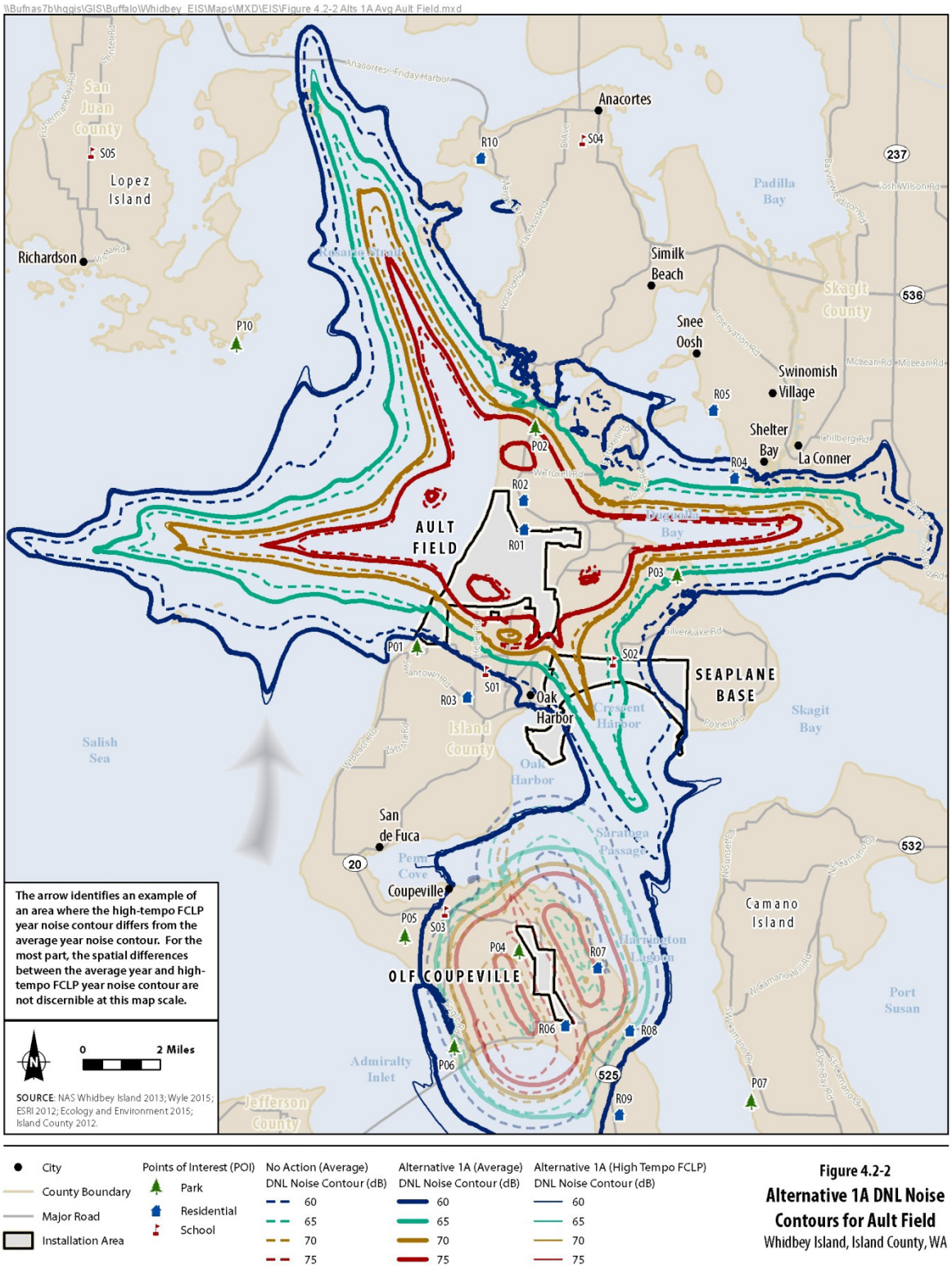


Figure 4.2-2
Alternative 1A DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

Figure 4.2-3 Alternative 1B DNL Noise Contours for Ault Field

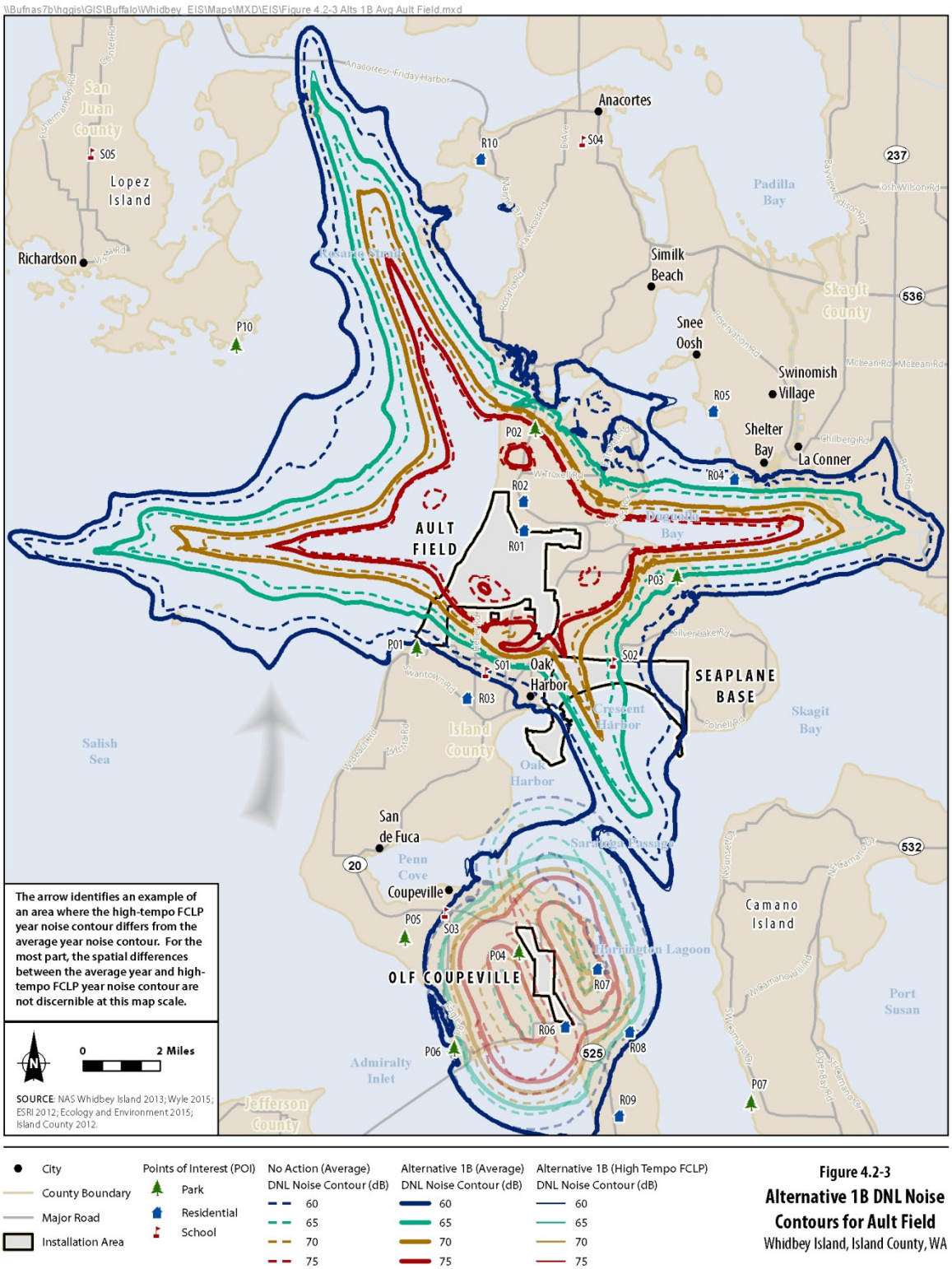


Figure 4.2-4 Alternative 1C DNL Noise Contours for Ault Field

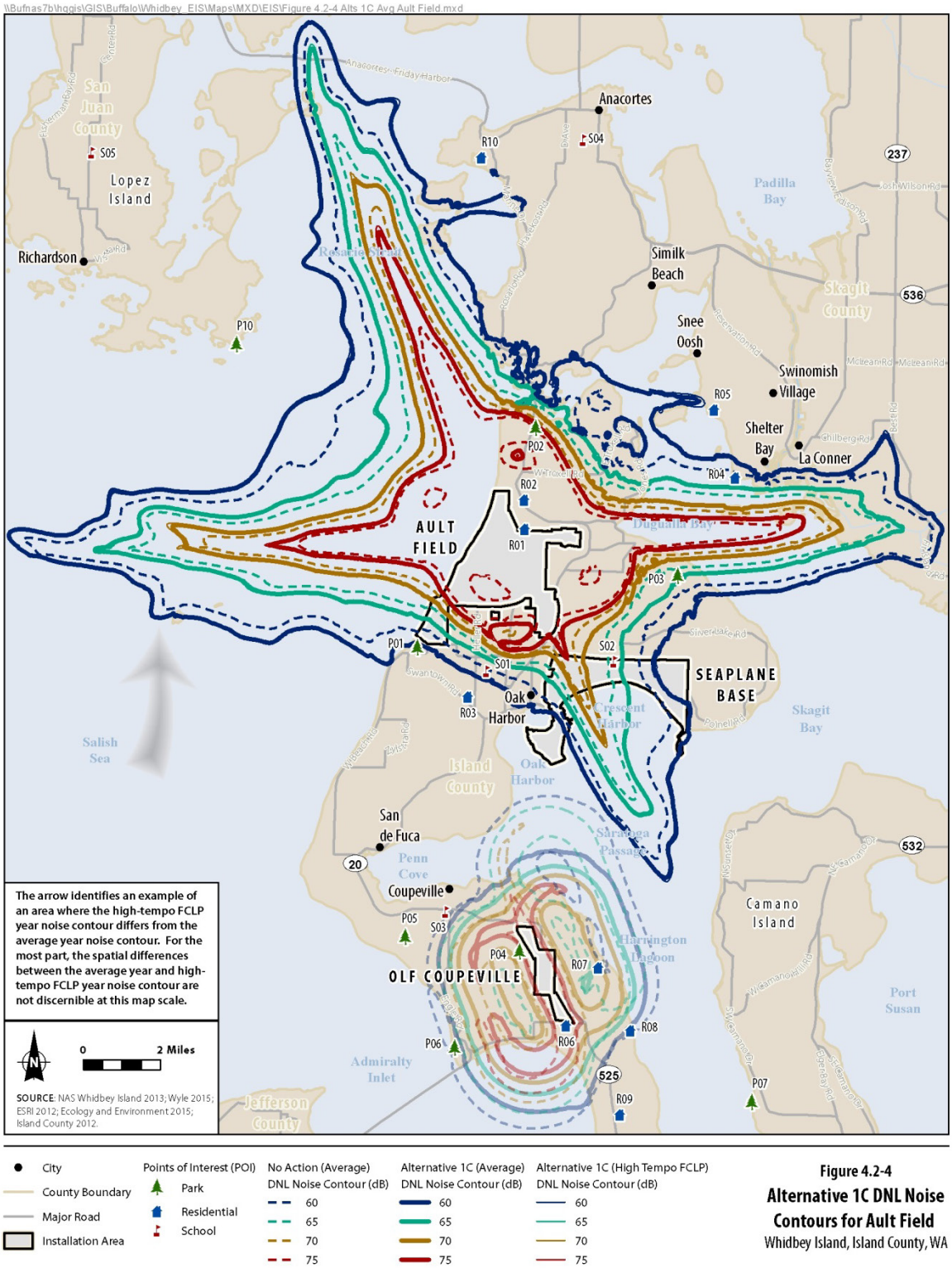


Figure 4.2-4
Alternative 1C DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

Figure 4.2-5 Alternative 1A DNL Noise Contours for OLF Coupeville

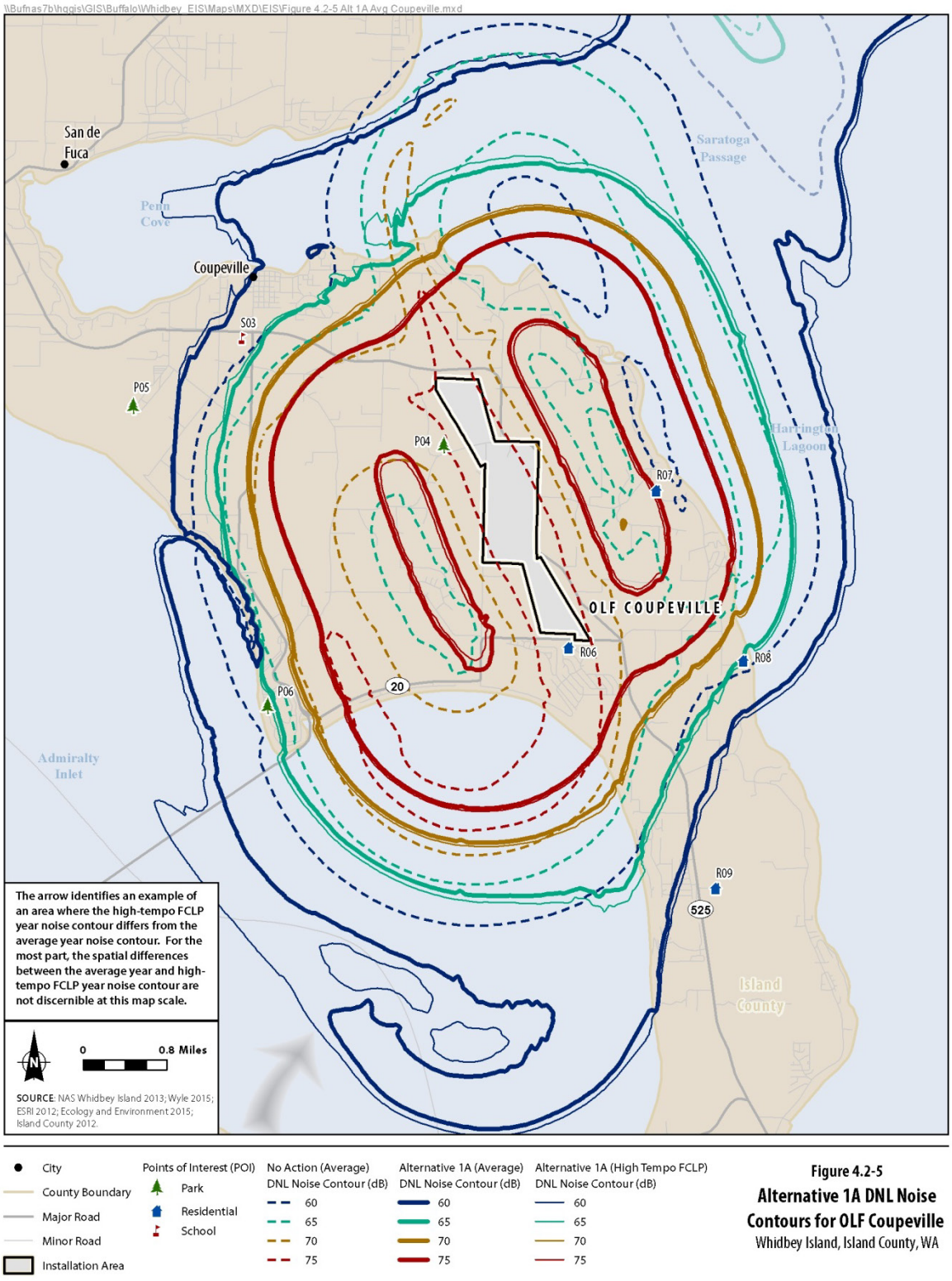


Figure 4.2-6 Alternative 1B DNL Noise Contours for OLF Coupeville

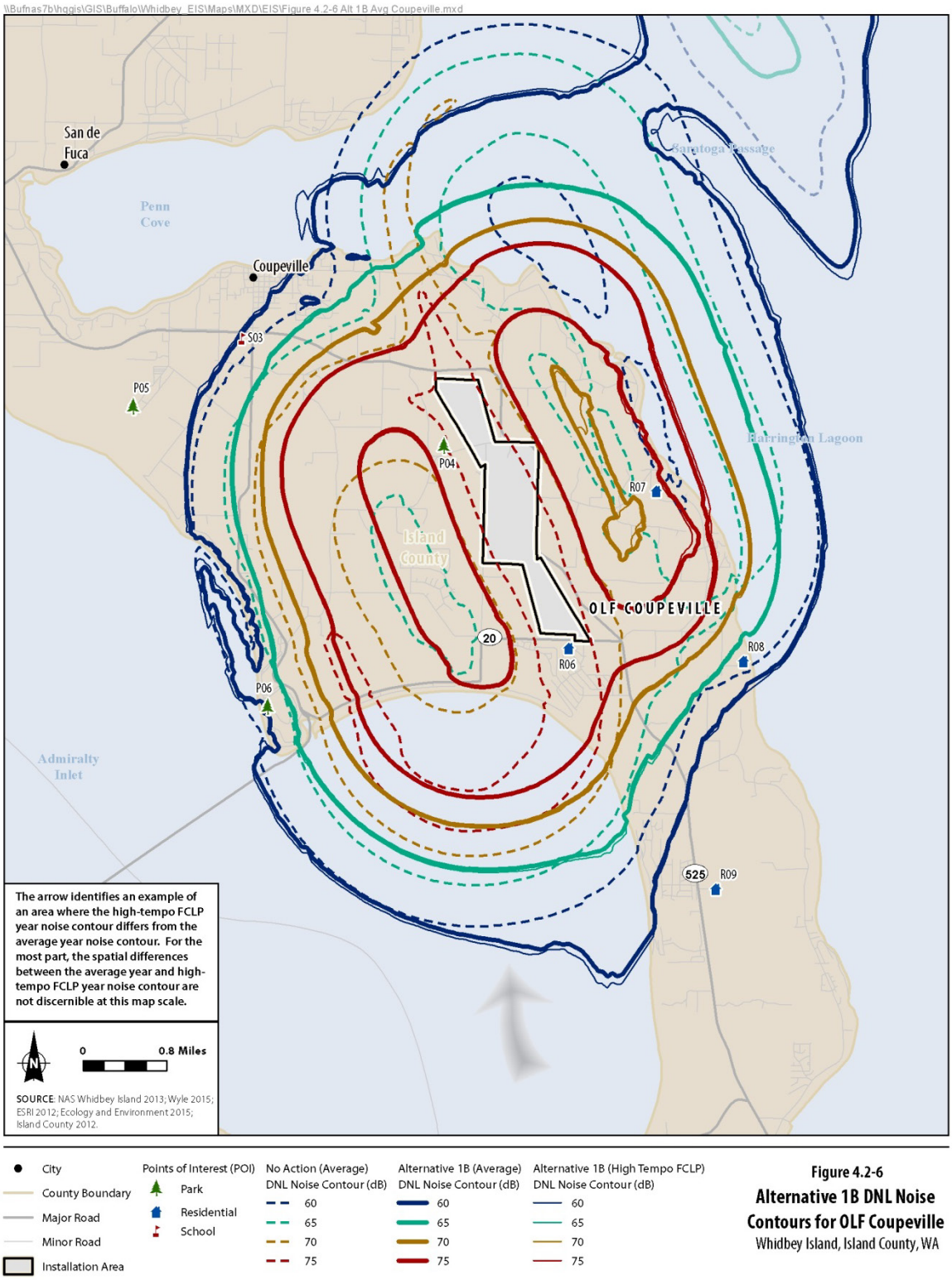


Figure 4.2-7 Alternative 1C DNL Noise Contours for OLF Coupeville

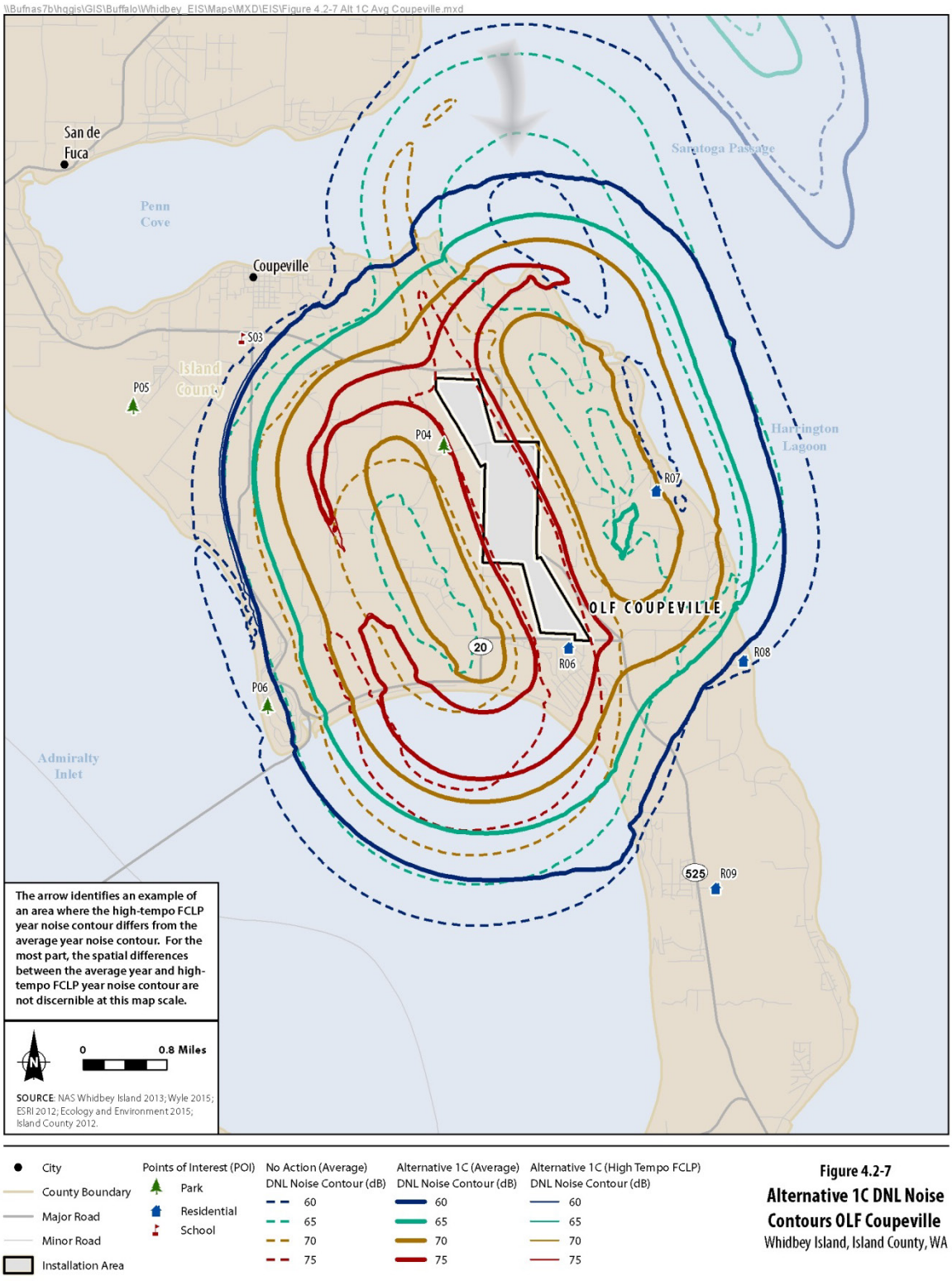


Figure 4.2-7
Alternative 1C DNL Noise Contours OLF Coupeville
Whidbey Island, Island County, WA

4.2.2.1.2 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, speech interference, classroom/learning interference, sleep disturbance, potential noise effects on recreation, and potential hearing loss. 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 as the location and type of POI dictates whether the particular analysis would apply.

Single Event Noise

Two noise metrics are used to evaluate single event noise: 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, Draft 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 only six of the 30 POIs changed from the No Action Alternative to Alternative 1 (measurements increased at R06 and R07 and decreased at R08, R09, S03, and S07). In addition, the SEL and L_{max} values for the representative POIs are all identical under all of the three action alternatives. However, the number of annual aircraft events that would produce these noise levels would differ between the three action alternatives and in comparison to the No Action Alternative. Table 4.2-3 also presents the number of annual aircraft events that produces the loudest single event for each POI.

What this analysis shows is that while there may not be a substantive difference in the loudest event at a particular POI, there may be a difference in the number of times that loudest event would occur between alternatives and compared to the No Action Alternative. Under Alternative 1, some of the POIs would experience more annual events of the maximum SEL/ L_{max} than under the No Action Alternative, and other POIs would experience fewer annual events of the maximum SEL/L_{max}. The POI R06 (Admirals Dr. and Byrd Dr.) would experience the largest increase in annual events (+2,383 under Scenario A); the POI P04 Ebey's Landing – Rhododendron Park would experience the largest decrease in annual events (-95 under Scenario C). Generally, POIs near OLF Coupeville experienced more annual events under Scenario A than under Scenarios B or C.

Under Alternative 1, the number of events that would produce the maximum SEL/ L_{max} values varies between the scenarios, depending on the POI (see Table 4.2-3). For example, on the high end, at Admirals Drive and Byrd Drive (R06) under Scenario A, a person would be exposed to the maximum SEL/ L_{max} an average of approximately seven times per day compared to the low end, such as at Cama Beach State Park (P07) under Scenario C, where a person would be exposed to the maximum SEL/ L_{max} an average of approximately once every month.

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]

		Maximum SEL (dB)		*L_{max} (dB)*		*Number of Annual Events[2]*			
ID	*Description*	*No Action Alternative*	*Alt 1*	*No Action Alternative*	*Alt 1*	*No Action Alternative*	*Alt 1 A*	*Alt 1 B*	*Alt 1 C*
Residences									
R01	Sullivan Rd.	121	121 (0)	114	114 (0)	26	88 (+62)	55 (+29)	18 (-8)
R02	Salal St. and N. Northgate Dr.	109	109 (0)	96	96 (0)	12	117 (+105)	63 (+51)	34 (+22)
R03	Central Whidbey	101	101 (0)	93	93 (0)	34	41 (+7)	42 (+8)	40 (+6)
R04	Pull and Be Damned Point	96	96 (0)	88	88 (0)	208	267 (+59)	249 (+41)	249 (+41)
R05	Snee-Oosh Point	92	92 (0)	84	84 (0)	733	1,033 (+300)	946 (+213)	918 (+185)
R06	Admirals Dr. and Byrd Dr.	118	121 (+3)	114	118 (+4)	267	2,650 (+2,383)	1,613 (+1,346)	649 (+382)
R07	Race Lagoon	114	115 (+1)	106	110 (+4)	55	515 (+460)	346 (+291)	132 (+77)
R08	Pratts Bluff	112	101 (-11)	105	92 (-13)	75	515 (+440)	346 (+271)	132 (+57)
R09	Cox Rd. and Island Ridge Way	92	90 (-2)	82	81 (-1)	72	23 (-49)	29 (-43)	18 (-54)
R10	Skyline	100	100 (0)	90	90 (0)	261	366 (+105)	338 (+77)	387 (+126)
R11	Sequim	73	73 (0)	60	60 (0)	74	102 (+28)	98 (+24)	109 (+35)
R12	Port Angeles	75	75 (0)	65	65 (0)	208	267 (+59)	249 (+41)	249 (+41)
Schools									
S01	Oak Harbor High School	99	99 (0)	90	90 (0)	26	111 (+85)	67 (+41)	27 (+1)
S02	Crescent Harbor Elementary School	102	102 (0)	94	94 (0)	178	298 (+120)	301 (+123)	312 (+134)
S03	Coupeville Elementary School	98	94 (-4)	90	85 (-5)	367	1,325 (+958)	807 (+440)	324 (-43)
S04	Anacortes High School	93	93 (0)	83	83 (0)	112	157 (+45)	145 (+33)	166 (+54)
S05	Lopez Island School	76	76 (0)	68	68 (0)	110	173 (+63)	125 (+15)	169 (+59)

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]

		Maximum SEL (dB)		*L_{max} (dB)*		*Number of Annual Events[2]*			
ID	*Description*	*No Action Alternative*	*Alt 1*	*No Action Alternative*	*Alt 1*	*No Action Alternative*	*Alt 1 A*	*Alt 1 B*	*Alt 1 C*
S06	Friday Harbor Elementary School	53	53 (0)	39	39 (0)	26	20 (-6)	27 (+1)	33 (+7)
S07	Sir James Douglas Elementary	62	62 (0)	52	51 (-1)	147	207 (+60)	189 (+42)	184 (+37)
Parks									
P01	Joseph Whidbey State Park	93	93 (0)	82	82 (0)	34	41 (+7)	42 (+8)	40 (+6)
P02	Deception Pass State Park	110	110 (0)	104	104 (0)	161	694 (+533)	422 (+261)	172 (+11)
P03	Dugualla State Park	105	105 (0)	98	98 (0)	110	175 (+65)	166 (+56)	171 (+61)
P04	Ebey's Landing – Rhododendron Park	112	112 (0)	106	106 (0)	267	694 (+427)	422 (+155)	172 (-95)
P05	Ebey's Landing – Ebey's Prairie	88	88 (0)	77	77 (0)	367	1,437 (+1,070)	872 (+505)	357 (-10)
P06	Fort Casey State Park	96	96 (0)	85	85 (0)	267	1,325 (+1,058)	807 (+540)	324 (+57)
P07	Cama Beach State Park	83	83 (0)	73	73 (0)	5	43 (+38)	29 (+24)	11 (+6)
P08	Port Townsend	85	85 (0)	n/a	n/a (0)	24	19 (-5)	21 (-3)	22 (-2)
P09	Moran State Park	62	62 (0)	51	51 (0)	61	47 (-14)	62 (+1)	78 (+17)
P10	San Juan Island National Monument	95	95 (0)	85	85 (0)	372	524 (+152)	482 (+110)	553 (+181)
P11	San Juan Island Visitors Center	63	63 (0)	50	50 (0)	147	207 (+60)	189 (+42)	184 (+37)

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] The number of annual events is the estimated number of times the single aircraft event with the maximum SEL or L_{max} at that POI would occur annually.

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

Speech Interference

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 (Wyle, 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 12 residential POIs and the seven 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 4.2-4 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, Scenarios A, B, and C.

Compared to the No Action Alternative, Alternative 1 would result in between 0 and 4 additional events per hour at representative POIs during which conversations or indoor speech would be interrupted. The largest change (with four additional events per daytime hour) would occur at R01 (Sullivan Road) and R02 (Salal St. and N. Northgate Dr.), both under Scenario C. However, there are also several POIs at which no change would occur under any of the scenarios compared to the No Action Alternative.

Table 4.2-4 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]

		No Action Alternative		Scenario A		Scenario B		Scenario C	
		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 s Closed[3]
Residences									
R01	Sullivan Rd.	8	8	10 (+2)	10 (+2)	11 (+3)	11 (+3)	12 (+4)	12 (+4)
R02	Salal St. and N. Northgate Dr.	8	7	10 (+2)	9 (+2)	11 (+3)	10 (+3)	11 (+3)	11 (+4)
R03	Central Whidbey	2	-	3 (+1)	- (0)	3 (+1)	- (0)	3 (+1)	- (0)
R04	Pull and Be Damned Point	4	2	5 (+1)	2 (0)	6 (+2)	2 (0)	6 (+2)	2 (0)
R05	Snee-Oosh Point	2	-	2 (0)	1 (+1)	2 (0)	1 (+1)	2 (0)	1 (+1)
R06	Admirals Dr. and Byrd Dr.	1	1	3 (+2)	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)
R07	Race Lagoon	-	-	2 (+2)	1 (+1)	1 (+1)	1 (+1)	1 (+1)	0 (0)
R08	Pratts Bluff	-	-	2 (+2)	1 (+1)	1 (+1)	1 (+1)	1 (+1)	- (0)
R09	Cox Rd and Island Ridge	1	-	3 (+2)	- (0)	2 (+1)	- (0)	1 (0)	- (0)
R10	Skyline	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R11	Sequim	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R12	Port Angeles	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Schools									
S01	Oak Harbor High School	5	1	6 (+1)	2 (+1)	7 (+2)	2 (+1)	8 (+3)	2 (+1)
S02	Crescent Harbor Elementary	4	1	5 (+1)	2 (+1)	6 (+2)	1 (0)	6 (+2)	1 (0)
S03	Coupeville Elementary	1	1	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)
S04	Anacortes High School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Table 4.2-4 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]

		No Action Alternative		Scenario A		Scenario B		Scenario C	
		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]

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).

Classroom/learning Interference

Two metrics were analyzed to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights: interior equivalent sound level ($L_{eq(8hr)}$) 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 (Wyle, 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 4.2-5 presents the 8-hour equivalent sound level ($L_{eq(8h)}$) and the number of events that exceed an L_{max} of 50 dB indoors under Alternative 1, Scenarios A, B, and C 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 4.2-5 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.

Table 4.2-5 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			
		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	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]
School Surrogates																	
R03	Central Whidbey	<45	2	<45	-	49	3 (+1)	<45	- (0)	49	3 (+1)	<45	- (0)	49	3 (+1)	<45	- (0)
R11	Sequim	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
Schools																	
S01	Oak Harbor High School	<45	5	<45	1	48	6 (+1)	<45	2 (+1)	48	7 (+2)	<45	2 (+1)	49	7 (+2)	<45	2 (+1)
S02	Crescent Harbor Elementary	49	4	<45	1	55	5 (+1)	45	2 (+1)	55	6 (+2)	45	2 (+1)	56	6 (+2)	46	2 (+1)
S03	Coupeville Elementary	<45	1	<45	-	48	2 (+1)	<45	2 (+2)	46	2 (+1)	<45	1 (+1)	<45	1 (0)	<45	- (0)
S04	Anacortes High School	<45	-	<45	-	<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)
S06	Friday Harbor Elementary	<45	-	<45	-	<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)

Table 4.2-5 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			
		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	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[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

$L_{eq(8hr)}$ = 8-hour sound level equivalent

L_{max} = maximum sound level

Most schools would experience interior $L_{eq(8hr)}$ 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 $L_{eq(8hr)}$ of 49 dB for No Action and the highest under all scenarios of 56 dB when windows are open. When windows are closed, the $L_{eq(8hr)}$ at Crescent Harbor Elementary School (S02) would drop to 45 or 46 dB, depending on the scenario. 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) 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) and Crescent Harbor Elementary School (S02) under Scenarios B and C (with windows open) and Coupeville Elementary (S03) under Scenario A (with windows closed) show the highest increase of classroom/learning interference, at an additional two events per hour. 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 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.

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, 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 4.2-6 presents the results of the sleep disturbance analysis for the 12 POI locations that are in the residential category, as well as the seven 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 48 percent under Scenario A with windows open, meaning that there is a 48-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 Scenarios B or C, and for the POIs around Ault Field, there was a larger increase in the percent probability of awakening for Scenario C than Scenarios A or B.

Table 4.2-6 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	
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]
Residences									
R01	Sullivan Rd.	69%	53%	78% (+9%)	63% (+10%)	84% (+15%)	69% (+16%)	89% (+20%)	76% (+23%)
R02	Salal St. and N. Northgate Dr.	51%	37%	60% (+9%)	45% (+8%)	66% (+15%)	50% (+13%)	74% (+23%)	58% (+21%)
R03	Central Whidbey	21%	10%	29% (+8%)	14% (+4%)	32% (+11%)	17% (+7%)	37% (+16%)	20% (+10%)
R04	Pull and Be Damned Point	25%	12%	32% (+7%)	16% (+4%)	36% (+11%)	18% (+6%)	41% (+16%)	19% (+7%)
R05	Snee-Oosh Point	20%	6%	26% (+6%)	10% (+4%)	29% (+9%)	10% (+4%)	34% (+14%)	11% (+5%)
R06	Admirals Dr. and Byrd Dr.	13%	8%	61% (+48%)	46% (+38%)	43% (+30%)	31% (+23%)	20% (+7%)	14% (+6%)
R07	Race Lagoon	6%	3%	35% (+29%)	23% (+20%)	24% (+18%)	15% (+12%)	13% (+7%)	6% (+3%)
R08	Pratts Bluff	6%	3%	25% (+19%)	17% (+14)	17% (+11%)	11% (+8%)	7% (+1%)	4% (+1%)
R09	Cox Rd and Island Ridge Way	4%	3%	21% (+17%)	14% (+11%)	13% (+9%)	9% (+6%)	6% (+2%)	3% (0%)
R10	Skyline	7%	2%	10% (+3%)	4% (+2%)	11% (+4%)	4% (+2%)	15% (+8%)	5% (+3%)
R11	Sequim	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%)
Schools (near residential areas)[5]									
S01	Oak Harbor High School	27%	16%	34% (+7%)	20% (+4%)	39% (+12%)	23% (+7%)	45% (+18%)	29% (+13%)
S02	Crescent Harbor Elementary	27%	16%	35% (+8%)	21% (+5%)	39% (+12%)	24% (+8%)	45% (+18%)	30% (+14%)
S03	Coupeville Elementary	7%	4%	29% (+22%)	19% (+15%)	19% (+12%)	12% (+8%)	9% (+2%)	5% (+1%)
S04	Anacortes High School	2%	1%	4% (+2%)	1% (0%)	4% (+2%)	1% (0%)	4% (+2%)	1% (0%)
S05	Lopez Island School	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%)
S07	Sir James Douglas Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)

Table 4.2-6 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	
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]

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

Potential Noise Effects on Recreation

The analysis of potential noise effects on recreation 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 65 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, Draft Aircraft Noise Study. Table 4.2-7 presents the results of the analysis for Alternative 1 for the 11 POIs that are considered parks or recreational centers with primarily outdoor features.

Under Alternative 1, the data in the table show a slight increase for some POIs where there would be potential for up to three additional daytime events per hour during which a recreationist may experience outdoor speech interference. 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 recreational 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 three events per hour (P03), depending on the scenario.

Table 4.2-7 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*
		Annual Average Daily Daytime Events per Hour			
ID	*Description*	*NA65 L_{max} [2]*	*NA65 L_{max} [2]*	*NA65 L_{max} [2]*	*NA65 L_{max} [2]*
P01	Joseph Whidbey State Park	5	6 (+1)	6 (+1)	6 (+1)
P02	Deception Pass State Park	6	7 (+1)	8 (+2)	8 (+2)
P03	Dugualla State Park	7	8 (+1)	9 (+2)	10 (+3)
P04	Ebey's Landing National Historical Reserve	1	3 (+2)	2 (+1)	1 (0)
P05	Ebey's Landing State Park	1	2 (+1)	1 (0)	1 (0)
P06	Fort Casey State Park	1	3 (+2)	2 (+1)	1 (0)
P07	Cama Beach State Park	-	- (0)	- (0)	- (0)
P08	Port Townsend	-	- (0)	- (0)	- (0)
P09	Moran State Park	-	- (0)	- (0)	- (0)
P10	San Juan Island National Monument	2	3 (+1)	3 (+1)	3 (+1)
P11	San Juan Island Visitors Center	-	- (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 events at or above an outdoor maximum single event sound level (L_{max}) of 65 dB; this reflects potential for outdoor speech interference.

Key:

dB = decibel

L_{max} = 24-hour Equivalent Sound Level

NA65 = Number of Events above an L_{max} of 65 dB

Potential Hearing Loss

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 found permanent threshold shifts are unlikely to be caused by exposures to aircraft noise thought to be typical of those who have lived on or near jet air stations. 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 2008).

As part of this analysis, an evaluation of the risk of potential hearing loss for populations in the areas around the NAS Whidbey Island complex was conducted (including both Ault Field and OLF Coupeville). Details on the potential hearing loss metric, methodology for the analysis, and assumptions are outlined in Section 3.2, as well as Appendix A, Draft 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 Potential Hearing Loss (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 potential hearing loss 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 4.2-8 presents the potentially affected populations in and near Ault Field and OLF Coupeville by 1 dB increments of the 24-hour equivalent sound level ($L_{eq(24)}$) 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 4.2-8 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 (58 additional people) and for OLF Coupeville would be under Scenario A (136 additional people). The range of potential NIPTS could be up to 9.5 dB at Ault Field and 7.5 dB at OLF Coupeville. The potential NIPTS values presented in Table 4.2-8 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). 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 4.2-8 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 15.0 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 4.2-8 Average and 10th Percentile Noise Induced Permanent Threshold Shifts (NIPTS) 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)[2,3]	Estimated Population[4,5,6] Ault Field No Action	Ault Field Alt 1A	Ault Field Alt 1B	Ault Field Alt 1C	OLF Coupeville No Action	OLF Coupeville Alt 1A	OLF Coupeville Alt 1B	OLF Coupeville Alt 1C
75-76	1.0	4.0	-	- (0)	1 (+1)	95 (+95)	67	62 (-5)	41 (-26)	28 (-39)
76-77	1.0	4.5	143	173 (+30)	276[7] (+133)	376[8] (+233)	55	184 (+129)	109 (+54)	59 (+4)
77-78	1.5	5.0	274	260 (-14)	401 (+127)	392 (+118)	51	165 (+114)	82 (+31)	55 (+4)
78-79	2.0	5.5	131	179 (+48)	299 (+168)	393 (+262)	36	118 (+82)	73 (+37)	60 (+24)
79-80	2.5	6.0	81	96 (+15)	208 (+127)	275 (+194)	16	81 (+65)	65 (+49)	70 (+54)
80-81	3.0	7.0	71	75 (+4)	99 (+28)	231 (+160)	4	72 (+68)	59 (+55)	2 (-2)
81-82	3.5	8.0	51	69 (+18)	75 (+24)	89 (+38)	-	66 (+66)	55 (+55)	1 (+1)
82-83	4.0	9.0	34	50 (+16)	66 (+32)	71 (+37)	-	60 (+60)	61 (+61)	- (0)
83-84	4.5	10.0	25	38 (+13)	41 (+16)	52 (+27)	-	54 (+54)	65 (+65)	- (0)
84-85	5.5	11.0	16	22 (+6)	28 (+12)	31 (+15)	-	59 (+59)	2 (+2)	- (0)
85-86	6.0	12.0	12	15 (+3)	21 (+9)	23 (+11)	-	72 (+72)	1 (+1)	- (0)
86-87	7.0	13.5	5	9 (+4)	15 (+10)	18 (+13)	-	4 (+4)	- (0)	- (0)
87-88	7.5	15.0	4	5 (+1)	9 (+5)	15 (+11)	-	1 (+1)	- (0)	- (0)
88-89	8.5	16.5	1	4 (+3)	4 (+3)	6 (+5)	-	- (0)	- (0)	- (0)
89-90	9.5	18.0	-	1 (+1)	2 (+2)	3 (+3)	-	- (0)	- (0)	- (0)

Table 4.2-8 Average and 10th Percentile Noise Induced Permanent Threshold Shifts (NIPTS) 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)[2,3]	Estimated Population[4,5,6]							
			Ault Field				OLF Coupeville			
			No Action	Alt 1A	Alt 1B	Alt 1C	No Action	Alt 1A	Alt 1B	Alt 1C

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, every day, 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 5.4 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, 2012). 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, 87 are military personnel living on-base at Ault Field.

8 Of this estimated population, 720 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

Nonauditory Health Effects

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.

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, Draft 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 118 dB, and therefore sound levels damaging to structural components of buildings are not likely to occur.

4.2.2.2 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 potential hearing loss would increase. The range of potential NIPTS could be up to 9.5 dB at Ault Field and 7.5 dB at OLF Coupeville for the population with average sensitivity to noise and

up to 18.0 dB at Ault Field and 15.0 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 the number of events above a threshold, which are used to evaluate such noise effects as community noise exposure, indoor and outdoor speech interference, sleep disturbance, classroom/learning interference, and potential hearing loss. Additional information on the noise metrics is also available in Appendix A, Draft Aircraft Noise Study.

4.2.3.1 Noise Potential Impacts, Alternative 2

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).

4.2.3.1.1 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 action 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 three scenarios, which present the optional FCLP allocations, were modeled individually to provide a comparative presentation of the potential noise levels.

Figure 4.2-8 presents the projected DNL noise contours for Scenarios A, B and C under Alternative 2. This overview figure of the NAS Whidbey Island complex (both Ault Field and OLF Coupeville) presents the 65 dB DNL contour for Scenarios A, B, and C for comparison.

Figures 4.2-9 through 4.2-11 present the three scenarios separately for Ault Field, and Figure 4.2-12 through 4.2-14 present the three scenarios separately for OLF Coupeville. 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 area (14,230 acres, compared to 13,194 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 area (10,449 acres, compared to 8,518 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 differences are more prominent at Ault Field toward the ends of the four lobes of the noise contour, which is commonly located over water. The difference in the noise contours at OLF Coupeville between the scenarios is more pronounced than at Ault Field due to the larger proportional difference of operations at OLF Coupeville than at Ault Field.

Table 4.2-9 presents an overall comparison of the number of 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, Scenarios A, B, and C. 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 395 and 1,785 at Ault Field, depending on the scenario and, for OLF Coupeville, increases from the No Action Alternative by between 512 and 1,256, depending on the scenario.

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, Draft Aircraft Noise Study. Figures 4.2-9 through 4.2-14 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.

Table 4.2-9 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 2 (Average Year)[2,3]

	DNL Contour Range							
	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	3,557	2,995	3,030	2,345	5,587	3,377	12,174	8,717
Alternative 2								
Scenario A (20/80 FCLP split)	4,154 (+597)	3,554 (+559)	3,246 (+216)	2,103 (-242)	5,794 (+207)	3,455 (+78)	13,194 (+1,020)	9,112 (+395)
Scenario B (50/50 FCLP split)	4,150 (+593)	3,747 (+752)	3,076 (+46)	2,374 (+29)	6,491 (+904)	3,857 (+480)	13,717 (+1,543)	9,978 (+1,261)
Scenario C (80/20 FCLP split)	4,245 (+688)	4,010 (+1,015)	2,990 (-40)	2,349 (+4)	6,995 (+1,408)	4,143 (+766)	14,230 (+2,056)	10,502 (+1,785)
OLF Coupeville								
No Action Alternative								
Average Year	3,742	880	3,181	820	836	616	7,759	2,316
Alternative 2								
Scenario A (20/80 FCLP split)	1,573 (-2,169)	655 (-225)	3,177 (-4)	900 (+80)	5,699 (+4,863)	2,017 (+1,401)	10,449 (+2,690)	3,572 (+1,256)
Scenario B (50/50 FCLP split)	1,805 (-1,937)	508 (-372)	3,883 (+702)	1,171 (+351)	4,047 (+3,211)	1,521 (+905)	9,735 (+1,976)	3,200 (+884)
Scenario C (80/20 FCLP split)	3,681 (-61)	1,053 (+173)	3,595 (+414)	1,065 (+245)	1,242 (+406)	710 (+94)	8,518 (+759)	2,828 (+512)
NAS Whidbey Island Complex								
No Action Alternative								
Average Year	7,299	3,875	6,211	3,165	6,423	3,993	19,933	11,033
Alternative 2								
Scenario A (20/80 FCLP split)	5,727 (-1,572)	4,209 (+334)	6,423 (+212)	3,003 (-162)	11,493 (+5,070)	5,472 (+1,479)	23,643 (+3,710)	12,684 (+1,651)
Scenario B (50/50 FCLP split)	5,955 (-1,344)	4,255 (+380)	6,958 (+748)	3,545 (+380)	10,538 (+4,115)	5,378 (+1,385)	23,452 (+3,519)	13,178 (+2,145)
Scenario C (80/20 FCLP split)	7,926 (+627)	5,063 (+1,188)	6,585 (+374)	3,414 (+249)	8,237 (+1,814)	4,853 (+860)	22,748 (+2,815)	13,330 (+2,297)

Table 4.2-9 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 2 (Average Year)[2,3]

	DNL Contour Range							
	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 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).

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 2 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). In addition, a 5.4-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, 2012). 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
OLF = outlying landing field

In addition, Table 4.2-10 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 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 Contour Range[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	0.4%	0.9%	0.5%	1.1%	0.6%	0.5%	0.5%	0.8%
Scenario B	1.1%	2.7%	-0.5%	1.3%	2.7%	2.8%	1.5%	2.4%
Scenario C	1.5%	1.9%	0.3%	0.8%	1.6%	2.2%	1.3%	1.8%
OLF Coupeville								
Scenario A	0.1%	3.7%	-4.2%	-4.6%	3.9%	3.2%	0.9%	1.3%
Scenario B	-3.7%	0.0%	-1.6%	-2.6%	4.7%	3.9%	0.6%	0.9%
Scenario C	-6.8%	-7.9%	1.8%	2.1%	31.8%	15.6%	2.5%	1.8%
NAS Whidbey Island Complex								
Scenario A	0.3%	1.3%	-1.8%	-0.6%	2.3%	1.5%	0.7%	0.9%
Scenario B	-0.3%	2.4%	-1.1%	0.1%	3.4%	3.1%	1.1%	2.0%
Scenario C	-2.3%	-0.2%	1.1%	1.2%	6.2%	4.2%	1.7%	1.8%

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

Figure 4.2-8 Alternative 2 Overview of 65 dB DNL Noise Contours for the NAS Whidbey Island Complex

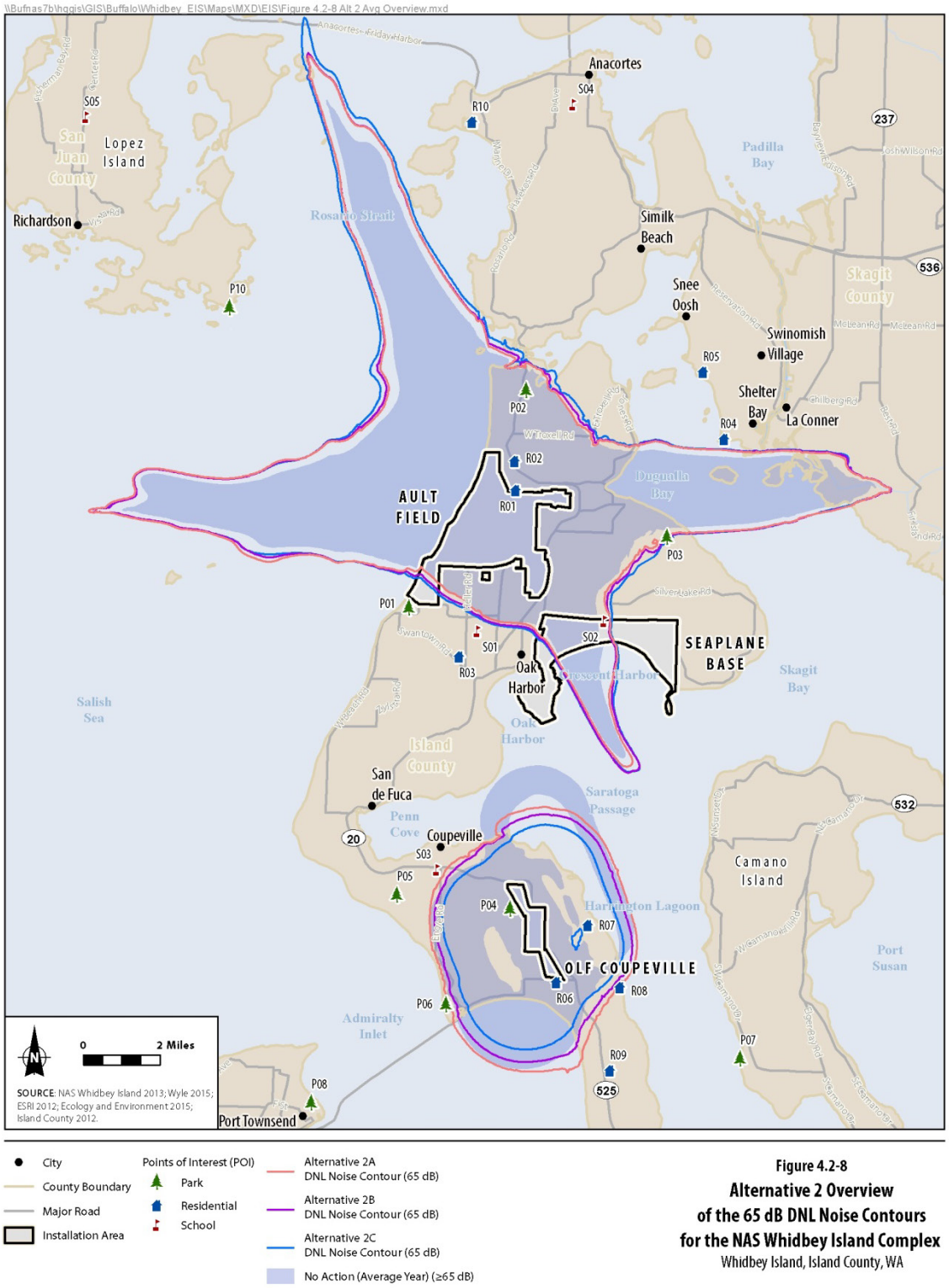


Figure 4.2-8
Alternative 2 Overview of the 65 dB DNL Noise Contours for the NAS Whidbey Island Complex
Whidbey Island, Island County, WA

Figure 4.2-9 Alternative 2A DNL Noise Contours for Ault Field

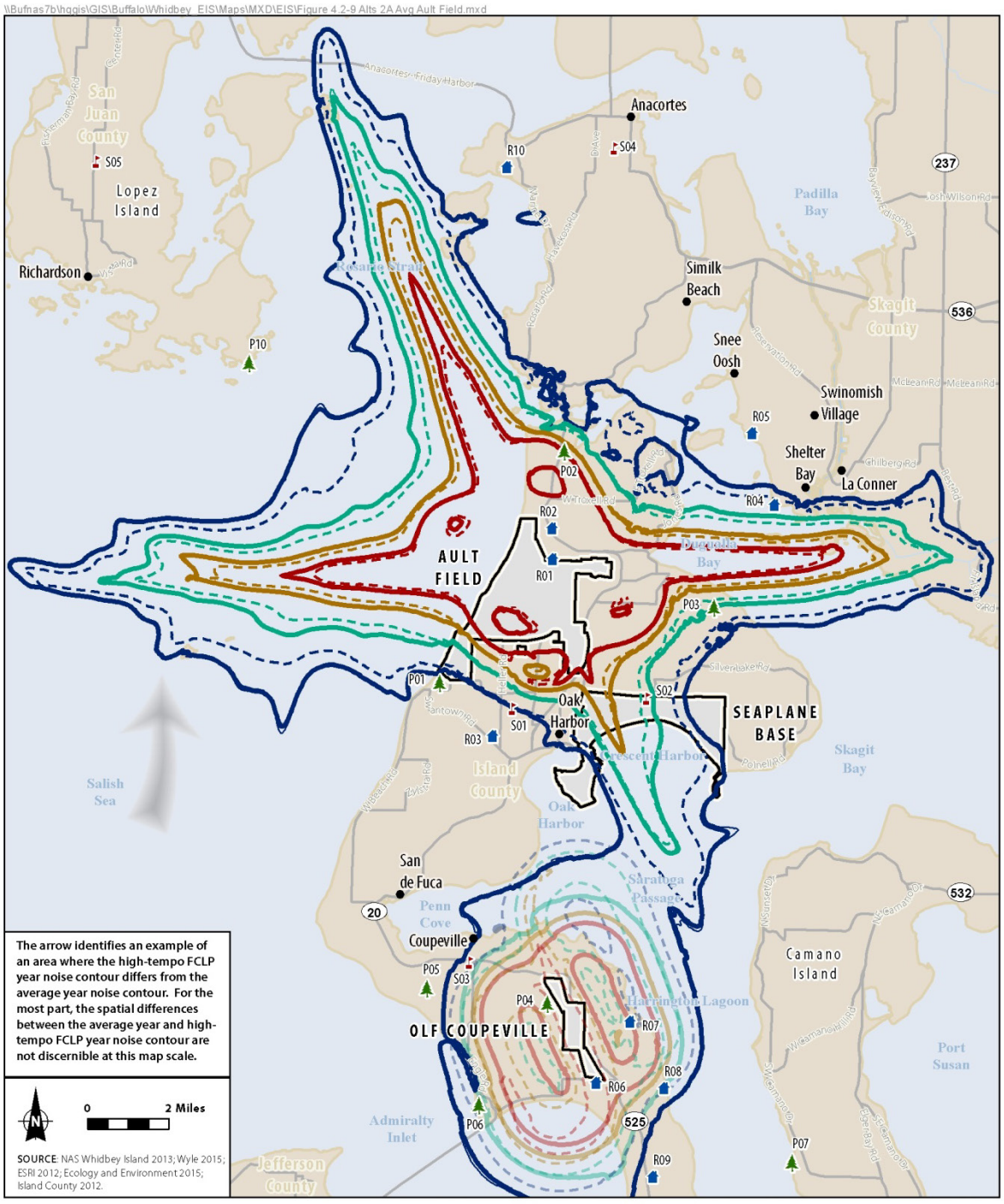


Figure 4.2-9
Alternative 2A DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

Figure 4.2-10 Alternative 2B DNL Noise Contours for Ault Field

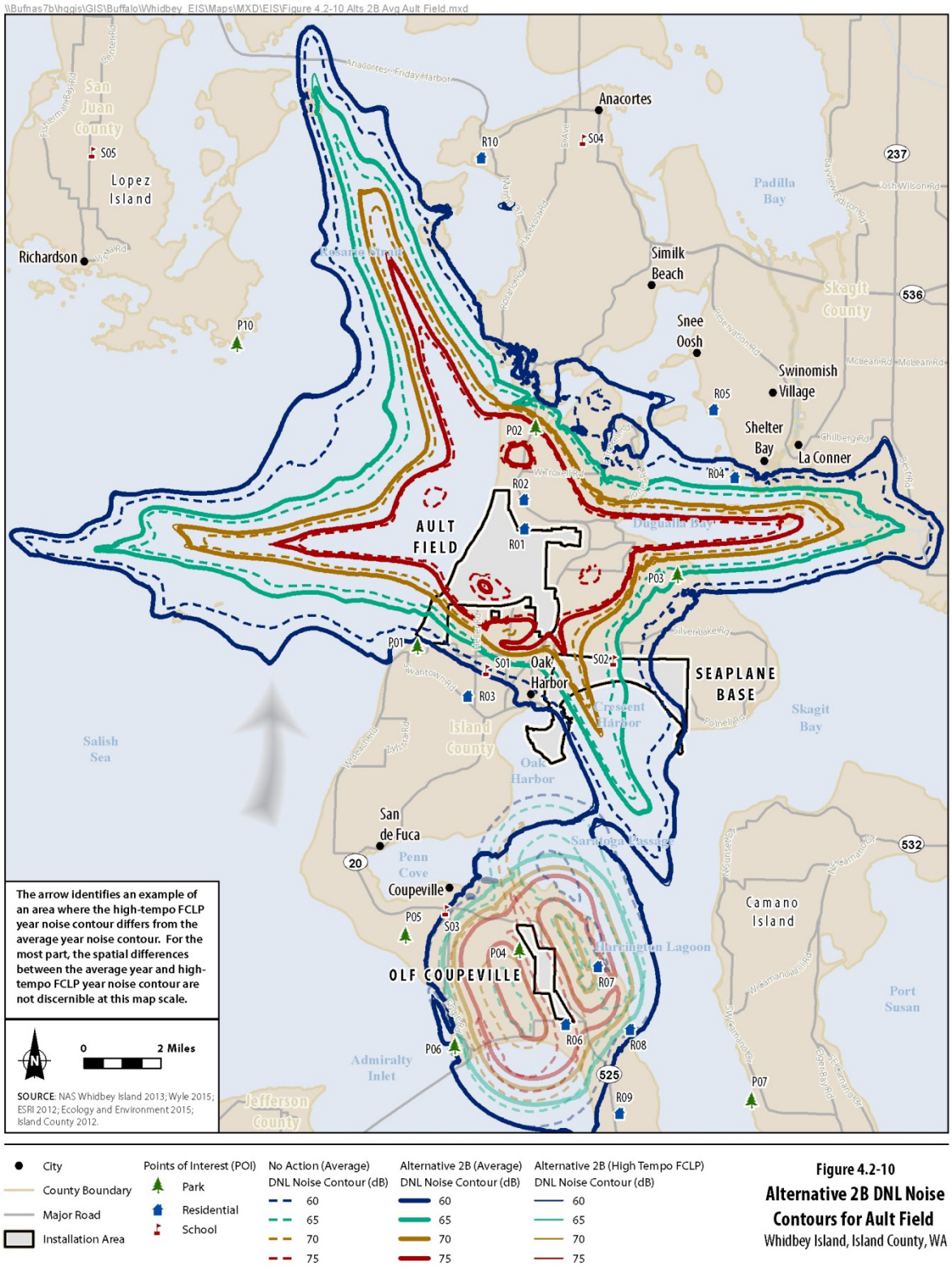


Figure 4.2-10
Alternative 2B DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

Figure 4.2-11 Alternative 2C DNL Noise Contours for Ault Field

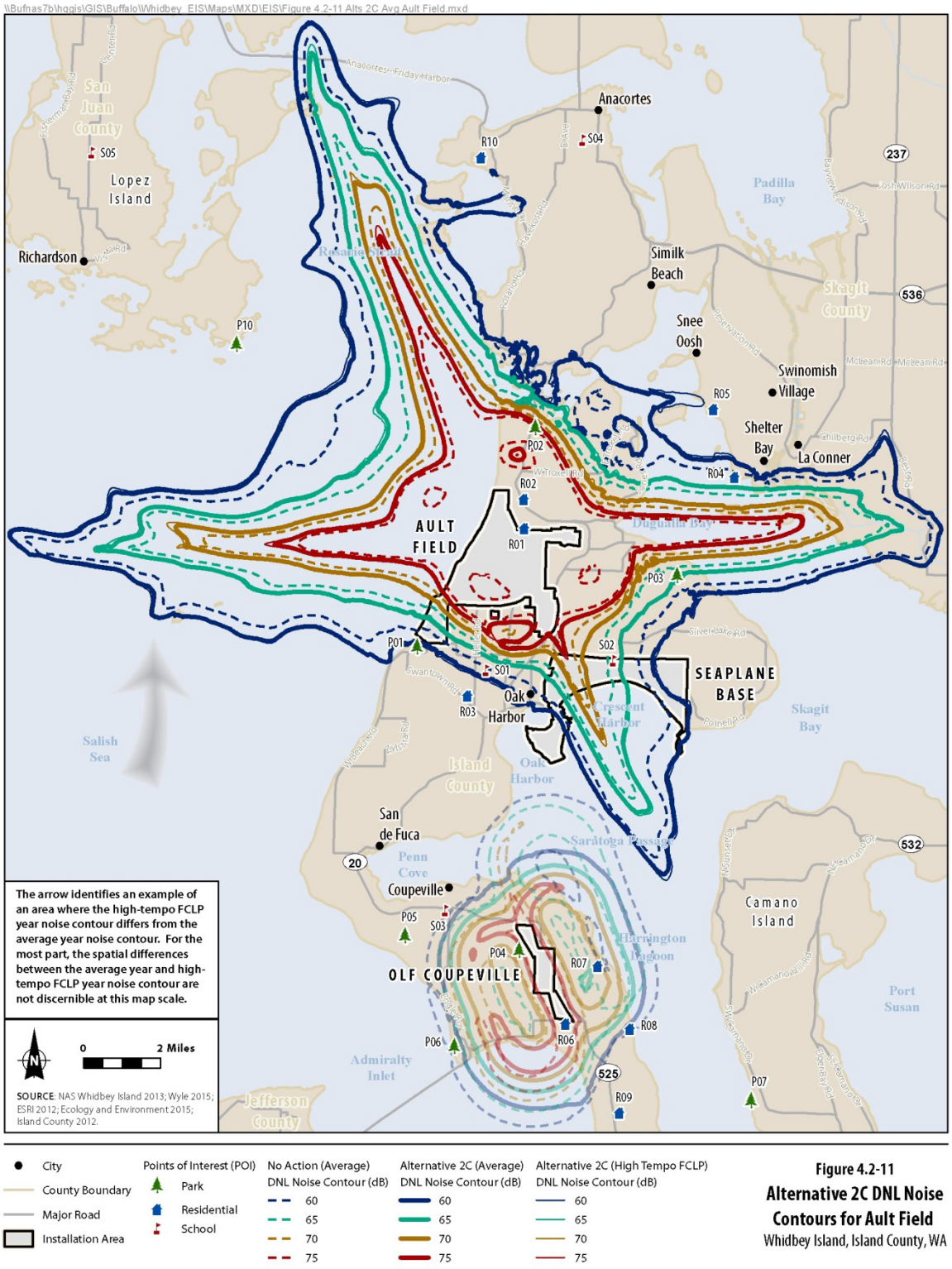


Figure 4.2-12 Alternative 2A DNL Noise Contours for OLF Coupeville

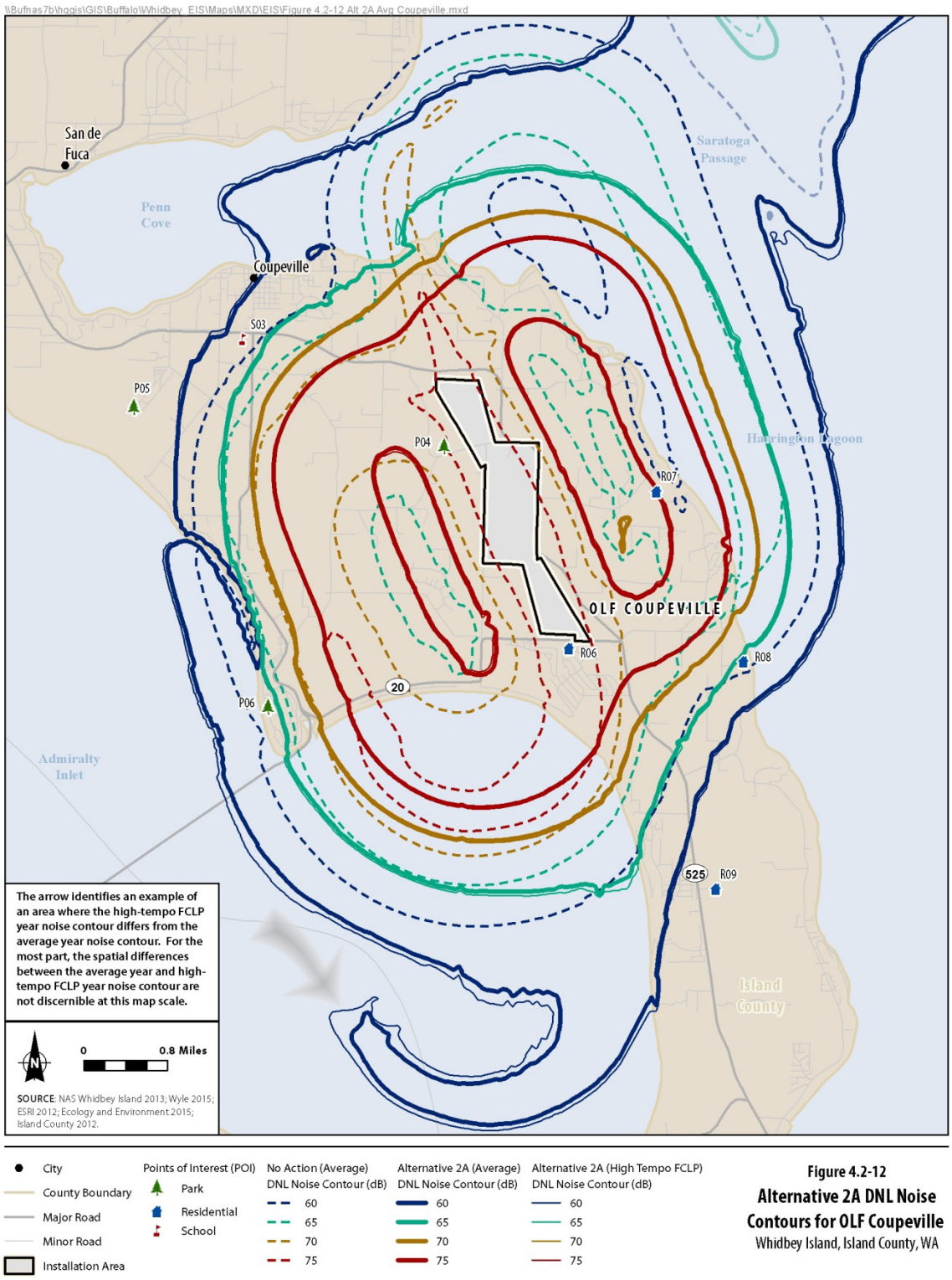


Figure 4.2-13 Alternative 2B DNL Noise Contours for OLF Coupeville

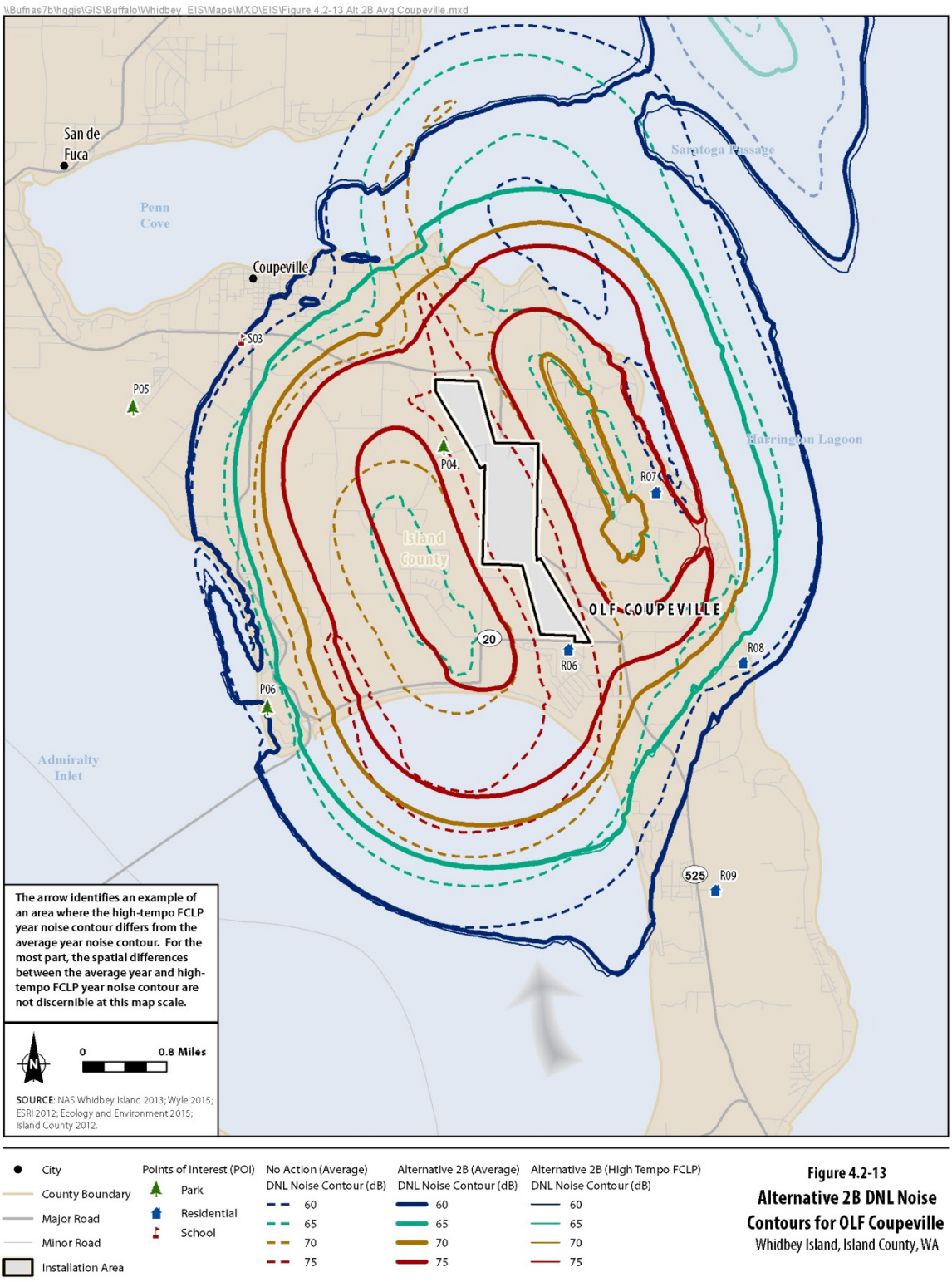


Figure 4.2-13
Alternative 2B DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

Figure 4.2-14 Alternative 2C DNL Noise Contours for OLF Coupeville

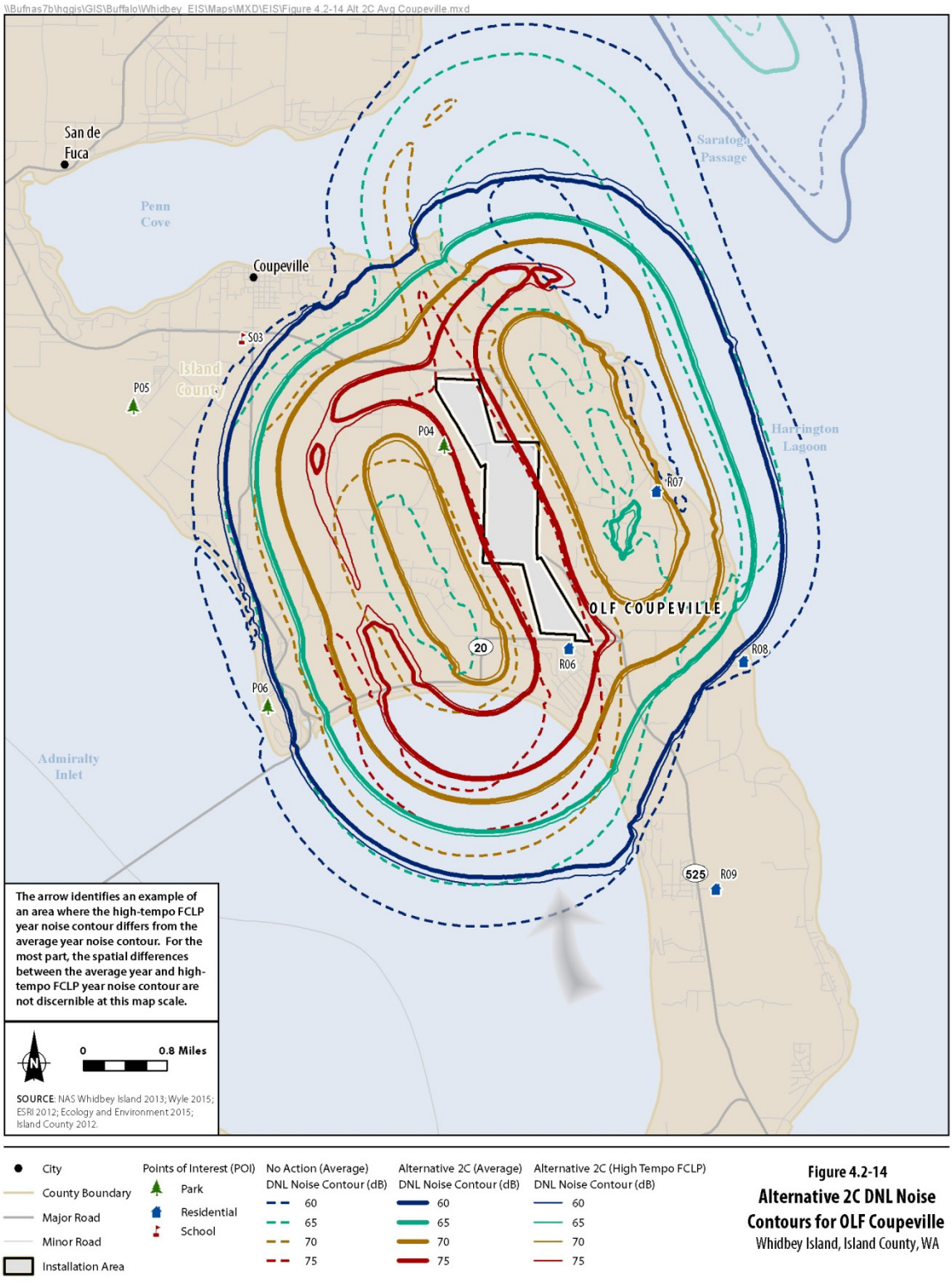


Figure 4.2-14
Alternative 2C DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

4.2.3.1.2 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, speech interference, classroom/learning interference, sleep disturbance, potential noise effects on recreation, and potential hearing loss. 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.

Single Event Noise

Two noise metrics are used to evaluate single event noise: 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 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, Draft 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 presented in Table 4.2-11. 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 only six of the 30 POIs changed from the No Action Alternative to Alternative 2 (measurements increased at R06 and R07 and decreased at R08, R09, S03, and S07). In addition, the SEL and L_{max} values for the representative POIs are all identical under all of the three action alternatives. However, the number of annual aircraft events that would produce these noise levels would differ between the three action alternatives and in comparison to the No Action Alternative. Table 4.2-11 also presents the number of annual aircraft events that produce the loudest single event for each POI.

This analysis shows that while there may not be a substantive difference in the loudest event at a particular POI, there may be a difference in the number of times that loudest event would occur between alternatives and compared to the No Action Alternative. Under Alternative 2, some of the POIs would experience more annual events of the maximum SEL/L_{max} than under the No Action Alternative, and other POIs would experience fewer annual events of the maximum SEL/L_{max}. The POI R06 (Admirals Dr. and Byrd Dr.) would experience the largest increase in annual events (+2,290 under Scenario A), while the POI P04 (Ebey's Landing – Rhododendron Park) would experience the largest decrease in annual events (-103 under Scenario C). Generally, POIs near OLF Coupeville experienced more annual events under Scenario A than under Scenarios B or C.

Under Alternative 2, the number of events that would produce the maximum SEL/L_{max} values vary between the scenarios, depending on the POI (see Table 4.2-11). For example, on the high end, at Admirals Drive and Byrd Drive (R06) under Scenario A, a person would be exposed to the maximum SEL/L_{max} an average of approximately seven times per day compared to the low end, such as at Cama Beach State Park (P07) under Scenario C, where a person would be exposed to the maximum SEL/L_{max} an average of approximately once every month.

Table 4.2-11 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 2 (Average Year)[1]

		Maximum SEL (dB)		*L_{max} (dB)*		*Number of Annual Events[2]*			
ID	*Description*	*No Action Alternative*	*Alt 2*	*No Action Alternative*	*Alt 2*	*No Action Alternative*	*Alt 2 A*	*Alt 2 B*	*Alt 2 C*
Residences									
R01	Sullivan Rd	121	121 (0)	114	114 (0)	26	80 (+54)	51 (+25)	18 (-8)
R02	Salal St. and N. Northgate Dr.	109	109 (0)	96	96 (0)	12	107 (+95)	58 (+46)	34 (+22)
R03	Central Whidbey	101	101 (0)	93	93 (0)	34	43 (+9)	43 (+9)	42 (+8)
R04	Pull and Be Damned Point	96	96 (0)	88	88 (0)	208	274 (+66)	256 (+48)	256 (+48)
R05	Snee-Oosh Point	92	92 (0)	84	84 (0)	733	1,029 (+296)	942 (+209)	905 (+172)
R06	Admirals Dr. and Byrd Dr.	118	121 (+3)	114	118 (+4)	267	2,557 (+2,290)	1,563 (+1,296)	627 (+360)
R07	Race Lagoon	114	115 (+1)	106	110 (+4)	55	497 (+442)	335 (+280)	128 (+73)
R08	Pratts Bluff	112	101 (-11)	105	92 (-13)	75	497 (+422)	335 (+260)	128 (+53)
R09	Cox Rd and Island Ridge Way	92	90 (-2)	82	81 (-1)	72	23 (-49)	28 (-44)	17 (-55)
R10	Skyline	100	100 (0)	90	90 (0)	261	378 (+117)	349 (+88)	400 (+139)
R11	Sequim	73	73 (0)	60	60 (0)	74	105 (+31)	101 (+27)	112 (+38)
R12	Port Angeles	75	75 (0)	65	65 (0)	208	274 (+66)	256 (+48)	256 (+48)
Schools									
S01	Oak Harbor High School	99	99 (0)	90	90 (0)	26	106 (+80)	64 (+38)	26 (0)
S02	Crescent Harbor Elementary School	102	102 (0)	94	94 (0)	178	310 (+132)	310 (+132)	329 (+151)
S03	Coupeville Elementary School	98	94 (-4)	90	85 (-5)	367	1,279 (+912)	782 (+415)	314 (-53)
S04	Anacortes High School	93	93 (0)	83	83 (0)	112	162 (+50)	149 (+37)	172 (+60)
S05	Lopez Island School	76	76 (0)	68	68 (0)	110	163 (+53)	110 (0)	155 (+45)

Table 4.2-11 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 2 (Average Year)[1]

ID	Description	Maximum SEL (dB)		L_{max} (dB)		Number of Annual Events[2]			
		No Action Alternative	Alt 2	No Action Alternative	Alt 2	No Action Alternative	Alt 2 A	Alt 2 B	Alt 2 C
S06	Friday Harbor Elementary School	53	53 (0)	39	39 (0)	26	20 (-6)	27 (+1)	34 (+8)
S07	Sir James Douglas Elementary	62	62 (0)	52	51 (-1)	147	206 (+59)	188 (+41)	181 (+34)
Parks									
P01	Joseph Whidbey State Park	93	93 (0)	82	82 (0)	34	43 (+9)	43 (+9)	42 (+8)
P02	Deception Pass State Park	110	110 (0)	104	104 (0)	161	665 (+504)	404 (+243)	164 (+3)
P03	Dugualla State Park	105	105 (0)	98	98 (0)	110	181 (+71)	171 (+61)	180 (+70)
P04	Ebey's Landing – Rhododendron Park	112	112 (0)	106	106 (0)	267	665 (+398)	404 (+137)	164 (-103)
P05	Ebey's Landing – Ebey's Prairie	88	88 (0)	77	77 (0)	367	1,367 (+1,000)	826 (+459)	338 (-29)
P06	Fort Casey State Park	96	96 (0)	85	85 (0)	267	1,279 (+1,012)	782 (+515)	314 (+47)
P07	Cama Beach State Park	83	83 (0)	73	73 (0)	5	41 (+36)	28 (+23)	11 (+6)
P08	Port Townsend	85	85 (0)	n/a	n/a (0)	24	20 (-4)	22 (-2)	22 (-2)
P09	Moran State Park	62	62 (0)	51	51 (0)	61	49 (-12)	64 (+3)	80 (+19)
P10	San Juan Island National Monument	95	95 (0)	85	85 (0)	372	539 (+167)	498 (+126)	572 (+200)
P11	San Juan Island Visitors Center	63	63 (0)	50	50 (0)	147	206 (+59)	188 (+41)	181 (+34)

Notes:

[1] The difference between the No Action Alternative and Alternative 2 is noted in parentheses for both the maximum SEL and L_{max} metrics, as well as the number of annual events.

[2] The number of annual events is the estimated number of times the single aircraft event with the maximum SEL or L_{max} at that POI would occur annually.

Key:

n/a = not available; the aircraft that generates the highest L_{max} at this POI is the P-8A.

SEL = sound exposure level

L_{max} = maximum A-weighted sound level

dB = decibel

Speech Interference

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 (Wyle, 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 12 residential POIs and the seven 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 4.2-12 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, Scenarios A, B, and C.

Table 4.2-12 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]

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C	
		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]
Residences									
R01	Sullivan Rd	8	8	10 (+2)	10 (+2)	11 (+3)	11 (+3)	12 (+4)	12 (+4)
R02	Salal St. and N. Northgate Dr.	8	7	10 (+2)	9 (+2)	11 (+3)	10 (+3)	11 (+3)	11 (+4)
R03	Central Whidbey	2	-	3 (+1)	- (0)	3 (+1)	- (0)	3 (+1)	- (0)
R04	Pull and Be Damned Point	4	2	6 (+2)	2 (0)	6 (+2)	2 (0)	6 (+2)	2 (0)
R05	Snee-Oosh Point	2	-	2 (0)	1 (+1)	2 (0)	1 (+1)	2 (0)	1 (+1)
R06	Admirals Dr. and Byrd Dr.	1	1	3 (+2)	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)
R07	Race Lagoon	-	-	2 (+2)	1 (+1)	1 (+1)	1 (+1)	1 (+1)	- (0)
R08	Pratts Bluff	-	-	2 (+2)	1 (+1)	1 (+1)	1 (+1)	1 (+1)	- (0)
R09	Cox Rd and Island Ridge	1	-	3 (+2)	- (0)	2 (+1)	- (0)	1 (0)	- (0)
R10	Skyline	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R11	Sequim	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R12	Port Angeles	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Schools									
S01	Oak Harbor High School	5	1	7 (+2)	2 (+1)	7 (+2)	2 (+1)	8 (+3)	2 (+1)
S02	Crescent Harbor Elementary	4	1	5 (+1)	2 (+1)	6 (+2)	2 (+1)	6 (+2)	2 (+1)
S03	Coupeville Elementary	1	1	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)
S04	Anacortes High School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Table 4.2-12 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	
		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]

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 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).

Compared to the No Action Alternative, Alternative 2 would result in between zero and four additional events per hour at representative POIs during which conversations or indoor speech would be interrupted. The largest change (with four additional events per daytime hour) would occur at R01 (Sullivan Road) and R02 (Salal St. and N. Northgate Dr.), both under Scenario C. However, there are several POIs at which no change would occur under any of the scenarios compared to the No Action Alternative.

Classroom/learning Interference

Two metrics were analyzed to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights: interior equivalent sound level ($L_{eq(8hr)}$) 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 (Wyle, 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 4.2-13 presents the 8-hour equivalent sound level ($L_{eq(8h)}$) and the number of events that exceed an L_{max} of 50 dB indoors under Alternative 2, Scenarios A, B, and C 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 4.2-13 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 $L_{eq(8hr)}$ 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 $L_{eq(8hr)}$ of 49 dB for the No Action Alternative and the highest under Scenarios A and C of 56 dB when windows are open. When windows are closed, the $L_{eq(8hr)}$ at Crescent

Harbor Elementary School (S02) would drop to 45 or 46 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 up to two events per hour (at S01, S02, and S03) 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) for all three scenarios with windows open, Crescent Harbor Elementary School (S02) under Scenarios B and C with windows open, and Coupeville Elementary School (S03) under Scenario A with windows closed. 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.

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 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 4.2-14 presents the results of the sleep disturbance analysis for the 12 POI locations that are in the residential category, as well as the seven schools, which are commonly located in residential areas.

Table 4.2-13 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			
		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	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]
School Surrogates																	
R03	Central Whidbey	<45	2	<45	-	49	3 (+1)	<45	- (0)	49	3 (+1)	<45	- (0)	49	3 (+1)	<45	- (0)
R11	Sequim	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
Schools																	
S01	Oak Harbor High School	<45	5	<45	1	48	7 (+2)	<45	2 (+1)	48	7 (+2)	<45	2 (+1)	49	7 (+2)	<45	2 (+1)
S02	Crescent Harbor Elementary	49	4	<45	1	56	5 (+1)	46	2 (+1)	55	6 (+2)	45	2 (+1)	56	6 (+2)	46	2 (+1)
S03	Coupeville Elementary	<45	1	<45	-	48	2 (+1)	<45	2 (+2)	46	1 (0)	<45	1 (+1)	<45	1 (0)	<45	- (0)
S04	Anacortes High School	<45	-	<45	-	<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)
S06	Friday Harbor Elementary	<45	-	<45	-	<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)

Table 4.2-13 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			
		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	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[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

$L_{eq(8hr)}$ = 8-hour sound level equivalent

L_{max} = maximum A-weighted sound level

Table 4.2-14 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]

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C	
		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	69%	53%	77% (+8%)	61% (+8%)	83% (+14%)	68% (+15%)	88% (+19%)	74% (+21%)
R02	Salal St. and N. Northgate Dr.	51%	37%	59% (+8%)	44% (+7%)	65% (+14%)	49% (+12%)	72% (+21%)	56% (+19%)
R03	Central Whidbey	21%	10%	28% (+7%)	14% (+4%)	31% (+10%)	16% (+6%)	35% (+14%)	19% (+9%)
R04	Pull and Be Damned Point	25%	12%	31% (+6%)	16% (+4%)	35% (+10%)	17% (+5%)	39% (+14%)	18% (+6%)
R05	Snee-Oosh Point	20%	6%	26% (+6%)	9% (+3%)	29% (+9%)	10% (+4%)	33% (+13%)	11% (+5%)
R06	Admirals Dr. and Byrd Dr.	13%	8%	58% (+45%)	43% (+35%)	40% (+27%)	28% (+20%)	19% (+6%)	13% (+5%)
R07	Race Lagoon	6%	3%	32% (+26%)	21% (+19%)	23% (+17%)	14% (+11%)	12% (+6%)	6% (+3%)
R08	Pratts Bluff	6%	3%	23% (+17%)	15% (+12%)	15% (+9%)	10% (+7%)	7% (+1%)	4% (+1%)
R09	Cox Rd and Island Ridge Way	4%	3%	20% (+16%)	13% (+10%)	12% (+8%)	8% (+5%)	5% (+1%)	3% (0%)
R10	Skyline	7%	2%	10% (3%)	4% (2%)	11% (+4%)	4% (+2%)	14% (+7%)	4% (+2%)
R11	Sequim	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%)
Schools (near residential areas)[5]									
S01	Oak Harbor High School	27%	16%	33% (+6%)	19% (+3%)	38% (+11%)	23% (+7%)	42% (+15%)	27% (+11%)
S02	Crescent Harbor Elementary	27%	16%	34% (+7%)	20% (+4%)	38% (+11%)	24% (+8%)	43% (+16%)	28% (+12%)
S03	Coupeville Elementary	7%	4%	27% (+20%)	17% (+13%)	18% (+11%)	11% (+7%)	9% (+2%)	5% (+1%)
S04	Anacortes High School	2%	1%	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	4% (+2%)	1% (0%)
S05	Lopez Island School	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%)
S07	Sir James Douglas Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)

Table 4.2-14 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	
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]

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.

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 Dr. and Byrd Dr.), where there would be an increase of 45 percent under Scenario A with windows open, meaning that there is a 45 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 Scenarios B or C. However, for the POIs around Ault Field, there was a larger increase in the percent probability of awakening for Scenario C than for Scenarios A or B.

Potential Noise Effects on Recreation

The analysis of potential noise effects on recreation 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 65 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, Draft Aircraft Noise Study. Table 4.2-15 presents the results of the analysis for Alternative 2 for the 11 POIs that are considered parks or recreational centers with primarily outdoor features.

Table 4.2-15 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*
		Annual Average Daily Daytime Events per Hour			
ID	*Description*	*NA65 L_{max} [2]*	*NA65 L_{max} [2]*	*NA65 L_{max} [2]*	*NA65 L_{max} [2]*
P01	Joseph Whidbey State Park	5	6 (+1)	6 (+1)	6 (+1)
P02	Deception Pass State Park	6	7 (+1)	8 (+2)	8 (+2)
P03	Dugualla State Park	7	8 (+1)	9 (+2)	10 (+3)
P04	Ebey's Landing – Rhododendron Park	1	3 (+2)	2 (+1)	1 (0)
P05	Ebey's Landing – Ebey's Prairie	1	2 (+1)	1 (0)	1 (0)
P06	Fort Casey State Park	1	2 (+1)	2 (+1)	1 (0)
P07	Cama Beach State Park	-	- (0)	- (0)	- (0)
P08	Port Townsend	-	- (0)	- (0)	- (0)
P09	Moran State Park	-	- (0)	- (0)	- (0)
P10	San Juan Island National Monument	2	3 (+1)	3 (+1)	3 (+1)
P11	San Juan Island Visitors Center	-	- (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 events at or above an outdoor maximum single event sound level (L_{max}) of 65 dB; this reflects potential for outdoor speech interference.

Key:

Lmax = maximum A-weighted sound level

NA65 = number of events above an L_{max} of 65 dB

Under Alternative 2, the data in the table show a slight increase for some POIs where there would be potential for one to three additional DNL daytime events per hour during which a recreationist may experience outdoor speech interference. P03 (Dugualla State Park) to the east of Ault Field shows the highest change, with three events per hour under Scenario C.

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. These increase range from zero to an increase of three events per hour (P03 under Scenario C), depending on the scenario.

Potential Hearing Loss

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 found permanent threshold shifts are unlikely to be caused by exposures to aircraft noise thought to be typical of those who have lived on or near jet air stations. 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 2008).

As part of this analysis, an evaluation of the risk of potential hearing loss for populations in the areas around the NAS Whidbey Island complex was conducted (including both Ault Field and OLF Coupeville). Details on the potential hearing loss metric, methodology for the analysis, and assumptions are outlined in Section 3.2, as well as Appendix A, Draft 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 potential hearing loss 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 4.2-16 presents the potentially affected populations in and near Ault Field and OLF Coupeville by 1 dB increments of $L_{eq(24)}$ as compared to the No Action Alternative numbers presented in Section 3.2.

Table 4.2-16 Average and 10th Percentile Noise Induced Permanent Threshold Shifts (NIPTS) 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)[2,3]	Estimated Population[4,5,6]							
			Ault Field				OLF Coupeville			
			No Action	Alt 2A	Alt 2B	Alt 2C	No Action	Alt 2A	Alt 2B	Alt 2C
75-76	1.0	4.0	-	- (0)	- (0)	33 (+33)	67	42 (-25)	25 (-42)	22 (-45)
76-77	1.0	4.5	143	129 (-14)	246[7] (+103)	354[8] (+211)	55	167 (+112)	100 (+45)	59 (+4)
77-78	1.5	5.0	274	261 (-13)	405 (+131)	391 (+117)	51	153 (+102)	77 (+26)	54 (+3)
78-79	2.0	5.5	131	182 (+51)	293 (+162)	391 (+260)	36	117 (+81)	73 (+37)	62 (+26)
79-80	2.5	6.0	81	96 (+15)	206 (+125)	277 (+196)	16	73 (+57)	64 (+48)	58 (+42)
80-81	3.0	7.0	71	76 (+5)	97 (+26)	217 (+146)	4	72 (+68)	58 (+54)	1 (-3)
81-82	3.5	8.0	51	70 (+19)	75 (+24)	86 (+35)	-	64 (+64)	55 (+55)	- (0)
82-83	4.0	9.0	34	50 (+16)	66 (+32)	70 (+36)	-	59 (+59)	63 (+63)	- (0)
83-84	4.5	10.0	25	39 (+14)	42 (+17)	52 (+27)	-	53 (+53)	53 (+53)	- (0)
84-85	5.5	11.0	16	22 (+6)	28 (+12)	31 (+15)	-	61 (+61)	1 (+1)	- (0)
85-86	6.0	12.0	12	15 (+3)	21 (+9)	23 (+11)	-	63 (+63)	- (0)	- (0)
86-87	7.0	13.5	5	9 (+4)	15 (+10)	18 (+13)	-	1 (+1)	- (0)	- (0)
87-88	7.5	15.0	4	5 (+1)	9 (+5)	14 (+10)	-	1 (+1)	- (0)	- (0)
88-89	8.5	16.5	1	4 (+3)	4 (+3)	6 (+5)	-	- (0)	- (0)	- (0)
89-90	9.5	18.0	-	1 (+1)	2 (+2)	3 (+3)	-	- (0)	- (0)	- (0)

Table 4.2-16 Average and 10th Percentile Noise Induced Permanent Threshold Shifts (NIPTS) 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)[2,3]	Estimated Population[4,5,6]							
			Ault Field				OLF Coupeville			
			No Action	Alt 2A	Alt 2B	Alt 2C	No Action	Alt 2A	Alt 2B	Alt 2C

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, every day, 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 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 5.4 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, 2012). 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, 55 are military personnel living on-base at Ault Field.

8 Of this estimated population, 470 are military personnel living on-base at Ault Field.

Key:

dB = decibel
DNL = day-night average sound level
$L_{eq(24)}$ = 24-hour Equivalent Sound Level
NIPTS = Noise Induced Permanent Threshold Shift
OLF = outlying landing field

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 4.2-16 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 (57 additional people) and for OLF Coupeville would be under Scenario A (126 additional people). The range of potential NIPTS could be up to 9.5 dB at Ault Field and 7.5 dB at OLF Coupeville. The potential NIPTS values presented in Table 4.2-16 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.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable.

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). 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 4.2-16 and the column identified as the 10th 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 15.0 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.

Nonauditory Health Effects

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.

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, Draft 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 4.2-11, for the representative POIs analyzed, the highest L_{max} value was 118 dB, and, therefore, sound levels damaging to structural components of buildings are not likely to occur.

4.2.3.2 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 potential hearing loss would increase. The range of potential NIPTS could be up to 9.5 dB at Ault Field and 7.5 dB at OLF Coupeville for the population with average noise sensitivity and up to 18.0 dB at Ault Field and 15.0 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 the number of events above a threshold, which are used to evaluate such noise effects as community noise exposure, indoor and outdoor speech interference, sleep disturbance, classroom/learning interference, and potential hearing loss. Additional information on the noise metrics is also available in Appendix A, Draft Aircraft Noise Study.

4.2.4.1 Noise Potential Impacts, Alternative 3

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).

4.2.4.1.1 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 action 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 three scenarios, which present the optional FCLP allocations, were modeled individually to provide a comparative presentation of the potential noise levels.

Figure 4.2-15 presents the projected DNL noise contours for Scenarios A, B, and C under Alternative 3. This overview figure of the NAS Whidbey Island complex (both Ault Field and OLF Coupeville) presents the 65 dB DNL contour for Scenarios A, B, and C for comparison.

Figures 4.2-16 through 4.2-18 present the three scenarios separately for Ault Field, and Figures 4.2-19 through 4.2-21 present the three scenarios separately for OLF Coupeville. 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), 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 area (14,230 acres, compared to 13,210 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 area (10,498 acres, compared to 8,581 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 differences are more prominent at Ault Field toward the ends of the four lobes of the noise contour, which is commonly located over water. The difference in noise contours at OLF Coupeville between the scenarios is more pronounced than at Ault Field due to the larger proportional difference of operations at OLF Coupeville than at Ault Field.

Table 4.2-17 presents an overall comparison of the number of acres and population in each of the DNL contour ranges, as well as the difference between the No Action Alternative and Alternative 3, Scenarios A, B, and C. 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 399 and 1,766 at Ault Field, depending on the scenario, and for OLF Coupeville increases from the No Action Alternative by between 526 and 1,284, also depending on the scenario.

Table 4.2-17 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 3 (Average Year)[2,3]

	DNL Contour Range							
	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	3,557	2,995	3,030	2,345	5,587	3,377	12,174	8,717
Alternative 3								
Scenario A (20/80 FCLP split)	4,167 (+610)	3,562 (+567)	3,254 (+224)	2,104 (-241)	5,789 (+202)	3,450 (+73)	13,210 (+1,036)	9,116 (+399)
Scenario B (50/50 FCLP split)	4,189 (+632)	3,760 (+765)	3,097 (+67)	2,379 (+34)	6,487 (+900)	3,850 (+473)	13,773 (+1,599)	9,989 (+1,272)
Scenario C (80/20 FCLP split)	4,266 (+709)	4,011 (+1,016)	2,997 (-33)	2,354 (+9)	6,967 (+1,380)	4,118 (+741)	14,230 (+2,056)	10,483 (+1,766)
OLF Coupeville								
No Action Alternative								
Average Year	3,742	880	3,181	820	836	616	7,759	2,316
Alternative 3								
Scenario A (20/80 FCLP split)	1,570 (-2,172)	669 (-211)	3,110 (-71)	879 (+59)	5,818 (+4,982)	2,052 (+1,436)	10,498 (+2,739)	3,600 (+1,284)
Scenario B (50/50 FCLP split)	1,745 (-1,997)	513 (-367)	3,840 (+659)	1,147 (+327)	4,223 (+3,387)	1,577 (+961)	9,808 (+2,049)	3,237 (+921)
Scenario C (80/20 FCLP split)	3,592 (-150)	1,022 (+142)	3,642 (+461)	1,077 (+257)	1,347 (+511)	743 (+127)	8,581 (+822)	2,842 (+526)
NAS Whidbey Island Complex								
No Action Alternative								
Average Year	7,299	3,875	6,211	3,165	6,423	3,993	19,933	11,033
Alternative 3								
Scenario A (20/80 FCLP split)	5,737 (-1,562)	4,231 (+356)	6,364 (+153)	2,983 (-182)	11,607 (+5,184)	5,502 (+1,509)	23,708 (+3,775)	12,716 (+1,683)
Scenario B (50/50 FCLP split)	5,934 (-1,365)	4,273 (+398)	6,937 (+726)	3,526 (+361)	10,710 (+4,287)	5,427 (+1,434)	23,581 (+3,648)	13,226 (+2,193)
Scenario C (80/20 FCLP split)	7,858 (+559)	5,033 (+1,158)	6,639 (+428)	3,431 (+266)	8,314 (+1,891)	4,861 (+868)	22,811 (+2,878)	13,325 (+2,292)

Table 4.2-17 Estimated Acreage and Population within the DNL Contour Ranges[1] for the NAS Whidbey Island Complex, Alternative 3 (Average Year)[2,3]

	DNL Contour Range			
	65 to <70 dB DNL	*70 to <75 dB DNL*	*Greater than or equal to 75 dB DNL*	*Total*

Notes:

1 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).

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 3 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). In addition, a 5.4-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, 2012). 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
NAS = Naval Air Station
OLF = Outlying Landing Field

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, Draft Aircraft Noise Study. Figures 4.2-16 through 4.2-21 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 4.2-18 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 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 Contour Range[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	1.3%	1.8%	0.9%	3.0%	1.9%	1.5%	1.5%	2.0%
Scenario B	1.2%	2.2%	-0.3%	1.4%	2.1%	2.0%	1.3%	1.9%
Scenario C	-0.3%	0.9%	-0.3%	0.1%	1.4%	2.0%	0.5%	1.2%
OLF Coupeville								
Scenario A	3.6%	8.2%	-8.4%	-8.8%	7.4%	5.8%	2.1%	2.7%
Scenario B	-9.3%	1.4%	-1.8%	-4.8%	9.0%	8.1%	1.5%	2.5%
Scenario C	-3.9%	-4.5%	0.6%	1.0%	18.5%	9.2%	1.5%	1.2%
NAS Whidbey Island Complex								
Scenario A	1.9%	2.8%	-3.7%	-0.4%	4.7%	3.1%	1.8%	2.2%
Scenario B	-1.9%	2.1%	-1.1%	-0.6%	4.8%	3.8%	1.4%	2.1%
Scenario C	-1.9%	-0.2%	0.2%	0.3%	4.2%	3.1%	0.9%	1.1%

Key:
dB = decibel
DNL = day-night average sound level
NAS = Naval Air Station
OLF = Outlying Landing Field

Figure 4.2-15 Alternative 3 Overview of 65 dB DNL Noise Contours for the NAS Whidbey Island Complex

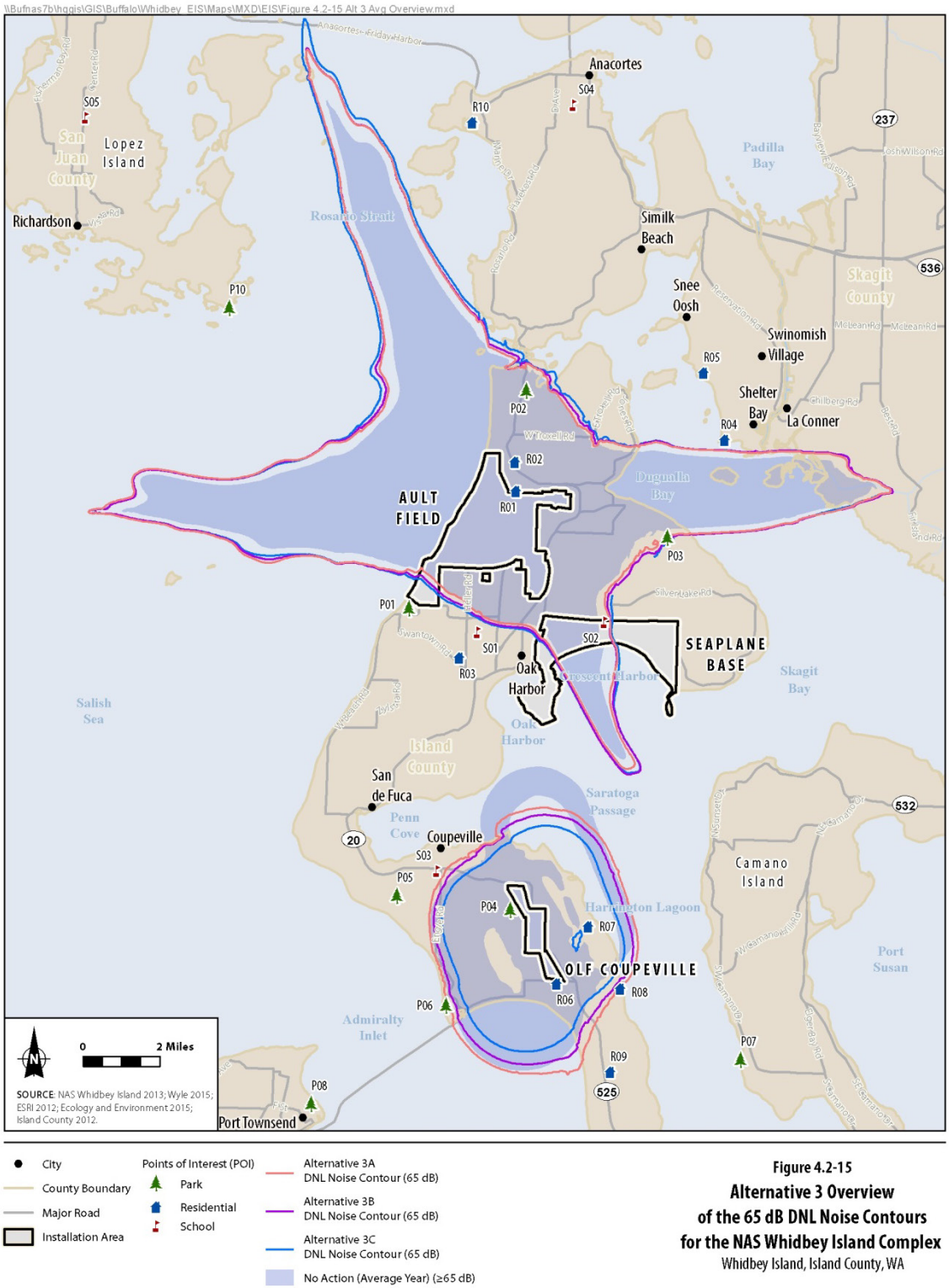


Figure 4.2-16 Alternative 3A DNL Noise Contours for Ault Field

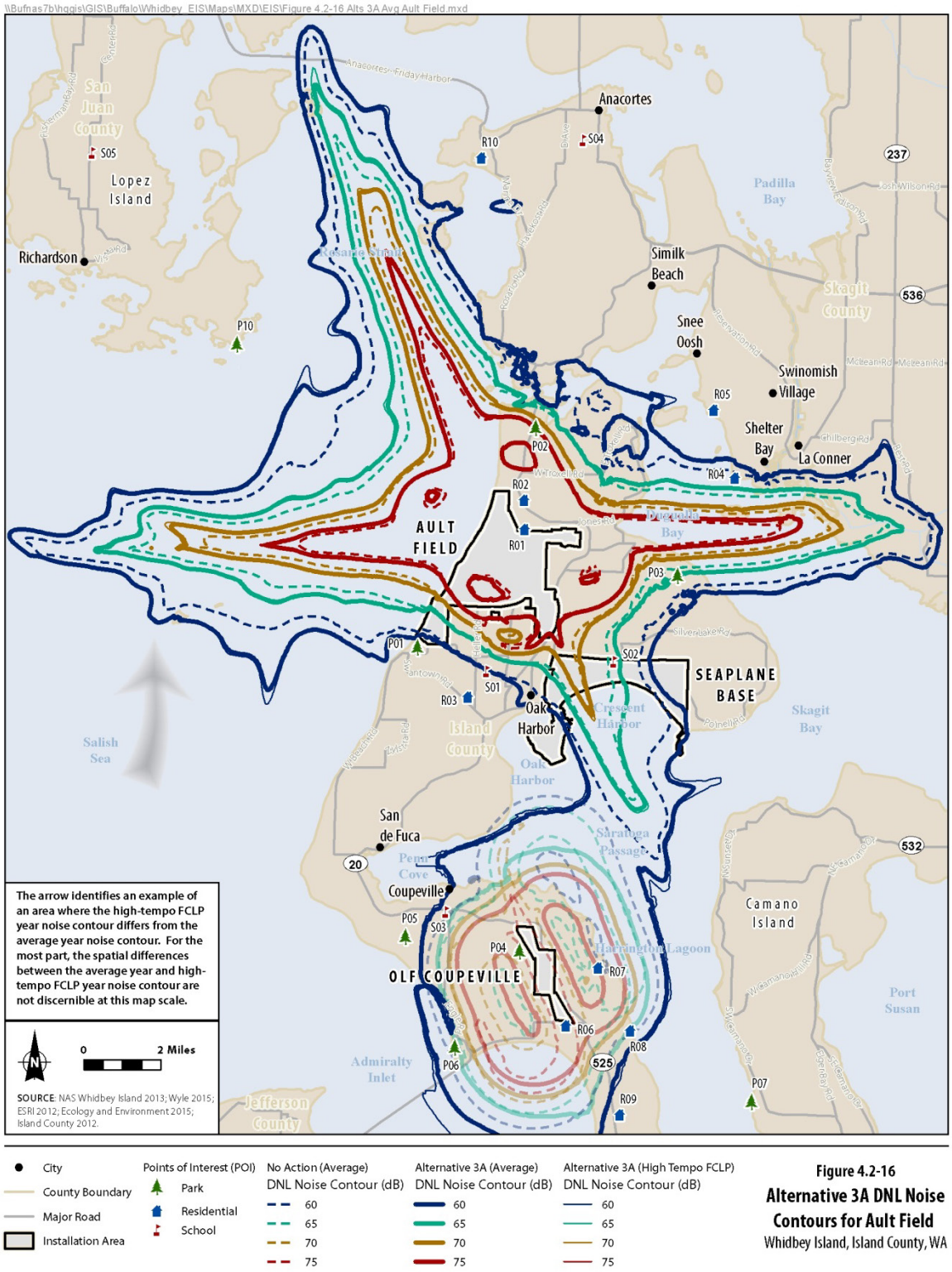


Figure 4.2-16
Alternative 3A DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

Figure 4.2-17 Alternative 3B DNL Noise Contours for Ault Field

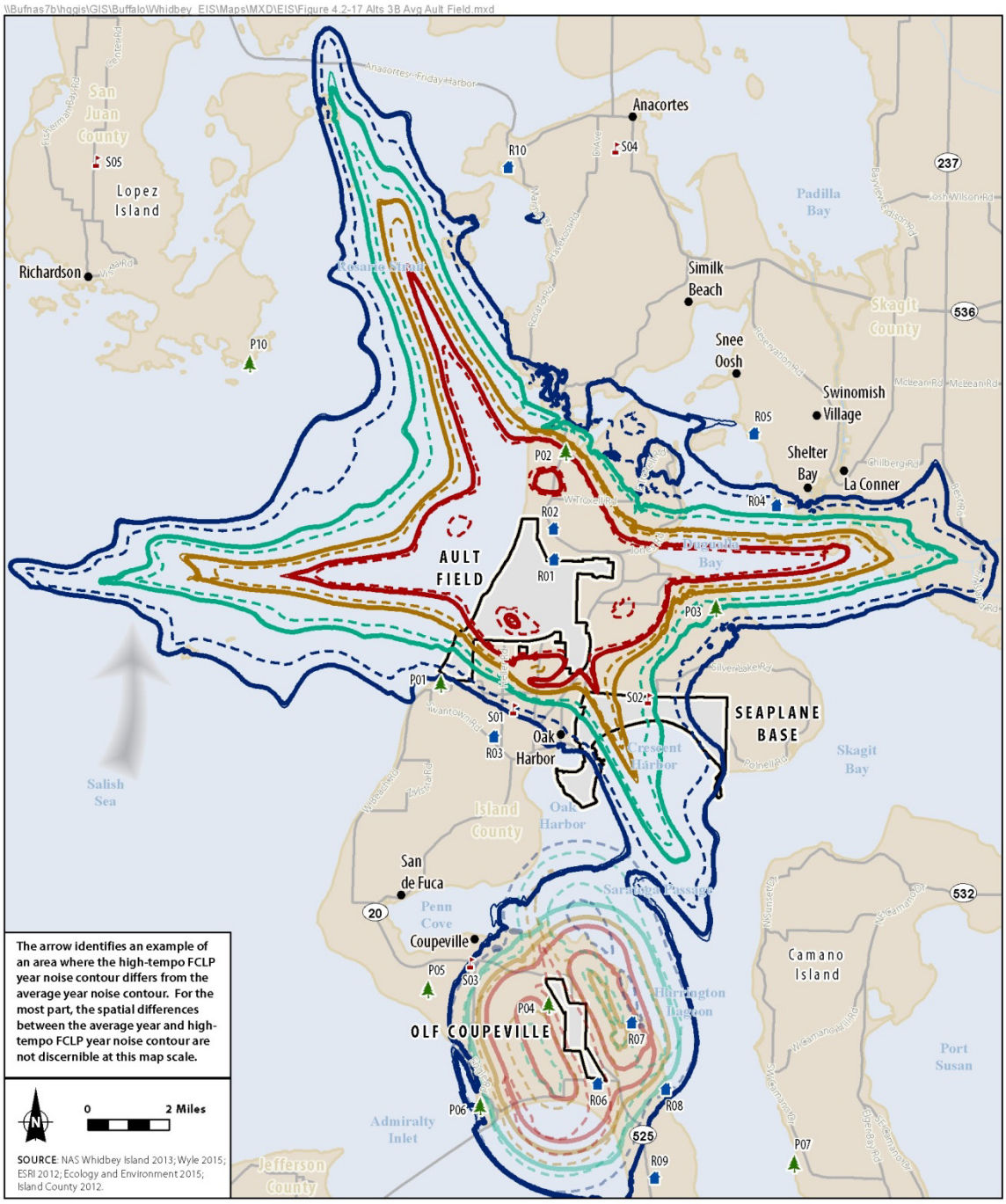


Figure 4.2-17
Alternative 3B DNL Noise Contours for Ault Field
Whidbey Island, Island County, WA

Figure 4.2-18 Alternative 3C DNL Noise Contours for Ault Field

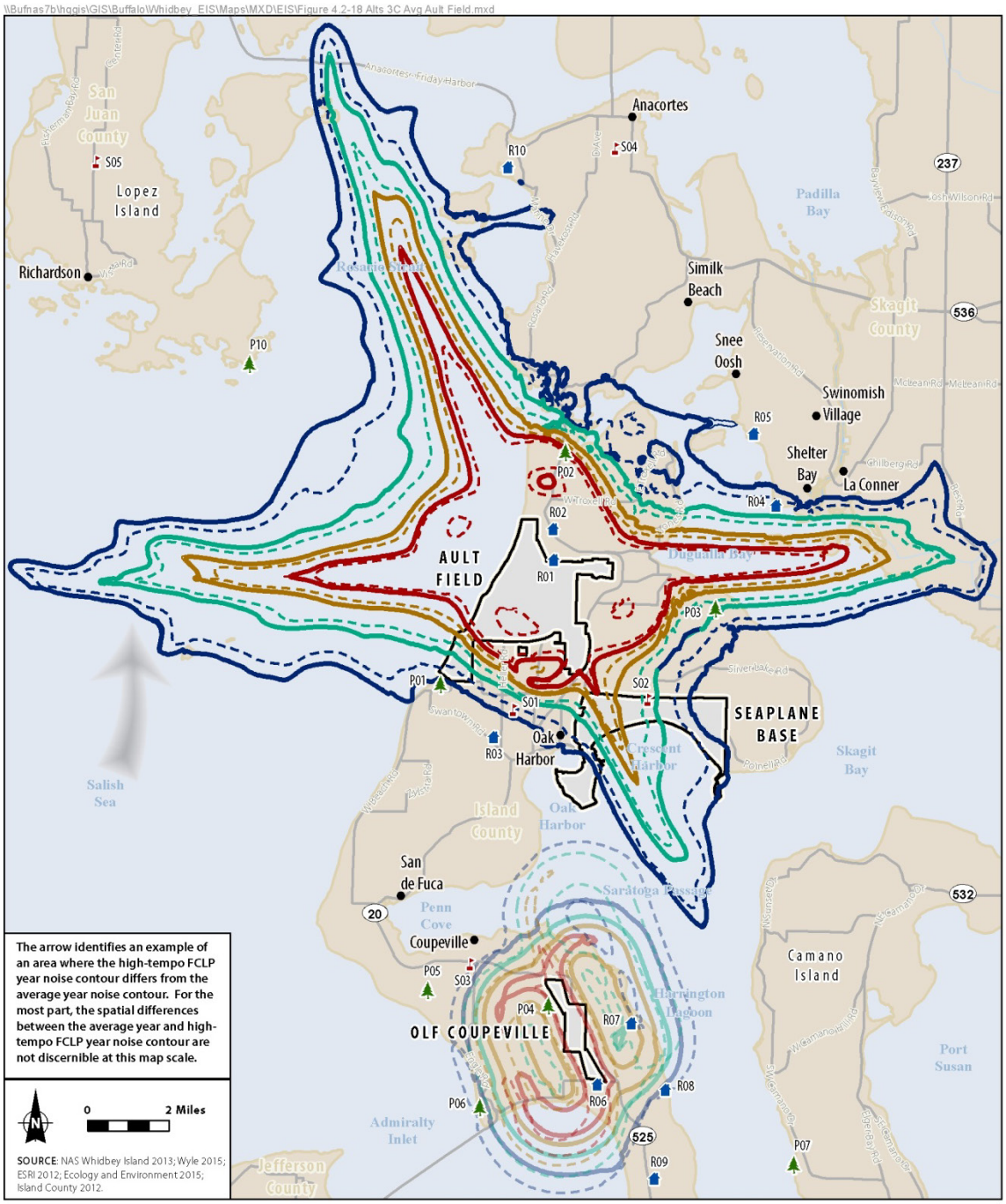


Figure 4.2-19 Alternative 3A DNL Noise Contours for OLF Coupeville

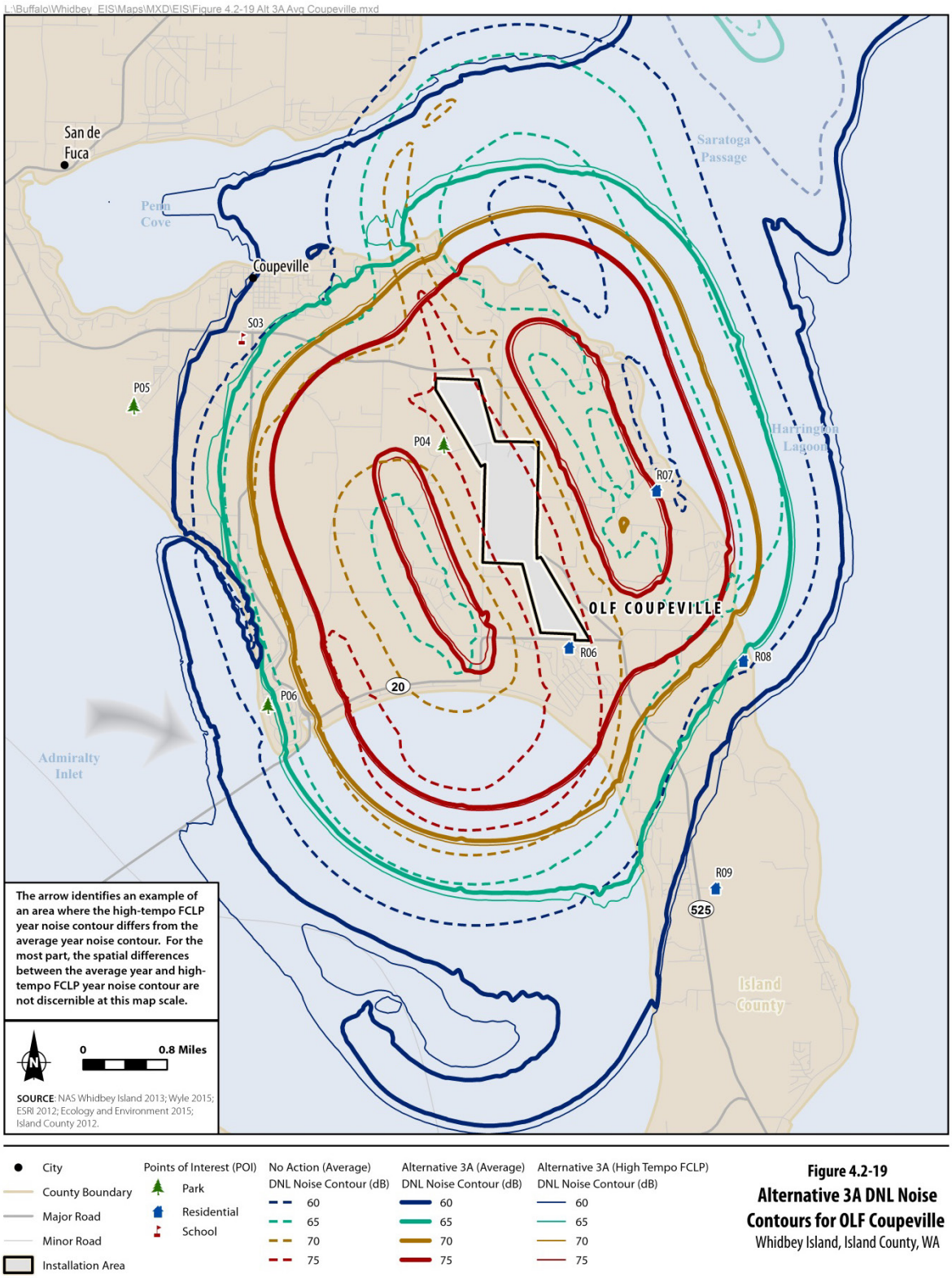


Figure 4.2-19
Alternative 3A DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

Figure 4.2-20 Alternative 3B DNL Noise Contours for OLF Coupeville

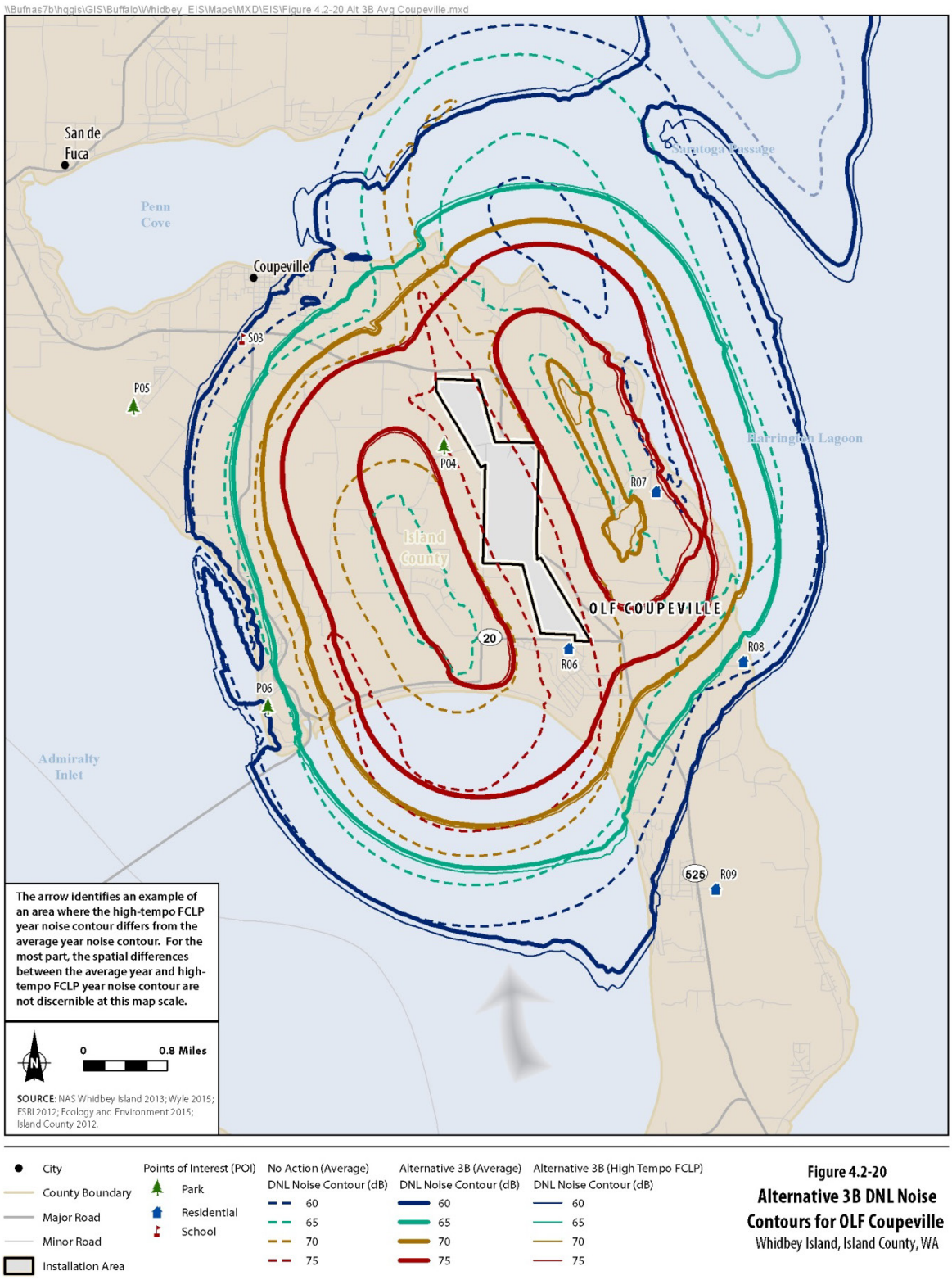


Figure 4.2-20
Alternative 3B DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

Figure 4.2-21 Alternative 3C DNL Noise Contours for OLF Coupeville

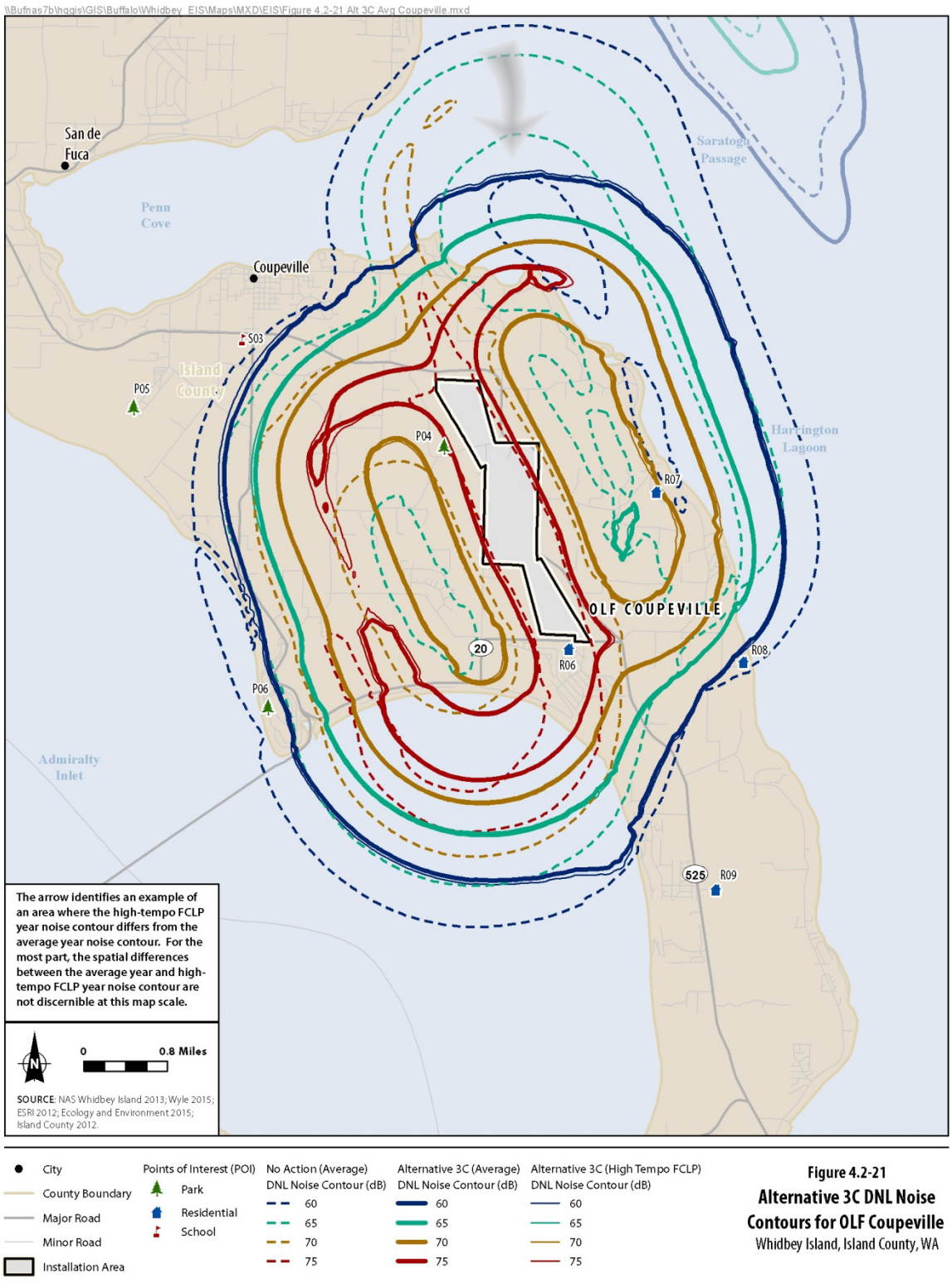


Figure 4.2-21
Alternative 3C DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

4.2.4.1.2 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, speech interference, classroom/learning interference, sleep disturbance, potential noise effects on recreation, and potential hearing loss. 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.

Single Event Noise

Two noise metrics are used to evaluate single event noise: 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, Draft 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 presented in Table 4.2-19. 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 3 are identical to those modeled in the No Action Alternative analysis. Measurements at only six of the 30 POIs changed from the No Action Alternative to Alternative 3 (measurements changed at R06, R07, R08, R09, S03, and S07). In addition, the SEL and L_{max} values for the representative POIs are all identical under all of the three action alternatives. However, the number of annual aircraft events that would produce these noise levels would differ between the three action alternatives and in comparison to the No Action Alternative. Table 4.2-19 also presents the number of annual aircraft events that produce the loudest single event for each POI.

This analysis shows that while there may not be a substantive difference in the loudest event at a particular POI, there may be a difference in the number of times that loudest event would occur between alternatives and compared to the No Action Alternative. Under Alternative 3, some of the POIs would experience more annual events of the maximum SEL/L_{max} than under the No Action Alternative, and other POIs would experience fewer annual events of the maximum SEL/L_{max}. The POI R06 (Admirals Dr. and Byrd Dr.) would experience the largest increase in annual events (+2,273 under Scenario A), while the POI P04 (Ebey's Landing – Rhododendron Park) would experience the largest decrease in annual events (-103 under Scenario C). Generally, POIs near OLF Coupeville experienced more annual events under Scenario A than under Scenarios B or C.

Under Alternative 3, the number of events that would produce the maximum SEL/ L_{max} values vary between the scenarios, depending on the POI (see Table 4.2-19). For example, on the high end, at Admirals Drive and Byrd Drive (R06) under Scenario A, a person would be exposed to the maximum SEL/ L_{max} an average of approximately seven times per day compared to the low end, such as at Central Whidbey (R03) under Scenario B, at Joseph Whidbey State Park (P01) under Scenario B, and at Cama Beach State Park (P07) under Scenario C, where a person would be exposed to the maximum SEL/ L_{max} an average of approximately once every month.

Table 4.2-19 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 3 (Average Year)[1]

		Maximum SEL (dB)		*L_{max} (dB)*		*Number of Annual Events[2]*			
ID	*Description*	*No Action Alternative*	*Alt 3*	*No Action Alternative*	*Alt 3*	*No Action Alternative*	*Alt 3 A*	*Alt 3 B*	*Alt 3 C*
Residences									
R01	Sullivan Rd	121	121 (0)	114	114 (0)	26	84 (+58)	55 (+29)	18 (-8)
R02	Salal St. and N. Northgate Dr.	109	109 (0)	96	96 (0)	12	113 (+101)	62 (+50)	34 (+22)
R03	Central Whidbey	101	101 (0)	93	93 (0)	34	42 (+8)	42 (+8)	41 (+7)
R04	Pull and Be Damned Point	96	96 (0)	88	88 (0)	208	273 (+65)	257 (+49)	255 (+47)
R05	Snee-Oosh Point	92	92 (0)	84	84 (0)	733	1,032 (+299)	936 (+203)	910 (+177)
R06	Admirals Dr. and Byrd Dr.	118	121 (+3)	114	118 (+4)	267	2,540 (+2,273)	1,545 (+1,278)	628 (+361)
R07	Race Lagoon	114	115 (+1)	106	110 (+4)	55	494 (+439)	331 (+276)	128 (+73)
R08	Pratts Bluff	112	101 (-11)	105	92 (-13)	75	494 (+419)	331 (+256)	128 (+53)
R09	Cox Rd and Island Ridge Way	92	90 (-2)	82	81 (-1)	72	22 (-50)	27 (-45)	17 (-55)
R10	Skyline	100	100 (0)	90	90 (0)	261	376 (+115)	349 (+88)	401 (+140)
R11	Sequim	73	73 (0)	60	60 (0)	74	104 (+30)	101 (+27)	111 (+37)
R12	Port Angeles	75	75 (0)	65	65 (0)	208	273 (+65)	257 (+49)	255 (+47)
Schools									
S01	Oak Harbor High School	99	99 (0)	90	90 (0)	26	105 (+79)	64 (+38)	26 (0)
S02	Crescent Harbor Elementary School	102	102 (0)	94	94 (0)	178	305 (+127)	312 (+134)	319 (+141)
S03	Coupeville Elementary School	98	94 (-4)	90	85 (-5)	367	1,270 (+903)	773 (+406)	314 (-53)
S04	Anacortes High School	93	93 (0)	83	83 (0)	112	161 (+49)	150 (+38)	172 (+60)

Table 4.2-19 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 3 (Average Year)[1]

ID	Description	Maximum SEL (dB)		L_{max} (dB)		Number of Annual Events[2]			
		No Action Alternative	Alt 3	No Action Alternative	Alt 3	No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C
S05	Lopez Island School	76	76 (0)	68	68 (0)	110	165 (+55)	131 (+21)	170 (+60)
S06	Friday Harbor Elementary School	53	53 (0)	39	39 (0)	26	20 (-6)	27 (+1)	34 (+8)
S07	Sir James Douglas Elementary	62	62 (0)	52	51 (-1)	147	206 (+59)	187 (+40)	182 (+35)
Parks									
P01	Joseph Whidbey State Park	93	93 (0)	82	82 (0)	34	42 (+8)	43 (+9)	41 (+7)
P02	Deception Pass State Park	110	110 (0)	104	104 (0)	161	664 (+503)	403 (+242)	164 (+3)
P03	Dugualla State Park	105	105 (0)	98	98 (0)	110	178 (+68)	172 (+62)	174 (+64)
P04	Ebey's Landing – Rhododendron Park	112	112 (0)	106	106 (0)	267	664 (+397)	403 (+136)	164 (-103)
P05	Ebey's Landing – Ebey's Prairie	88	88 (0)	77	77 (0)	367	1,370 (+1,003)	831 (+464)	337 (-30)
P06	Fort Casey State Park	96	96 (0)	85	85 (0)	267	1,270 (+1,003)	773 (+506)	314 (+47)
P07	Cama Beach State Park	83	83 (0)	73	73 (0)	5	41 (+36)	28 (+23)	11 (+6)
P08	Port Townsend	85	85 (0)	n/a	n/a (0)	24	19 (-5)	22 (-2)	22 (-2)
P09	Moran State Park	62	62 (0)	51	51 (0)	61	48 (-13)	64 (+3)	80 (+19)
P10	San Juan Island National Monument	95	95 (0)	85	85 (0)	372	538 (+166)	499 (+127)	572 (+200)
P11	San Juan Island Visitors Center	63	63 (0)	50	50 (0)	147	206 (+59)	187 (+40)	182 (+35)

Notes:

[1] The difference between the No Action Alternative and Alternative 3 is noted in parentheses for both the maximum SEL and L_{max} metrics, as well as the number of annual events.

[2] The number of annual events is the estimated number of times the single aircraft event with the maximum SEL or L_{max} at that point of interest would occur annually.

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

Speech Interference

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 (Wyle, 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 12 residential POIs and the seven 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 4.2-20 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, Scenarios A, B, and C.

Table 4.2-20 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*	
		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]*
Residences									
R01	Sullivan Rd	8	8	10 (+2)	10 (+2)	11 (+3)	11 (+3)	12 (+4)	12 (+4)
R02	Salal St. and N. Northgate Dr.	8	7	10 (+2)	9 (+2)	11 (+3)	10 (+3)	11 (+3)	11 (+4)
R03	Central Whidbey	2	-	3 (+1)	- (0)	3 (+1)	- (0)	3 (+1)	- (0)
R04	Pull and Be Damned Point	4	2	6 (+2)	2 (0)	6 (+2)	2 (0)	6 (+2)	2 (0)
R05	Snee-Oosh Point	2	-	2 (0)	1 (+1)	2 (0)	1 (+1)	2 (0)	1 (+1)
R06	Admirals Dr. and Byrd Dr.	1	1	3 (+2)	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)
R07	Race Lagoon	-	-	2 (+2)	1 (+1)	1 (+1)	1 (+1)	1 (+1)	- (0)
R08	Pratts Bluff	-	-	2 (+2)	1 (+1)	1 (+1)	1 (+1)	1 (+1)	- (0)
R09	Cox Rd and Island Ridge	1	-	3 (+2)	- (0)	2 (+1)	- (0)	1 (0)	- (0)
R10	Skyline	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R11	Sequim	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R12	Port Angeles	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Schools									
S01	Oak Harbor High School	5	1	7 (+2)	2 (+1)	7 (+2)	2 (+1)	8 (+3)	2 (+1)
S02	Crescent Harbor Elementary	4	1	5 (+1)	2 (+1)	6 (+2)	2 (+1)	6 (+2)	2 (+1)
S03	Coupeville Elementary	1	1	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)	- (-1)
S04	Anacortes High School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Table 4.2-20 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	
		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]

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 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.

Compared to the No Action Alternative, Alternative 3 would result in between zero and four additional events per hour at representative POIs during which conversations or indoor speech would be interrupted. The largest change (with four additional events per daytime hour) would occur at R01 (Sullivan Road) and R02 (Salal St. and N. Northgate Dr.), both under Scenario C. However, several POIs would have no change from the No Action Alternative.

Classroom/learning Interference

Two metrics were analyzed to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights: interior equivalent sound level ($L_{eq(8hr)}$) 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 (Wyle, 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 4.2-21 presents the 8-hour equivalent sound level ($L_{eq(8h)}$) and the number of events that exceed an L_{max} of 50 dB indoors under Alternative 3, Scenarios A, B, and C, 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 4.2-21 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.

Table 4.2-21 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			
		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	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]
School Surrogates																	
R03	Central Whidbey	<45	2	<45	-	49	3 (+1)	<45	- (0)	49	3 (+1)	<45	- (0)	49	3 (+1)	<45	- (0)
R11	Sequim	<45	-	<45	-	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)	<45	- (0)
Schools																	
S01	Oak Harbor High School	<45	5	<45	1	48	7 (+2)	<45	2 (+1)	48	7 (+2)	<45	2 (+1)	49	7 (+2)	<45	2 (+1)
S02	Crescent Harbor Elementary	49	4	<45	1	56	5 (+1)	46	2 (+1)	55	6 (+2)	45	2 (+1)	56	6 (+2)	46	2 (+1)
S03	Coupeville Elementary	<45	1	<45	-	48	2 (+1)	<45	2 (+2)	46	2 (+1)	<45	1 (+1)	<45	1 (0)	<45	- (0)
S04	Anacortes High School	<45	-	<45	-	<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)
S06	Friday Harbor Elementary	<45	-	<45	-	<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)

Table 4.2-21 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			
		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	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[3] (dB)	Events per Hour[4]	$L_{eq(8h)}$[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 (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 because normal conversation is at 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

$L_{eq(8hr)}$ = 8-hour sound level equivalent

L_{max} = maximum sound level

Most schools would experience interior $L_{eq(8hr)}$ 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 $L_{eq(8hr)}$ of 49 dB for the No Action Alternative and the highest under Scenarios A and C of 56 dB when windows are open. When windows are closed, the $L_{eq(8hr)}$ at Crescent Harbor Elementary School (S02) would drop to 45 or 46 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) 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) for all three scenarios with windows open, Crescent Harbor Elementary School (S02) under Scenarios B and C with windows open, and Coupeville Elementary School (S03) under Scenario A with windows closed. 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.

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 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 4.2-22 presents the results of the sleep disturbance analysis for the 12 POI locations that are in the residential category, as well as the seven schools, which are commonly located in residential areas.

Table 4.2-22 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]

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C	
		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	69%	53%	77% (+8%)	62% (+9%)	83% (+14%)	68% (+15%)	87% (+18%)	74% (+21%)
R02	Salal St. and N. Northgate Dr.	51%	37%	60% (+9%)	44% (+7%)	65% (+14%)	49% (+12%)	72% (+21%)	55% (+18%)
R03	Central Whidbey	21%	10%	28% (+7%)	14% (+4%)	31% (+10%)	16% (+6%)	35% (+14%)	19% (+9%)
R04	Pull and Be Damned Point	25%	12%	32% (+7%)	16% (+4%)	35% (+10%)	17% (+5%)	39% (+14%)	18% (+6%)
R05	Snee-Oosh Point	20%	6%	26% (+6%)	10% (+4%)	29% (+9%)	10% (+4%)	32% (+12%)	11% (+5%)
R06	Admirals Dr. and Byrd Dr.	13%	8%	60% (+47%)	45% (+37%)	43% (+30%)	30% (+22%)	20% (+7%)	13% (+5%)
R07	Race Lagoon	6%	3%	34% (+28%)	22% (+19%)	24% (+18%)	15% (+12%)	13% (+7%)	6% (+3%)
R08	Pratts Bluff	6%	3%	24% (+18%)	16% (+13)	16% (+10%)	11% (+8%)	7% (+1%)	4% (+1%)
R09	Cox Rd and Island Ridge Way	4%	3%	21% (+17%)	13% (+10%)	13% (+9%)	8% (+5%)	5% (+1%)	3% (0%)
R10	Skyline	7%	2%	10% (+3%)	4% (+2%)	11% (+4%)	4% (+2%)	14% (+7%)	4% (+2%)
R11	Sequim	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%)
Schools (near residential areas)[5]									
S01	Oak Harbor High School	27%	16%	34% (+7%)	19% (+3%)	38% (+11%)	23% (+7%)	42% (+15%)	27% (+11%)
S02	Crescent Harbor Elementary	27%	16%	34% (+7%)	20% (+4%)	38% (+11%)	24% (+8%)	43% (+16%)	28% (+12%)
S03	Coupeville Elementary	7%	4%	28% (+21%)	18% (+14%)	19% (+12%)	12% (+8%)	9% (+2%)	5% (+1%)
S04	Anacortes High School	2%	1%	4% (+2%)	1% (0%)	4% (+2%)	1% (0%)	4% (+2%)	1% (0%)
S05	Lopez Island School	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%)
S07	Sir James Douglas Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)

Table 4.2-22 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*	
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]*

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 decibels (dB) and 25 dB for windows open and closed, respectively.

5 All school points of interest were included in the potential sleep disturbance analysis because of their typical proximity to 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 47 percent under Scenario A with windows open, meaning that there is a 47-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 Scenarios B or C. However, for the POIs around Ault Field, there was a larger increase in the percent probability of awakening for Scenario C than for Scenarios A or B.

Potential Noise Effects on Recreation

The analysis of potential noise effects on recreation 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 65 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, Draft Aircraft Noise Study. Table 4.2-23 presents the results of the analysis for Alternative 3 for the 11 POIs that are considered parks or recreational centers with primarily outdoor features.

Under Alternative 3, the table shows a slight increase for some POIs where there would be potential for one to three additional DNL daytime events per hour during which a recreationist may experience outdoor speech interference. 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 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. These increases range from zero to an increase of three events per hour (P03 under Scenario C), depending on the scenario.

Table 4.2-23 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
		Annual Average Daily Daytime Events per Hour			
ID	Description	NA65 L_{max} [2]	NA65 L_{max} [2]	NA65 L_{max} [2]	NA65 L_{max} [2]
P01	Joseph Whidbey State Park	5	6 (+1)	6 (+1)	6 (+1)
P02	Deception Pass State Park	6	7 (+1)	8 (+2)	8 (+2)
P03	Dugualla State Park	7	8 (+1)	9 (+2)	10 (+3)
P04	Ebey's Landing – Rhododendron Park	1	3 (+2)	2 (+1)	1 (0)
P05	Ebey's Landing – Ebey's Prairie	1	2 (+1)	1 (0)	0 (-1)
P06	Fort Casey State Park	1	2 (+1)	2 (+1)	1 (0)
P07	Cama Beach State Park	-	- (0)	- (0)	- (0)
P08	Port Townsend	-	- (0)	- (0)	- (0)
P09	Moran State Park	-	- (0)	- (0)	- (0)
P10	San Juan Island National Monument	2	3 (+1)	3 (+1)	3 (+1)
P11	San Juan Island Visitors Center	-	- (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 events at or above an outdoor maximum single event sound level (L_{max}) of 65 decibels; this reflects potential for outdoor speech interference.

Key:

L_{max} = maximum A-weighted sound level

NA65 = number of events above an L_{max} of 65 decibels

Potential Hearing Loss

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 found permanent threshold shifts are unlikely to be caused by exposures to aircraft noise thought to be typical of those who have lived on or near jet air stations. 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 2008).

As part of this analysis, an evaluation of the risk of potential hearing loss for populations in the areas around the NAS Whidbey Island complex was conducted (including both Ault Field and OLF Coupeville). Details on the potential hearing loss metric, methodology for the analysis, and assumptions are outlined in Section 3.2, as well as Appendix A, Draft 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 potential hearing loss 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 4.2-24 presents the potentially affected populations in and near Ault Field and OLF Coupeville by 1 dB increments of the 24-hour equivalent sound level ($L_{eq(24)}$) as compared to the No Action Alternative numbers presented in Section 3.2.

Table 4.2-24 Average and 10th Percentile Noise Induced Permanent Threshold Shifts (NIPTS) 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)[2,3]	Estimated Population[4,5,6]							
			Ault Field				OLF Coupeville			
			No Action	Alt 3A	Alt 3B	Alt 3C	No Action	Alt 3A	Alt 3B	Alt 3C
75-76	1.0	4.0	-	0 (0)	0 (0)	21 (+21)	67	61 (-6)	45 (-22)	35 (-32)
76-77	1.0	4.5	143	121 (-22)	243 (+100)	348[7] (+205)	55	180 (+125)	106 (+51)	59 (+4)
77-78	1.5	5.0	274	261 (-13)	407 (+133)	390 (+116)	51	152 (+101)	77 (+26)	54 (+3)
78-79	2.0	5.5	131	181 (+50)	291 (+160)	390 (+259)	36	117 (+81)	73 (+37)	62 (+26)
79-80	2.5	6.0	81	96 (+15)	203 (+122)	277 (+196)	16	73 (+57)	64 (+48)	58 (+42)
80-81	3.0	7.0	71	76 (+5)	96 (+25)	214 (+143)	4	72 (+68)	58 (+54)	1 (-3)
81-82	3.5	8.0	51	70 (+19)	75 (+24)	86 (+35)	-	64 (+64)	55 (+55)	0 (0)
82-83	4.0	9.0	34	50 (+16)	66 (+32)	70 (+36)	-	59 (+59)	63 (+63)	0 (0)
83-84	4.5	10.0	25	39 (+14)	42 (+17)	51 (+26)	-	53 (+53)	53 (+53)	0 (0)
84-85	5.5	11.0	16	22 (+6)	28 (+12)	31 (+15)	-	61 (+61)	1 (+1)	0 (0)
85-86	6.0	12.0	12	15 (+3)	21 (+9)	23 (+11)	-	62 (+62)	0 (0)	0 (0)
86-87	7.0	13.5	5	9 (+4)	15 (+10)	18 (+13)	-	1 (+1)	0 (0)	0 (0)
87-88	7.5	15.0	4	5 (+1)	9 (+5)	14 (+10)	-	1 (+1)	0 (0)	0 (0)
88-89	8.5	16.5	1	4 (+3)	4 (+3)	6 (+5)	-	0 (0)	0 (0)	0 (0)
89-90	9.5	18.0	-	1 (+1)	2 (+2)	3 (+3)	-	0 (0)	0 (0)	0 (0)

Table 4.2-24 Average and 10th Percentile Noise Induced Permanent Threshold Shifts (NIPTS) 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)[2,3]	Estimated Population[4,5,6]							
			Ault Field				OLF Coupeville			
			No Action	Alt 3A	Alt 3B	Alt 3C	No Action	Alt 3A	Alt 3B	Alt 3C

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, every day, 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 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 5.4 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, 2012). 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, 446 are military personnel living on-base at Ault Field.

Key:

dB = decibel
DNL = day-night average sound level
NIPTS = Noise Induced Permanent Threshold Shift
OLF = Outlying Landing Field

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 4.2-24, 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 (57 additional people) and for OLF Coupeville would be under Scenario A (125 additional people). The range of potential NIPTS could be up to 9.5 dB at Ault Field and 7.5 dB at OLF Coupeville. The potential NIPTS values presented in Table 4.2-24 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). 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 4.2-24 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 dB for the population most sensitive to noise around Ault Field and up to 15.0 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.

Nonauditory Health Effects

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.

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, Draft 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 4.2-19, for the representative POIs analyzed, the highest L_{max} value was 118 dB, and, therefore, sound levels damaging to structural components of buildings are not likely to occur.

4.2.4.2 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 potential hearing loss would increase. The range of potential NIPTS could be up to 9.5 dB at Ault Field and 7.5 dB at OLF Coupeville for the population with average noise sensitivity and up to 18.0 dB at Ault Field and 15.0 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 action alternatives discussed in the preceding sections using the noise metrics provided within the discussion.

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.

The DNL noise contour that covered the highest estimated population was Alternative 1, Scenario C, with a total of 13,547 (an increase of 2,514). 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 2, Scenario A, with a total of 12,684 (an addition of 1,651 people and an

approximately 7-percent difference from the high range). Comparing the three 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 three scenarios.

It addition, the estimated population within the greater than 75 dB DNL noise contour increases under each scenario of each alternative at both Ault Field and OLF Coupeville. Around Ault Field, this ranges from a high of 889 more people under Alternative 1, Scenario C, to a low of 73 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 1,479 people under Alternative 1, Scenario A, and the smallest increase would be 94 more people under Alternative 2, Scenario C. Table 4.2-25 shows a DNL noise comparison, by action alternative and scenario, of the overall increase in the number of people within the 65 dB DNL noise contour.

Supplemental Metrics

The supplemental metric analyses for the three alternatives are associated with the 30 POIs that were identified as part of this project. 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 three scenarios.

With respect to the evaluation of potential hearing loss, 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.

Table 4.2-25 DNL Noise Contour Comparison - Overall Increase in the Number of People within the 65 dB DNL Noise Contour

	No Action	*Alt 1A*	*Alt 1B*	*Alt 1C*	*Alt 2A*	*Alt 2B*	*Alt 2C*	*Alt 3A*	*Alt 3B*	*Alt 3C*
Ault Field	8,717 people	Additional 442 people (+5.1%)	Additional 1,327 people (+15.2%)	Additional 1,979 people (+22.7%)	Additional 395 people (+4.5%)	Additional 1,261 people (+14.5%)	Additional 1,785 people (+20.5%)	Additional 399 people (+4.6%)	Additional 1,272 people (+14.6%)	Additional 1,766 people (+20.3%)
OLF Coupeville	2,316 people	Additional 1,316 people (+56.8%)	Additional 939 people (+40.5%)	Additional 535 people (+23.1%)	Additional 1,256 people (+54.2%)	Additional 884 people (+38.2%)	Additional 512 people (+22.1%)	Additional 1,284 people (+55.4%)	Additional 921 people (+39.8%)	Additional 526 people (+22.7%)
NAS Whidbey Island Complex	11,033 people	Additional 1,758 people (+15.9%)	Additional 2,266 people (+20.5%)	Additional 2,514 people (+22.8%)	Additional 1,651 people (+15.0%)	Additional 2,145 people (+19.4%)	Additional 2,297 people (+20.8%)	Additional 1,683 people (+15.3%)	Additional 2,193 people (+19.9%)	Additional 2,292 people (+20.8%)

Key:
NAS = Naval Air Station
OLF = Outlying Landing Field

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 potential hearing loss 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 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 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.

Noise Mitigation

In addition to the force-structure alternatives, the Navy analyzed three sub-alternatives (Scenarios A, B, and C) to provide a total of nine alternatives. The Secretary of the Navy will be able to select a final alternative/scenario combination from the range of nine 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 Coupeville, the Navy analyzed whether different operational scenarios would mitigate noise at OLF Coupeville. Therefore, 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.

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.** The Navy is testing the use of chevrons (ceramic strips placed in the exhaust nozzle of a jet engine for sound reduction). Chevron testing in October 2014 confirmed that this technology has some positive effect, but it also disclosed that some redesign of the exhaust nozzle chevrons will be necessary to achieve noise reduction benefits in the Super Hornet and Growler. The Navy will continue to explore different technologies to reduce the noise impacts from aircraft.
- **MAGIC CARPET.** MAGIC CARPET (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 process easier. 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. Initial capabilities of MAGIC CARPET 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. The full capabilities of MAGIC CARPET will be released in 2019 timeframe. While this system's impact on future training has not been fully realized, it has the potential to significantly reduce training requirements for FCLPs.

Specifically related to the noise suppression facility/hush house, the noise study analyzed the proposed hush house operations (656 annual events under the average year conditions and 944 annual events under the high-tempo FCLP year) 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, Draft 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 dBA, in 10-dB increments, for the Growler at minimum afterburner 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 afterburner power, typically 3 minutes per maintenance event. The average year analysis incudes 665 annual events, meaning the average time spent at afterburner 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.

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 System Training Facility Boardman, and the numerous northwest instrument and visual military training routes (IR/VR) 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 3710.7Z 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 3710.7Z, March 9, 2015 et seq.) include:

- 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.
- Due to noise-abatement procedures, 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 and wilderness 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.

The Navy 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.

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.

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 (ODO), 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 ODO provides copies of the complaints to the Commanding Officer, Executive Officer, Operations Officer, Community Planning and Liaison Officer (CPLO), and Public Affairs Officer (PAO) 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 air traffic control 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 CPLO 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.

4.3 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), and Accident Potential Zones (APZs).

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, Alternatives 1 through 3

4.3.2.1 Public Health and Safety, Potential Impacts

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.

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 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*) (DoD, 2011).

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.

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 Air Installations Compatible Use Zones (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).

At OLF Coupeville, it was determined during the 2005 AICUZ process 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 action 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 APZs depicted in Figures 4.3-1 or 4.3-2, 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 figures 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 will be issued. At which time, the Navy will perform an AICUZ update and share official recommendations with the community.

Figure 4.3-1 Existing 2005 AICUZ Clear Zones and Conceptual APZs for OLF Coupeville, Option 1

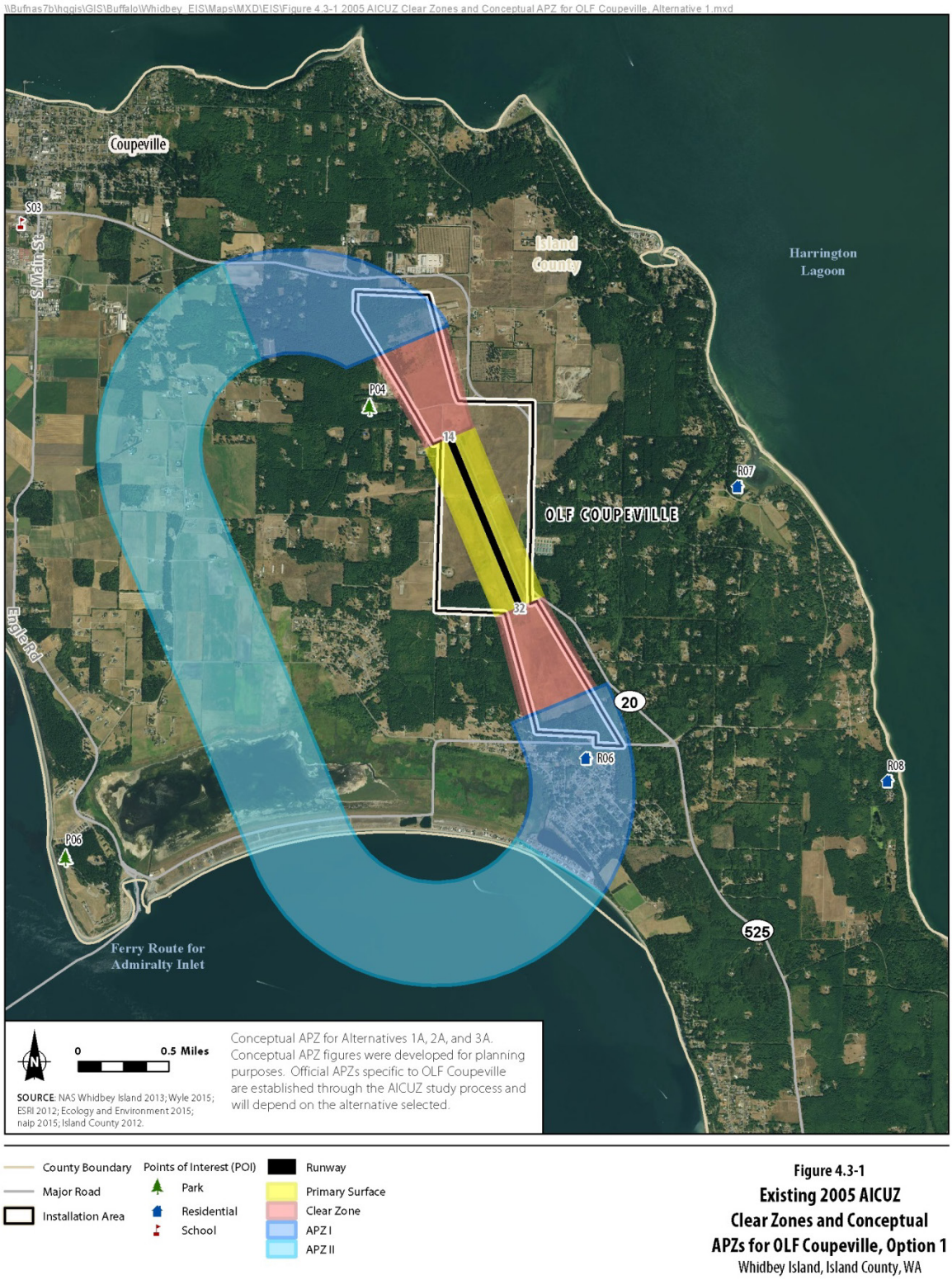


Figure 4.3-1
Existing 2005 AICUZ Clear Zones and Conceptual APZs for OLF Coupeville, Option 1
Whidbey Island, Island County, WA

Figure 4.3-2 Existing 2005 AICUZ Clear Zones and Conceptual APZs for OLF Coupeville, Option 2

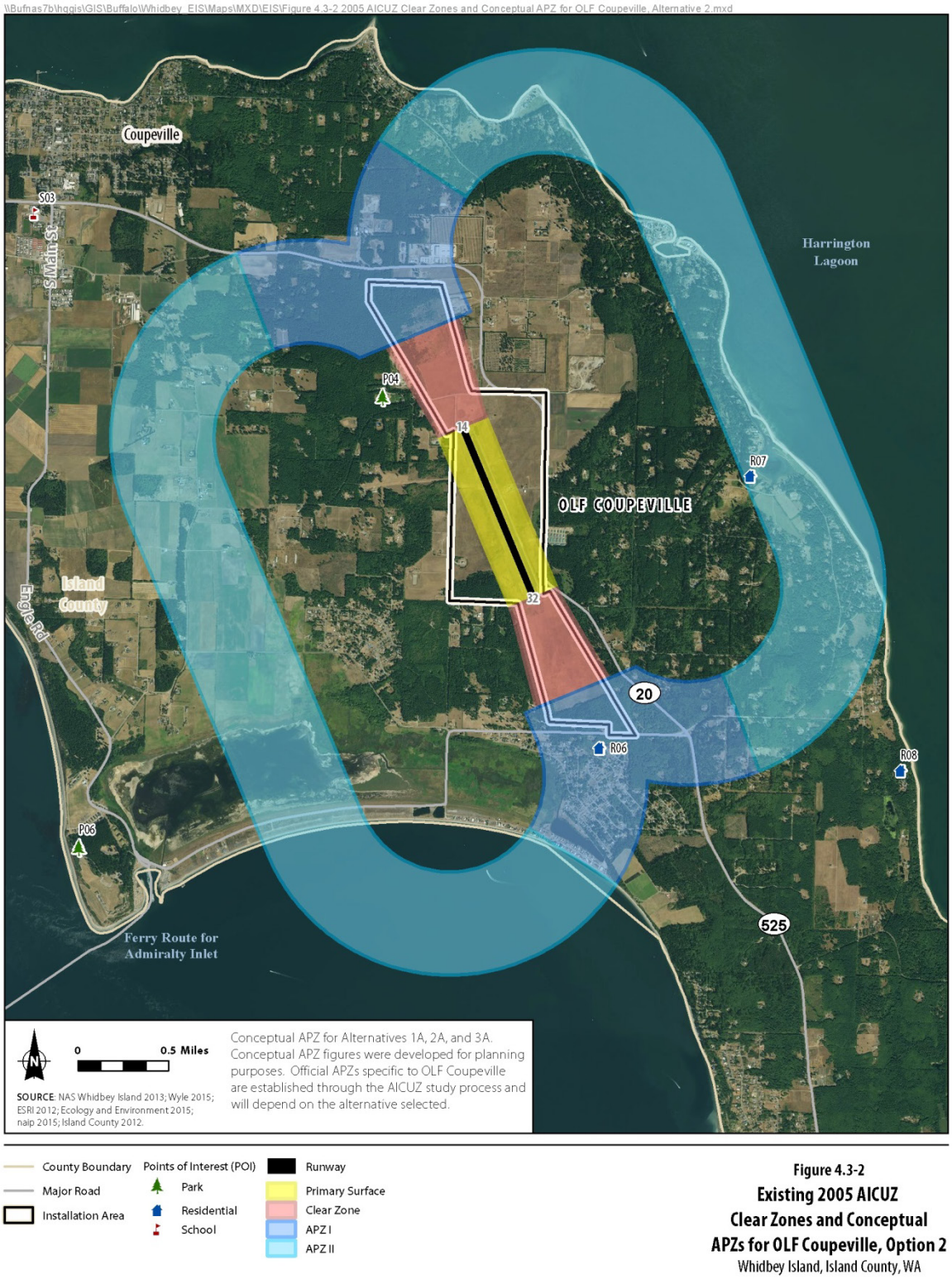


Figure 4.3-2
Existing 2005 AICUZ Clear Zones and Conceptual APZs for OLF Coupeville, Option 2
Whidbey Island, Island County, WA

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] and Scenario B [50 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. Additionally, under Alternative 1, Scenario A; Alternative 2, Scenario A; and Alternative 3, Scenario A, Runway 14 would meet the OPNAVINST APZ threshold (see Figure 1.2-3 for a depiction of runways at OLF Coupeville). Average year and high-tempo FCLP years were both considered and support the findings in Table 4.3.1. Official APZs are established through the AICUZ study process and would depend on the alternative selected. If APZs are created, they could influence future land use decisions by the community and may have a minor impact on the land under the APZs. 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

	Existing Clear Zones and Conceptual APZs		
Alternatives	***Existing Clear Zone***	***Runway 32 Conceptual APZ***	***Runway 14 Conceptual APZ***
Existing 2005 AICUZ	⦿[1]		
Alternative 1, Scenario A	⦿[1]	⦿[2]	⦿[3]
Alternative 1, Scenario B	⦿[1]	⦿[2]	
Alternative 1, Scenario C	⦿[1]		
Alternative 2, Scenario A	⦿[1]	⦿[2]	⦿[3]
Alternative 2, Scenario B	⦿[1]	⦿[2]	
Alternative 2, Scenario C	⦿[1]		
Alternative 3, Scenario A	⦿[1]	⦿[2]	⦿[3]
Alternative 3, Scenario B	⦿[1]	⦿[2]	
Alternative 3, Scenario C	⦿[1]		
No Action Alternative	⦿[1]		

Source: Wyle, 2015

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 (Option 1); if this alternative is selected, it is likely the Navy would recommend establishing an APZ for this runway.
3 Conceptual depiction of APZs for Runway 32 and Runway 14 (Option 2).

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

Environmental Health Risks and Safety Risks to Children

In accordance with the requirements of Executive Order (EO) 13405, this section also evaluates the potential impacts on children residing near Ault Field and OLF Coupeville. Tables 4.3-2 through 4.3-4 present information on the number of children who reside within the 65 or greater db DNL contours under the action alternatives and scenarios during the average year. Tables 4.3-5 through 4.3-7 present information on the number of children who are likely to be affected by the action alternatives and scenarios during high-tempo FCLP years.

As shown on the tables, the total number of children likely to be affected by the greater than 65 db DNL contours would range from a low of 3,080 children under Alternative 2, Scenario A, to a high of 3,380 children under Alternative 1, Scenario C, under the average year. Under the high-tempo FCLP year, these figures would range from a low of 3,107 children under Alternative 2, Scenario A, to a high of 3,446 children under Alternative 1, Scenario C.

When compared to the No Action Alternative, this would equate to 317 additional children being affected by the greater than 65 db DNL contours under Alternative 2, Scenario A, to 617 additional children being affected by the greater than 65 db DNL contours 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 186 additional children being affected by the greater than 65 db DNL contours under Alternative 2, Scenario A, to 525 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 the greater than 65 dB DNL contours would range between 317 and 617 children (or a percent increase of between 11.5 percent and 22.4 percent, respectively) under all alternatives and scenarios under the average year compared to the No Action Alternative. An estimated 186 to 525 additional children (or a percent increase of between 6.4 percent and 17.9 percent, respectively) would be affected by the greater than 65 db DNL contours under all alternatives and scenarios under the high-tempo FCLP year compared to the No Action Alternative.

Children living under 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, Draft 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 action alternatives is intermittent; therefore, the Navy does not anticipate any significant disproportionate health impacts to children caused by aircraft noise.

As described in Section 3.3.2.4, 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 4.3-1 and 4.3-2, 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.

Table 4.3-2 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 1, Scenarios A, B, and C, 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	3,875	969	25.0%	-	-
70-75 DNL	3,165	805	25.4%	-	-
75+ DNL	3,993	989	24.8%	-	-
Total Affected Population	**11,033**	**2,763**	**25.0%**	**-**	**-**
Alternative 1, Scenario A					
65-70 DNL	4,250	1,079	25.4%	110	-
70-75 DNL	2,967	733	24.7%	-72	-
75+ DNL	5,574	1,291	23.2%	302	-
Total Affected Population	**12,791**	**3,103**	**24.3%**	**340**	**19.3%**
Alternative 1, Scenario B					
65-70 DNL	4,289	1,106	25.8%	137	-
70-75 DNL	3,515	866	24.6%	61	-
75+ DNL	5,495	1,311	23.9%	322	-
Total Affected Population	**13,299**	**3,283**	**24.7%**	**520**	**22.9%**
Alternative 1, Scenario C					
65-70 DNL	5,095	1,283	25.2%	314	-
70-75 DNL	3,424	848	24.8%	43	-
75+ DNL	5,028	1,249	24.8%	260	-
Total Affected Population	**13,547**	**3,380**	**25.0%**	**617**	**24.5%**

Sources: USCB, 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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 5.4-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, 2012).

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, Scenarios A, B, and C, 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*
No Action Alternative					
65-70 DNL	3,875	969	25.0%	-	-
70-75 DNL	3,165	805	25.4%	-	-
75+ DNL	3,993	989	24.8%	-	-
Total Affected Population	**11,033**	**2,763**	**25.0%**	**-**	**-**
Alternative 2, Scenario A					
65-70 DNL	4,209	1,072	25.5%	103	-
70-75 DNL	3,003	738	24.6%	-67	-
75+ DNL	5,472	1,270	23.2%	281	-
Total Affected Population	**12,684**	**3,080**	**24.3%**	**317**	**19.2%**
Alternative 2, Scenario B					
65-70 DNL	4,255	1,097	25.8%	128	-
70-75 DNL	3,545	871	24.6%	66	-
75+ DNL	5,378	1,287	23.9%	298	-
Total Affected Population	**13,178**	**3,255**	**24.7%**	**492**	**22.9%**
Alternative 2, Scenario C					
65-70 DNL	5,063	1,273	25.1%	304	-
70-75 DNL	3,414	848	24.8%	43	-
75+ DNL	4,853	1,205	24.8%	216	-
Total Affected Population	**13,330**	**3,326**	**25.0%**	**563**	**24.5%**

Sources: USCB, 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c])

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 5.4 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, 2012).

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, Scenarios A, B, and C, 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	3,875	969	25.0%	-	-
70-75 DNL	3,165	805	25.4%	-	-
75+ DNL	3,993	989	24.8%	-	-
Total Affected Population	**11,033**	**2,763**	**25.0%**	**-**	**-**
Alternative 3, Scenario A					
65-70 DNL	4,231	1,076	25.4%	107	-
70-75 DNL	2,983	734	24.6%	-71	-
75+ DNL	5,502	1,276	23.2%	287	-
Total Affected Population	**12,716**	**3,086**	**24.3%**	**323**	**19.2%**
Alternative 3, Scenario B					
65-70 DNL	4,273	1,101	25.8%	132	-
70-75 DNL	3,526	868	24.6%	63	-
75+ DNL	5,427	1,295	23.9%	306	-
Total Affected Population	**13,226**	**3,264**	**24.7%**	**501**	**22.8%**
Alternative 3, Scenario C					
65-70 DNL	5,033	1,267	25.2%	298	-
70-75 DNL	3,431	851	24.8%	46	-
75+ DNL	4,861	1,205	24.8%	216	-
Total Affected Population	**13,325**	**3,323**	**24.9%**	**560**	**24.4%**

Sources: USCB, 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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 5.4-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, 2012).

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, Scenarios A, B, and C, High-Tempo FCLP

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	4,141	1,040	25.1%	-	-
70-75 DNL	3,293	842	25.6%	-	-
75+ DNL	4,170	1,039	24.9%	-	-
Total Affected Population	**11,604**	**2,921**	**25.2%**	**-**	**-**
Alternative 1, Scenario A					
65-70 DNL	4,355	1,101	25.3%	61	-
70-75 DNL	2,958	737	24.9%	-105	-
75+ DNL	5,734	1,324	23.1%	285	-
Total Affected Population	**13,047**	**3,162**	**24.2%**	**241**	**16.7%**
Alternative 1, Scenario B					
65-70 DNL	4,359	1,125	25.8%	85	-
70-75 DNL	3,505	865	24.7%	23	-
75+ DNL	5,646	1,344	23.8%	305	-
Total Affected Population	**13,510**	**3,334**	**24.7%**	**413**	**21.7%**
Alternative 1, Scenario C					
65-70 DNL	5,183	1,304	25.2%	264	-
70-75 DNL	3,400	840	24.7%	-2	-
75+ DNL	5,223	1,302	24.9%	263	-
Total Affected Population	**13,806**	**3,446**	**25.0%**	**525**	**23.8%**

Sources: USCB 2012a, 2012b, 2012c, 2012d; USCB n.d.[a], n.d.[b], n.d.[c].

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 5.4-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, 2012).

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, Scenarios A, B, and C, 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	4,141	1,040	25.1%	-	-
70-75 DNL	3,293	842	25.6%	-	-
75+ DNL	4,170	1,039	24.9%	-	-
Total Affected Population	**11,604**	**2,921**	**25.2%**	**-**	**-**
Alternative 2, Scenario A					
65-70 DNL	4,264	1,084	25.4%	44	-
70-75 DNL	2,985	737	24.7%	-105	-
75+ DNL	5,554	1,286	23.2%	247	-
Total Affected Population	**12,803**	**3,107**	**24.3%**	**186**	**15.5%**
Alternative 2, Scenario B					
65-70 DNL	4,355	1,124	25.8%	84	-
70-75 DNL	3,547	874	24.6%	32	-
75+ DNL	5,545	1,327	23.9%	288	-
Total Affected Population	**13,447**	**3,325**	**24.7%**	**404**	**21.9%**
Alternative 2, Scenario C					
65-70 DNL	5,055	1,275	25.2%	235	-
70-75 DNL	3,454	854	24.7%	12	-
75+ DNL	5,056	1,252	24.8%	213	-
Total Affected Population	**13,565**	**3,381**	**24.9%**	**460**	**23.5%**

Sources: USCB 2012a, 2012b, 2012c, 2012d; USCB n.d.[a], n.d.[b], n.d.[c].

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 5.4-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, 2012).

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, Scenarios A, B, and C, 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	4,141	1,040	25.1%	-	-
70-75 DNL	3,293	842	25.6%	-	-
75+ DNL	4,170	1,039	24.9%	-	-
Total Affected Population	**11,604**	**2,921**	**25.2%**	**-**	**-**
Alternative 3, Scenario A					
65-70 DNL	4,348	1,101	25.3%	61	-
70-75 DNL	2,970	739	24.9%	-103	-
75+ DNL	5,675	1,311	23.1%	272	-
Total Affected Population	**12,993**	**3,151**	**24.3%**	**230**	**16.6%**
Alternative 3, Scenario B					
65-70 DNL	4,363	1,125	25.8%	85	-
70-75 DNL	3,505	866	24.7%	24	-
75+ DNL	5,633	1,339	23.8%	300	-
Total Affected Population	**13,501**	**3,330**	**24.7%**	**409**	**21.6%**
Alternative 3, Scenario C					
65-70 DNL	5,024	1,268	25.2%	228	-
70-75 DNL	3,443	852	24.7%	10	-
75+ DNL	5,010	1,240	24.8%	201	-
Total Affected Population	**13,477**	**3,360**	**24.9%**	**439**	**23.4%**

Sources: USCB 2012a, 2012b, 2012c, 2012d; USCB n.d.[a], n.d.[b], n.d.[c].

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 5.4-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, 2012).

Key:
DNL = day-night average sound level

Public Health and Safety Conclusion

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 Record of Decision, 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 under the noise contours under all alternatives and scenarios. 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 may affect compliance with NAAQS.

Effects on air quality are based on the estimated changes in direct and indirect emissions associated with the action 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 Northwest Washington Intrastate Air Quality Control Region. 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 this action because the region is in attainment for all National Ambient Air Quality Standards (NAAQS).

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. 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 hangers, 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 371 personnel at the NAS Whidbey Island complex. Alternative 1 represents the largest increase in aircraft operations of the three alternatives. The three different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the 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 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 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 occur before on- going operation emissions. Each of the three scenarios considered under Alternative 1 would result in the same construction activities. 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, Alternative 1

	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	5.47	0.72	3.23	0.010	0.49	0.47	1,701
VOCs from paving and painting		1.61					
PM from grading and demolition					0.27	0.03	
Worker Commute and Deliveries	0.29	0.02	0.62	0.005	0.79	0.09	107
Total Alternative 1	**5.77**	**2.35**	**3.85**	**0.015**	**1.54**	**0.59**	**1,808**

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

Construction-related emissions for Alternative 1 were calculated assuming 55,923 square feet of new construction, 5.3 acres of new paved area, and 6.6 acres of ground disturbance. Construction activities are conservatively assumed to be conducted within 1 year. Emission factors for vehicles and equipment were obtained from the USEPA's MOVES 2014 (USEPA, 2015e). Appendix B provides the assumptions and calculations used to estimate the total emissions.

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.

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

Under Alternative 1, changes to facilities and the maintenance of more aircraft would result in increases in stationary source emissions at NAS Whidbey Island. These emissions are subject to NAS Whidbey Island's Air Operating Permit (AOP) (NWCAA, 2013); however, because they are below permit revision

requirement thresholds, they are not likely to result in changes to the AOP. 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). 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).

Table 4.4-2 provides a summary of the estimated increase in direct and indirect building energy emissions that would result from the action. Increased maintenance and operations of aircraft may also result in an increase in painting, degreasing, and fueling operations and fuel storage, which could increase reported emissions from these permitted sources. These emissions would be difficult to quantify at this time, but in addition to the increase in building-related emissions, they should be negligible and covered by the permit's assumed maximum totals.

Table 4.4-2 Stationary Direct and Indirect Criteria Pollutant Emissions, Alternative 1

Operations	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
New Building Electricity Use (Indirect)	0.07	N/A	N/A	0.05	N/A	N/A
New Building Natural Gas Use (Direct)	0.03	0.00	0.06	0.00	0.01	0.01
Total Change in Stationary Emissions	**0.10**	**0.00**	**0.06**	**0.05**	**0.01**	**0.01**

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; however, these emissions contribute to regional emission totals and can affect compliance with NAAQS. Each of the A, B, and C 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 emission factors for aircraft emissions (AESO 2014, 2015a, 2015b) and the USEPA's Motor Vehicle Emission Simulator (MOVES2014) (USEPA, 2015e) emission factors for Island County for personnel commuting emissions. 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, Draft Aircraft Noise Study). The Aircraft Environmental Support Office estimates a 30-minute maximum setting (with afterburner) time-in-mode for Growler take off; however, emission factors have been adjusted to account for a more accurate 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.

Criteria pollutant emissions from the mobile operations associated with this action under Alternative 1, Scenario A, are provided in Table 4.4-3; Scenario B emissions are provided in Table 4.4-4; and Scenario C emissions are provided in Table 4.4-5. 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	404.46	595.27	1,587.03	59.33	179.37	179.37
OLF Growler Aircraft	51.85	1.21	26.21	5.76	14.39	14.39
In-frame Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Mobile Operation Emissions	**498.54**	**699.74**	**2,135.87**	**72.24**	**302.33**	**223.58**
Alternative 1, Scenario A						
Alternative 1A Emissions						
Ault Field Growler Aircraft	514.10	831.54	2,215.81	77.29	236.43	236.43
OLF Growler Aircraft	260.06	6.05	131.37	28.88	72.18	72.18
In-frame Maintenance Operations	47.58	145.00	638.63	10.12	28.55	28.55
POV (Personnel Commuting)	9.69	1.78	81.86	0.07	96.57	10.70
Total Mobile Operation Emissions	**831.43**	**984.37**	**3,067.62**	**116.37**	**433.73**	**347.86**
Change in Emissions between No Action and Alternative 1A						
Ault Field Growler Aircraft	109.64	236.27	628.78	17.97	57.79	57.79
OLF Growler Aircraft	208.20	4.84	105.16	23.12	56.76	56.76
In-frame Maintenance Operations	14.23	43.38	191.04	3.03	8.54	8.54
POV (Personnel Commuting)	0.80	0.15	6.79	0.01	8.01	0.89
Total Change in Mobile Operation Emissions	**332.88**	**284.63**	**931.76**	**44.12**	**131.40**	**124.28**

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	404.46	595.27	1,587.00	59.33	179.37	179.37
OLF Growler Aircraft	51.85	1.21	26.21	5.76	14.39	14.39
In-frame Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**498.54**	**699.74**	**2,135.87**	**72.24**	**302.33**	**223.58**
Alternative 1, Scenario B						
Alternative 1B Emissions						
Ault Field Growler Aircraft	556.53	792.68	2,113.46	80.89	243.55	243.55
OLF Growler Aircraft	162.57	3.78	82.23	18.06	45.12	45.12
In-frame Maintenance Operations	47.58	145.00	638.63	10.12	28.55	28.55
POV (Personnel Commuting)	9.69	1.78	81.86	0.07	96.57	10.70
Total Operation Emissions	**776.37**	**943.25**	**2,916.18**	**109.14**	**413.80**	**327.93**
Change in Emissions between No Action Alternative and Alternative 1B						
Ault Field Growler Aircraft	152.07	197.41	526.47	21.56	64.18	64.18
OLF Growler Aircraft	110.72	2.58	56.02	12.30	30.73	30.73
In-frame Maintenance Operations	14.23	43.38	191.04	3.03	8.54	8.54
POV (Personnel Commuting)	0.80	0.15	6.79	0.01	8.01	0.89
Total Change in Operation Emissions	**277.83**	**243.51**	**780.32**	**36.89**	**111.46**	**104.34**

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 4.4-5 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	404.46	595.27	1,587.00	59.33	179.37	179.37
OLF Growler Aircraft	51.85	1.21	26.21	5.76	14.39	14.39
In-frame Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**498.54**	**699.74**	**2,135.87**	**72.24**	**302.33**	**223.58**
Alternative 1, Scenario C						
Alternative 1C Emissions						
Ault Field Growler Aircraft	600.88	760.87	2,029.91	84.89	252.05	252.05
OLF Growler Aircraft	65.07	1.52	33.04	7.23	18.06	18.06
In-frame Maintenance Operations	47.58	145.00	638.63	10.12	28.55	28.55
POV (Personnel Commuting)	9.69	1.78	81.86	0.07	96.57	10.70
Total Operation Emissions	**723.22**	**909.18**	**2,783.44**	**102.31**	**395.23**	**309.36**
Change in Emissions between No Action Alternative and Alternative 1C						
Ault Field Growler Aircraft	196.42	165.60	442.92	25.56	72.68	72.68
OLF GROWLER Aircraft	13.22	0.31	6.83	1.47	3.67	3.67
In-frame Maintenance Operations	14.23	43.38	191.04	3.03	8.54	8.54
POV (Personnel Commuting)	0.80	0.15	6.79	0.01	8.01	0.89
Total Change in Operation Emissions	**224.68**	**209.44**	**647.57**	**30.06**	**92.90**	**85.78**

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). This expansion would require more construction of new buildings than Alternative 1, 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 664 personnel at the NAS Whidbey Island complex. The three different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the 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 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

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 three scenarios considered under Alternative 2 would result in the same construction activities. Table 4.4-6 shows estimated criteria pollutant emissions from construction activities for Alternative 2.

Table 4.4-6 NAS Whidbey Island Complex Emissions from Construction, Alternative 2

	Total Emissions (tpy)						*Metric tons per year*
Activity	***NO_X***	***VOC***	***CO***	***SO_2***	***PM_{10}***	***$PM_{2.5}$***	***CO_2***
Alternative 2							
Construction equipment	7.48	1.01	4.59	0.014	0.683	0.663	2,303
VOCs from paving and painting		2.54					
PM from grading and demolition					0.28	0.03	
Worker Commute and Deliveries	0.43	0.03	0.84	0.007	1.07	0.12	148
Total Alternative 2	**7.91**	**3.59**	**5.43**	**0.021**	**2.03**	**0.81**	**2,451**

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
tpy = tons per year
VOC = Volatile organic compound

Construction related criteria pollutant emissions for Alternative 2 were calculated assuming 93,423 square feet of new construction, 5.3 acres of new paved area, and 7.5 acres of ground disturbance, and construction activities would be conducted within 1 year. Emission factors for vehicles and equipment were obtained from the USEPA's MOVES2014 (USEPA, 2015e). Appendix B provides the assumptions and calculations used to estimate the total emissions.

Based on the projected total construction emissions summarized in Table 4.4-6, the impact on air quality in the region would be minor and temporary and would not result in any significant impacts.

Construction emissions would be reduced using 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.

4.4.3.1.2 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 similar to those described under Alternative 1. Emissions estimates were developed as described in Section 4.4.2.1.2.

Table 4.4-7 provides a summary of the estimated increase in building energy emissions that would result from the action. Increased maintenance and operations of aircraft may also result in an increase in painting, degreasing, and fueling operations and fuel storage, which could increase reported emissions from these permitted sources. These emissions would be difficult to quantify at this time but should be negligible and covered by the permit's assumed maximum totals. Therefore, a revision to the AOP would not be required.

Table 4.4-7 Stationary Direct and Indirect Criteria Pollutant Emissions, Alternative 2

Operations	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
New Building Electricity Use (Indirect)	0.16	N/A	N/A	0.11	N/A	N/A
New Building Natural Gas Use (Direct)	0.07	0.01	0.14	0.00	0.01	0.01
Total Change in Stationary Emissions	**0.23**	**0.01**	**0.14**	**0.11**	**0.01**	**0.01**

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
tpy = tons per year
VOC = Volatile organic compound

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 NAS Whidbey Island AOP; however, these emissions contribute to regional emission totals and can affect compliance with NAAQS. Each of the A, B, and C 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 as described in Section 4.4.2.1.3.

Criteria pollutant emissions from the operations associated with this action under Alternative 2, Scenario A are provided in Table 4.4-8; Scenario B emissions are provided in Table 4.4-9; and Scenario C emissions are provided in Table 4.4-10. 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	404.46	595.27	1,587.00	59.33	179.37	179.37
OLF GROWLER Aircraft	51.85	1.21	26.21	5.76	14.39	14.39
In-frame Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	**498.54**	**699.74**	**2,135.87**	**72.24**	**302.33**	**223.58**
Alternative 2, Scenario A						
Alternative 2A Emissions						
Ault Field GROWLER Aircraft	520.00	846.62	2,255.90	78.33	239.81	239.81
OLF GROWLER Aircraft	249.06	5.79	125.85	27.66	69.13	69.13
In-frame Maintenance Operations	47.99	146.24	644.09	10.21	28.79	28.79
POV (Personnel Commuting)	10.32	1.90	87.22	0.08	102.89	11.40
Total Mobile Operation Emissions	**827.37**	**1,000.55**	**3,113.06**	**116.28**	**440.63**	**349.14**
Change in Emissions between No Action Alternative and Alternative 2A						
Ault Field GROWLER Aircraft	115.54	251.34	668.91	19.01	60.44	60.44
OLF GROWLER Aircraft	197.21	4.59	99.64	21.90	54.74	54.74
In-frame Maintenance Operations	14.64	44.62	196.50	3.11	8.78	8.78
POV (Personnel Commuting)	1.44	0.26	12.15	0.01	14.33	1.59
Total Change in Mobile Operation Emissions	**328.83**	**300.81**	**977.19**	**44.03**	**138.30**	**125.56**

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	404.46	595.27	1,587.00	59.33	179.37	179.37
OLF GROWLER Aircraft	51.85	1.21	26.21	5.76	14.39	14.39
In-frame Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	**498.54**	**699.74**	**2,135.87**	**72.24**	**302.33**	**223.58**
Alternative 2, Scenario B						
Alternative 2B Emissions						
Ault Field GROWLER Aircraft	560.25	809.01	2,156.89	81.73	246.50	246.50
OLF GROWLER Aircraft	155.67	3.62	78.70	17.29	43.21	43.21
In-frame Maintenance Operations	47.99	146.24	644.09	10.21	28.79	28.79
POV (Personnel Commuting)	10.32	1.90	87.22	0.08	102.89	11.40
Total Mobile Operation Emissions	**774.23**	**960.78**	**2,966.89**	**109.30**	**421.39**	**329.90**
Change in Emissions between No Action Alternative and Alternative 2B						
Ault Field GROWLER Aircraft	155.79	213.74	569.89	22.40	67.13	67.13
OLF GROWLER Aircraft	103.82	2.42	52.49	11.53	28.82	28.82
In-frame Maintenance Operations	14.64	44.62	196.50	3.11	8.78	8.78
POV (Personnel Commuting)	1.44	0.26	12.15	0.01	14.33	1.59
Total Change in Mobile Operation Emissions	**275.68**	**261.03**	**831.02**	**37.06**	**119.06**	**106.32**

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	404.46	595.27	1,587.00	59.33	179.37	179.37
OLF GROWLER Aircraft	51.85	1.21	26.21	5.76	14.39	14.39
In-frame Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	**498.54**	**699.74**	**2,135.87**	**72.24**	**302.33**	**223.58**
Alternative 2, Scenario C						
Alternative 2C Emissions						
Ault Field GROWLER Aircraft	601.60	778.21	2,075.97	85.43	254.29	254.29
OLF GROWLER Aircraft	62.27	1.45	31.49	6.92	17.28	17.28
In-frame Maintenance Operations	47.99	146.24	644.09	10.21	28.79	28.79
POV (Personnel Commuting)	10.32	1.90	87.22	0.08	102.89	11.40
Total Mobile Operation Emissions	**722.18**	**927.81**	**2,838.76**	**102.63**	**403.26**	**311.77**
Change in Emissions between No Action Alternative and Alternative 2C						
Ault Field GROWLER Aircraft	197.14	182.94	488.97	26.10	74.92	74.92
OLF GROWLER Aircraft	10.42	0.24	5.28	1.16	2.89	2.89
In-frame Maintenance Operations	14.64	44.62	196.50	3.11	8.78	8.78
POV (Personnel Commuting)	1.44	0.26	12.15	0.01	14.33	1.59
Total Change in Mobile Operation Emissions	**223.64**	**228.06**	**702.90**	**30.38**	**100.93**	**88.19**

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). This expansion would require less construction than Alternative 2, including 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 337 personnel at the NAS Whidbey Island complex. The three different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the 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 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

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 three scenarios considered under Alternative 2 would result in the same construction activities. Table 4.4-11 shows estimated criteria pollutant emissions from construction activities for Alternative 3.

Table 4.4-11 NAS Whidbey Island Complex Emissions from Construction, Alternative 3

	Total Emissions (tpy)						*Metric tons per year*
Activity	*NO_X*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2*
Alternative 3							
Construction equipment	5.47	0.72	3.23	0.010	0.49	0.47	1,701
VOCs from paving and painting		1.61					
PM from grading and demolition					0.27	0.03	
Worker commuting and deliveries	0.29	0.02	0.62	0.005	0.79	0.09	107
Total Alternative 3	**5.77**	**2.35**	**3.85**	**0.015**	**1.54**	**0.59**	**1,808**

Key:
CO = Carbon monoxide
CO_2 = carbon dioxide
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

Construction-related criteria pollutant emissions for Alternative 3 were calculated assuming 65,573 square feet of new construction, 5.3 acres of new paved area, and 6.8 acres of ground disturbance. Construction activities would be conducted within 1 year. Emission factors for vehicles and equipment were obtained from the USEPA's MOVES2014 (USEPA, 2015e). Appendix B provides the assumptions and calculations used to estimate the total emissions.

Based on the projected total construction emissions summarized in Table 4.4-11, the impact on air quality in the region would be minor and temporary and would not result in any significant impacts.

Construction emissions would be reduced using 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.

4.4.4.1.2 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, similar to those described under Alternative 1. Emissions estimates were developed as described in Section 4.4.2.1.2.

Table 4.4-12 provides a summary of the estimated increase in building energy emissions that would result from the action. Increased maintenance and operations of aircraft may also result in an increase in painting, degreasing, and fueling operations and fuel storage, which could increase reported emissions from these permitted sources. These emissions would be difficult to quantify at this time but should be negligible and covered by the permit's assumed maximum totals.

Table 4.4-12 Stationary Direct and Indirect Criteria Pollutant Emissions, Alternative 3

Operations	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
New Building Electricity Use (Indirect)	0.07	N/A	N/A	0.05	N/A	N/A
New Building Natural Gas Use (Direct)	0.03	0.00	0.06	0.00	0.01	0.01
Total Change in Stationary Emissions	**0.10**	**0.00**	**0.06**	**0.05**	**0.01**	**0.01**

Key:
CO = Carbon monoxide
N/A = not applicable
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

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; however, these emissions contribute to regional emission totals and can affect compliance with NAAQS. Each of the A, B, and C 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 as described in Section 4.4.2.1.3.

Criteria pollutant emissions from the operations associated with this action under Alternative 3, Scenario A, are provided in Table 4.4-13; Scenario B emissions are provided in Table 4.4-14; and Scenario C emissions are provided in Table 4.4-15. 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	404.46	595.27	1,587.00	59.33	179.37	179.37
OLF Growler Aircraft	51.85	1.21	26.21	5.76	14.39	14.39
In-frame Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**498.54**	**699.74**	**2,135.87**	**72.24**	**302.33**	**223.58**
Alternative 3, Scenario A						
Alternative 3A Emissions						
Ault Field Growler Aircraft	519.06	844.59	2,250.51	78.18	239.32	239.32
OLF Growler Aircraft	248.54	5.78	125.61	27.60	68.99	68.99
In-frame Maintenance Operations	47.99	146.24	644.09	10.21	28.79	28.79
POV (Personnel Commuting)	9.70	1.78	81.97	0.07	96.70	10.71
Total Operation Emissions	**825.29**	**998.40**	**3,102.17**	**116.06**	**433.80**	**347.81**
Change in Emissions between No Action Alternative and Alternative 3A						
Ault Field Growler Aircraft	114.60	249.32	663.51	18.85	59.95	59.95
OLF Growler Aircraft	196.69	4.57	99.40	21.85	54.60	54.60
In-frame Maintenance Operations	14.64	44.62	196.50	3.11	8.78	8.78
POV (Personnel Commuting)	0.82	0.15	6.90	0.01	8.14	0.90
Total Change in Operation Emissions	**326.75**	**298.66**	**966.31**	**43.82**	**131.47**	**124.23**

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	404.46	595.27	1,587.00	59.33	179.37	179.37
OLF Growler Aircraft	51.85	1.21	26.21	5.76	14.39	14.39
In-frame Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**498.54**	**699.74**	**2,135.87**	**72.24**	**302.33**	**223.58**
Alternative 3, Scenario B						
Alternative 3B Emissions						
Ault Field Growler Aircraft	561.10	814.82	2,172.29	81.97	247.39	247.39
OLF Growler Aircraft	155.35	3.62	78.58	17.25	43.12	43.12
In-frame Maintenance Operations	47.99	146.24	644.09	10.21	28.79	28.79
POV (Personnel Commuting)	9.70	1.78	81.97	0.07	96.70	10.71
Total Operation Emissions	**774.14**	**966.46**	**2,976.92**	**109.50**	**416.00**	**330.02**
Change in Emissions between No Action Alternative and Alternative 3B						
Ault Field Growler Aircraft	156.64	219.54	585.30	22.64	68.02	68.02
OLF Growler Aircraft	103.50	2.41	52.36	11.50	28.73	28.73
In-frame Maintenance Operations	14.64	44.62	196.50	3.11	8.78	8.78
POV (Personnel Commuting)	0.82	0.15	6.90	0.01	8.14	0.90
Total Change in Operation Emissions	**275.60**	**266.72**	**841.06**	**37.26**	**113.67**	**106.44**

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	404.46	595.27	1,587.00	59.33	179.37	179.37
OLF Growler Aircraft	51.85	1.21	26.21	5.76	14.39	14.39
In-frame Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	**498.54**	**699.74**	**2,135.87**	**72.24**	**302.33**	**223.58**
Alternative 3, Scenario C						
Alternative 3C Emissions						
Ault Field Growler Aircraft	600.53	777.17	2,073.19	85.28	253.88	253.88
OLF Growler Aircraft	62.14	1.45	31.43	6.90	17.25	17.25
In-frame Maintenance Operations	47.99	146.24	644.09	10.21	28.79	28.79
POV (Personnel Commuting)	9.70	1.78	81.97	0.07	96.70	10.71
Total Operation Emissions	**720.36**	**926.65**	**2,830.67**	**102.47**	**396.63**	**310.64**
Change in Emissions between No Action Alternative and Alternative 3C						
Ault Field Growler Aircraft	196.07	181.90	486.19	25.96	74.51	74.51
OLF Growler Aircraft	10.29	0.24	5.22	1.14	2.86	2.86
In-frame Maintenance Operations	14.64	44.62	196.50	3.11	8.78	8.78
POV (Personnel Commuting)	0.82	0.15	6.90	0.01	8.14	0.90
Total Change in Operation Emissions	**221.82**	**226.90**	**694.81**	**30.22**	**94.29**	**87.06**

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

Air Quality Conclusions, Alternatives 1 through 3

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 scenarios but greatest under Alternative 2, Scenario A (see Table 4.4-8). 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 4.4-16).

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.

Table 4.4-16 Total Change in Criteria Pollutant and GHG Emissions, All Alternatives

Alternative	Emissions (tpy)[2]						MT CO_2e
	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Alternative 1							
Scenario A	333.0	284.6	931.8	44.2	131.4	124.3	56,829
Scenario B	277.9	243.5	780.4	36.9	111.5	104.4	47,672
Scenario C	224.8	209.4	647.6	30.1	92.9	85.8	39,000
Alternative 2							
Scenario A	329.1	300.8	977.3	44.1	138.3	125.6	57,447
Scenario B	275.9	261.0	831.2	37.2	119.1	106.3	48,609
Scenario C	223.9	228.1	703.0	30.5	100.9	88.2	40,134
Alternative 3							
Scenario A	326.9	298.7	966.4	43.9	131.5	124.2	56,381
Scenario B	275.7	266.7	841.1	37.3	113.7	106.4	48,051
Scenario C	221.9	226.9	694.9	30.3	94.3	87.1	39,137

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

Emissions would also be higher under the high-tempo FCLP year conditions across all three action alternatives, although the difference varies depending on the type of emissions (see Table 4.4-17 and Appendix B for details). High-tempo FCLP conditions would produce 2 to 9 percent more emissions under Alternative 2, compared to average conditions. Under Alternatives 1 and 3, High-tempo FCLP conditions would produce 3 to 7 percent more NO_x, SO_2, PM_{10} and $PM_{2.5}$ emissions, 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.

Changes in construction and stationary source emissions would not be significant. Changes in mobile emissions are not subject to permit requirements or emission thresholds, therefore the level of impact from these emissions is inconclusive. 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.

Table 4.4-17 Total Change in Criteria Pollutant and GHG Emissions, High Tempo, All Alternatives

Alternative/Scenario	Emissions (tpy)[2]						MT CO_2e
	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Alternative 1							
Scenario A	356.7	281.7	935.5	46.7	137.6	133.5	60,138
Scenario B	296.1	239.0	775.5	38.8	115.9	110.5	50,137
Scenario C	237.3	203.9	635.6	31.3	95.7	88.8	40,624
Alternative 2							
Scenario A	355.2	310.2	1,013.4	47.3	146.5	136.6	61,434
Scenario B	296.1	266.0	851.1	39.5	125.1	113.9	51,595
Scenario C	239.0	231.3	714.3	32.2	105.4	92.8	42,349
Alternative 3							
Scenario A	349.9	302.0	986.7	46.5	138.1	133.8	59,748
Scenario B	292.7	263.8	840.5	39.1	118.0	112.3	50,380
Scenario C	234.3	223.0	687.2	31.5	97.2	90.2	40,766

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

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.

4.5 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 areas of water or 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 action 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 operational scenarios to noticeably affect the recreational experiences of a majority 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 14 to 19 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. Official APZs specific to OLF Coupeville could be established through the AICUZ study process and will depend on the alternative selected. If APZs are created, they could influence future land use decisions by the community and may have a minor impact on the land under the APZs

Recreation and Wilderness
All alternative would have localized significant impacts on one or two county and municipal parks as a result of increased annual average noise levels. There would be no significant impacts to recreation as a result of increased demand under these alternatives and no significant impacts to wilderness areas.

The Proposed Action would have no significant impacts on the management, use of, or demand for recreational areas 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

On-station Land Use

Primary construction projects associated with all action 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 action 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 action 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.

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.

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 2 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 action 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.

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 DNL noise contours. With expected changes in land uses within 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 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.

Pursuant to the federal Coastal Zone Management Act and the state's Washington Coastal Zone Management Program, results of consultation with the State of Washington will be presented in the Final EIS.

Land Use in the Noise Environment

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 4.5-3 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.

Table 4.5-1 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1 during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*				*Scenario B (dB DNL)*				*Scenario C (dB DNL)*			
Land Use	*65-69*	*70-74*	*>75*	*Total*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*
Ault Field																
Agriculture	369	284	412	1,065	535 (+166)	361 (+77)	420 (+8)	1,316 (+24%)	562 (+193)	337 (+53)	483 (+71)	1,382 (+30%)	551 (+182)	350 (+66)	523 (+111)	1,424 (+34%)
Commercial	53	225	60	338	74 (+21)	193 (-32)	74 (+14)	341 (+1%)	46 (-7)	206 (-19)	101 (+41)	353 (+4%)	60 (+7)	179 (-46)	134 (+74)	373 (+10%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)	1 (0)	0 (0)	12 (0)	13 (0%)	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	14	318	230	562	29 (+15)	336 (+18)	196 (-34)	561 (-<1%)	0 (-14)	238 (-80)	323 (+93)	561 (-<1%)	0 (-14)	174 (-144)	387 (+157)	561 (-<1%)
Open Space/Forest	608	295	179	1,082	478 (-130)	406 (+111)	254 (+75)	1,138 (+5%)	445 (-163)	438 (+143)	272 (+93)	1,155 (+7%)	430 (-178)	441 (+146)	303 (+124)	1,174 (+9%)
Parks	462	160	300	922	615 (+153)	222 (+62)	301 (+1)	1,138 (+23%)	692 (+230)	237 (+77)	336 (+36)	1,265 (+37%)	723 (+261)	298 (+138)	377 (+77)	1,398 (+52%)
Residential	1,504	1,210	2,692	5,406	1,831 (+327)	1,178 (-32)	2,810 (+118)	5,819 (+8%)	1,840 (+336)	1,079 (-131)	3,127 (+435)	6,046 (+12%)	1,906 (+402)	1,029 (-181)	3,367 (+675)	6,302 (+17%)
Rural[4]	422	432	1,354	2,208	438 (+16)	449 (+17)	1,415 (+61)	2,302 (+4%)	429 (+7)	438 (+6)	1,500 (+146)	2,367 (+7%)	405 (-17)	404 (-28)	1,619 (+265)	2,428 (+10%)
Transportation[5]	113	106	348	567	135 (+22)	94 (-12)	362 (+14)	591 (+4%)	128 (+15)	96 (-10)	385 (+37)	609 (+7%)	136 (+23)	91 (-15)	406 (+58)	633 (+12%)
Other[6]	11	0	0	11	28 (+17)	0 (0)	0 (0)	28 (+155%)	29 (+18)	0 (0)	0 (0)	29 (+164%)	45 (+34)	4 (+4)	0 (0)	49 (+345%)
Subtotal	3,557	3,030	5,587	12,174	4,164 (+607)	3,239 (+209)	5,844 (+257)	13,247 (+9%)	4,172 (+615)	3,069 (+39)	6,539 (+952)	13,780 (+13%)	4,257 (+700)	2,970 (-60)	7,128 (+1,541)	14,355 (+18%)

Table 4.5-1 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1 during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*				*Scenario B (dB DNL)*				*Scenario C (dB DNL)*			
Land Use	*65-69*	*70-74*	*>75*	*Total*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*
OLF Coupeville																
Agriculture	796	810	33	1,639	336 (-460)	454 (-356)	1,167 (+1,134)	1,957 (+19%)	343 (-453)	551 (-259)	878 (+845)	1,772 (+8%)	517 (-279)	941 (+131)	80 (+47)	1,538 (-6%)
Commercial	1	0	0	1	6 (+5)	0 (0)	0 (0)	6 (+500%)	1 (0)	0 (0)	0 (0)	1 (0%)	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal[3]	0	2	8	10	0 (0)	0 (-2)	10 (+2)	10 (0%)	0 (0)	0 (-2)	10 (+2)	10 (0%)	0 (0)	0 (-2)	9 (+1)	9 (-10%)
Industrial	0	11	16	27	0 (0)	0 (-11)	27 (+11)	27 (0%)	0 (0)	0 (-11)	27 (+11)	27 (0%)	0 (0)	0 (-11)	27 (+11)	27 (0%)
Open Space/Forest	409	274	132	815	305 (-104)	420 (+146)	521 (+389)	1,246 (+53%)	328 (-81)	414 (+140)	375 (+243)	1,117 (+37%)	437 (+28)	286 (+12)	147 (+15)	870 (+7%)
Parks	48	6	0	54	83 (+35)	7 (+1)	0 (0)	90 (+67%)	42 (-6)	1 (-5)	0 (0)	43 (-20%)	4 (-44)	0 (-6)	0 (0)	4 (-93%)
Residential	1,418	1,081	262	2,761	452 (-966)	1,305 (+224)	2,337 (+2,075)	4,094 (+48%)	567 (-851)	1,799 (+718)	1,553 (+1,291)	3,919 (+42%)	1,602 (+184)	1,380 (+299)	542 (+280)	3,524 (+28%)
Rural[4]	928	910	331	2,169	310 (-618)	746 (-164)	1,677 (+1,346)	2,733 (+26%)	348 (-580)	940 (+30)	1,300 (+969)	2,588 (+19%)	885 (-43)	903 (-7)	545 (+214)	2,333 (+8%)
Transportation[5]	137	87	54	278	82 (-55)	81 (-6)	232 (+178)	395 (+42%)	69 (-68)	115 (+28)	177 (+123)	361 (+30%)	98 (-39)	134 (+47)	71 (+17)	303 (+9%)
Other[6]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)	0 (-5)	0 (0)	5 (+5)	5 (0%)	0 (-5)	5 (+5)	0 (0)	5 (0%)
Subtotal	3,742	3,181	836	7,759	1,574 (-2,168)	3,013 (-168)	5,976 (+5,140)	10,563 (+36%)	1,698 (-2,044)	3,820 (+639)	4,325 (+3,489)	9,843 (+27%)	3,543 (-199)	3,649 (+468)	1,421 (+585)	8,613 (+11%)
TOTAL[7]	**7,299**	**6,211**	**6,423**	**19,933**	**5,738 (-1,561)**	**6,252 (+41)**	**11,820 (+5,397)**	**23,810 (+19%)**	**5,870 (-1,429)**	**6,889 (+678)**	**10,864 (+4,441)**	**23,623 (+19%)**	**7,800 (+501)**	**6,619 (+408)**	**8,549 (+2,126)**	**22,968 (+15%)**

Table 4.5-1 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 1 during an Average Year

	No Action Alternative (NAA) (dB DNL)				Scenario A (dB DNL)				Scenario B (dB DNL)				Scenario C (dB DNL)			
Land Use	65-69	70-74	>75	Total	65-69	70-74	>75	Total (% change from NAA)	65-69	70-74	>75	Total (% change from NAA)	65-69	70-74	>75	Total (% change from NAA)

Notes:

1 The difference between No Action Alternative and Action 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 Rural 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. Parcel properties with 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), were re-categorized as 'Residential' to more accurately assess impacts.

5 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.

6 "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.

7 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 2 during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*				*Scenario B (dB DNL)*				*Scenario C (dB DNL)*			
Land Use	*65-69*	*70-74*	*>75*	*Total*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*
Ault Field																
Agriculture	369	284	412	1,065	530 (+161)	367 (+83)	416 (+4)	1,313 (+23%)	551 (+182)	340 (+56)	480 (+68)	1,371 (+29%)	541 (+172)	353 (+69)	515 (+103)	1,409 (+32%)
Commercial	53	225	60	338	78 (+25)	190 (-35)	73 (+13)	341 (+1%)	45 (-8)	207 (-18)	100 (+40)	352 (+4%)	57 (+4)	188 (-37)	123 (+63)	368 (+9%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)	1 (0)	0 (0)	12 (0)	13 (0%)	1 (0)	0 (0)	13 (+1)	14 (+8%)
Industrial	14	318	230	562	34 (+20)	335 (+17)	193 (-37)	562 (0%)	1 (-13)	245 (-73)	316 (+86)	562 (0%)	0 (-14)	193 (-125)	369 (+139)	562 (0%)
Open Space/Forest	608	295	179	1,082	483 (-125)	402 (+107)	250 (+71)	1,135 (+5%)	453 (-155)	430 (+135)	268 (+89)	1,151 (+6%)	437 (-171)	436 (+141)	296 (+117)	1,169 (+8%)
Parks	462	160	300	922	599 (+137)	219 (+59)	297 (-3)	1,115 (21%)	684 (+222)	232 (+72)	334 (+34)	1,250 (+36%)	717 (+255)	287 (+127)	366 (+66)	1,370 (+49%)
Residential	1,504	1,210	2,692	5,406	1,832 (+328)	1,186 (-24)	2,787 (+95)	5,805 (+7%)	1,829 (+325)	1,087 (-123)	3,107 (+415)	6,023 (+11%)	1,898 (+394)	1,030 (-180)	3,320 (+628)	6,248 (+16%)
Rural[4]	422	432	1,354	2,208	436 (+14)	452 (+20)	1,407 (+53)	2,295 (+4%)	430 (+8)	439 (+7)	1,492 (+138)	2,361 (+7%)	418 (-4)	409 (-23)	1,591 (+237)	2,418 (+10%)
Transportation[5]	113	106	348	567	135 (+22)	95 (-11)	359 (+11)	589 (+4%)	129 (+16)	96 (-10)	382 (+34)	607 (+7%)	134 (+21)	92 (-14)	402 (+54)	628 (+11%)
Other[6]	11	0	0	11	26 (+15)	0 (0)	0 (0)	26 (+136%)	27 (+16)	0 (0)	0 (0)	27 (+145%)	42 (+31)	2 (+2)	0 (0)	44 (+300%)
Subtotal	3,557	3,030	5,587	12,174	4,154 (+597)	3,246 (+216)	5,794 (+207)	13,194 (+8%)	4,150 (+593)	3,076 (+46)	6,491 (+904)	13,717 (+13%)	4,245 (+688)	2,990 (-40)	6,995 (+1,408)	14,230 (+17%)

Table 4.5-2 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2 during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*				*Scenario B (dB DNL)*				*Scenario C (dB DNL)*			
Land Use	***65-69***	***70-74***	***>75***	***Total***	***65-69***	***70-74***	***>75***	***Total (% change from NAA)***	***65-69***	***70-74***	***>75***	***Total (% change from NAA)***	***65-69***	***70-74***	***>75***	***Total (% change from NAA)***
OLF Coupeville																
Agriculture	796	810	33	1,639	323 (-473)	467 (-343)	1,127 (+1,094)	1,917 (+17%)	354 (-442)	569 (-241)	826 (+793)	1,749 (+7%)	536 (-260)	939 (+129)	42 (+9)	1,517 (-7%)
Commercial	1	0	0	1	3 (+2)	0 (0)	0 (0)	3 (+200%)	1 (0)	0 (0)	0 (0)	1 (0%)	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal[3]	0	2	8	10	0 (0)	0 (-2)	10 (+2)	10 (0%)	0 (0)	0 (-2)	10 (+2)	10 (0%)	0 (0)	0 (-2)	9 (+1)	9 (-10%)
Industrial	0	11	16	27	0 (0)	0 (-11)	27 (+11)	27 (0%)	0 (0)	0 (-11)	27 (+11)	27 (0%)	0 (0)	1 (-10)	27 (+11)	28 (+4%)
Open Space/Forest	409	274	132	815	312 (-97)	427 (+153)	492 (+360)	1,231 (+51%)	330 (-79)	410 (+136)	353 (+221)	1,093 (+34%)	440 (+31)	277 (+3)	138 (+6)	855 (+5%)
Parks	48	6	0	54	76 (+28)	6 (0)	0 (0)	82 (+52%)	36 (-12)	0 (-6)	0 (0)	36 (-33%)	3 (-45)	0 (-6)	0 (0)	3 (-94%)
Residential	1,418	1,081	262	2,761	456 (-962)	1,394 (+313)	2,215 (+1,953)	4,065 (+47%)	639 (-779)	1,843 (+762)	1,408 (+1,146)	3,890 (+41%)	1,682 (+264)	1,329 (+248)	478 (+216)	3,489 (+26%)
Rural[4]	928	910	331	2,169	322 (-606)	798 (-112)	1,599 (+1,268)	2,719 (+25%)	377 (-551)	939 (+29)	1,253 (+922)	2,569 (+18%)	914 (-14)	916 (+6)	482 (+151)	2,312 (+7%)
Transportation[5]	137	87	54	278	81 (-56)	85 (-2)	224 (+170)	390 (+40%)	68 (-69)	122 (+35)	165 (+111)	355 (+28%)	106 (-31)	128 (+41)	66 (+12)	300 (+8%)
Other[6]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)	0 (-5)	0 (0)	5 (+5)	5 (0%)	0 (-5)	5 (+5)	0 (0)	5 (0%)
Subtotal	3,742	3,181	836	7,759	1,573 (-2,169)	3,177 (-4)	5,699 (+4,863)	10,449 (+35%)	1,805 (-1,937)	3,883 (+702)	4,047 (+3,211)	9,735 (+25%)	3,681 (-61)	3,595 (+414)	1,242 (+406)	8,518 (+10%)
TOTAL[7]	**7,299**	**6,211**	**6,423**	**19,933**	**5,727 (-1,572)**	**6,423 (+212)**	**11,493 (+5,070)**	**23,643 (+19%)**	**5,955 (-1,344)**	**6,959 (+748)**	**10,538 (+4,115)**	**23,452 (+18%)**	**7,926 (+627)**	**6,585 (+374)**	**8,237 (+1,814)**	**22,748 (+14%)**

Table 4.5-2 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 2 during an Average Year

	No Action Alternative (NAA) (dB DNL)				Scenario A (dB DNL)				Scenario B (dB DNL)				Scenario C (dB DNL)			
Land Use	65-69	70-74	>75	Total	65-69	70-74	>75	Total (% change from NAA)	65-69	70-74	>75	Total (% change from NAA)	65-69	70-74	>75	Total (% change from NAA)

Notes:

1 The difference between No Action Alternative and Action Alternative 2 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 Rural 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. Parcel properties with 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), were re-categorized as 'Residential' to more accurately assess impacts.

5 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.

6 "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.

7 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 3 during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*				*Scenario B (dB DNL)*				*Scenario C (dB DNL)*			
Land Use	*65-69*	*70-74*	*>75*	*Total*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*
Ault Field																
Agriculture	369	284	412	1,065	538 (+169)	366 (+82)	414 (+2)	1,318 (+24%)	573 (+204)	342 (+58)	478 (+66)	1,393 (+31%)	533 (+164)	354 (+70)	514 (+102)	1,401 (+32%)
Commercial	53	225	60	338	78 (+25)	189 (-36)	73 (+13)	340 (+<1%)	46 (-7)	207 (-18)	100 (+40)	353 (+4%)	56 (+3)	189 (-36)	121 (+61)	366 (+8%)
Federal[3]	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)	1 (0)	0 (0)	12 (0)	13 (0%)	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	14	318	230	562	34 (+20)	335 (+17)	193 (-37)	562 (0%)	1 (-13)	247 (-71)	313 (+83)	561 (-<1%)	0 (-14)	197 (-121)	364 (+134)	561 (-<1%)
Open Space/Forest	608	295	179	1,082	478 (-130)	406 (+111)	252 (+73)	1,136 (+5%)	446 (-162)	440 (+145)	271 (+92)	1,157 (+7%)	441 (-167)	433 (+138)	294 (+115)	1,168 (+8%)
Parks	462	160	300	922	603 (+141)	222 (+62)	297 (-3)	1,122 (+22%)	691 (+229)	234 (+74)	333 (+33)	1,258 (+36%)	716 (+254)	285 (+125)	367 (+67)	1,368 (+48%)
Residential	1,504	1,210	2,692	5,406	1,835 (+331)	1,189 (-21)	2,782 (+90)	5,806 (+7%)	1,844 (+340)	1,090 (-120)	3,104 (+412)	6,038 (+12%)	1,914 (+410)	1,033 (-177)	3,310 (+618)	6,257 (+16%)
Rural[4]	422	432	1,354	2,208	437 (+15)	452 (+20)	1,407 (+53)	2,296 (+4%)	430 (+8)	441 (-9)	1,494 (+140)	2,365 (+7%)	429 (+7)	411 (-21)	1,585 (+231)	2,425 (+10%)
Transportation[5]	113	106	348	567	135 (+22)	95 (-11)	359 (+11)	589 (+4%)	129 (+16)	96 (-10)	382 (+34)	607 (+7%)	134 (+21)	93 (-13)	400 (+52)	627 (+11%)
Other[6]	11	0	0	11	28 (+17)	0 (0)	0 (0)	28 (+155%)	28 (+17)	0 (0)	0 (0)	28 (+155%)	42 (+31)	2 (+2)	0 (0)	44 (+300%)
Subtotal	3,557	3,030	5,587	12,174	4,167 (+610)	3,254 (+224)	5,789 (+202)	13,210 (+9%)	4,189 (+632)	3,097 (+67)	6,487 (+900)	13,773 (+13%)	4,266 (+709)	2,997 (-33)	6,967 (+1,380)	14,230 (+17%)

Table 4.5-3 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3 during an Average Year

	No Action Alternative (NAA) (dB DNL)				*Scenario A (dB DNL)*				*Scenario B (dB DNL)*				*Scenario C (dB DNL)*			
Land Use	*65-69*	*70-74*	*>75*	*Total*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*	*65-69*	*70-74*	*>75*	*Total (% change from NAA)*
OLF Coupeville																
Agriculture	796	810	33	1,639	326 (-470)	462 (-348)	1,144 (+1,111)	1,932 (+18%)	348 (-448)	557 (-253)	859 (+826)	1,764 (+8%)	523 (-273)	947 (+137)	61 (+28)	1,531 (-7%)
Commercial	1	0	0	1	4 (+3)	0 (0)	0 (0)	4 (+300%)	1 (0)	0 (0)	0 (0)	1 (0%)	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal[3]	0	2	8	10	0 (0)	0 (-2)	10 (+2)	10 (0%)	0 (0)	0 (-2)	10 (+2)	10 (0%)	0 (0)	0 (-2)	9 (+1)	9 (-10%)
Industrial	0	11	16	27	0 (0)	0 (-11)	27 (+11)	27 (0%)	0 (0)	0 (-11)	27 (+11)	27 (0%)	0 (0)	0 (-11)	27 (+11)	27 (0%)
Open Space/Forest	409	274	132	815	310 (-99)	424 (+150)	504 (+372)	1,238 (+52%)	331 (-78)	411 (+137)	367 (+235)	1,109 (+36%)	438 (+29)	283 (+9)	144 (+12)	865 (+6%)
Parks	48	6	0	54	79 (+31)	7 (+1)	0 (0)	86 (+59%)	40 (-8)	1 (-5)	0 (0)	41 (-24%)	4 (-44)	0 (-6)	0 (0)	4 (-93%)
Residential	1,418	1,081	262	2,761	453 (-965)	1,357 (+276)	2,268 (+2,006)	4,078 (+48%)	597 (-821)	1,815 (+734)	1,498 (+1,236)	3,910 (+42%)	1,631 (+213)	1,366 (+285)	516 (+254)	3,515 (+27%)
Rural[4]	928	910	331	2,169	317 (-611)	777 (-133)	1,632 (+1,301)	2,726 (+26%)	359 (-569)	939 (+29)	1,284 (+953)	2,582 (+19%)	895 (-33)	909 (-1)	521 (+190)	2,325 (+7%)
Transportation[5]	137	87	54	278	81 (-56)	83 (-4)	228 (+174)	392 (+41%)	69 (-68)	117 (+30)	173 (+119)	359 (+29%)	101 (-36)	132 (+45)	69 (+15)	302 (+9%)
Other[6]	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)	0 (-5)	0 (0)	5 (+5)	5 (0%)	0 (-5)	5 (+5)	0 (0)	5 (0%)
Subtotal	3,742	3,181	836	7,759	1,570 (-2,172)	3,110 (-71)	5,818 (+4,982)	10,498 (+35%)	1,745 (-1,997)	3,840 (+659)	4,223 (+3,387)	9,808 (+26%)	3,592 (-150)	3,642 (+461)	1,347 (+511)	8,581 (+11%)
TOTAL[7]	**7,299**	**6,211**	**6,423**	**19,933**	**5,737 (-1,562)**	**6,364 (+153)**	**11,607 (+5,184)**	**23,708 (+19%)**	**5,934 (-1,365)**	**6,937 (+726)**	**10,710 (+4,287)**	**23,581 (+18%)**	**7,858 (+559)**	**6,639 (+428)**	**8,314 (+1,891)**	**22,811 (+14%)**

Table 4.5-3 NAS Whidbey Island Complex Land Use Acreage (+/-)[1] within the DNL Contours[2] for Alternative 3 during an Average Year

	No Action Alternative (NAA) (dB DNL)				Scenario A (dB DNL)				Scenario B (dB DNL)				Scenario C (dB DNL)			
Land Use	65-69	70-74	>75	Total	65-69	70-74	>75	Total (% change from NAA)	65-69	70-74	>75	Total (% change from NAA)	65-69	70-74	>75	Total (% change from NAA)

Notes:

1 The difference between the No Action Alternative and Action Alternative 3 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 Rural 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. Parcel properties with 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), were re-categorized as 'Residential' to more accurately assess impacts.

5 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.

6 "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.

7 Acreages have been rounded to ensure totals sum.

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

When compared with the No Action Alternative, the action alternatives would result in an 14 percent to 19 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 across Alternative 1, Scenario A and Scenario B, and Alternatives 2 and 3 under Scenario A (20 percent of operations at Ault Field and 80 percent at OLF Coupeville).
- 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).
- Under Alternative 1, each scenario results in an increase of 15 percent to 19 percent in land impacted by the greater than 65 dB DNL noise contours. Across all action alternatives and scenarios under the projected DNL contours surrounding Ault Field, agricultural land, parks, and residential land categories experience the greatest increase in acreage under the greater than 65 dB DNL noise contours.
- Across all action alternatives for Scenario A surrounding OLF Coupeville, commercial, open space/forest, and park land categories experience the greatest increase in acreage under the greater than 65 dB DNL noise contours.
- Across all action alternatives for Scenario B surrounding OLF Coupeville, open space/forest, residential, and transportation land categories experience the greatest increase, while park land decreases in acreage under the greater than 65 dB DNL noise contours.
- Across all action alternatives under Scenario C surrounding OLF Coupeville, residential, rural, and transportation land categories experience the greatest increase, while agriculture, commercial, federal, and park land acreage decrease under the greater than 65 dB DNL noise contours.

Per the AICUZ program, residential land use is not recommended within the greater than 65 dB DNL noise contour (OPNAVINST 11010.36C). Land use designation is the responsibility of the municipality and/or county.

- The largest increases in residential land use impacted by the greater than 65 dB DNL noise contours surrounding Ault Field occur under Alternative 1, Scenario C; Alternative 2, Scenario C; and Alternative 3, Scenario C which has 80 percent of FCLPs being conducted at Ault Field, relative to the No Action Alternative.
- 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.
- The largest increases in residential land use impacted by the greater than 65 dB DNL contours surrounding OLF Coupeville occur under Scenario A of all action alternatives, which has 80 percent of FCLPs being conducted at OLF Coupeville.

Accident Potential Zones

There would be no change in APZs at Ault Field under any of the action alternatives. No impacts to land use would occur under the current APZs at Ault Field.

Regarding OLF Coupeville, Alternative 1, Scenario B; Alternative 2, Scenario B; and Alternative 3, Scenario B, 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 4.5-4; these acreages represent the change from the No Action Alternative. Generally, the majority of impacted land under

APZ-I is residential and rural land, and the majority of impacted land under APZ-II is agricultural and rural land.

Table 4.5-4 Land Use Acreage within Conceptual APZs for Runway 32 at OLF Coupeville, Option 1

	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	267	236	503
Rural[2]	147	376	523
Transportation[3]	50	24	74
Other[4]	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 Rural 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. Parcel properties with 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), were re-categorized as 'Residential' to more accurately assess impacts.

3 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.

4 "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

Alternative 1, Scenario A; Alternative 2, Scenario A; and Alternative 3, Scenario A, have conceptual APZs for Runway 32 and Runway 14 (see Table 4.3-1 and Figure 4.3-1). The land use acreage within these conceptual APZs is shown in Table 4.5-5 below. These acreages represent the change from the No Action Alternative. Generally, the majority of impacted land under APZ-I and APZ-II is residential and rural land.

Because there would be no change in APZs at OLF Coupeville under Scenario C for all action 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 action alternatives and, therefore, no impacts to land use would occur in the current Clear Zones.

Table 4.5-5 Land Use Acreage within Conceptual APZs for Runway 32 and Runway 14 at OLF Coupeville, Option 2

	APZ-I	*APZ-II*	*TOTAL*
Land Use			
Agriculture	20	555	575
Commercial	0	0	0
Federal[1]	4	0	4
Industrial	27	0	27
Open Space/Forest	91	75	166
Parks	0	0	0
Residential	419	882	1,301
Rural[2]	363	540	903
Transportation[3]	67	79	146
Other[4]	2	1,551	1,553
Total	***993***	***3,682***	***4,675***

Notes:

1 "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.

2 Rural 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. Parcel properties with 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), were re-categorized as 'Residential' to more accurately assess impacts

3 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.

4 "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 Recreation and Wilderness Potential Impacts

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). 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 (Krog, Engdahl, and Tambs, 2010a). 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 (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).

No Congressionally designated wilderness areas or 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 wilderness areas.

4.5.2.2.1 Parks and Recreation Areas Potential Noise Impacts

Regardless of the alternative chosen, the additional Growler aircraft 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 average annual operations and the overall numbers of noise events per DNL daytime hour that are greater than the maximum sound level of 65 dB outdoors (to capture outdoor speech interference, which is used as an indicator for potential annoyance). For parks and recreation areas for which the annual average number of noise events greater than 65 dB outdoors has not been modeled, potential changes in annual average DNL at that location were assessed. The action 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.

A. 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 noise contours under any of the proposed alternatives. Between 10,600 acres of water (under Alternative 2, Scenario A) and 12,200 acres of water (under Alternative 1, Scenario C) within the San Juan National Conservation Area Boundary that marks the extent of the national monument would be within the greater than 65 dB DNL average year 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 or boat. Table 4.5-6 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 2,098 acres of water area under Alternative 2, Scenario A, to 3,884 acres of water area under Alternative 1, Scenario C. Scenario A, which would shift 80 percent of FCLPs to OLF Coupeville, would result in less of an impact on water recreation within the San Juan National Conservation Area Boundary. Based on the increased water area within the San Juan National Conservation Area Boundary that would be intermittently exposed to high 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 4.5-6 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	*No Action Alternative Conditions* *Acres[2]*	*Scenario A (Change from No Action Alternative)*	*Scenario B (Change from No Action Alternative)*	*Scenario C (Change from No Action Alternative)*
Alternative 1				
65 – 70 dB DNL	4,165	5,238 (1,073)	5,351 (1,186)	5,888 (1,723)
70 – 75 dB DNL	2,676	3,254 (578)	3,277 (601)	3,432 (756)
> 75 dB DNL	1,433	2,293 (860)	2,334 (901)	2,837 (1,404)
Total	**8,273**	**10,785 (2,512)**	**10,962 (2,689)**	**12,157 (3,884)**
Alternative 2				
65 – 70 dB DNL	4,201	5,182 (981)	5,287 (1,086)	5,766 (1,565)
70 – 75 dB DNL	2,807	3,233 (426)	3,255 (448)	3,411 (604)
> 75 dB DNL	1,536	2,227 (691)	2,273 (737)	2,740 (1,204)
Total	**8,544**	**10,642 (2,098)**	**10,815 (2,271)**	**11,917 (3,373)**
Alternative 3				
65 – 70 dB DNL	4,201	5,237 (1,036)	5,358 (1,157)	5,757 (1,556)
70 – 75 dB DNL	2,807	3,250 (443)	3,275 (468)	3,408 (601)
> 75 dB DNL	1,536	2,277 (741)	2,326 (790)	2,727 (1,191)
Total	**8,544**	**10,764 (2,557)**	**10,960 (2,416)**	**11,891 (3,347)**

Notes:
1 Totals may not sum exactly due to rounding.
2 The difference in acreage between the No Action Alternative and the action alternatives is shown in parentheses.

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

Point Colville, at the southern end of Lopez Island and one of the closest national monument lands to the area that would be within the greater than 65 dB DNL noise contours, was included as a POI in the supplemental noise analysis for the Proposed Action. Under the No Action Alternative, this location would experience two noise events per DNL daytime hour greater than 65 dB outdoors. This rate would not change under any alternative or operational scenario, because of the distance of Point Colville from Ault Field (see Tables 4.2-5, 4.2-11, 4.2-17, and 4.2-23). The majority of national monument lands, as well as the waters surrounding national monument lands, are farther from Ault Field than Point Colville. Therefore, the Proposed Action would not result in noticeable effects on outdoor recreation across most of the San Juan Islands National Monument as a result of noise.

Potential Impacts on Recreation Management

BLM currently is preparing the San Juan Islands National Monument Resource Management Plan, which is expected to be complete in the spring of 2018 (BLM, n.d.[b]).The Proposed Action under any of the alternatives would not directly conflict with or impact the BLM's management of the national monument because safe and efficient aircraft operations by the Armed Forces are not restricted by the designation of the national monument (The 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).

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 (The White House Office of the Press Secretary, 2013). Aircraft operations at Ault Field under the Proposed Action, regardless of alternative or operational scenario selected, are not expected to indirectly 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 operational scenario selected, Growler aircraft would 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 10,300 acres (under Alternative 2, Scenario A) to 12,300 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 zones. Aircraft overflights would not directly impact, or restrict, use of this area for fishing but may result in indirect impacts, primarily annoyance, as a result of average annual noise levels greater than 65 dB DNL. 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 operational 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 (see Figure 4.5-1).

B. Ebey's Landing National Historical Reserve

Potential Impacts on Recreation

With implementation of the Proposed Action, between approximately 33 percent and 43 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 operational scenario provide a means of assessing relative impacts on recreation at the national historical reserve.

As shown in Table 4.5-7, the operational scenario selected would affect the degree of intermittent noise exposure at the national historical reserve more than the alternative. Under the No Action Alternative, approximately 6,300 acres would be within the noise contours. Therefore, all three alternatives with either Scenario A or B would result in a greater degree of noise impact on recreation than the No Action Alternative; Scenario C would result in a slight long-term, beneficial impact on recreation because 80 percent of FCLPs would be conducted at Ault Field and less area at the national historical reserve would be exposed to noise above 65 dB DNL. 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.

Figure 4.5-1 Greater than 65 dB DNL Noise Contours in the Vicinity of the San Juan Islands National Monument

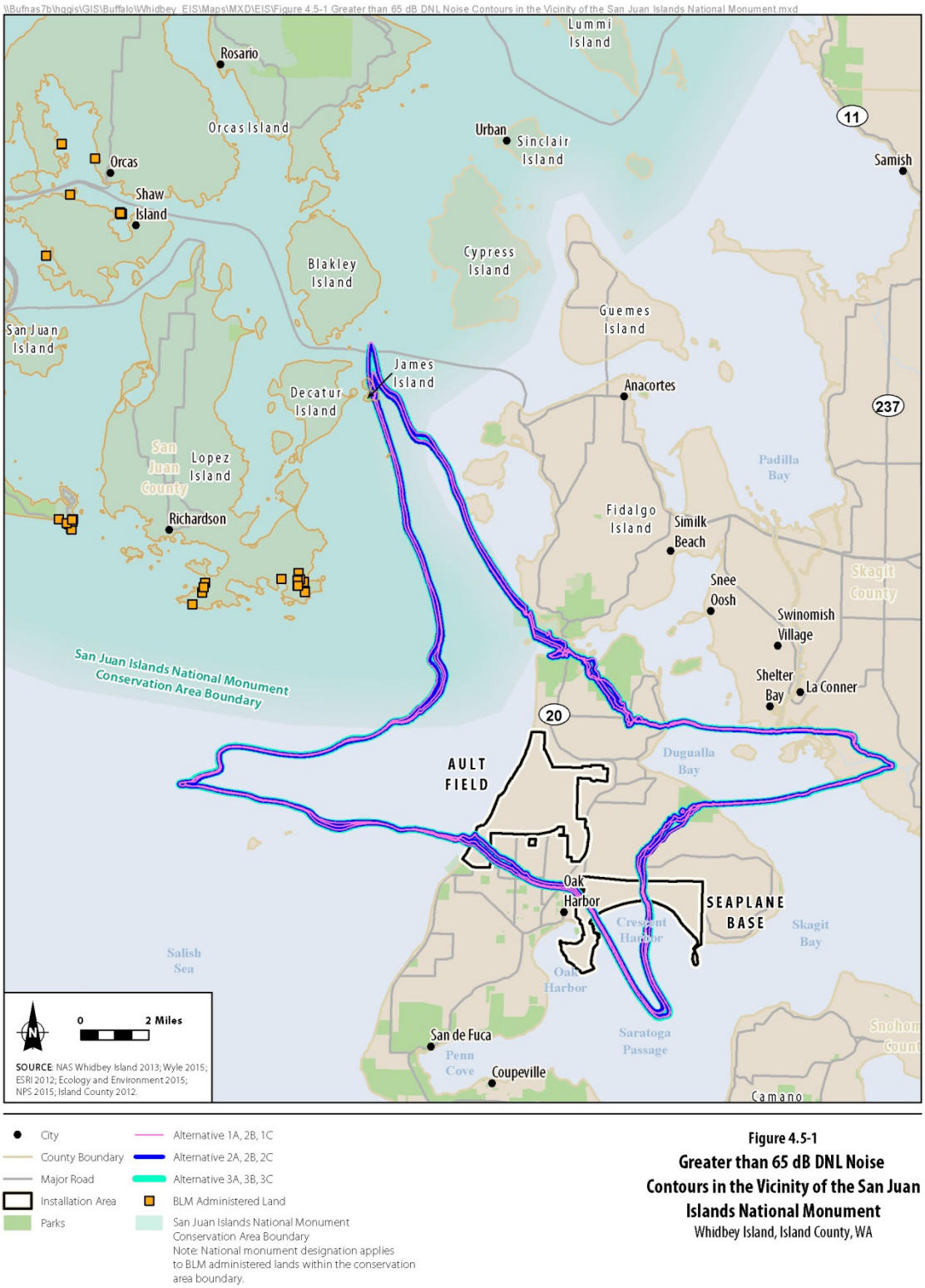


Figure 4.5-1
Greater than 65 dB DNL Noise Contours in the Vicinity of the San Juan Islands National Monument
Whidbey Island, Island County, WA

Table 4.5-7 Area of Ebey's Landing National Historical Reserve Encompassed by the Greater than 65 dB DNL Noise Contours under the Proposed Action (Acres)

Alternative	*Scenario A*	*Scenario B*	*Scenario C*
Alternative 1	7,273	6,646	5,618
Alternative 2	7,159	6,549	5,549
Alternative 3	7,203	6,615	5,595

Depending on the alternative and scenario selected, annual aircraft operations would increase approximately 46 percent to 47 percent over affected environment 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 the Ebey's Landing National Historical Reserve was created in 1978 and over most of the reserve's existence.

Three outdoor locations within the 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, and the Admiralty Head Lighthouse at Fort Casey State Park in the southwestern corner of the national historical reserve (Wyle, 2016). 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 the average number of noise events above 65 dB DNL.

As shown in Table 4.5-8, Alternatives 1 and 2 would result in the same increases in the annual average number of outdoor noise events over 65 dB at each POI under each operational scenario. Under both alternatives, Scenario A would result in the greatest impacts, with increases in the number of noise events ranging from one to two noise events per hour on average. Scenario C would result in no change in the number of noise events, compared to conditions under the No Action Alternative. Alternative 3, Scenario A, would have the same impacts as Alternative 1, Scenario A or Alternative 2, Scenario A. Alternative 3, Scenarios B and C, would result in less of an impact to outdoor recreation than Alternatives 1, Scenarios B and C, and Alternative 2, Scenarios B and C, as shown in the table, with Alternative 3, Scenario C, resulting in no change or a decrease in the number of noise events over 65 dB DNL.

Recreational users of these areas already experience disruptions that may affect recreational experiences as a result of current operations at OLF Coupeville. The Proposed Action, particularly under Alternatives 1 through 3, Scenario A, may increase the rate of disruptive noise events at the 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.

In general, Scenarios A and B of any of the three action alternatives would result in long-term, moderate impacts on recreation at Ebey's Landing National Historical Reserve because of the potential for increased noise events above 65 dB to degrade the visitor experience compared to affected environment conditions. As noted previously in this section, operational conditions experienced at the 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. Each of the alternatives listed above also would result in an increase in the area of the national historical reserve exposed to average annual noise levels above 65 dB DNL.

Table 4.5-8 Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest at Ebey's Landing National Historical Reserve (Average Year)

Point of Interest	*No Action Alternative Conditions*	*Scenario A*	*Scenario B*	*Scenario C*
	Annual Average Outdoor Daily DNL Daytime Events per Hour (NA65 L_{max})			
Alternative 1				
Ebey's Landing National Historical Reserve (Rhododendron Park)	1	3 (+2)	2 (+1)	1 (-)
Ebey's Landing State Park (Ebey's Prairie)	1	2 (+1)	1 (-)	1 (-)
Fort Casey State Park	1	3 (+2)	2 (+1)	1 (-)
Alternative 2				
Ebey's Landing National Historical Reserve (Rhododendron Park)	1	3 (+2)	2 (+1)	1 (-)
Ebey's Landing State Park (Ebey's Prairie)	1	2 (+2)	1 (-)	1 (-)
Fort Casey State Park	1	2 (+1)	2 (+1)	1 (-)
Alternative 3				
Ebey's Landing National Historical Reserve (Rhododendron Park)	1	3 (+2)	2 (+1)	1 (-)
Ebey's Landing State Park (Ebey's Prairie)	1	2 (+1)	1 (-)	- (-1)
Fort Casey State Park	1	2 (+1)	2 (+1)	1 (-)

Note:
[1] Hyphens (-) indicate result equals zero. The difference between the No Action Alternative and action alternative conditions under each scenario are noted in parentheses.

Key:
DNL = day-night average sound level
Lmax = maximum A-weighted sound level

Scenario C under any of the three action alternatives would have a long-term, slightly beneficial impact on recreation at the national historical reserve because each of these alternatives would either result in no changes or decreases in the number of noise events, and would decrease the area of the national historical reserve exposed to average annual noise levels above 65 dB DNL, compared to the No Action Alternative.

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 national historical reserve consists of "sounds traditionally associated with rural agriculture and natural quiet" (NPS, 2005). The document notes that the majority of impacts to the soundscape of the 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 that, the document notes, "are short-term, highly variable in their frequency, and range from minor to moderate in their intensity" (NPS, 2005). The document also 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, it is likely that aircraft noise impacts the perceived experience of visitors who "come with expectations of seeing, hearing, and experiencing phenomena associated with a specific natural or cultural environment" (NPS, 2014).

Neither the Final General Management Plan nor the Long-range Interpretive Plan for the 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 Environmental Impact Statement (NPS, 2006) for the national historical reserve notes that, "The NPS [National Park Service] and Reserve staff have no influence over…[OLF Coupeville] practice [operations]".

The Proposed Action would not directly impact implementation of management plans for Ebey's Landing National Historical Reserve. However, aircraft operations at OLF Coupeville and, to a lesser degree, at Ault Field may indirectly impact management of the national historical reserve by degrading overall visitor experience. Based on the above and considering that OLF Coupeville has been in operation and part of the soundscape of the national historical reserve since the reserve's establishment in 1978 and often supporting higher numbers of operations, Alternatives 1, Scenarios A and B; Alternative 2, Scenarios A and B; and Alternative 3, Scenarios A and B would have a long-term, moderate indirect impact on management of Ebey's Landing National Historical Reserve as a result of the potential increase in the numbers of noise events over 65 dB DNL to degrade visitor experience. Scenario C under Alternatives 1, 2, and 3 would have no impact on management of the national historical reserve because these alternatives would not increase the numbers of noise events over 65 dB DNL compared to the No Action Alternative.

C. 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 4.5-9 shows the length of trail that would fall within the greater than 65 dB DNL noise contours under each alternative and operational 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 north of the Keystone Ferry Terminal also would be within the noise contours under the three alternatives with Scenarios A or B. Both segments of the trail would be within the greater than 65 dB DNL noise contours under the No Action Alternative. Under Scenario C, under which 80 percent of FCLPs would be conducted at Ault Field, 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 Scenario C would result in a slight benefit on recreation on this segment of the trail, compared to conditions under the No Action Alternative.

As shown in the table, each alternative with Scenarios A or B would impact a longer segment of the trail than the segment impacted under the No Action Alternative (12.7 miles), while each alternative with

Scenario C would impact slightly less of the trail. Scenario A would impact the longest segment of the trail; however, the difference between the alternatives with the most impact (Scenario A under Alternatives 1, 2, and 3) and the alternatives with the least impact (Scenario C under Alternatives 1, 2, and 3) would only be approximately 0.7 mile.

Table 4.5-9 Length of the Pacific Northwest National Scenic Trail Encompassed by the Greater than 65 dB DNL Noise Contours under the Proposed Action (Miles)

Alternative	*Scenario A*	*Scenario B*	*Scenario C*
Alternative 1	13.0	13.0	12.4
Alternative 2	13.0	12.9	12.3
Alternative 3	13.0	13.0	12.3

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. Therefore, the Proposed Action would have a long-term, intermittent, minor impact on recreational use of the trail, regardless of 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.). 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 indirect impacts on the trail when aircraft are operating in the area, 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 impacts on the trail corridor or public access to the trail.

D. State Parks and Recreation Areas

Potential Impacts on Recreation

Table 4.5-10 shows the average number of noise events above 65 dB DNL by alternative and scenario, compared to conditions under the No Action Alternative. In general, impacts on recreation on the parks near Ault Field would be increased under all alternatives and scenarios; impacts on parks closer to OLF Coupeville would be decreased under Scenarios A and B and increased under Scenario C, because of the proposed distribution of FCLPs. As shown in the table, Scenario A under each alternative would increase the number of noise events at Deception Pass State Park, Dugualla State Park, and Fort Casey State Park by one to two daytime events per hour, resulting in long-term, intermittent, minor direct impacts on recreation at these parks when aircraft are operating in the area. Scenarios B and C generally would result in long-term, moderate direct impacts on recreation as a result of the larger increases in noise

events. Scenario C would result in greater impacts on Dugualla State Park, with the number of daytime noise events per hour estimated to increase from six to 10 noise events. Fort Casey State Park would be less impacted than the two state parks at the northern end of Whidbey Island. Regardless of alternative or scenario chosen, the number of daytime noise events per hour at this park would not increase or would increase only by one event.

Table 4.5-10 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*	*Scenario A*	*Scenario B*	*Scenario C*
	Annual Average Outdoor Daily DNL Daytime Events per Hour (NA65 L_{max})			
Alternative 1				
Deception Pass State Park	6	7 (+1)	8 (+2)	8 (+2)
Dugualla State Park	6	8 (+2)	9 (+3)	10 (+4)
Fort Casey State Park	1	3 (+2)	2 (+1)	1 (-)
Alternative 2				
Deception Pass State Park	6	7 (+1)	8 (+2)	8 (+2)
Dugualla State Park	6	8 (+2)	9 (+3)	10 (+4)
Fort Casey State Park	1	2 (+1)	2 (+1)	1 (-)
Alternative 3				
Deception Pass State Park	6	7 (+1)	8 (+2)	8 (+2)
Dugualla State Park	6	8 (+2)	9 (+3)	10 (+4)
Fort Casey State Park	1	2 (+1)	2 (+1)	1 (-)

Note:
[1] Hyphens (-) indicate result equals zero. The difference between the No Action Alternative and action alternative conditions under each scenario are noted in parentheses.

Key:
DNL = day-night average sound level
Lmax = maximum A-weighted sound level

Potential impacts on recreation at James Island State Park 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 operational scenario selected, a portion of James Island 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, 4.2-8, and 4.2-18, the contours in the vicinity of James Island 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 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.

Potential Impacts on Recreation Management

The Proposed Action would not directly affect any parklands. Therefore, the ability of the Washington State Parks and Recreation Commission to implement the Centennial 2013 Plan would not directly be impacted. However, aircraft noise may impact visitor experience, particularly for those visitors 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. Based on the previous section, Scenario A of Alternatives 1, 2, and 3 would result in long-term, minor indirect impacts on recreation management at Deception Pass and Dugualla state parks when aircraft are operating in the area. Alternative 1, Scenarios B and C; Alternative 2, Scenarios B and C; and Alternative 3, Scenarios B and C would result in long-term, moderate indirect impacts on recreation management on Deception Pass and Dugualla state parks because of the estimated greater impact to the visitor experience as a result of aircraft noise. Long-term, indirect impacts on recreation management at Fort Casey State Park would be minor under all alternatives and operational scenarios for the reasons described in the previous section. Long-term, indirect impacts on recreation management on James Island State Park under all alternatives and scenarios would be moderate because the Proposed Action would result in this park being partially encompassed by the 65 to less than 70 dB DNL noise contours.

Based on the above, no significant impacts on recreational use or recreation management at Deception Pass, Dugualla, Fort Casey, or James Island state parks would occur as a result of the Proposed Action.

E. 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 4.5-11 and 4.5-12 show the noise contour range that encompasses the largest area of each park/recreation area under each alternative and operational 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 operational 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 4.5-11, the county parks that would be most affected by increased noise exposure under the Proposed Action include Driftwood Park and Rhododendron Park in Island County and Ika

Island and the Skagit Wildlife Area at Goat Island and the Skagit Bay estuary. The potential impacts on recreation in these areas would be the same, regardless of alternative selected. Noise exposure at each of these areas would increase by at least one DNL contour range (i.e., the contour range encompassing the majority of the park/recreation area would increase from the 65 to less than 70 dB DNL contour range to the 70 to less than 75 dB DNL contour range, or from the 70 to less than 75 dB DNL contour range to the greater than 75 dB DNL contour range). Under each alternative, Driftwood Park would be the most affected, with noise exposure increasing from the 65 to less than 70 dB DNL contour range under the No Action Alternative to the greater than 75 dB DNL contour range under Scenarios A and B. Impacts on this park under Scenarios A and B would be long-term and significant. Under Scenario C, noise exposure at this park would increase to the 70 to less than 75 dB DNL contour range. Impacts on Driftwood Park under Scenario C and on the other parks listed above under all 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.

Table 4.5-11 dB DNL Contour Range at County Parks and Recreation Areas under each Alternative and Operational Scenario

County Park or Recreation Area	*No Action Alternative Conditions*	*Scenario A*	*Scenario B*	*Scenario C*
	dB DNL Contour Range			
Alternative 1				
Clover Valley (Island)	>75	>75 (negl.)	>75 (negl.)	>75 (negl.)
Moran Beach (Island)	>75	>75 (negl.)	>75 (negl.)	>75 (negl.)
Driftwood Park (Island)	65-70	>75 (+)	>75 (+)	70-75 (+)
Crockett Blockhouse (Island)	70-75	70-75 (negl.)	70-75 (negl.)	65-70 (-)
Rhododendron Park (Island)	70-75	>75 (+)	>75 (+)	>75 (+)
Patmore Pit (Island)	>75	>75 (negl.)	>75 (negl.)	>75 (negl.)
Recreational trails between Keystone Spit and Hill Road (Island)	65-70	- (-)	- (-)	- (-)
Ika Island (Skagit)	70-75	>75 (+)	>75 (+)	>75 (+)
Skagit Wildlife Area (Goat Island)	65-70	70-75 (+)	70-75 (+)	70-75 (+)
Skagit Wildlife Area (Fir Island Farms Reserve)	65-70	65-70 (+)	65-70 (+)	65-70 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65-70	70-75 (+)	70-75 (+)	70-75 (+)
Alternative 2				
Clover Valley (Island)	>75	>75 (negl.)	>75 (negl.)	>75 (negl.)
Moran Beach (Island)	>75	>75 (negl.)	>75 (negl.)	>75 (negl.)
Driftwood Park (Island)	65-70	>75 (+)	>75 (+)	70-75 (+)
Crockett Blockhouse (Island)	70-75	70-75 (negl.)	70-75 (negl.)	65-70 (-)
Rhododendron Park (Island)	70-75	>75 (+)	>75 (+)	>75 (+)
Patmore Pit (Island)	>75	>75 (negl.)	>75 (negl.)	>75 (negl.)
Recreational trails between Keystone Spit and Hill Road (Island)	65-70	- (-)	- (-)	- (-)
Ika Island (Skagit)	70-75	>75 (+)	>75 (+)	>75 (+)
Skagit Wildlife Area (Goat Island)	65-70	70-75 (+)	70-75 (+)	70-75 (+)

Table 4.5-11 dB DNL Contour Range at County Parks and Recreation Areas under each Alternative and Operational Scenario

County Park or Recreation Area	*No Action Alternative Conditions*	*Scenario A*	*Scenario B*	*Scenario C*
	dB DNL Contour Range			
Skagit Wildlife Area (Fir Island Farms Reserve)	65-70	65-70 (+)	65-70 (+)	65-70 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65-70	70-75 (+)	70-75 (+)	70-75 (+)
Alternative 3				
Clover Valley (Island)	>75	>75 (negl.)	>75 (negl.)	>75 (negl.)
Moran Beach (Island)	>75	>75 (negl.)	>75 (negl.)	>75 (negl.)
Driftwood Park (Island)	65-70	>75 (+)	>75 (+)	70-75 (+)
Crockett Blockhouse (Island)	70-75	70-75 (negl.)	70-75 (negl.)	65-70 (-)
Rhododendron Park (Island)	70-75	>75 (+)	>75 (+)	>75 (+)
Patmore Pit (Island)	>75	>75 (negl.)	>75 (negl.)	>75 (negl.)
Recreational trails between Keystone Spit and Hill Road (Island)	65-70	- (-)	- (-)	- (-)
Ika Island (Skagit)	70-75	>75 (+)	>75 (+)	>75 (+)
Skagit Wildlife Area (Goat Island)	65-70	70-75 (+)	70-75 (+)	70-75 (+)
Skagit Wildlife Area (Fir Island Farms Reserve)	65-70	65-70 (+)	65-70 (+)	65-70 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65-70	70-75 (+)	70-75 (+)	70-75 (+)

Key:
DNL = day-night average sound level
Lmax = maximum A-weighted sound level

Contour ranges:
65 – 70 dB DNL
70 – 75 dB DNL
>75 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 area exposed to high noise levels at the Skagit Wildlife Area, Fir Island Farms Reserve, also would increase under each alternative and scenario. However, Fir Island Farms Reserve would remain within the same noise contour range (the 65 to less than 70 dB DNL contour range) under the Proposed Action, compared to the No Action Alternative. All alternatives and scenarios would have long-term, intermittent, minor impacts on the Fir Island Farms Reserve. All alternatives and scenarios would have long-term, beneficial impacts on the recreational trails between Keystone Spit and Hill Road in Island County, which would no longer be located within the greater than 65 dB DNL noise contours.

While some parks, such as Clover Valley, Moran Beach, and Patmore Pit in Island County, would remain in the greater than 75 dB DNL contour range under all or most of the alternatives and scenarios, the differences in the areas exposed to high noise levels between the No Action Alternative and the Proposed Action would be negligible. Therefore, the Proposed Action would have long-term, negligible impacts on these parks. The Proposed Action may have slight long-term beneficial impacts on some parks as a result of a long-term decrease in noise exposure compared to the No Action Alternative. These parks include the Crockett Blockhouse in Island County under Scenario C and the Island County recreational trails as described above.

Potential impacts on municipal parks in the greater than 65 dB DNL noise contours generally would be less than potential impacts on the county parks under all alternatives and scenarios. Scenarios B and C would result in a change in noise exposure that would increase the DNL contour range at one of the parks listed in Table 4.5-12 (i.e., the contour range encompassing the majority of the park/recreation area would increase from the 65 to less than 70 dB DNL contour range to the 70 to less than 75 dB DNL contour range, or from the 70 to less than 75 dB DNL contour range to the greater than 75 dB DNL contour range). Both scenarios would increase noise exposure at the Off-leash Dog Park in Oak Harbor from the 70 to less than 75 dB DNL contour range to the greater than 75 dB DNL contour range, resulting in long-term significant impacts on this park. Scenarios B and C would otherwise result in slight long-term minor or beneficial impacts on municipal recreational areas. Scenario A would result in long-term, intermittent, minor impacts on Parker Road Trail under each alternative and recreational facilities at Coupeville High School under Alternatives 1 and 3, which would remain in the 65 to less than 70 dB DNL contour range. Impacts not described above would be long-term, intermittent, and negligible.

Table 4.5-12 dB DNL Contour Range at Municipal Parks and Recreation Areas under each Alternative and Operational Scenario

Municipal Park or Recreation Area	*No Action Alternative Conditions*	*Scenario A*	*Scenario B*	*Scenario C*
	dB DNL Contour Range			
Alternative 1				
Off-leash Dog Park (Oak Harbor)	70-75	70-75 (negl.)	>75 (+)	>75 (+)
Ridgewood Park (Oak Harbor)	65-70	65-70 (negl.)	65-70 (negl.)	65-70 (negl.)
Parker Road Trail (Coupeville)	65-70	65-70 (+)	65-70 (+)	- (-)
Coupeville High School	-[1]	65-70 (+)	65-70 (+)	- (-)
Alternative 2				
Off-leash Dog Park (Oak Harbor)	70-75	70-75 (negl.)	>75 (+)	>75 (+)
Ridgewood Park (Oak Harbor)	65-70	65-70 (negl.)	65-70 (negl.)	65-70 (negl.)
Parker Road Trail (Coupeville)	65-70	65-70 (+)	65-70 (+)	- (-)
Coupeville High School	-[1]	65-70 (+)	- (-)	- (-)
Alternative 3				
Off-leash Dog Park (Oak Harbor)	70-75	70-75 (negl.)	>75 (+)	>75 (+)
Ridgewood Park (Oak Harbor)	65-70	65-70 (negl.)	65-70 (negl.)	65-70 (negl.)
Parker Road Trail (Coupeville)	65-70	65-70 (+)	65-70 (+)	- (-)
Coupeville High School	-[1]	65-70 (+)	65-70 (+)	- (-)

Note:
[1] Coupeville High School, including the school's outdoor recreational facilities, is located outside of the greater than 65 dB DNL noise contours under the No Action Alternative.

Key:
DNL = day-night average sound level
Lmax = maximum A-weighted sound level

Contour ranges:
65 – 70 dB DNL
70 – 75 dB DNL
>75 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.

Potential Impact on Recreation Management

The ability of county and municipal governments to manage parks and recreation areas would not be directly impacted. However, 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 indirect 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 4.5-11 and 4.5-12.

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 less than 1.5 percent in Island County and less than 0.2 percent 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 4.5-13 compares the estimated existing (2013) demand for parks and recreation areas in Skagit County to the estimated demand under each action 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 1 acre (under Alternative 1) 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 may 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 4.5-13 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)	1,404	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	1,226	1,226

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 population increase under each alternative (see Section 4.10).

Land Use Conclusion

Table 4.5-14 provides a summary of potential impacts on land use and recreation under each action alternative.

Table 4.5-14 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 19 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.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact on 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, moderate impacts on Ebey's Landing National Historical Reserve. • Long-term, intermittent, minor impact on the Pacific Northwest National Scenic Trail. • Long-term, intermittent, minor impacts on Deception Pass State Park, Dugualla State Park, and Fort Casey State Park. Long-term, intermittent, moderate impacts on James Island State Park. • Long-term significant impacts on Driftwood Park. Long-term, intermittent, moderate impacts on Rhododendron Park, Ika Island, the Skagit Wildlife Area at Goat Island, and the Skagit Bay Estuary. Impacts on other county and municipal parks would be long term and minor or negligible. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impacts to Congressionally designated wilderness areas or BLM-owned lands with wilderness characteristics.

Table 4.5-14 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
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 19 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.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact on 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, moderate impacts on Ebey's Landing National Historical Reserve. • Long-term, intermittent, minor impact on the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts on Deception Pass State Park, Dugualla State Park, and James Island State Park. Long-term, intermittent, moderate impacts on recreation, and long-term, minor impacts on recreation management at Fort Casey State Park. • Long-term significant impacts on Driftwood Park and the Oak Harbor Off-leash Dog Park. Long-term, intermittent, moderate impacts on Rhododendron Park, Ika Island, the Skagit Wildlife Area at Goat Island, and the Skagit Bay Estuary. Long-term, slightly beneficial impacts on the Island County recreational trails. Impacts on other county and municipal parks would be long term and minor or negligible. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impacts to Congressionally designated wilderness areas or 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 15 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.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact on 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, slightly beneficial impact on recreation at Ebey's Landing National Historical Reserve. No impact on management of the national historical reserve for recreation. • Long-term, intermittent, minor impact on the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts on Deception Pass State Park, Dugualla State Park, and James Island State Park. Long-term, intermittent, moderate impacts on recreation, and long-term, minor impacts on recreation management at Fort Casey State Park. • Long-term, significant impacts at the Oak Harbor Off-leash Dog Park. Long-term, intermittent, moderate impacts on Driftwood Park, Rhododendron Park, Ika Island, the Skagit Wildlife Area at Goat Island, and the Skagit Bay Estuary. Long-term, slightly beneficial impacts on the Island County recreational trails and the Crockett Blockhouse. Impacts on other county and municipal parks would be long term and minor or negligible. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand.

Table 4.5-14 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
	• No impacts to Congressionally designated wilderness areas or 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 19 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.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact on 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, moderate impacts on Ebey's Landing National Historical Reserve. • Long-term, intermittent, minor impact on the Pacific Northwest National Scenic Trail. • Long-term, intermittent, minor impacts on Deception Pass State Park, Dugualla State Park, and Fort Casey State Park. Long-term, intermittent, moderate impacts on James Island State Park. • Long-term, significant impacts on Driftwood Park. Long-term, intermittent, moderate impacts on Rhododendron Park, Ika Island, the Skagit Wildlife Area at Goat Island, and the Skagit Bay Estuary. Impacts on other county and municipal parks would be long term and minor or negligible. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impacts to Congressionally designated wilderness areas or 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 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.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact on 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, moderate impacts on Ebey's Landing National Historical Reserve. • Long-term, intermittent, minor impact on the Pacific Northwest National Scenic Trail. • Long-term, intermittent moderate impacts on Deception Pass State Park, Dugualla State Park, and James Island State Park. Long-term, intermittent, moderate impacts on recreation and long-term, minor impacts on recreation management at Fort Casey State Park. • Long-term significant impacts on Driftwood Park and the Oak Harbor Off-leash Dog Park. Long-term, intermittent, moderate impacts on Rhododendron Park, Ika Island, the Skagit Wildlife Area at Goat Island, and the Skagit Bay Estuary. Long-term, slightly beneficial impacts on the Island County recreational trails. Impacts on other county and municipal parks would be long term and minor or negligible. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impacts to Congressionally designated wilderness areas or BLM-owned lands with wilderness characteristics.

Table 4.5-14 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*
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 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.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact on 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, slightly beneficial impact on recreation at Ebey's Landing National Historical Reserve. No impact on management of the national historical reserve for recreation. • Long-term, intermittent, minor impact on the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts on Deception Pass State Park, Dugualla State Park, and James Island State Park. Long-term, intermittent, moderate impacts on recreation and long-term, minor impacts on recreation management at Fort Casey State Park. • Long-term, significant impacts at the Oak Harbor Off-leash Dog Park. Long-term, intermittent, moderate impacts on Driftwood Park, Rhododendron Park, Ika Island, the Skagit Wildlife Area at Goat Island, and the Skagit Bay Estuary. Long-term, slightly beneficial impacts on the Island County recreational trails and the Crockett Blockhouse. Impacts on other county and municipal parks would be long term and minor or negligible. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impacts to Congressionally designated wilderness areas or 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 19 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.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact on 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, moderate impacts on Ebey's Landing National Historical Reserve. • Long-term, intermittent, minor impact on the Pacific Northwest National Scenic Trail. • Long-term, intermittent, minor impacts on Deception Pass State Park, Dugualla State Park, and Fort Casey State Park. Long-term, intermittent, moderate impacts on James Island State Park. • Long-term significant impacts on Driftwood Park. Long-term, intermittent, moderate impacts on Rhododendron Park, Ika Island, the Skagit Wildlife Area at Goat Island, and the Skagit Bay Estuary. Impacts on other county and municipal parks would be long term and minor or negligible. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impacts to Congressionally designated wilderness areas or BLM-owned lands with wilderness characteristics.

Table 4.5-14 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 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.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact on 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, moderate impacts on Ebey's Landing National Historical Reserve. • Long-term, intermittent, minor impact on the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts on Deception Pass State Park, Dugualla State Park, and James Island State Park. Long-term, intermittent, moderate impacts on recreation and long-term, minor impacts on recreation management at Fort Casey State Park. • Long-term significant impacts on Driftwood Park and the Oak Harbor Off-leash Dog Park. Long-term, intermittent, moderate impacts on Rhododendron Park, Ika Island, the Skagit Wildlife Area at Goat Island, and the Skagit Bay Estuary. Long-term, slightly beneficial impacts on the Island County recreational trails. Impacts on other county and municipal parks would be long term and minor or negligible. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impacts to Congressionally designated wilderness areas or 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 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.
	Recreation and Wilderness: • Long-term, intermittent, moderate impact on water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts on management of the national monument for recreatio • Long-term, slightly beneficial impact on recreation at Ebey's Landing National Historical Reserve. No impact on management of the national historical reserve for recreation. • Long-term, intermittent, minor impact on the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts on Deception Pass State Park, Dugualla State Park, and James Island State Park. Long-term, intermittent, moderate impacts on recreation and long-term, minor impacts on recreation management at Fort Casey State Park. • Long-term, significant impacts at the Oak Harbor Off-leash Dog Park. Long-term, intermittent, moderate impacts on Driftwood Park, Rhododendron Park, Ika Island, the Skagit Wildlife Area at Goat Island, and the Skagit Bay Estuary. Long-term, slightly beneficial impacts on the Island County recreational trails, the Crockett Blockhouse, Parker Road Trail, and Coupeville High School. Impacts on other county and municipal parks would be long term and minor or negligible. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impacts to Congressionally designated wilderness areas or BLM-owned lands with wilderness characteristics.

Table 4.5-14 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	*Summary of Impacts*

Key:
DNL = day-night average sound level
Lmax = maximum A-weighted sound level

In summary, implementation of the action 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 action 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 action alternative. The acreage of land within the projected greater than 65 dB DNL noise contours would increase by 14 percent to 19 percent during an average operating year. Incompatible land use (i.e., residential land) within the DNL noise contours would increase under all action alternatives and scenarios, during average operating years.

During a high-tempo FCLP year, the Proposed Action would result in a slightly larger 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 14 percent to 20 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 action alternatives and scenarios during high-tempo FCLP years. Furthermore, off-station land use controls should consider the temporary impacts of the high-tempo year or designate as an area to monitor.

Land within the conceptual APZs at OLF Coupeville would increase under each action 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.

Overall, implementation of the Proposed Action at NAS Whidbey Island would result in localized significant impacts to recreation at one county park, Driftwood Park, under Scenarios A and B and regardless of alternative selected, as a result of increased noise exposure. There would be localized significant impacts to recreation at the Oak Harbor Off-leash Dog Park under Alternative 1, Scenario C, as a result of increased noise exposure. Impacts on other parks and recreational areas would predominantly be long term and minor or moderate at individual parks as a result of increases in the area within the greater than 65 dB DNL noise contours or in the average number of daytime noise

events above 65 dB DNL per hour. 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 operational scenarios may result in localized beneficial 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 not directly impact management of parks or recreation areas by federal, state, or local agencies or departments but may indirectly affect recreation management 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. No Congressionally designated wilderness areas or BLM-owned lands with wilderness characteristics would be located within the greater than 65 dB DNL contours, regardless of alternative or operational scenario chosen.

4.6 Cultural Resources

This section evaluates the potential impacts of the Proposed Action on cultural resources, including architectural or built resources, archaeological resources, and American Indian resources within the Area of Potential Effect (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, and consulting parties regarding the potential to affect archaeological and architectural resources that are historic properties.

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). 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. Examples of adverse effects are included in Table 4.6-1. Effects to traditional Native American tribal properties can be determined only through consultation with the affected American Indian tribes and nations. However, ground disturbance to prehistoric archaeological sites and graves has often been cited as an adverse impact.

Cultural Resources

Archaeological Resources
Minimal to no impact will result to known or intact archaeological sites within Ault Field and OLF Coupeville during construction and operation.

No off-station impacts are anticipated because ground disturbance is limited to Ault Field.

The Navy is consulting with the Washington SHPO, American Indian tribes and nations, and consulting parties regarding archaeological resources.

Architectural Resources
Minimal to no direct and indirect impacts are anticipated to occur to on-station historic 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 resources during operation.

The Navy is consulting with the Washington SHPO, American Indian tribes and nations, and consulting parties regarding architectural resources.

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 National Register of Historic Places [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 initiated consultation with the Washington SHPO, the ACHP, eight federally recognized American Indian tribes and nations, and several 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 3.6.2.4, consultation was initiated in October 2014 with the SHPO and the following organizations:

- ACHP
- Town of Coupeville
- Citizens of Ebey's Reserve
- Trust Board of Ebey's Landing National Historical Reserve
- Island County Commissioners
- Island County Historical Society
- National Park Service
- 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.
- 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 Citizens of Ebey's Reserve 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 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 the Citizens of Ebey's Reserve concerning the noise data; 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.

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 mentioned previously, the Navy also has initiated Section 106 consultation with the eight federally recognized American Indian tribes and nations regarding the Proposed Action and its effects on historic properties at NAS Whidbey Island.

The following American Indian tribes and nations 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 American Indian tribes and nations 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 American Indian tribes and nations 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.

No other responses have been received to date from the other American Indian tribes and nations.

Documentation of the correspondence with the American Indian tribes and nations is provided in Appendix C.

4.6.1 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, no existing structures would be demolished (see Figure 3.6-2, Facilities Map).

Archaeological Resources

The Navy is evaluating potential impacts of the Proposed Action to archaeological resources under NEPA and under Section 106 of the NHPA.

As part of the Proposed Action, some 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 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, 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 6.6 acres for Alternatives 1 and 3 and 7.4 acres for Alternative 2. Upon completion of construction, each of the three alternatives would have a total of 2.1 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. No ground disturbance that would have the potential to impact archaeological resources would occur during operation.

Therefore, 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; the Navy also anticipates that no historic properties that are archaeological resources would be affected. The Navy is consulting with the Washington SHPO, the ACHP, American Indian tribes and nations, and consulting parties regarding archaeological resources and historic properties.

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 state Department of Archaeology and Historic Preservation as to the treatment of the remains and/or archaeological resources per applicable laws.

Architectural Resources

The Navy is evaluating the potential impacts of the Proposed Action to historic architectural resources under NEPA and under Section 106 of the NHPA.

Construction Impacts

With regard to historic architectural resources, 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. For Alternative 2, a two-squadron hangar would be constructed on the flight line adjacent to Building 386 (Hangar 5) (see Section 2.4.2.3, Facility and Infrastructure Requirements, for additional details). As mentioned previously, during the construction of armament storage, hangar facilities, storage areas, and expanded parking areas, 6.6 acres would be needed for

Alternatives 1 and 3 and 7.4 acres for Alternative 2. Once constructed, facilities and parking would add up to approximately 2.1 acres of new impervious surface at the installation for all alternatives. This amount would not vary between scenarios within each of the three alternatives.

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, due to its date of construction and lack of significance for the Cold War, it is not considered historically significant and has been determined not eligible for listing in the NRHP. The Washington SHPO has concurred with this finding. As such, under NEPA, the potential impact to this building would not be significant and would be determined no historic properties affected for Section 106 purposes.

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 under Alternative 2. 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, personnel, and machinery may temporarily impact the setting. Under NEPA, the potential impacts to Building 386 (Hangar 5) would be minimal; no adverse effect would be anticipated to occur under Section 106.

Other changes to architectural resources during construction include repairs to inactive taxiways, located to the south of Runway 7-25 (Facility 201247), which was built in the early 1950s. Similar to Building 2737 (Hangar 12), while the taxiways are important to the operations at NAS Whidbey Island, they too are 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). Therefore, the potential impacts to these taxiways would not be considered significant under NEPA; furthermore, since the taxiways are not historic properties, no effect would be anticipated to occur per Section 106 of the NHPA.

Indirect impacts, including visual and auditory impacts, also may be experienced within other areas of Ault Field or within immediate proximity to it during construction. As noted in Section 3.6.2.2, Architectural Resources, 17 buildings that are eligible for the NRHP are located within Ault Field. However, 10 of these buildings are anticipated for demolition; the Navy has worked with the SHPO to coordinate these efforts. Due to their final disposition, these 10 buildings are not considered in this analysis. Among these structures anticipated for demolition is Building 112 (Hangar 1); this structure currently is positioned within an area of Ault Field in which 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 for which the SHPO has been consulted. 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). Therefore, under NEPA, no impact would occur to Building 112 (Hangar 1); since it would no longer be extant, no effect would be anticipated to occur under Section 106.

Indirect effects associated with construction activities and equipment may create temporary, minor impacts due to the presence of increased dust, personnel, and machinery. The impacts for each of the

alternatives would be anticipated to be similar in nature. These impacts would lessen as the distance between the construction areas and the resource would increase. As these impacts are temporary in nature, they are not anticipated to impact the NRHP eligibility of properties within Ault Field or within proximate areas. Therefore, under NEPA, no impacts or minor, temporary impacts would be anticipated to occur to architectural resources within and proximate to Ault Field; under Section 106, no adverse effect would be anticipated to occur. The Navy is consulting with the Washington SHPO, the ACHP, American Indian tribes and nations, and consulting parties regarding architectural resources and historic properties.

Operational Impacts

After construction is complete, indirect impacts within the APE may occur. These types of impacts would be associated with changes to the visual and auditory setting of historic architectural resources.

Visual Impacts Associated with Operational Impacts

Limited visual changes would occur as a result of the changes resulting from the construction associated with each alternative to Building 2737 (Hangar 12), new armament storage, separate maintenance facilities, and expanded parking areas 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. As 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 or to other areas within the APE. Within Ault Field, the resulting facilities would be consistent with the airfield operations and would not be anticipated to alter the overall feel of the setting.

Visual impacts, however, would be anticipated to occur due to the increased flight operations at Ault Field and OLF Coupeville. As noted in Section 2.4.2.2, annual airfield operations would increase from approximately 12 percent to 38 percent, 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 in proximity to the airfields; the aircraft would be less visible as the distance from the airfields increases.

For those resources immediately adjacent to the Ault Field and OLF Coupeville airfields, minimal impacts would be anticipated to occur because the existing visual setting in part is designed to accommodate aircraft operations. The visual presence of aircraft during take-off and landing associated with the Proposed Action generally would be consistent with the visual setting of historic resources located within Ault Field and OLF Coupeville.

During take-off and landing, the aircraft also would be within the viewshed of historic resources outside of Ault Field and OLF Coupeville, including Ebey's Landing National Historical Reserve, a part of which is used to interpret the history of Fort Casey and Fort Ebey, which protected the entrance to Puget Sound. In this manner, the military is part of the cultural landscape of Ebey's Landing National Reserve, as the military presence began in the late nineteenth century and helped shape the subsequent settlement patterns. Two of the major themes of its original comprehensive plan were Major American Wars and Political and Military Affairs (NPS, 1980). As part of these themes, Fort Ebey, Fort Casey, and OLF Coupeville were listed as historic resources representative of the themes (NPS, 1980).

The presence of the 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 Section 1.4, the total number of flight operations within Ault Field and OLF Coupeville would increase by approximately 46 to 47 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 three 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. 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 these resources.

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 three 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 action alternatives, the frequency of aircraft in flight also may increase.

In some situations, aircraft are noticed after being heard rather than from visual cues. Aircraft would be most visible temporarily in open areas. In addition, due to the vertical distance between the aircraft and the ground surface, the aircraft would appear as small objects within the sky; some also may leave contrails (i.e., condensation trails), which readily evaporate, albeit marking their previous presence. The in-flight time would be limited to a specific range and would not create a permanent effect on the visual setting of these resources. For these reasons, only minimal to moderate impacts would be anticipated to occur to the visual setting of historic resources located within the APE.

Lighting associated with the aircraft and operations at NAS Whidbey Island facilities also may be visible to and from historic resources located in proximity 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 to

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 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 air 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 Alternative 2.

Considered together, under NEPA, only minor to moderate visual impacts would be anticipated to occur; under Section 106, no adverse effect would be anticipated to occur to historic properties located within the APE. The Navy is consulting with the Washington SHPO, the ACHP, American Indian tribes and nations, and consulting parties regarding architectural resources and historic properties.

Noise and Vibration Associated with Operational Impacts

In addition to those structures within the immediate vicinity of construction areas, architectural resources within NAS Whidbey Island (i.e., Ault Field and OLF Coupeville) and within its immediate surroundings that may be impacted by noise and vibration from the operation of the additional Growler aircraft were considered 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 hertz (Hz) to 1,000 Hz frequency range) are considered potentially damaging to structural components (NRC/NAS, 1977). This is a conservative standard for assessing all sound (NRC/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 (inches/sec)[18] (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/NAS, 1977). Other scholars suggest that limits between 0.006 and 0.08 inches/sec for continuous vibration would not be expected to cause damage; however, when continuous vibrations exceed 0.4 or 0.6 inches/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

[18] 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.

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 noise appendix (Appendix A, Section A.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, 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[19] 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

[19] 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).

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).

No historical data is present for facilities at NAS Whidbey Island to suggest the presence of noise and vibration-related effects on historic architectural resources. Due to the continuous operation of aircraft for more than 70 years, including periods of significantly higher levels of operation, and a history of little or no damage at this location, minimal to no impacts are anticipated to 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.

Within the APE, historic architectural resources also are located within Ebey's Landing National Historical Reserve, a NPS-managed unit and a historic property. The NPS, in studies at other units, has accounted for the potential disruption to visitor experiences caused by overflights (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).

Noise and vibration across Ebey's Landing National Historical Reserve would likely vary due to the location of specific historic architectural resources in relation to the airfields. No significant physical damage as a result of aircraft operations has been reported to these structures as a result of continuous operation of aircraft for over 70 years. The potential noise and vibration would temporarily impact the setting of historic architectural resources by causing a distraction to the setting and potential annoyance to visitors or within the reserve. However, due to the temporary nature of the impacts and the location outside the airfield, minimal to moderate auditory and/or vibratory impacts would be anticipated. These impacts would not significantly detract from the historic nature or character of the individual historic architectural resources or the overall Ebey's Landing National Historical Reserve due to the consistent military presence since its founding as a reserve and the importance of the military as one of its interpretative themes. 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 Ebey's Landing National Historical Reserve due to its proximity to OLF Coupeville. In addition, 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. As the frequency of aircraft would increase during a high-tempo FCLP year, the potential for noise and vibration impacts also may increase.

Therefore, under NEPA, only minor to moderate, temporary impacts would be anticipated to occur; under Section 106, no adverse effect would occur. The Navy is consulting with the Washington SHPO, the ACHP, American Indian tribes and nations, and consulting parties regarding architectural resources and historic properties.

Native American Resources

The Navy is evaluating the potential impacts of the Proposed Action on Native American resources. In addition, the Navy is consulting with federally recognized American Indian tribes and nations.

Cultural Resources Conclusion

As considered under NEPA, implementation of Alternatives 1 through 3 would result in no significant impacts, direct or indirect, to archaeological, architectural, and American Indian traditional resources.

The Navy anticipates that minimal to no direct impacts would result to known or intact archaeological sites within Ault Field during the construction and operation of the Proposed Action, and no ground disturbance is anticipated to occur at the Seaplane Base and OLF Coupeville. 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 action alternatives.

The Navy anticipates that minimal to no direct impacts would result to architectural resources during construction of the Proposed Action. On-station resources, such as Building 2737 (Hangar 12) and the taxiways, may be directly impacted as a result of the expansion of facilities and new structures; because these are not historically significant, the impacts are anticipated to be minor.

Indirect impacts to other historic architectural resources, including visual, auditory, and/or vibratory changes to the setting, also may result from the Proposed Action. These types of impacts may occur in areas proximate to Building 386 (Hangar 5), which is eligible for the NRHP. These impacts are not anticipated to be significant. Minimal to no off-station direct impacts to architectural resources are anticipated during construction because ground disturbance is limited to Ault Field.

During operation, the Navy anticipates that minor to moderate visual, auditory, and/or vibratory 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 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 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.

Under Section 106, no effect to historic properties that are archaeological resources and no adverse effect to historic properties that are architectural resources are anticipated to occur. The Navy is consulting with the Washington SHPO, the ACHP, American Indian tribes and nations, and consulting parties regarding archaeological and architectural resources and historic properties.

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 has 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. To date, no tribes have requested government-to-government consultation on the Proposed Action.

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 (U&A) 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 dBA 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 action alternatives, 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 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 dBA DNL noise contour areas.

Terrestrial and Marine Wildlife

Under each of the three action alternatives, no direct impacts are anticipated to occur to terrestrial or marine 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, the Proposed Action would not directly impact 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 action alternatives, 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 approximately 2.0 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 action alternatives and 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, 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

The implementation of the three action 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 action 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 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. To date, no tribes have requested or initiated government-to-government consultation on the Proposed Action.

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 statue. 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 direct impact to individuals (i.e., wildlife-aircraft collisions [NAS Whidbey Island BASH plan (NAS Whidbey Island, 2012)]).

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. 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 approximately 2 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 in and around Ault Field and OLF Coupeville are 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.

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 would be not significantly impacted by noise; there would be an increase in noise in the study area but wildlife are already exposed to a high level of long-term aircraft operations and other human-made disturbances and have presumably habituated. Only minor behavioral disturbances are anticipated for marine species.

Large numbers of wildlife inhabiting the study area throughout the year increase the risk of a strike, but with the continued implementation of a BASH plan, the Proposed Action would not significantly impact local wildlife populations.

Species:
No significant impacts from sensory disturbances. Only minor behavioral disturbances are anticipated for marine species, including fish and mammals.

ESA-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, canary rockfish, yelloweye rockfish, Southern Resident killer whale, and humpback whale. The Proposed Action may affect the marbled murrelet, but a final determination of adverse effects is pending consultation with the USFWS.

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 and 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. Impacts on terrestrial wildlife (i.e., general birds, mammals, and reptiles and amphibians) include details on the type of potential impact related to habitat loss effects, sensory disturbance effects, and aircraft-wildlife strike effects. 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, there are three main effect categories on terrestrial wildlife: habitat loss, sensory disturbance, and wildlife strikes. Each effect is discussed below, along with impacts specific to species groups, including separate discussions of special status species (i.e., those protected under the ESA, MBTA, and BGEPA).

Habitat Loss

Habitat loss will 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 approximately 2 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.

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. The construction site provides marginal habitat for MBTA-protected species, and species occurring in construction areas would likely be adapted to human-modified environments. Still, the Navy would conduct surveys for active bird nests within the construction footprint to avoid harming nesting birds or their young during vegetation clearing, grading, or excavation. No changes to feeding, sheltering, or reproduction are anticipated, and the abundance and frequency of migratory birds occurring near the construction site are expected to return to prior levels after construction is completed. Pursuant to the MBTA, no harm to or incidental takes of migratory birds are anticipated.

Therefore, vegetation removal under each of the three action alternatives would have negligible impacts on terrestrial wildlife, including MBTA-protected species, and would not negatively affect habitat use by any wildlife species. These impacts would not be significant.

As described in Section 4.9, there would be no significant impacts on surface water, wetlands, or marine sediments. Therefore, there would be no significant impact on terrestrial wildlife related to water quality.

Sensory Disturbances

Although impacts on wildlife habitat under each of the three action alternatives are limited, an increase in human activity and noise and vibrations associated with equipment use during construction and operation of the proposed facilities could disturb wildlife. Wildlife responses may include displacement or avoidance of affected areas and increased stress.

Wildlife may be directly displaced or avoid areas during construction activities. Terrestrial wildlife that live at or near the proposed construction site are presumed to be habituated to high levels of noise associated with current Ault Field activities and aircraft operations because they continue to be present despite the history of anthropogenic noise in the area. However, construction activities associated with the Proposed Action will introduce new levels of disturbance that may cause wildlife to avoid the area and/or be temporarily displaced.

While difficult to measure in the field, all behavioral responses are accompanied by some form of physiological response, such as increased heart rate or a startle response. A startle is a rapid, primitive reflex characterized by rapid increase in heart rate, shutdown of nonessential functions, and mobilization of glucose reserves. Animals can learn to control the behavioral reactions associated with a startle response and often become habituated to noise (NPS [National Park Service], 1994; Bowles, 1995; Larkin, Pater, and Tazik, 1996). Habituation keeps animals from expending energy and attention on harmless stimuli, but the physiological component might not habituate completely (Bowles, 1995).

The increase in noise during construction would be temporary and negligible compared to the No Action Alternative due to existing noise generated by airfield operations. 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.

MBTA-protected species occurring in construction areas would likely be adapted to human-modified environments. The Navy would conduct surveys for active bird nests within the construction footprint to avoid disturbing nesting birds or their young. 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. As such, no changes to feeding, sheltering, or reproduction are anticipated, and the abundance and frequency of migratory birds occurring near the construction site are expected to return to prior levels after construction is completed. Pursuant to the MBTA, no harm to or incidental takes of migratory birds are anticipated.

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 create stress and result in displacement/avoidance 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).

Birds

Bird responses to aircraft disturbances vary by species and may vary by situation (Grubb and Bowerman, 1997; Goudie, 2006). For example, 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. In general, aircraft disturbances are not likely to disrupt major behavior patterns, and impacts are not expected to have an adverse impact at the population level.

This section addresses these impacts in detail for bird groups that potentially occur in the study area.

Waterfowl

Several studies have examined aircraft disturbances on breeding waterfowl. Harlequin ducks (*Histrionicus histrionicus*) had more intense alert responses when noise from military jet overflights exceeded 80 dBA (Goudie and Jones, 2004). The responses included lifting the head up, agitation, flushing, and panic diving. The direct behavioral responses typically lasted less than one minute, but additional behavioral responses such as decreased courtship behavior lasted up to 2 hours after overflights. However, the authors suggested that the responses were unlikely to affect critical behaviors of breeding pairs, such as resting, foraging, and courtship.

In a study of American black ducks (*Anas rubripes*), 25 percent to 30 percent of individuals initially responded to aircraft noise and visual disturbances, but they habituated to the disturbances with repeated exposure (Conomy et al., 1998). Wood ducks (*Aix sponsa*) also responded to initial exposure to aircraft noise and visual disturbances but did not exhibit the same pattern of habituation as American black ducks, demonstrating that responses vary between species.

Breeding waterfowl in the study area would likely respond to aircraft operations under the Proposed Action by exhibiting alert postures, flushing, diving, or disrupting normal activities but would be expected to resume normal activities within a short period after overflights (Goudie and Jones, 2004). The individuals breeding in the area of potential aircraft disturbance are already exposed to a high level of long-term operations activity as well as other human-made disturbances. Thus, most breeding waterfowl have presumably habituated to high levels of aircraft disturbances, and, based on the studies cited above, disturbances of those that may not have habituated would not likely affect critical behaviors. Additionally, there is no evidence to suggest waterfowl would suffer physical injury or hearing loss due to aircraft noise.

The Navy examined Crockett Lake Important Bird Area (IBA) as an indicator of potential aircraft disturbance impacts on breeding waterfowl between the various alternatives and scenarios. Crockett Lake IBA is known to support breeding waterfowl, including Canada geese (*Branta canadensis*), mallards, and gadwalls (*Anas strepera*) (eBird, 2015a). Assuming the Crockett Lake IBA supports higher concentrations of breeding waterfowl than other areas near Ault Field and OLF Coupeville, there would be a greater potential for aircraft disturbance impacts at this location. While potential impacts on breeding waterfowl at Crockett Lake IBA would be similar under Alternatives 1 through 3, the potential for impacts at the IBA would increase with increased aircraft operations at OLF Coupeville, with Scenario A having the highest potential (refer to Table 4.1-5). However, under all scenarios, the Proposed Action is not expected to have significant impacts on breeding waterfowl.

Studies of non-breeding bird responses to aircraft overflights have focused primarily on waterbirds, including waterfowl. On lakes in Switzerland, the number of wintering waterbirds showing stressed behaviors was higher during airplane overflights less than 1,000 feet AGL and helicopter overflights less than 1,500 feet AGL than when these aircraft flew at higher altitudes. The same study showed that birds returned to a relaxed behavior within 5 minutes after overflights (Komenda-Zehnder, Cevallos, and Bruderer, 2003). Seventy-five percent of brant (*Branta bernicla*) and 9 percent of Canada goose flocks, both of which occur in the study area, flew in response to aircraft overflights in Alaska. The greatest response of geese occurred when aircraft flew between 1,000 feet AGL and 2,500 feet AGL (Ward et al., 1999).

Migrating and wintering waterfowl may be disturbed by aircraft flying below 2,500 feet AGL. However, the affected birds would likely return to relaxed states shortly after the disturbance and also may habituate with repeated exposures. Skagit Bay IBA, Deception Pass IBA, Crescent Harbors Marsh IBA, and Penn Cove IBA support large numbers of migrating and wintering waterfowl. Potential impacts on migrating and wintering waterfowl at the IBAs would be similar under Alternatives 1 through 3; however, impacts would vary by scenario. The potential for impacts on Skagit Bay IBA and Deception Pass IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impact (refer to Table 4.1-5). The potential for impact on Penn Cove IBA would increase with increased aircraft operations at OLF Coupeville, with Scenario A having the highest potential for impact (refer to Table 4.1-5). Crescent Harbors IBA is centrally located between Ault Field and OLF Coupeville; therefore, all scenarios may have similar impacts.

Migrating and wintering waterfowl are already exposed to an annual average of 89,000 aircraft operations (year 2021 flight operations; see Table 3.1-1). The IBAs and other parts of the study area provide important wintering and migration habitat in the biological resources study area (refer to Section 3.8). Therefore, migrating and wintering waterfowl in the study area have presumably habituated to high levels of aircraft operations and other human-made disturbances. It is not expected that the Proposed Action would have significant impacts on waterfowl using the study area outside of the breeding season.

Wading Birds

Breeding wading birds within mixed breeding colonies in Florida that were exposed to military jet overflights at 500 feet AGL responded significantly more than those that were not exposed (Black et al., 1984). However, the responses of wading birds were not severe and typically consisted of alert postures (e.g., looking up or changing position), and no birds were observed flushing from their nests. The birds began to look up at 60 dBA to 65 dBA and began to change position at 70 dBA to 75 dBA, but they returned to their original positions within 1 to 2 minutes after the overflight. Chicks responded significantly more often than adults. Overflights did not impact nest attendance, feeding of young, nest success, chick survival, nestling mortality, or nesting chronology (Black et al., 1984).

The Black et al. (1984) research suggests that the wading birds in the study area would react to the aircraft operations but would not respond strongly. Furthermore, the breeding wading birds in the study area are already exposed to a high level of long-term aircraft operations as well as other human-made noises and visual disturbances, and they are presumably habituated to the high levels of disturbances.

Penn Cove IBA and Skagit Bay IBA support known concentrations of breeding wading birds, and there would be a greater potential for aircraft disturbance impacts at this location versus some other areas in the study area. For this reason, the Navy examined Penn Cove IBA and Skagit Bay IBA as an indicator of

potential aircraft disturbance impacts on breeding wading birds between the various alternatives and scenarios. Potential impacts on breeding wading birds at the IBAs would be similar under Alternatives 1 through 3; however, impacts would vary by scenario. The potential for impacts on breeding wading birds at Skagit Bay IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts (refer to Table 4.1-5). The potential for impacts on breeding wading birds at Penn Cove IBA would increase with increased aircraft operations at OLF Coupeville, with Scenario A having the highest potential for impacts (refer to Table 4.1-5).

Similar to waterfowl, migrating and wintering wading birds may be disturbed by aircraft but are already exposed to aircraft operations (see previous section). Migrating and wintering wading birds in the study area have presumably habituated to high levels of aircraft operations and other human-made disturbances. Potential impacts on migrating and wintering wading birds at the IBAs would be similar under Alternatives 1 through 3; however, impacts would vary by scenarios, as is detailed in the previous waterfowl section. It is not expected that the Proposed Action would have significant impacts on wading birds using the study area outside of the breeding season.

Seabirds

Studies of aircraft disturbances on nesting colonial seabirds are limited. One study showed that most aircraft disturbances on common murres (*Uria aalge*) breeding in central California occurred during overflights of 1,000 feet above MSL or less (Rojek et al., 2007). Flushing of nesting birds can result in eggs breaking or chicks and/or eggs being exposed to predation or the elements. Noise levels at which disturbances occurred were not documented in the Rojek et al. (2007) study. Burger (1981) found no effects on nesting herring gulls (*Larus argentatus*) during subsonic aircraft overflights with noise levels ranging from 88 to 101 dBA (supersonic overflights are not permitted in the study area).

The Navy used the common murre (Rojek et al., 2007) and herring gull (Burger, 1981) studies as proxies for potential breeding seabird responses to the Proposed Action's operations. The study area includes portions of Deception Pass IBA, which is known to support breeding seabirds, including pigeon guillemots. While Rojek et al. (2007) documented seabird behavioral responses from flyovers at altitudes lower than 1,000 feet AGL, these flights were considered infrequent, and birds were assumed to not be habituated to the flights. Breeding seabirds in the study area are already exposed to a high level of long-term aircraft operations and other human-made disturbances, which suggests they are habituated to the high levels of disturbances.

As Deception Pass is the only IBA in the study area known to support breeding seabirds, there would be a greater potential for aircraft disturbance impacts at this location. For this reason, the Navy examined the Deception Pass IBA as an indicator of potential aircraft disturbance impacts on breeding seabirds between the various alternatives and scenarios. While potential impacts on breeding seabirds at Deception Pass IBA would be similar under Alternatives 1 through 3, the potential for impacts at the IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential (refer to Table 4.1-5). However, under all scenarios, the Proposed Action is not expected to have significant impacts on breeding seabirds.

Similar to waterfowl, migrating and wintering seabirds may be disturbed by aircraft but are already exposed to aircraft operations (see previous section). Migrating and wintering seabirds in the study area have presumably habituated to high levels of aircraft operations and other human-made disturbances. Potential impacts on migrating and wintering seabirds at the IBAs would be similar under Alternatives 1 through 3; however, impacts would vary by scenarios, as is detailed in the previous section. It is not

expected that the Proposed Action would have significant impacts on seabirds using the study area outside of the breeding season.

Shorebirds

Shorebird responses to aircraft disturbances are limited to one known study on red knots, which is a BCC in the study area. Koolhaas, Dekinga, and Piersma (1993) found that large numbers of red knots were rarely observed on days with aircraft activity during fall migration in Holland. In addition, they reported that a limited amount of habituation to aircraft activity by the species. There is no available research that specifically estimates shorebird response distances to aircraft disturbances. The Skagit Bay, Deception Pass, Crescent Harbors Marsh, and Penn Cove IBAs are key wintering locations for shorebirds (e.g., black oystercatchers). The Skagit Bay IBA is also an important migration stopover spot (refer to "Important Bird Areas" in Section 3.8.2.2 for more information).

Assuming the above-mentioned IBAs support higher concentrations of shorebirds than other parts of the study area, there would be a greater potential for aircraft disturbance impacts at these locations. For this reason, the Navy examined these IBAs as an indicator of potential aircraft disturbance impacts on shorebirds between the various alternatives and scenarios. Potential impacts on shorebirds would be similar under Alternatives 1 through 3; however, impacts would vary by scenario. The potential for aircraft disturbance impacts on Skagit Bay IBA and Deception Pass IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts. The potential for impacts on Penn Cove IBA would increase with increased aircraft operations at OLF Coupeville, with Scenario A having the highest potential (refer to Table 4.1-5). Crescent Harbors IBA is centrally located between Ault Field and OLF Coupeville; therefore, all scenarios may have similar impacts. Shorebirds in the study area are already exposed to a high level of long-term aircraft operations and other human-made disturbances, and they are presumably habituated to the high levels of disturbances. Disturbances associated with aircraft operations would not significantly impact breeding raptors in the study area.

Raptors

Responses of raptors to military aircraft overflights have been studied for several species and research indicates that raptors in the study area are not expected to be significantly impacted by and/or may habituate to military aircraft overflights, i.e., the Proposed Action. Nesting behavior of ospreys, an Island County Species of Local Importance, was not significantly affected by military jet overflights with noise levels ranging from 52 dBA to 101 dBA (Trimper and Thomas, 2001). No agitation or startle responses were observed, but young did crouch in the nest. Ospreys appeared to have habituated to frequent jet overflights. Nesting peregrine falcons, which are both state-listed and a BCC, responded infrequently to military jet overflights and rarely exhibited intense reactions (i.e., standing, crouching, flying) in Alaska (Nordemeyer, 1999). Bald eagle responses to military aircraft disturbance have been studied and are discussed below in the "Bald and Golden Eagles" subsection.

Assuming IBAs support higher concentrations of breeding raptors than other areas in the study area, there would be a greater potential for aircraft disturbance impacts at these locations. For this reason, the Navy examined IBAs as an indicator of potential aircraft disturbance impacts on breeding raptors between the various alternatives and scenarios. Potential impacts on breeding raptors would be similar under Alternatives 1 through 3; however, impacts would vary by scenarios. The potential for aircraft disturbance impacts on Skagit Bay IBA and Deception Pass IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts. The potential for

impacts on Penn Cove IBA and Crockett Lake IBA would increase with increased aircraft operations at OLF Coupeville, with Scenario A having the highest potential (refer to Table 4.1-5). Crescent Harbors IBA is centrally located between Ault Field and OLF Coupeville; therefore, all scenarios may have similar impacts. Breeding raptors in the study area, including ospreys and peregrine falcons, are already exposed to a high level of long-term aircraft operations and other human-made disturbances, and they are presumably habituated to the high levels of disturbances. Disturbances associated with aircraft operations would not significantly impact breeding raptors in the study area.

Research indicates that wintering and migrating birds could be disturbed by aircraft (Ward et al., 1999; Komenda-Zehnder, Cevallos, and Bruderer, 2003). The Penn Cove and Skagit Bay IBAs are important for wintering and migratory raptors (refer to "Important Bird Areas" in Section 3.8.2.2 for more information). Assuming Penn Cove IBA and Skagit Bay IBA support higher concentrations of wintering and migratory raptors than other locations in the study area, there would be a greater potential for aircraft disturbance impacts at these locations. For this reason, the Navy examined these two IBAs as indicators of potential aircraft disturbance impacts on raptors during non-breeding seasons between the various alternatives and scenarios.

The potential for impacts on wintering and migrating raptors at Skagit Bay IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts (refer to Table 4.1-5). Conversely, the potential for impacts on wintering and migrating raptors at Penn Cove IBA would increase with increased aircraft operations at OLF Coupeville, with Scenario A having the highest potential (refer to Table 4.1-5). However, like breeding raptors, migrating and wintering raptors in the study area have presumably habituated to the already high levels of aircraft operations and other human-made disturbances. The Proposed Action is not expected to have significant impacts on raptors using the study area during the migratory and wintering seasons.

Passerines

Research of aircraft disturbance impacts on passerines during any time of year is limited. One study documented a weak correlation between aircraft noise and reduced reproductive success (Hunsaker, 2001). Skagit Bay was designated as an IBA, in part, due to its importance for both breeding and migratory passerines (refer to "Important Bird Areas" in Section 3.8.2.2 for more information). Assuming the Skagit Bay IBA supports higher concentrations of breeding and migratory passerines than other parts of the study area, there would be a greater potential for aircraft disturbance impacts at this location. For this reason, the Navy examined Skagit Bay IBA as an indicator of potential aircraft disturbance impacts on passerines between the various alternatives and scenarios.

Potential impacts on passerines at Skagit Bay IBA would be similar under Alternatives 1 through 3; however impacts would vary by scenario. Impacts at Skagit Bay IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts (refer to Table 4.1-5). However, passerines in the study area are already exposed to a high level of long-term military operations and other human-made disturbances, and they are presumably habituated to the high levels of disturbance. The Proposed Action is not expected to have significant impacts on passerines using the study area.

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). 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[20].

Studies of the effects of aircraft noise on small mammals are limited (Efroymson et al., 2000). Sound pressure levels at which adverse effects occurred typically exceeded 100 dBA in small mammals. Small mammal responses included changes in reproduction and physiology as well as decreased survival rates.

Potential impacts on mammals are similar for Alternatives 1 through 3. Potential impacts on mammals would be similar across the scenarios, but the intensity of the impacts would shift between sites. Potential impacts on mammals at OLF Coupeville would increase as aircraft operations increase at OLF Coupeville, with the greatest potential for impacts at OLF Coupeville occurring under Scenario A. Potential impacts on mammals at Ault Field would increase as aircraft operations increase at Ault Field, with the greatest potential for impacts occurring under Scenario C.

Terrestrial mammals inhabiting the study area are already exposed to a high level of long-term aircraft operations (annual average of 89,000 [Table 3.1-1]) and other human-made disturbances, and have presumably habituated to the very high level of noise and visual disturbances, as has been reported for some mammals (i.e., ungulates) in other areas of repeated exposure (Efroymson et al., 2000). Thus, the implementation of the Proposed Action would not significantly affect terrestrial mammals by disturbances from aircraft operations.

Reptiles and Amphibians

Studies regarding reptile and amphibian responses to noise, aircraft noise in particular, 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. 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). Amphibian responses to aircraft noise have not been studied. However, 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.

Potential impacts on reptiles and amphibians are similar for Alternatives 1 through 3. Potential impacts on reptiles and amphibians would be similar across the scenarios, but the intensity of impacts would shift between sites. Potential impacts on reptiles and amphibians at OLF Coupeville would increase as aircraft operations increase at OLF Coupeville, with the greatest potential for impacts at OLF Coupeville

[20] Columbian black-tailed deer, which occur in the study area, are a subspecies of mule deer.

occurring under Scenario A. Potential impacts on reptiles and amphibians at Ault Field would increase as aircraft operations increase at Ault Field, with the greatest potential for impacts under Scenario C.

Given that reptiles and amphibians occurring in the study area are already exposed to high levels of noise, they would presumably be habituated to these noise levels, as were desert tortoises in the Bowles et al. (1999) study. Therefore, the aircraft noise impacts on reptiles and amphibians under each of the three alternatives would not differ significantly from those under the No Action Alternative.

Federal Threatened and Endangered Terrestrial Species

With the exception of the marbled murrelet, the Proposed Action would have no effect on ESA-listed terrestrial wildlife species discussed in Chapter 3. As such, the following section focuses on the marbled murrelet. Effects to bull trout, covered under terrestrial species in Chapter 3, are discussed with marine fisheries in Section 4.8.2.2, below.

Marbled Murrelet

In general, impacts on marbled murrelet would be similar to those are described under the Seabirds section, above. 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.

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 marbled murrelets 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. 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. The following discussion summarizes existing research on marbled murrelet behavior responses to disturbance.

The Proposed Action's aircraft operations have the potential to cause noise and/or visual disturbances of marbled murrelets. While nesting marbled murrelets have not been documented in the study area (Milner, 2016), recent occupancy surveys have not been conducted where suitable habitat is present (Hamer, 2016). 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. The following discussion of existing research on boat-related disturbances on marbled murrelets and aircraft-related disturbances of similar bird species allows for inference of how marbled murrelets might respond to aircraft overflights and the distances at which behavioral responses

are more likely to occur. 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, Piatt, and Springer, 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, a sign 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, Piatt, and Springer, 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, Lee, and Ronconi, 2009)[21]. 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, Lee, and Ronconi 2009).

While focused studies of aircraft disturbances on marbled murrelets have not been conducted, studies of other waterbird species may provide some indication as to how marbled murrelets may respond to overflights. In a study of breeding common murres[22] in California, most aircraft disturbances occurred during overflights of 1,000 feet above MSL or less (Rojek et al., 2007). Most boat disturbances occurred within 165 feet of nesting areas, which is within the range of disturbance distances for at-sea marbled murrelets reported by Speckman, Piatt, and Springer (2004), Hentze (2006), and Bellefleur, Lee, and Ronconi (2009). Because nesting common murres and at-sea marbled murrelets respond to boat traffic at similar distances, marbled murrelets might also respond to aircraft at distances similar to those of common murres.

The behaviors and relative sensitivities to aircraft disturbances between common murres at nesting sites (Rojek et al., 2007) and at-sea marbled murrelets (Speckman, Piatt, and Springer, 2004; Hentze, 2006; Bellefleur, Lee, and Ronconi, 2009) may be quite different, despite similarities in their responses to boats. Groups of colonial birds, such as common murres, at active nest sites may be more sensitive to disturbance than a bird foraging or loafing at sea (i.e., marbled murrelets). However, Komenda-Zehnder,

[21] 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).

[22] Common murres belong to the same family (Alcidae) as marbled murrelets.

Cevallos, and Bruderer (2003) found that the proportion of wintering waterbirds on Swiss lakes exhibiting stressed behaviors was significantly higher during airplane overflights of less than 1,000 feet AGL. While this study did not include marbled murrelets, common murres, or birds at sea, it did evaluate the responses of several species of waterbirds on open water and produced a similar disturbance-altitude threshold to the Rojek et al. (2007) study (i.e., 1,000 feet AGL).

For a detailed discussion of risk of marbled murrelet aircraft strikes, please refer to the Aircraft-Wildlife Strike Effects section.

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, marbled murrelets in the study area are already exposed to an annual average of 89,000 aircraft operations on the NAS Whidbey Island complex (refer to Table 3.1-1), 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, Piatt, and Springer, 2004; Hentze, 2006; Bellefleur, Lee, and Ronconi, 2009). For these reasons, the Proposed Action under each of the three action alternatives would not result in significant aircraft-related, sensory disturbance impacts on marbled murrelets based on the best available information[23].

Migratory Birds

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, including aircraft operations, DoD installations are exempt from "take" of migratory birds, unless the activities may result in a signification adverse effect at the population level. Impacts on migratory birds are detailed in full in the Birds section, above.

Bald and Golden Eagles

Breeding bald eagles may occur in the study area and eagle responses to military aircraft overflights have been studied. Of bald eagles studied in Arizona and Michigan, the median distance from eagles to aircraft at which there was no response to military jets 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.

Skagit Bay and Penn Cove were designated as IBAs, in part, because of their importance to breeding bald eagles. Assuming the abovementioned 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. For this reason, the Navy examined these IBAs as indicators of potential aircraft disturbance impacts on breeding bald eagles between the various alternatives and scenarios.

Potential impacts on breeding bald eagles would be similar under Alternatives 1 through 3; however, impacts would vary across scenarios. The potential for impacts on Skagit Bay IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts. It is

[23] The ESA effects determination for the marbled murrelet is presented at the end of the Marbled Murrelet" subsection of the "Wildlife Strike Effects" section below.

also important to note that breeding bald eagles have been documented at Ault Field (NAS Whidbey Island, 2012) and increased aircraft operations would increase potential for impact on nesting eagles. The potential for impact to Penn Cove IBA would increase with increased aircraft operations at OLF Coupeville, with Scenario A having the highest potential for impacts. No eagles have been documented breeding at OLF Coupeville. Similar to other breeding raptors in the study area, bald eagles are already exposed to a high level of long-term aircraft operations and other human-made disturbances, and they are presumably habituated to the high levels of disturbances. Disturbances associated with aircraft operations would not significantly impact breeding bald eagles in the study area.

During the non-breeding season both bald eagles and golden eagles may occur. There is no known research examining aircraft disturbances on eagles, or any other raptor species, during 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. Potential impacts on eagles in non-breeding seasons would be similar under Alternatives 1 through 3; however, impacts would vary across scenarios. The potential for impacts on Skagit Bay IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts. Migrating and wintering raptors in the study area have presumably habituated to high levels of aircraft operations and other human-made disturbances. The Proposed Action is not expected to have significant impacts on bald and golden eagles using the study area outside of the breeding season.

During any season, aircraft could strike eagles, and these impacts are detailed in the Wildlife Strike Effects section, below.

Wildlife Strike Effects

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 are generally highly mobile and would avoid construction equipment and vehicles. 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 "take" of MBTA-protected species. As a result, impacts on wildlife and MBTA-protected species would not be significant.

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, and collisions with small birds (i.e., passerines) may go unnoticed (DoD and Partners in Flight, 2010; Dolbeer, 2015). The NAS Whidbey Island complex reported 279 wildlife strikes between November 2005 and November 2015 (Naval Safety Center, 2015a, 2015b). Strike data for the NAS Whidbey Island complex from November 2005 through November 2015 were reviewed to determine aircraft-wildlife strike trends specific to the study area.

The NAS Whidbey Island complex reported only 279 aircraft-wildlife strikes over a 10-year period, or an average of 27.9 reports per year (Naval Safety Center, 2015a, 2015b). Assuming that an estimated 20 to 47 percent of strikes were reported (DoD and Partners in Flight, 2010; Dolbeer, 2015), the NAS Whidbey Island complex would have averaged between 58.7 and 139.5 aircraft-wildlife strikes annually during that period, most of which were birds. The estimated numbers of strikes (and actual number of reported strikes) are minimal relative to the 89,000 aircraft operations flown at the NAS Whidbey Island

complex under the No Action Alternative(refer to Table 3.1-1) and the high numbers of wildlife inhabiting the study area throughout the year. The NAS Whidbey Island BASH plan (NAS Whidbey Island, 2012) is, in large part, responsible for minimizing the numbers of strikes at the complex through the implementation of a series of land management, wildlife dispersal, and warning system measures.

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).

Birds

At the NAS Whidbey Island complex, birds comprised 275 of the 279 reported strikes (98.6 percent) from 2005 through 2015 (Naval Safety Center, 2015a, 2015b). Songbirds, raptors, and shorebirds comprised 89 percent[24] of all bird strikes identified to species group at the NAS Whidbey Island complex from 2005 through 2015 (Naval Safety Center, 2015a, 2015b).

At the NAS Whidbey Island complex, more than 56 percent of reported bird strikes occurred between July and October (Naval Safety Center, 2015a, 2015b). 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 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 increase 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. 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 civil aircraft occur during the day (Dolbeer et al., 2014). Under all three alternatives, most of the operations would be conducted from 7:00 a.m. to 10:00 p.m. at both Ault Field (88 percent) and OLF Coupeville (82 percent) (refer to Section 3.1.2). This suggests that birds would be at an increased risk of strikes because they are more susceptible to strikes during daylight hours (Dolbeer et al., 2014).

Alternative 1 would increase operations at the NAS Whidbey Island complex by 47 percent, and Alternatives 2 and 3 would increase operations by 46 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. Assuming the IBAs supports higher concentrations of birds than other parts of the study area, there would be a greater potential for aircraft-bird strikes at these locations. For this reason, the Navy examined the IBAs as an indicator of potential aircraft disturbance

[24] 153 of 275 (56 percent) reported bird strikes at the NAS Whidbey Island complex were identified as "Unknown Bird". Of the remaining 122 bird strikes, songbirds, raptors, and shorebirds comprised 108 (89 percent).

impacts between the various scenarios. The potential for aircraft-bird strikes over Skagit Bay IBA and Deception Pass IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts. The potential for impacts on Penn Cove IBA and Crockett Lake IBA would increase with increased aircraft operations at OLF Coupeville, with Scenario A having the highest potential (refer to Table 4.1-5). Crescent Harbors IBA is centrally located between Ault Field and OLF Coupeville; therefore, all scenarios may have similar impacts.

The 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 may not constitute a population-level impact for abundant species. Aircraft strikes would not have significant impacts on local bird populations.

Marbled Murrelet

Marbled murrelets are found year-round in marine waters of the study area (eBird, 2015b; Seattle Audubon Society, 2015), and individuals make daily, year-round flights between different foraging areas and between foraging and nesting areas during the breeding season (Nelson, 1997; WDFW, 2013). Marbled murrelets have been reported to fly at altitudes ranging from ground level to more than 3,000 feet AGL (Nelson, 1997; Strumpf et al., 2011; Sanzenbacher et al., 2014). The Navy has determined the Proposed action may affect the marbled murrelet, and the Navy will consult with the USFWS.

Migratory Birds

For military readiness activities, including aircraft operations, DoD installations are exempt from "take" of migratory birds, unless the activities may result in a significant adverse effect at the population level. Impacts on migratory birds are detailed in full in the Birds section, above.

Bald and Golden Eagles

The NAS Whidbey Island complex reported three strikes of bald eagles, all at Ault Field, between 2005 and 2015 (Naval Safety Center, 2015a, 2015b). 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). In this context, the loss of several bald eagles due to aircraft strikes under the Proposed Action may not constitute a population-level impact 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 2015 (Naval Safety Center, 2015a, 2015b), and the species is a rare visitor to the study area (NAS Whidbey Island, 2012; 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.

Mammals

At the NAS Whidbey Island complex, while birds comprised the majority of strikes, mammals are also known to strike with aircraft. There were three reports of bat strikes (two in June, one in September) (Naval Safety Center, 2015a, 2015b). 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 three alternatives, most of the operations would be conducted from 7:00 a.m. to 10:00 p.m. at both Ault Field (88 percent) and OLF Coupeville (82 percent) (refer to Section 3.1.2). Strike data at the NAS Whidbey Island complex indicate that the risk of mammal strikes are minimal regardless of time of day because only three strikes were reported between 2005 and 2015 despite a high level of operations (89,000 annual average) under the No Action Alternative (Naval Safety Center, 2015a, 2015b).

The Proposed Action would increase aircraft operations at the NAS Whidbey Island complex by 47 percent under Alternative 1 or by 46 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. Thus, increasing operations more heavily at Ault Field would increase the potential for mammal-aircraft strikes at that location, while reducing the potential for strikes at OLF Coupeville. The reverse is true if operations are increased more heavily at OLF Coupeville.

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. Therefore, it is expected that the number of mammal-aircraft strikes at the NAS Whidbey Island complex would remain relatively low compared to the high number of operations. Aircraft strikes would not have significant impacts on local mammal populations.

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). Aircraft strikes effects on reptiles and amphibians would not be expected to increase as a result of the Proposed Action.

4.8.2.2 Effects on Marine Species

The Proposed Action would consist of both construction and operations. 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) (Washington Department of Fish and Wildlife, 2000). Due to the distance from the construction site, sound from construction would attenuate below levels that might impact pinnipeds. Consequently, the remainder of the marine species discussion will focus on potential impacts from operations.

The operations portion of the Proposed Action would not directly impact marine habitats (see Section 4.9, Water Resources). Direct injury to marine mammals and fish from aircraft noise is also not anticipated. The effects of noise appear to be somewhat attenuated by the air/water interface. The U.S. Air Force (2000) concluded that there are very few and limited cases for which there could be any risk of injury to a marine mammal from underwater noise generated by subsonic flight of Air Force aircraft. As the sound from overhead aircraft would be non-impulsive, the proposed activities would likely not result in any direct physical injury to fish species. Therefore, no direct injuries resulting from noise have been included in the following discussions of impacts on individuals of marine species under water. However, noise and visual stimuli from aircraft operations have the potential to cause minor behavioral impacts on marine mammals that surface for air or haul-out on shorelines and islands in the study area, and marine mammals and fish underwater. This section evaluates the Proposed Action's potential to disturb both fish and marine mammals during 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.

Underwater sound from aircraft overflights has been derived for some airframes. For the derived, worst-case scenario of an FA-18 at the lowest altitude (984.2 feet), the sound level at 6.6 feet below the 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 µPa (Eller and Cavanagh, 2000). When FA-18 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. For sonic boom transmission for an FA-18 Hornet supersonic flight at Mach 1.2, the derived underwater peak pressure at the surface reached 176 dB re 1 µPa and at a depth of 164.0 feet reached 138 dB re 1 µPa. At Mach 2, the derived underwater peak pressure at the surface reached 178 dB re 1 µPa and at a depth of 164.0 feet reached 146 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).

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 buoyancy) can enhance sound detection by converting acoustic pressure into localized particle motion, which may then be detected by the inner ear. Fish with swim bladders generally have greater sensitivity and better high-frequency hearing than fish without swim bladders (Popper and Fay, 2010).

Direct injury or loss of hearing are not likely due to the non-impulsive nature of the sound. Noise sources such as vessel movement and aircraft overflights lack the duration and intensity to cause hearing loss. Aircraft overflights have the potential to affect surface waters and, therefore, to expose fish occupying those upper portions of the water column to sound and general disturbance, which could potentially result in short-term behavioral or physiological responses. Consequently, the impacts of underwater sound on fish would likely include behavioral changes and auditory masking (ICF Jones and Stokes and Illingworth and Rodkin, Inc., 2012). The extent to which fish react varies among species, their life stage, and with other environmental conditions. In general, these impacts would be short-term and minimal.

Behavioral

Behavioral changes could result from overhead aircraft flights. The current guideline for establishing a behavioral impact to fish is 150 dB re 1 µPa, which would be surpassed near the surface and, in certain circumstances, at shallow depths (<164.0 feet) below the surface, as explained above. 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. 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).

The majority of fish species exposed to non-impulsive sources would likely have no reaction or mild behavioral reactions. Overall, long-term impacts for individual fish are unlikely in most cases because acoustic exposures are of short duration (tens of seconds), intermittent, and unlikely to repeat over short periods.

Auditory Masking

Auditory 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.

Any noise (i.e., unwanted or irrelevant sound, often of an anthropogenic nature) detectable by a fish can prevent the fish from hearing biologically important sounds including those produced by prey or predators (Myrberg, 1980; Popper et al., 2003). Auditory 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 frequency of the sound is an important consideration for masking for fish because many marine fish are limited to detection of the particle motion component of low frequency sounds at relatively high sound intensities (Amoser and Ladich, 2005). The frequency of the acoustic stimuli must first be compared to the animal's known or suspected hearing sensitivity to establish if the animal can potentially detect the sound.

Based on this information, the Proposed Action has the potential to affect green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio, canary rockfish, yelloweye rockfish, and bull trout, but those impacts to fish species would be "insignificant" in ESA terms in that they would not rise to the level of take. Therefore, the Proposed Action may affect, but is not likely to adversely affect, the ESA-listed fish species.

Marine Mammals

Seeing and hearing the aircraft during operations could result in stress and displacement/avoidance by marine mammals in the study area, which, in turn, could take time and effort from important daily activities such as resting or foraging. Increased stress can affect the health of adults and/or their young, as can disruptions of daily activities, which may increase energy expenditure, decrease energy (i.e., food) intake, and decrease resting opportunities. Existing research has not reported hearing loss or other bodily injury occurring as a direct result of aircraft overflights (Born et al., 1999; Efroymson et al., 2000).

Several studies have investigated marine mammal responses to aircraft disturbances. These studies and the Proposed Action's potential impacts on marine mammals, which are all protected by the MMPA, are discussed separately for pinnipeds (seals and sea lions), cetaceans (whales, dolphins, and porpoises), and federal threatened and endangered species below.

Pinnipeds

In Greenland, hauled-out ringed seals (*Pusa hispida*) escaped the ice into the water 6 percent and 49 percent of the time in response to fixed-wing airplanes and helicopters, respectively, flying at about 500 feet AGL (Born et al., 1999). For fixed-winged airplanes, ringed seals escaped the ice into the water about 21 percent of the time when the aircraft was about 330 feet away and 6 percent of the time when the aircraft was about 1,000 feet away. For helicopters, the seals escaped the ice into the water about 79 percent of the time when the helicopter was 330 feet to 1,640 feet away and about 30 percent of the time when the helicopter was more than 1,640 feet away. Born et al. (1999) suggested that the risk of scaring ringed seals could be substantially reduced if fixed-wing planes and helicopters avoided approaching them at distances closer than 1,640 feet and 5,000 feet, respectively. It should be noted that this study was conducted in an area where ambient noise levels were very low and the seals were not believed to have very much experience with human-made disturbances. Thus, the ringed seals in this study may have been less habituated to these disturbances and more susceptible to escaping the ice into the water.

Harbor seals are the primary marine mammal known to haul-out on the southeastern shores of Whidbey Island on Kalamut and the study area (NAS Whidbey Island, 2012; Jefferies 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; Jefferies 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 non-military readiness activities as "any act that disturbs or is likely to disturb a marine mammal by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering" (16 U.S.C. 1362[18][A]). In 2004, the MMPA was amended to include a separate definition of "harassment" for military readiness activities. For military readiness activities, the threshold for finding Level B harassment is higher: specifically, the act must disturb or be likely to disturb these same behavior patterns 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). Therefore, it is unlikely that the Proposed Action would result in injury or "harassment" of these animals as defined under the MMPA amendment for military readiness activities.

The number of operations at the NAS Whidbey Island complex would increase by 47 percent under Alternative 1 and by 46 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 increase would be similar under all three alternatives because the increase in air operations is 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. Thus, increasing operations more heavily at Ault Field would increase the potential for pinniped disturbances near that location, while reducing the potential near OLF Coupeville. The reverse is true if operations are increased more heavily at OLF Coupeville.

Unlike ringed seals in Greenland (Born et al., 1999), harbor seals in the area of potential aircraft disturbance are already 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, 2012) 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. Therefore, Alternatives 1 through 3 are not expected to have significant impacts on pinnipeds, either through behavioral disturbance or injury resulting from military readiness activities. Consequently, the Navy has determined that the Proposed Action under each of the three alternatives would not result in reasonably foreseeable "takes" of pinnipeds by harassment, injury, or mortality as defined under the MMPA.

Cetaceans

There are a number of studies on cetaceans but few on species that occur in the study area.

Patenaude et al. (2002) found that bowhead whales (*Balaena mysticetus*) and beluga whales (*Delphinapterus leucasto*) 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.

Near the Hawaiian Islands, 12 percent of all sperm whale (*Physeter microcephalus*) groups observed reacted to passing fixed-wing aircrafts by diving hastily (Smultea et al., 2008). Of the groups that reacted, all were within 1,180 feet lateral distance from the aircraft. However, only about 38 percent of all groups sighted within 1,180 feet reacted. A group also closed flanks to protect a calf when they were circled for a period of about 9 minutes (Smultea et al., 2008).

It is important to note that bowhead whales, beluga whales, and sperm whales do not occur in the study area. However, the responses described above in these more recent studies on cetaceans (Patenaude et al., 2002; Smultea et al., 2008) are similar to those reported in older studies on species that occur in the study area (i.e., gray whales and minke whales).

The Navy assumes an area of potential aircraft disturbance of 1,200 feet AGL for all cetaceans in the study area because it conservatively estimates the aircraft response threshold for all the cetacean species evaluated by Efroymson et al. (2000), Patenaude et al. (2002), and Smultea et al. (2008). Under the Proposed Action, the cetacean area of potential aircraft disturbance includes Deception Pass, Dugualla Bay, Penn Cove, Admiralty Bay, and nearshore waters west of Ault Field.

The number of operations at the NAS Whidbey Island complex would increase by 47 percent under Alternative 1 and by 46 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 increase would be similar under all three alternatives because the increase in air operations is 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. Thus, increasing operations more heavily at Ault Field would increase the potential for cetacean disturbances near that location, while reducing the potential near OLF Coupeville. The reverse is true if operations are increased more heavily at OLF Coupeville.

As described above, studies have shown that the majority of individual cetaceans did not respond to overflights even when the aircraft was closer than the identified thresholds (Patenaude et al., 2002; Smultea et al., 2008). Whales in Alaska (Patenaude et al., 2002) and Hawaii (Smultea et al., 2008) 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. Consequently, the Navy has determined that each of the three action alternatives would not result in reasonably foreseeable “takes” of

cetaceans (whales, dolphins, and porpoises; see Table 3.8-5) by harassment, injury, or mortality as defined under the MMPA.

Federal Threatened and Endangered Marine Species

Fish

As discussed above, the Proposed Action has the potential to affect green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio, canary rockfish, yelloweye rockfish, Dolly Varden, and bull trout, but those impacts to fish species would be "insignificant" in ESA terms in that they would not rise to the level of take. Therefore, the Proposed Action may affect, but is not likely to adversely affect, the ESA-listed fish species.

Humpback Whale and Southern Resident Killer Whale

There are no aircraft disturbance data or studies for the ESA-listed humpback whale and Southern Resident killer whale. As described, marine mammals exposed to low-altitude fixed-wing aircraft overflights could exhibit a short-term behavioral response, but not to the extent where natural behavioral patterns would be abandoned or significantly altered. 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. Fixed-wing aircraft overflights may affect ESA-listed marine mammals. This same disturbance is not expected to result in Level A or Level B harassment as defined by the MMPA. In accordance with NEPA, fixed-wing aircraft overflights over territorial waters would have no significant impact on marine mammals. Furthermore, cetaceans, including humpback whales and Southern Resident killer whales in the project area, are presumably habituated to the existing, long-term high levels of disturbances.

Based on this information, the Proposed Action has the potential to affect humpback whales and Southern Resident killer whales, but those impacts would be "insignificant" in ESA terms in that they would not rise to the level of take. Therefore, the Proposed Action may affect, but is not likely to adversely affect, the ESA-listed humpback whale or Southern Resident killer whale.

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 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 action alternatives. Differences would be due 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 action alternative because the increase in operations under each of the three action 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 under the Proposed Action would have no impact on marine habitats. Construction noise would not have any impacts on marine species.

- While the Proposed Action would result in either a 46-percent or a 47-percent increase in aircraft operations at the NAS Whidbey Island complex over the No Action Alternative, it would not produce notable increases in maximum or average annual noise levels. Furthermore, terrestrial and marine wildlife in the study area are already exposed to a high level of long-term aircraft operations and other human-made disturbances and have presumably habituated. Therefore, visual and noise disturbances from increased aircraft operations under the Proposed Action would not significantly impact terrestrial and marine wildlife.
- The NAS Whidbey Island complex reports a proportionally small number of aircraft-wildlife strikes annually (27.9 strikes/year between 2005 and 2015) relative to the high number of aircraft operations flown (89,000 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 military readiness activities, including aircraft operations, DoD installations are exempt from "take" of migratory birds, unless the activities may result in a significant adverse effect at the population level. The Proposed Action's increase in aircraft operations would not have a significant impact on MBTA-protected species at the population level. During construction, impacts on MBTA-protected species would be largely avoided and minimized and, therefore, would not rise to the level of "take."
- The Navy will be consulting with USFWS on the Proposed Action's effects on marbled murrelets.
- 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, canary 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, canary rockfish, and yelloweye rockfish. In 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, canary rockfish, and yelloweye rockfish.
- 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 will consult with NMFS regarding the effects determination for Southern Resident killer whales and humpback whales under the ESA. Pursuant to the MMPA, including the 2004 military readiness amendment, no take of marine mammals is anticipated.

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 approximately 2.1 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

Groundwater

New construction under each of the action 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 fuel or other chemicals could be spilled during construction, implementation of BMPs, 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.

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 action 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.

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 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.

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 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.

Wetlands

Each of the three action 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 surface waters, would minimize runoff into nearby wetlands.

Floodplains

No construction would occur within Federal Emergency Management Agency-mapped floodplains under any of the three action 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.

Marine Waters and Sediments

The projected increase in new impervious surfaces under each action 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 for surface waters.

Water Resources Conclusion

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 action 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 approximately 2 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 action 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 action 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 to moderate impacts on the local and regional population, housing market, and local government finances.

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 Socioeconomics, 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 Socioeconomics Potential Impacts, Alternatives 1 through 3

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 4,475 personnel under Alternative 1 to a high of 4,768 personnel under Alternative 2. These personnel numbers would correspond to an increase of between 371 and 664 personnel under 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, 1,574 military personnel and dependents would move into the region compared to the No Action Alternative level. The majority of these new residents (1,207 residents) would likely live in Island County. The remaining personnel and dependents are expected to live in Skagit County (200 residents) and other communities (167 residents). This increase in population would amount to an increase of approximately 1.5 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 786 military personnel and dependents under Alternative 1; 1,407 military personnel and dependents under Alternative 2; and 799 military personnel and dependents under Alternative 3 are expected to reside in the two counties. 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	633	116	655	138	633	116
Enlisted	3,587	3,842	255	4,113	526	3,848	261
Military Personnel Total	4,104	4,475	371	4,768	664	4,481	377
Military Dependents[1]	5,627	6,136	509	6,537	910	6,144	517
Total Military and Dependents	9,731	10,611	880	11,305	1,574	10,625	894

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	371	664	377
Military Dependents	509	910	517
Total Population Change[2]	**880**	**1,574**	**894**
Island County Impacts			
Number of Military Personnel and Dependents Expected to Reside in Island County	674	1,207	685
Island County's 2020 Projected Population	82,735	82,735	82,735
Total Population Change as a Percentage of Island County's 2013 Population	**0.8%**	**1.5%**	**0.8%**
Skagit County Impacts			
Number of Military Personnel and Dependents Expected to Reside in Skagit County	112	200	114
Skagit County's 2013 Population	128,249	128,249	128,249
Total Population Change as a Percentage of Skagit County's 2013 Population	**0.1%**	**0.2%**	**0.1%**

Source: Washington State Office of Financial Management, 2012

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.

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.

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 action 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: Form DD 1391; 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.

Long-term Employee Earnings and Spending Impacts

As described above, direct Navy employment at NAS Whidbey Island would expand by an additional 371 to 664 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 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 $14.3 million under Alternatives 1 and 3 to $23.5 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	371	$14,300,000
Alternative 2	664	$23,500,000
Alternative 3	377	$14,300,000

Socioeconomics Summary

Implementation of Alternatives 1 through 3 would 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.

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 1,495 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). For the purposes of this analysis, it has been assumed that all additional personnel would be required to seek accommodations in the private sector.

The relatively small 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 only a minor impact on the overall housing market in the two counties under all three alternatives. Implementation

of the proposed alternatives would result in 371 personnel, 664 personnel, and 377 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 371 and 664 additional housing units would be required under the three alternatives.

In 2015, a housing study completed for the NAS Whidbey Island complex found that there was a surplus of 591 acceptable family housing units in the area. In addition, in the communities located directly around the NAS Whidbey Island complex, a total of 2,545 housing units were vacant in 2013. These communities included Oak Harbor (850 vacant units), Coupeville (76 vacant units), Anacortes (670 vacant units), and Mount Vernon (949 vacant units) and counted both owner-occupied and rental-occupied housing (USCB, n.d.[e]). Therefore, if this number of units is still available in 2021, with the possible exception of Alternative 2, the local housing market should be able to accommodate the influx of households to the region with a moderate impact on the supply of housing in the region. However, if recent real estate market trends continue and fewer housing units are offered for sale or lease, Navy personnel may find it more difficult to acquire or lease housing.

Property Values

Aircraft noise could affect the value of property under 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. 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.

Local Government Revenues and Expenditures

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 $421,000 and Skagit County by $239,000.

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	674	1,207	685
Per Capita Tax Contribution	$349	$349	$349
Estimated Increase in Tax Revenues	$235,000	$421,000	$239,000
Skagit County Impacts			
Number of Military Personnel and Dependents Expected to Reside in Skagit County	112	200	114
Per Capita Tax Contribution	$525	$525	$525
Estimated Increase in Tax Revenues	$59,000	$105,000	$60,000

Note:
[1] All population impacts are calculated for 2021, the time when all transition activities have been completed.

Community Services Impacts

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	371	664	377
Total Military-connected Children (ages 0 to 22 residing with Navy personnel)	318	568	323
Total Military School-aged Children (ages 5 to 18)	191	341	195
Oak Harbor School District	135	242	138
Coupeville School District	11	20	11
Anacortes School District	15	26	15
All Other Districts	30	53	31

Source: DoD, n.d.

Note: Totals may not sum due to rounding.

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 135 and 242 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 242 students could relocate to the district, including 153 elementary students (grades Kindergarten through 5); 45 middle school students (grades 6 through 8); and 44 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	135	242	138
Elementary School (K-5th)	85	153	87
Middle School (6th-8th)	25	45	26
High School (9th-12th)	25	44	25

Source: DoD, n.d.

Note: Totals may not sum due to rounding.

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 is planned for FY 17 that would improve flow and access to care throughout the hospital (Rose, 2016).

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 action 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.

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 2014, the Oak Harbor Fire Department responded to 68 calls for assistance due to fires and 546 calls for assistance due to emergency medical service (EMS)/rescue incidents, while serving a city population of an estimated 22,178 residents (Oak Harbor Fire Department, 2015). 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 1,028 residents and the Town of Coupeville by 39 residents. Assuming that these ratios of incidents to population remain constant, implementation of Alternative 2 could potentially result in an additional three fire calls and 72 EMS/rescue calls per year for the Oak Harbor Fire Department and no fire calls and only one 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.

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 not expected to change as a result of the projected influx of residents associated with the proposed relocation. The Town of Coupeville currently has approximately 2.5 police officers per 1,000 residents. Under Alternative 2 (the maximum population impact), this ratio would decline slightly to 2.4 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.

Conclusion

The Proposed Action would have negligible to minor to moderate impacts on the local and regional population, housing market, and local government finances. The action alternatives would have 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. 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. 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

No disproportionately high and adverse human health or environmental effects to minority or low-income populations are expected to occur under any of the alternatives/scenarios.

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 and high adverse impacts under the No Action Alternative; Section 4.11.2, identifying environmental justice communities and identifying disproportionately high and adverse impacts under Alternatives 1 through 3.

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 new and existing APZs and Ault Field and OLF Coupeville. Additionally, the majority of the Oak Harbor School District falls within the greater than 65 dB DNL noise contours.

Identifying Environmental Justice Communities

In order to assess the impacts to minority and low-income communities, the Navy must first identify 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 are 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 are 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. Minority populations of concern (environmental justice communities) are identified where the minority population of the affected area exceeds 50 percent or the minority population percentage of the affected area is "meaningfully greater" than the minority population percentage in the general population or other comparison group. For the purposes of this environmental justice analysis, "meaningfully greater" has been 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 are

defined as census block groups where the percentage of the population considered to be low income is greater than (or equal to) 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 38 persons) reside in Skagit County. Additionally, Island County has a smaller percentage of minority, Hispanic or Latino, 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. 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. 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. A 5.4-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, 2012).

Demographic characteristics of the corresponding census block groups were then compared to the total affected population number to estimate the total minority, Hispanic or Latino, 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 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.

Tables 4.11-2 through 4.11-11 (see Section 4.11.2) present estimates of the affected minority, Hispanic or Latino, 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.

4.11.1 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 5.4-percent increase in total population in Island County between 2010 and 2020.

4.11.2 Environmental Justice, Alternatives 1 through 3

4.11.2.1 Environmental Justice Potential Impacts

As indicated above, Tables 4.11-3 through 4.11-11 present estimates of the affected minority, Hispanic or Latino, 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 or Hispanic/Latino 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 4.11-1 Minority, Hispanic or Latino, and Low-Income Populations in Census Block Groups Underlying Ault Field and OLF Coupevile dB DNL Contours* for All Alternatives and Scenarios, Average Year

Census Block Group	*Total Population*[1]	*Percent Population Total Minority*[2]	*Percent Population Hispanic or Latino*[3]	*Percent Population Below Poverty Level*[4]
Island County	***78,506***	***13.9%***	***5.5%***	***8.0%***
Block Group 1, Census Tract 9701	1,102	16.5%**	4.3%	14.1%
Block Group 2, Census Tract 9701	1,502	11.3%	3.5%	14.1%
Block Group 1, Census Tract 9702	1,633	27.9%	12.8%	23.4%
Block Group 1, Census Tract 9703	791	20.7%	9.4%	4.4%
Block Group 2, Census Tract 9703	1,203	10.4%	8.5%	4.4%
Block Group 3, Census Tract 9703	1,044	11.0%	4.4%	4.4%
Block Group 1, Census Tract 9704	951	30.5%	14.2%	8.6%
Block Group 2, Census Tract 9704	2,256	27.2%	8.5%	8.6%
Block Group 1, Census Tract 9706.01	1,299	36.1%	9.9%	11.2%
Block Group 2, Census Tract 9706.01	981	27.8%	6.6%	11.2%
Block Group 3, Census Tract 9706.01	906	30.7%	11.9%	11.2%
Block Group 1, Census Tract 9707	1,111	23.5%	9.3%	9.5%
Block Group 1, Census Tract 9708	1,484	22.0%	6.7%	8.7%
Block Group 1, Census Tract 9710	1,470	10.1%	4.7%	6.3%
Block Group 1, Census Tract 9711	2,019	11.2%	7.3%	2.9%
Block Group 2, Census Tract 9711	1,270	6.1%	2.4%	2.9%
Block Group 3, Census Tract 9713	1,762	4.3%	3.5%	6.8%
Skagit County	***116,901***	***16.6%***	***16.9%***	***11.7%***
Block Group 1, Census Tract 9403	1,174	4.4%	3.4%	6.2%
Block Group 1, Census Tract 9408	2,278	31.0%	2.2%	18.2%
Block Group 2, Census Tract 9521	658	10.3%	10.0%	9.1%
Block Group 3, Census Tract 9527	906	10.6%	12.9%	7.3%

Table 4.11-1 Minority, Hispanic or Latino, and Low-Income Populations in Census Block Groups Underlying Ault Field and OLF Coupevile dB DNL Contours* for All Alternatives and Scenarios, Average Year

Census Block Group	*Total Population*[1]	*Percent Population Total Minority*[2]	*Percent Population Hispanic or Latino*[3]	*Percent Population Below Poverty Level*[4]

Sources: USCB 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

[3] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

[4] 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 (or equal to) 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.

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 Hispanic or Latino Origin[2]*	*Percent Hispanic or Latino Origin*	*Total Low Income Population[3]*	*Percent Low-Income*
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population[4]* **	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**

Sources: USCB 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

[2] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

[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 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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-3 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 Hispanic or Latino Origin*[2]	*Percent Hispanic or Latino Origin*	*Total Low Income Population*[3]	*Percent Low-Income*
No Action Alternative							
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**
Alternative 1A							
65-70 dB DNL	4,250	898	21.1%**	325	7.6%	346	8.1%
70-75 dB DNL	2,967	549	18.5%	218	7.3%	208	7.0%
75+ dB DNL	5,574	730	13.1%	346	6.2%	386	6.9%
Total Affected Population	**12,791**	**2,177**	**17.0%**	**889**	**7.0%**	**940**	**7.3%**
Population Change from No Action Alternative							
65-70 dB DNL	375	112	-	40	-	54	-
70-75 dB DNL	-198	-63	-	-36	-	-14	-
75+ dB DNL	1,581	126	-	76	-	46	-
Population Change from No Action Alternative[4***]	**1,758**	**175**	**10.0%**	**80**	**4.6%**	**86**	**4.9%**

Sources: USCB 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

2 Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

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 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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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 in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-4 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 Hispanic or Latino Origin*[2]	*Percent Hispanic or Latino Origin*	*Total Low Income Population*[3]	*Percent Low-Income*
No Action Alternative							
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**
Alternative 1B							
65-70 dB DNL	4,289	958	22.3%**	330	7.7%	359	8.4%
70-75 dB DNL	3,515	656	18.7%	261	7.4%	239	6.8%
75+ dB DNL	5,495	777	14.1%	358	6.5%	407	7.4%
Total Affected Population	**13,299**	**2,391**	**18.0%**	**949**	**7.1%**	**1,005**	**7.6%**
Population Change from No Action Alternative							
65-70 dB DNL	414	172	-	45	-	67	-
70-75 dB DNL	350	44	-	7	-	17	-
75+ dB DNL	1,502	173	-	88	-	67	-
Population Change from No Action Alternative[4]***	**2,266**	**389**	**17.2%**	**140**	**6.2%**	**151**	**6.7%**

Sources: USCB, 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

[2] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

[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.

[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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

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 C, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population[1]*	*Percent Minority*	*Total Hispanic or Latino Origin[2]*	*Percent Hispanic or Latino Origin*	*Total Low Income Population[3]*	*Percent Low-Income*
No Action Alternative							
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**
Alternative 1C							
65-70 dB DNL	5,095	1,093	21.5%**	382	7.5%	399	7.8%
70-75 dB DNL	3,424	645	18.8%	259	7.6%	232	6.8%
75+ dB DNL	5,028	781	15.5%	343	6.8%	417	8.3%
Total Affected Population	**13,547**	**2,519**	**18.6%**	**984**	**7.3%**	**1,048**	**7.7%**
Population Change from No Action Alternative							
65-70 dB DNL	1,220	307	-	97	-	107	-
70-75 dB DNL	259	33	-	5	-	10	-
75+ dB DNL	1,035	177	-	73	-	77	-
Population Change from No Action Alternative[4]* **	**2,514**	**517**	**20.6%**	**175**	**7.0%**	**194**	**7.7%**

Sources: USCB 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

[2] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

[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.

[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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-6 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 Hispanic or Latino Origin*[2]	*Percent Hispanic or Latino Origin*	*Total Low Income Population*[3]	*Percent Low-Income*
No Action Alternative							
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**
Alternative 2A							
65-70 dB DNL	4,209	892	21.2%**	323	7.7%	342	8.1%
70-75 dB DNL	3,003	547	18.2%	219	7.3%	208	6.9%
75+ dB DNL	5,472	720	13.2%	340	6.2%	382	7.0%
Total Affected Population	**12,684**	**2,159**	**17.0%**	**882**	**7.0%**	**932**	**7.3%**
Population Change from No Action Alternative							
65-70 dB DNL	334	106	-	38	-	50	-
70-75 dB DNL	-162	-65	-	-35	-	-14	-
75+ dB DNL	1,479	116	-	70	-	42	-
Population Change from No Action Alternative[4]***	**1,651**	**157**	**9.5%**	**73**	**4.4%**	**78**	**4.7%**

Sources: USCB 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

2 Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

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 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.

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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-7 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 Hispanic or Latino Origin*[2]	*Percent Hispanic or Latino Origin*	*Total Low Income Population*[3]	*Percent Low-Income*
No Action Alternative							
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**
Alternative 2B							
65-70 dB DNL	4,255	948	22.3%**	327	7.7%	355	8.3%
70-75 dB DNL	3,545	657	18.5%	263	7.4%	239	6.7%
75+ dB DNL	5,378	764	14.2%	352	6.5%	402	7.5%
Total Affected Population	**13,178**	**2,369**	**18.0%**	**942**	**7.1%**	**996**	**7.6%**
Population Change from No Action Alternative							
65-70 dB DNL	380	162	-	42	-	63	-
70-75 dB DNL	380	45	-	9	-	17	-
75+ dB DNL	1,385	160	-	82	-	62	-
Population Change from No Action Alternative[4]***	**2,145**	**367**	**17.1%**	**133**	**6.2%**	**142**	**6.6%**

Sources: USCB, 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

[2] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

[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.

[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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-8 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 Hispanic or Latino Origin*[2]	*Percent Hispanic or Latino Origin*	*Total Low Income Population*[3]	*Percent Low-Income*
No Action Alternative							
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**
Alternative 2C							
65-70 dB DNL	5,063	1,071	21.2%**	377	7.4%	391	7.7%
70-75 dB DNL	3,414	647	19.0%	260	7.6%	232	6.8%
75+ dB DNL	4,853	746	15.4%	329	6.8%	405	8.3%
Total Affected Population	**13,330**	**2,464**	**18.5%**	**966**	**7.2%**	**1,028**	**7.7%**
Population Change from No Action Alternative							
65-70 dB DNL	1,188	285	-	92	-	99	-
70-75 dB DNL	249	35	-	6	-	10	-
75+ dB DNL	860	142	-	59	-	65	-
Population Change from No Action Alternative[4]***	**2,297**	**462**	**20.1%**	**157**	**6.8%**	**174**	**7.6%**

Sources: USCB 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

[2] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

[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. 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.

[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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

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 3, Scenario A, Average Year

*dB DNL Contours**	*Total Affected Population*	*Total Minority Population*[1]	*Percent Minority*	*Total Hispanic or Latino Origin*[2]	*Percent Hispanic or Latino Origin*	*Total Low Income Population*[3]	*Percent Low-Income*
No Action Alternative							
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**
Alternative 3A							
65-70 dB DNL	4,231	895	21.2%**	324	7.7%	345	8.2%
70-75 dB DNL	2,983	546	18.3%	218	7.3%	207	6.9%
75+ dB DNL	5,502	722	13.1%	342	6.2%	383	7.0%
Total Affected Population	**12,716**	**2,163**	**17.0%**	**884**	**7.0%**	**935**	**7.4%**
Population Change from No Action Alternative							
65-70 dB DNL	356	109	-	39	-	53	-
70-75 dB DNL	-182	-66	-	-36	-	-15	-
75+ dB DNL	1,509	118	-	72	-	43	-
Population Change from No Action Alternative[4]***	**1,683**	**161**	**9.6%**	**75**	**4.5%**	**81**	**4.8%**

Sources: USCB 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

[2] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

[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 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.

[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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-10 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 Hispanic or Latino Origin[2]*	*Percent Hispanic or Latino Origin*	*Total Low Income Population[3]*	*Percent Low-Income*
No Action Alternative							
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**
Alternative 3B							
65-70 dB DNL	4,273	950	22.2%**	328	7.7%	357	8.4%
70-75 dB DNL	3,526	656	18.6%	262	7.4%	239	6.8%
75+ dB DNL	5,427	766	14.1%	354	6.5%	403	7.4%
Total Affected Population	**13,226**	**2,372**	**17.9%**	**944**	**7.1%**	**999**	**7.6%**
Population Change from No Action Alternative							
65-70 dB DNL	398	164	-	43	-	65	-
70-75 dB DNL	361	44	-	8	-	17	-
75+ dB DNL	1,434	162	-	84	-	63	-
Population Change from No Action Alternative[4]* **	**2,193**	**370**	**16.9%**	**135**	**6.2%**	**145**	**6.6%**

Sources: USCB, 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

[2] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

[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 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.

[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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

Key:
dB DNL = day-night average sound level in decibels

Table 4.11-11 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 Hispanic or Latino Origin[2]*	*Percent Hispanic or Latino Origin*	*Total Low Income Population[3]*	*Percent Low-Income*
No Action Alternative							
65-70 dB DNL	3,875	786	20.3%	285	7.4%	292	7.5%
70-75 dB DNL	3,165	612	19.3%	254	8.0%	222	7.0%
75+ dB DNL	3,993	604	15.1%	270	6.8%	340	8.5%
Total Affected Population	**11,033**	**2,002**	**18.1%**	**809**	**7.3%**	**854**	**7.7%**
Alternative 3C							
65-70 dB DNL	5,033	1,066	21.2%**	375	7.5%	389	7.7%
70-75 dB DNL	3,431	649	18.9%	260	7.6%	233	6.8%
75+ dB DNL	4,861	744	15.3%	329	6.8%	404	8.3%
Total Affected Population	**13,325**	**2,459**	**18.5%**	**964**	**7.2%**	**1,026**	**7.7%**
Population Change from No Action Alternative							
65-70 dB DNL	1,158	280	-	90	-	97	-
70-75 dB DNL	266	37	-	6	-	11	-
75+ dB DNL	868	140	-	59	-	64	-
Population Change from No Action Alternative[4]* **	**2,292**	**457**	**19.9%**	**155**	**6.8%**	**172**	**7.5%**

Sources: USCB, 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

[2] Hispanic or Latino population is defined as individuals who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

[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 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.

[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 shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

Key:
dB DNL = day-night average sound level in decibels

Identifying Disproportionately High and Adverse Impacts

Methodology

Once the presence or absence of environmental justice communities is determined, the Navy then must assess the impacts from the Proposed Action and determine whether these impacts would have a disproportionately high and adverse effect on these populations. This analysis involves 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 exist, the Navy also considers 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 the Report of the Federal Interagency Working Group on Environmental Justice and NEPA Committee, *Promising Practices for EJ Methodologies in NEPA Reviews* (March 2016), 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 to the general population or appropriate comparison groups.

The Report from the Federal Interagency Working Group on Environmental Justice and NEPA (March 2016) also provides guidance for determining whether the impacts to minority or low-income populations may be disproportionately high and adverse. 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, an 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.

Analysis for Identifying Disproportionately High and Adverse Impacts

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 disproportionately impact 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 disproportionately impact the previously identified environmental justice communities.

The Navy considered whether there may be other education-related impacts that had the potential to disproportionately impact environmental justice communities and concluded that overcrowding and

noise impacts would be equally felt across the affected area. The Navy identified that environmental justice communities 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.

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 disproportionately affect 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 through 4.11-11, 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 disproportionately affected. 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 17 percent to 23 percent for identified minority populations and approximately 7 percent to 8 percent for identified Hispanic or Latino and 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 action alternative and the No Action Alternative of each environmental justice community was analyzed. For this analysis, the estimates of the affected minority, Hispanic or Latino, 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 through 4.11-11 and are summarized on Table 4.11-12. See Appendix F for detailed tables showing the effects of the high-tempo FCLP year conditions; summary conclusions are included on Table 4.11-12. This calculation allows the Navy to determine the minority and/or low-income populations impacted by each alternative and scenario.

Table 4.11-12 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

	Population Change from No Action Alternative			
*Geographical Area***	*Total Affected Population****	*Percent Minorities*	*Percent Hispanic or Latino*	*Percent Low Income*
Island County	78,506	13.9%	5.5%	8.0%
Alternative 1A				
Average Year	1,758	10.0%	4.6%	4.9%
High-tempo FCLP Year	1,443	4.8%	3.3%	3.7%
Alternative 1B				
Average Year	2,266	17.2%	6.2%	6.7%
High-tempo FCLP Year	1,906	14.8%	5.6%	6.1%
Alternative 1C				
Average Year	13,547	20.6%	7.0%	7.7%
High-tempo FCLP Year	2,202	19.5%	6.6%	7.5%
Alternative 2A				
Average Year	1,651	9.5%	4.4%	4.7%
High-tempo FCLP Year*	1,199	1.9%	2.6%	2.9%
Alternative 2B				
Average Year	2,145	17.1%	6.2%	6.6%
High-tempo FCLP Year	1,843	15.0%	5.6%	6.2%
Alternative 2C				
Average Year	2,297	20.1%	6.8%	7.6%
High-tempo FCLP Year	1,961	18.3%	6.3%	7.2%
Alternative 3A				
Average Year	1,683	9.6%	4.5%	4.8%
High-tempo FCLP Year	1,389	4.2%	3.2%	3.6%
Alternative 3B				
Average Year	2,193	16.9%	6.2%	6.6%
High-tempo FCLP Year	1,897	14.4%	5.5%	6.0%
Alternative 3C				
Average Year	2,292	19.9%	6.8%	7.5%
High-tempo FCLP Year	1,873	18.0%	6.2%	7.1%

Table 4.11-12 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

	Population Change from No Action Alternative			
*Geographical Area***	*Total Affected Population****	*Percent Minorities*	*Percent Hispanic or Latino*	*Percent Low Income*

Sources: USCB,2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

Notes:

* In total, the Alternative 2, Scenario A, high-tempo FCLP year is expected to affect 146 fewer minority residents, 24 fewer Hispanic/Latino residents, and 21 fewer low-income residents than are currently impacted by the No Action Alternative.

** 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.

*** All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4-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, 2012).

Key:
FCLP = field carrier landing practice

The tables show that the net change in environmental justice communities within the dB DNL noise contours under the nine alternatives/scenarios ranges from 9.5 percent to 20.6 percent. This means that 9.5 percent to 20.6 percent of the residents within the greater than 65 dB DNL noise contour are calculated to be a minority (and 74.9 percent to 90.5 percent are calculated to be a non-minority). In a similar calculation, 4.7 percent to 7.7 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 92.3 percent to 95.3 percent are calculated to be not in the low-income population), and 4.6 percent to 7.0 percent are calculated to be Hispanic/Latino (and 93 percent to 95.4 percent are calculated to be not Hispanic/Latino).

Under the high-tempo FCLP year, 1.9 percent to 19.5 percent of the population residing under the dB DNL contours are calculated to be minority (79.5 percent to 98.2 percent are calculated to be non-minority), 2.9 percent to 7.5 percent to be part of the low-income population (92.5 percent to 97.1 percent are calculated to be not in the low-income population), and 2.6 percent to 6.6 percent to be Hispanic/Latino (93.4 percent to 97.4 percent are calculated to be not Hispanic/Latino) (see Appendix F).

When analyzing data provided on Tables 4.11-2 through 4.11-11, 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 C), approximately 20.6 percent of this population change are minority residents. At the same time, 25.2 percent of all residents living in the 65 to 70 dB DNL contours are minorities,

while only 17.1 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. 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 are not disproportionately impacted 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 determines that although there are significant impacts to noise levels on populations living within the dB DNL noise contours from the alternatives/scenarios, these impacts do not disproportionately impact environmental justice communities.

Potential Increased Risk of Aircraft Mishaps in 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 an increase in the risk of a mishap (see Section 4.3.1.1). Accident Potential Zones (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.

It is not expected that the APZs 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 and APZs at Ault Field).

A potential environmental justice issue could be raised if environmental justice communities were concentrated in higher-risk areas, such as 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 APZs at Ault Field and OLF Coupeville. All APZs identified in Section 4.3 (2005 AICUZ APZs at Ault Field, 2005 AICUZ Clear Zones at OLF Coupeville, and Conceptual APZs Option 1 and 2 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 APZs was applied to the population of that census block to estimate the population within the APZ boundary. A 5.4-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, 2012).

Demographic characteristics of the corresponding census block groups were then applied to this total affected population number to estimate the total minority, Hispanic or Latino, and low-income populations impacted by each APZ. These calculations assume an even distribution of the population

across the census block groups, and they exclude populations on military properties within the APZs. Table 4.11-13 presents estimates of the affected minority, Hispanic or Latino, and low-income populations under each APZ.

Table 4.11-13 Environmental Justice Populations at NAS Whidbey Island Complex under APZs for Ault Field and OLF Coupeville

APZ	*Total Affected Population**	*Total Minority Population[1]*	*Percent Minority*	*Total Hispanic or Latino Origin[2]*	*Percent Hispanic or Latino Origin*	*Total Low Income Population[3]*	*Percent Low-Income*
Ault Field Existing APZs	1,830	406	22.2%**	190	10.4%	226	12.4%
OLF Coupeville Existing APZs[4]	95	7	7.5%	4	3.8%	3	2.9%
OLF Coupeville Conceptual APZs – Option 1[5]	666	70	10.5%	43	6.5%	21	3.1%
OLF Coupeville Conceptual APZs – Option 2[6]	1,324	121	9.2%	66	5.0%	49	3.7%

Sources: USCB 2012a, 2012b, 2012c, 2012d, n.d.[a], n.d.[b], n.d.[c]

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.

2 Hispanic or Latino population is defined as individual(s) who self-identify as belonging to this ethnic group in U.S. Census surveys. This population definition is based on ethnicity and not race.

3 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.

4 Under Alternative 1, Scenario C; Alternative 2, Scenario C; and Alternative 3, Scenario C no new APZs would be required at OLF Coupeville. There would be no change in the APZs at Ault Field compared to existing conditions.

5 Under Alternative 1, Scenario B; Alternative 2, Scenario C; and Alternative 3, Scenario C OLF Coupeville Conceptual APZs – Option 1 would be required. There would be no change in APZs at Ault Field compared to existing conditions.

6 Under Alternative 1, Scenario A; Alternative 2, Scenario A; and Alternative 3, Scenario A OLF Coupeville Conceptual APZs – Option 2 would be required. There would be no change in APZs at Ault Field compared to existing conditions..

* All population estimates for areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 5.4 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, 2012).

** The shaded cells indicate the alternatives/scenarios that contain percentages of minority or Hispanic/Latino populations that are "meaningfully greater" than 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.

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. Official APZs are established through the AICUZ study process and would depend on the alternative selected. If APZs are created, they could influence

future land use decisions by the community and may have a minor impact on the land under the APZs (see Section 4.5).

The Navy has determined there are environmental justice communities living within the 2005 AICUZ APZs at Ault Field (see Table 4.11-13). Additionally, as shown in Table 4.11-13 and described in detail in Section 4.3.1, the increase in airfield operations at Ault Field under all of the action alternatives/ scenarios would not result in a change to the existing APZs 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 APZs.

The Navy has determined there are no environmental justice communities living within the 2005 AICUZ APZs at OLF Coupeville or within the Conceptual APZ Option 2 at OLF Coupeville. There is a Hispanic/Latino population within the Conceptual APZ Option 1 at OLF Coupeville.

Under Scenario C for all action 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 for all action 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 APZs.

Under Scenarios A and B for all action 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 Scenario B, Conceptual APZ Option 1 may be warranted, and under Scenario A, Conceptual APZ Options 1 and 2 may be warranted. Official APZs are established through the AICUZ study process and would depend on the alternative selected. There would be an increase in the number of operations at OLF Coupeville under Scenarios A and B for all action alternatives and, therefore, an increase in risk for mishap, and there would be a minor impact on the land use under the conceptual APZs for these two scenarios.

This EIS has determined that there is not a significant increase in risk associated with the increase in aircraft operations under the action 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 (DoD Instruction 6055.07, Mishap Notification, Investigation, Reporting, and Record Keeping) (DoD, 2011).

In addition, there are no identified POIs such as schools or churches where communities congregate within the APZs surrounding Ault Field (see Figure 3.3-2) or OLF Coupeville (see Figures 4.3-1 and 4.3-2).

Therefore, the Navy has determined that although there are environmental justice communities within the APZs and risk associated with aircraft mishaps is expected to increase within the areas surrounding both Ault Field and OLF Coupeville, implementation of the Proposed action is not expected to disproportionately impact environmental justice communities.

Environmental Justice Conclusion

The Navy has concluded that although 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), these impacts do not disproportionately impact environmental justice communities.

Although the Navy has determined there to be no disproportionately high or adverse impacts on environmental justice 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 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 would be limited to peak hours during the day.

No significant increase in use of transit, pedestrian, and bicycle facilities since majority of new traffic will 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 volumes and levels 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 3.0 percent in Island County and 5.4 percent in Skagit County would apply based on medium county population projections (Washington State Office of Financial Management, 2012), 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 (American Fact Finder, 2014). 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 (Navy, 2005b).
    - It was assumed that no new Navy personnel under the action 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 operational scenario; therefore, traffic impacts under a given alternative would be the same under each operational 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 action alternative would not result in significant impacts to transportation.

4.12.2.1 Transportation Potential Impacts

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.

Off-base Operations, Trip Generation

The Proposed Action would generate between 171 and 2,321 new trips per weekday under Alternative 1, 306 to 4,154 new trips per weekday under Alternative 2, and 174 to 2,359 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 south of Swantown Road in Oak Harbor and would range from 16 percent under Alternative 1 to 29 percent under Alternative 3.

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***	193	346	197	0
SR 20	Under I-5	193	346	197	0
SR 20	East of Pulver Road to West of March Point Road	205	367	209	0
SR 20	East of SR 20 Spur to South of SR 20 Spur	286	512	291	0
SR 20	North of Rosario Drive to South of Rosario Drive	224	400	227	0
SR 20	North of Banta Road to South of Frostad Road	227	407	231	0
SR 20	North of Regatta Drive to South of Swantown Road	2,321	4,154	2,359	0
SR 20	North of Sidney Street to South of Libbey Road	215	384	218	0
SR 20	West of Main Street to East of Main Street	213	381	216	0
SR 20/ SR 525	West of Bayview Road to Clinton Ferry Doc	171	306	174	0

Note: Based on percentage of personnel stationed and employed at NAS Whidbey Island by place of residence (Navy, 2005b), ITE Trip Generation Manual 9th Edition (ITE, 2012), and Housing Unit Type (American Fact Finder, 2014); 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.

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.

Off-base Operations, Level of Service

The majority of road segments studied would not experience a change in LOS under the action alternatives compared to the affected environment or the No Action Alternative. SR 20 south of Swantown Road would experience degradation in LOS compared to both the affected environment and the No Action Alternative. SR 20 South of Swantown Road currently operates at LOS C and would operate at LOS C under the No Action Alternative. Under Alternatives 1, 2, and 3, this road segment would drop to LOS D; however, the road segment would still operate at a level higher than the LOS standard of LOS E. SR 20 north of Goldie Street currently operates at LOS C but would degrade to LOS D under Alternatives 1, 2, 3, and the No Action Alterative. However, SR 20 north of Goldie Street would still operate above the LOS standard of E. No road segments along SR 20, SR 525, and I-5 under the Proposed Action (any of the action alternatives) would fail to operate at or better than LOS standards.

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	69,000	C	72,900	C	73,100	C	72,900	C	72,700	C
North of SR 20	D	54,000	B	57,100	B	57,300	B	57,100	B	56,900	B
Road: State Route 20 (SR 20)											
Municipality: Burlington											
Under I-5	D	23,000	B	24,400	B	24,600	B	24,400	B	24,200	B
Municipality: Skagit County											
East of Pulver Rd	D	23,000	B	24,400	B	24,600	B	24,500	B	24,200	B
East of Avon Allen Rd	D	24,000	B	25,500	B	25,700	B	25,500	B	25,300	B
West of Avon Allen Rd	D	22,000	B	23,400	B	23,600	B	23,400	B	23,200	B
East of SR 536	D	21,000	B	22,300	B	22,500	B	22,300	B	22,100	B
West of SR 536	D	31,000	B	32,900	B	33,000	B	32,900	B	32,700	B
East of LaConner Whitney Rd	D	31,000	B	32,900	B	33,000	B	32,900	B	32,700	B
West of LaConner Whitney Rd	D	31,000	B	32,900	B	33,000	B	32,900	B	32,700	B
East of March Point Rd	D	31,000	B	32,900	B	33,000	B	32,900	B	32,700	B
West of March Point Rd	D	31,000	B	32,900	B	33,000	B	32,900	B	32,700	B
Road enters Anacortes											
North of Rosario Dr	D	14,000	D	15,000	D	15,200	D	15,000	D	14,800	D
South of Rosario Dr	D	16,000	D	17,100	D	17,300	D	17,100	D	16,900	D
Road enters Island County											
Municipality: Anacortes											
East of SR 20 Spur	D	31,000	B	33,000	B	33,200	B	33,000	B	32,700	B
South of SR 20 Spur	D	16,000	D	17,200	D	17,400	D	17,200	D	16,900	D
Municipality: Island County											
North of Banta Rd	D	17,000	D	17,700	D	17,900	D	17,700	D	17,500	D
North of Frostad Rd	D	17,000	D	17,700	D	17,900	D	17,700	D	17,500	D
South of Frostad Rd	D	18,000	D	18,800	D	18,900	D	18,800	D	18,500	D
Road enters Oak Harbor											
North of Sidney St	D	11,000	C	11,500	C	11,700	C	11,500	C	11,300	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 Rd	D	11,000	C	11,500	C	11,700	C	11,500	C	11,300	C
Road enters Coupeville											
East of Quail Trail Lane	D	8,000	B	8,400	B	8,500	B	8,400	B	8,200	B
North of SR 525 and Race Rd	D	6,600	B	7,000	B	7,100	B	7,000	B	6,800	B
West of SR 525 and Race Rd	D	1,100	B	1,300	B	1,400	B	1,300	B	1,100	B
Municipality: Oak Harbor											
North of Regatta Dr	E	17,000	D	19,800	D	21,700	D	19,900	D	17,500	D
North of Case Rd	E	17,000	D	19,800	D	21,700	D	19,900	D	17,500	D
North of Goldie St	E	15,000	C	17,800	D	19,600	D	17,800	D	15,500	D
South of SE Midway Blvd	E	17,000	C	19,800	C	21,700	C	19,900	C	17,500	C
North of SE Sixth Ave	E	21,000	C	24,000	C	25,800	C	24,000	C	21,600	C
South of SE Sixth Ave	E	21,000	C	24,000	C	25,800	C	24,000	C	21,600	C
North of SE Barrington Ave	E	20,000	C	22,900	C	24,800	C	23,000	C	20,600	C
North of SE Pioneer Way	E	16,000	C	18,800	C	20,600	C	18,800	C	16,500	C
West of Beeksma Dr	E	18,000	C	20,900	C	22,700	C	20,900	C	18,500	C
North of Swantown Rd	E	21,000	C	24,000	C	25,800	C	24,000	C	21,600	C
South of Swantown Rd	E	14,000	C	16,700	D	18,600	D	16,800	D	14,400	C
Municipality: Coupeville											
West of Main St	D	9,900	C	10,400	C	10,600	C	10,400	C	10,200	C
East of Main St	D	7,900	B	8,300	B	8,500	B	8,400	B	8,100	B
State Route 525 (SR 525)											
Municipality: Island County											
South of SR 20	D	7,000	B	7,400	B	7,500	B	7,400	B	7,200	B
North of Ellwood Dr	D	6,600	B	7,000	B	7,100	B	7,000	B	6,800	B
Road enters Freeland											
West of Bayview Rd	D	12,000	C	12,500	C	12,700	C	12,500	C	12,400	C
West of Maxwelton Rd	D	11,000	C	11,500	C	11,600	C	11,500	C	11,300	C
East of Maxwelton Rd	D	9,700	C	10,200	C	10,300	C	10,200	C	10,000	C
West of Campbell Rd	D	9,000	C	9,400	C	9,600	C	9,400	C	9,300	C
East of Cedar Vista Dr	D	9,000	C	9,400	C	9,600	C	9,400	C	9,300	C

Table 4.12-2 NAS Whidbey Island Projected Average Daily Traffic and Level of Service

		Affected Environment		Alternative 1		Alternative 2		Alternative 3		No Action	
Location	**LOS Standard**	**ADT**	**LOS**	**ADT**	**LOS**	**ADT**	**LOS**	**ADT**	**LOS**	**ADT**	**LOS**
West of Humphrey Rd	D	8,400	C	8,800	C	9,000	C	8,800	C	8,700	C
East of Humphrey Rd	D	7,000	C	7,400	C	7,500	C	7,400	C	7,200	C
At Clinton Ferry Dock	D	5,900	C	6,200	C	6,400	C	6,300	C	6,100	C
Municipality: Freeland											
West of Honeymoon Bay Rd	D	6,500	B	6,900	B	7,000	B	6,900	B	6,700	B
East of Honeymoon Bay Rd	D	11,000	C	11,500	C	11,600	C	11,500	C	11,300	C
West of Fish Rd	D	13,000	C	13,600	C	13,700	C	13,600	C	13,400	C

Sources: ADT (WSDOT, 2014); 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 [TRB], 2010), Appendix D; ADT is rounded to nearest 100. In addition, a 3.0-percent (Island County) and 5.4-percent (Skagit County) growth factor was applied to the 2014 Washington State Department of Transportation traffic counts to account for population changes between 2014 and 2020 based on median forecasted population projections during that period (Washington State Office of Financial Management, 2012)

Key:
ADT = average daily traffic
LOS = level of service
SR = State Route

County and local roads would be expected to see some increase in traffic volumes. LOS was not determined for these roads 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. 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 227 vehicles (Alternative 1) to 407 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; however, the Island County 6-year Transportation Improvement Program indicates a traffic signal will be installed at this intersection by 2021 (Island County, 2016b). 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 the addition of a traffic signal 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, 2014a). 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. 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).

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to transportation.

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 action alternatives, gates at Ault field could see an increase of between 700 and 1,300 daily trips (approximately 3 percent to 8 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.

Transit, Pedestrian, and Bicycle Facilities

Use of transit, pedestrian, and bicycle facilities would be expected to increase under any of the action 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.

Therefore, implementation of the Proposed Action under any of alternatives would not result in significant impacts to transportation.

Conclusion

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 (Navy, 2005b). 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 509 (Alternative 1) to 910 (Alternative 2). As discussed in Section 4.10, sufficient housing stock exists in the study area, and new households are expected to occupy currently vacant housing within the study area. 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 Infrastructure Potential Impacts

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, 2015a; NAVFAC, 2015a; 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 104,000 (Alternative 1) to 186,000 (Alternative 2) gallons per day would be needed to support 371 to 664 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	263	73,600	14.1%
Anacortes	291	81,500	0.3%
Skagit PUD	19	5,300	0.0%
Unincorporated[1]	61	17,100	n/a
Study Area	371	103,900	n/a
Alternative 2			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	470	131,600	25.2%
Anacortes	521	145,900	0.6%
Skagit PUD	34	9,500	0.1%
Unincorporated	110	30,800	n/a
Study Area	664	185,900	n/a
Alternative 3			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	267	74,800	14.3%
Anacortes	296	82,900	0.3%
Skagit PUD	19	5,300	0.0%
Unincorporated	62	17,400	n/a
Study Area	377	105,600	n/a

Source: Nelson, 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 14 percent (Alternative 1) to 25 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 mgd, andAnacortes has water rights for, and the ability to expand, to 55 mgd (City of Anacortes, 2011, 2015a). Therefore, implementation of the Proposed Action under any of the action 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.

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	1,920,000	4,500,000	2,580,000
Mount Vernon	4,000,000	16,500,000	12,500,000

Sources: USEPA, 2008; Carollo Engineers, 2013; City of Oak Harbor, 2015b, 2015c; City of Anacortes, 2015b; 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 94,000 to 168,000 gallons per day would be produced by 371 to 664 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	263	66,200	2.9%
Anacortes	28	7,100	0.3%
Mount Vernon	19	4,800	0.0%
Unincorporated	61	15,400	n/a
Study Area	371	93,500	n/a
Alternative 2			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	470	118,500	5.2%
Anacortes	50	12,700	0.5%
Mount Vernon	34	8,500	0.1%
Unincorporated	110	27,700	n/a
Study Area	664	167,300	n/a
Alternative 3			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	267	67,300	2.9%
Anacortes	29	7,200	0.3%
Mount Vernon	19	4,900	0.0%
Unincorporated	62	15,600	n/a
Study Area	377	95,000	n/a

Source: Nelson, 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

Stormwater Impacts

The Proposed Action would result in an increase in total impervious surface area at Ault Field. Specifically, approximately 2.1 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 approximately 2.1 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. As discussed in Section 4.10.2, sufficient existing housing is expected to be available to accommodate the new households under the Proposed Action. Therefore, no new housing is expected to be built that would increase impervious surface area and impact existing stormwater systems. 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.

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 3,900 and 6,900 pounds of solid waste daily. Approximately 1,300 to 2,400 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 action 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	3,900	1,300
Alternative 2	6,900	2,400
Alternative 3	3,900	1,300
No Action	0	0

Source: USEPA, 2015d

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.

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 action 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 1.5 million kWh to 2.8 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 27,800 million British thermal units to 50,000 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	371	1,539,600	27,750
Alternative 2	664	2,755,400	49,670
Alternative 3	377	1,564,500	28,200
No Action	0	0	0

Source: EIA, 2013

Note: Assumed daily household consumption of 12.57 MWh 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 EO 13693 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, 2015). Washington State has produced over 114 million MWh, with retail sales of only 92 MWh (EIA, 2015). 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 BTUs) and demand of just over 4 million therms in 2021 (CNG, 2011). Projected natural gas consumption under any of the action 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.

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 action 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.

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. Approximately 55,500 square feet (Alternatives 1 and 3) to 93,000 square feet (Alternative 2) of new facilities would be constructed (see Section 2.3.2.4 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.

Infrastructure Conclusion

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 action 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.

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.

4.14.1 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 approximately 2 acres of new impervious surface at NAS Whidbey Island.

4.14.2.1 Geological Resources Potential Impacts

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.

Geology Impacts

Under each of the three action 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.

Seismic Activity Impacts

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.

Soils Impacts

Under each of the three action alternatives, impacts to soils during construction could include compaction and rutting from vehicle traffic and an increase in erosion. Up to approximately 2 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, 2012). Revegetation techniques would include replanting disturbed areas with native plants.

Therefore, implementation of each of the three action alternatives would not result in significant impacts on soils.

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 approximately 2 acres of new impervious surfaces would result from construction activities; however, implementation of each of the three action 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 action 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 U.S. Navy regulation 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.

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 action 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 methodology for evaluating contaminated sites (Defense Environmental Remediation Program [DERP] 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, and no proposed construction activities under any of the alternatives would occur within or in proximity to any DERP sites 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.

In June 2016, the Navy issued a policy that it intends to remove, dispose, and replace legacy aqueous film forming foam that contains perfluorooctane sulfonate and/or perfluorooctanoic acid. Future operations at Ault Field and OLF Coupeville would not result in release of legacy aqueous film forming foam into the environment once it is removed and replaced. The Navy continues to assemble information concerning potential historical perfluorinated compounds at Ault Field and OLF Coupeville. The Navy is developing a preliminary assessment for perfluorinated compounds to identify areas where historical releases of perfluorooctane sulfonate and/or perfluorooctanoic acid may be impacting drinking water sources and ensure that no one is drinking water with levels of perfluorooctane sulfonate and/or perfluorooctanoic acid greater than the recommended level set by the USEPA in May 2016.

Therefore, implementation of any of the action alternatives would not result in significant impacts to hazardous materials and wastes.

Hazardous Materials and Wastes Conclusion

Hazardous materials and wastes would increase in quantity but would be managed under existing law and U.S. Navy regulation 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

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 and 20 percent of FCLPs at Ault Field, would result in the greater increase in GHG emissions.

GHG emissions from the Proposed Action should not have a significant impact on Washington's GHG emission goals.

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. CEQ recommends agencies use the projected GHG emissions and also, when appropriate, potential changes in carbon sequestration and storage as the proxy for assessing a Proposed Action's potential climate change impacts. In order to provide the decision maker and public with a frame of reference, the CEQ recommends agencies incorporate by reference applicable agency emissions targets, such as GHG emissions reductions, to make it clear whether the emissions being discussed are consistent with such goals (including applicable state, regional, and local goals) (CEQ, 2016).

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.

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 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, 2016f)

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.[g]).

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.[k]).

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.[i]).

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.[j]).

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.[h]).

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 carbon dioxide 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.[l]).

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 aircraft 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, 2014b) and CEQ guidance (CEQ 2016), the following section quantifies the estimated GHG emissions that would be generated in executing the Proposed Action.

4.16.2.1 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 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 hangers, 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 371 personnel at the NAS Whidbey Island complex. Alternative 1 represents the largest increase in aircraft operations of the three alternatives. The three 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. 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 1,808 metric tons (MT) of carbon dioxide equivalent (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 three different scenarios.

Site-wide stationary source GHG emissions would increase by 1 percent, and site-wide mobile GHG emissions associated with the Proposed Action would increase by 39 percent to 57 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 (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 42.5 Million MT CO_2e between 1990 and 2012 (refer to Table 3.16-1 in Section 3.16), annual aircraft GHG emissions decreased from 9.1 to 8.0 Million MT CO_2e over the same period (Washington State Department of Ecology, 2016). 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.

Table 4.16-1 NAS Whidbey Island Complex Annual GHG Emissions, Alternative 1

Emission Source	CO_2e Emissions (Metric tpy) No Action	Alt 1A	Alt 1B	Alt 1C
Stationary Sources				
Site-wide Total GHG Emissions (2014 Reported)	11,371			
New Electricity Building Use (Indirect)	0	53	53	53
New Natural Gas Building Use (Direct)	0	83	83	83
Total Change in Stationary CO_2 Emissions		136	136	136
% increase in Stationary CO_2 Emissions		1%	1%	1%
Mobile Sources				
Aircraft Operations	90,431	146,302	137,145	128,473
Personnel Commute Emissions	9,091	9,912	9,912	9,912
Total Action-related Mobile CO_2 Emissions	99,521	156,214	147,057	138,385
Change in Mobile CO_2 Emissions		56,693	47,536	38,864
% increase in Mobile CO_2 Emissions		57%	49%	39%
Total Change in Emissions (Stationary and Mobile)		56,829	47,672	39,000
2012 Total CO_2 from Transportation in Washington State[1]		42,500,000		
Change in Mobile Emissions as % of Total 2012 Transportation CO_2e Emissions in Washington State		0.13%	0.11%	0.09%
2012 Total CO_2e from Aircraft in Washington State[1]		8,000,000		
Change in Aircraft Emissions as % of Total 2012 Aircraft CO_2e Emissions in Washington State		0.71%	0.59%	0.49%

Note:
[1] Washington State Department of Ecology, 2016: GHG Inventory 1990-2012 http://www.ecy.wa.gov/climatechange/docs/2012GHGtable.pdf

Key:
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
tpy = tons per year

4.16.2.3 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 more construction of new buildings than Alternative 1, 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 664 personnel at the NAS Whidbey Island complex. The three 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 4.4-6, construction activities would generate approximately 2,451 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 three different scenarios.

Table 4.16-2 NAS Whidbey Island Complex Annual GHG Emissions, Alternative 2

	CO_2e Emissions (Metric tpy)			
Emission Source	*No Action*	*Alt 1A*	*Alt 1B*	*Alt 1C*
Stationary Sources				
Site-wide Total GHG Emissions (2014 Reported)	11,371			
New Electricity Building Use (Indirect)	0	122	122	122
New Natural Gas Building Use (Direct)	0	188	188	188
Total Change in Stationary CO_2 Emissions		310	310	310
% increase in Stationary CO_2 Emissions		3%	3%	3%
Mobile Sources				
Aircraft Operations	90,431	146,108	137,270	128,794
Personnel Commute Emissions	9,091	10,561	10,561	10,561
Total Action Related Mobile CO_2 Emissions	99,521	156,669	147,832	139,356
Change in Mobile CO_2 Emissions		57,148	48,310	39,835
% increase in Mobile CO_2 Emissions		58%	49%	40%
Total Change in Emissions (Stationary and Mobile)		57,447	48,609	40,134
2012 Total CO_2 from Transportation in Washington State[1]		42,500,000		
Change in Mobile Emissions as % of Total 2012 Transportation CO_2e Emissions in Washington State		0.13%	0.11%	0.9%
2012 Total CO_2e from Aircraft in Washington State[1]		8,000,000		
Change in Aircraft Emissions as % of Total 2012 Aircraft CO_2e Emissions in Washington State		0.71%	0.60%	0.50%

Note:
[1] Washington State Department of Ecology, 2016: GHG Inventory 1990-2012 http://www.ecy.wa.gov/climatechange/docs/2012GHGtable.pdf.

Key:
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
tpy = tons per year

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 41 percent to 58 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 42.5 Million MT CO_2e between 1990 and 2012 (refer to Table 3.16-1 in Section 3.16), annual aircraft GHG emissions decreased from 9.1 to 8.0 Million MT CO_2e over the same period (Washington State Department of Ecology, 2016). 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 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 less construction than Alternative 2, including 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 337 personnel at the NAS Whidbey Island complex. The three 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 4.4-11, construction activities would generate approximately 1,808 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 three different scenarios.

Site-wide stationary source GHG emissions would increase by 1 percent, and site-wide mobile GHG emissions associated with the Proposed Action would increase by 40 percent to 57 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 1A	Alt 1B	Alt 1C
Stationary Sources				
Site-wide Total GHG Emissions (2014 Reported)	11,371			
New Electricity Building Use (Indirect)	0	58	58	58
New Natural Gas Building Use (Direct)	0	91	91	91
Total Change in Stationary CO_2 Emissions		149	149	149
% increase in Stationary CO_2 Emissions		1%	1%	1%
Mobile Sources				
Aircraft Operations	90,431	145,840	137,510	128,596
Personnel Commute Emissions	9,091	9,926	9,926	9,926
Total Action Related Mobile CO_2 Emissions	99,521	155,766	147,436	138,522
Change in Mobile CO_2 Emissions		56,245	47,915	39,001
% increase in Mobile CO_2 Emissions		57%	48%	39%
Total Change in Emissions (Stationary and Mobile)		56,381	48,051	39,137
2012 Total CO_2e from all sources in Washington State[1]		92,000,000		
Change in Emissions (Stationary and Mobile) as % of Total 2012 CO_2e Emissions in Washington State		0.06%	0.05%	0.04%
2012 Total CO_2e from Aircraft in Washington State[1]		8,000,000		
Change in Aircraft Emissions as % of Total 2012 Aircraft CO_2e Emissions in Washington State		0.70%	0.60%	0.49%

Note:
[1] Washington State Department of Ecology, 2016: GHG Inventory 1990-2012 http://www.ecy.wa.gov/climatechange/docs/2012GHGtable.pdf.

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 42.5 Million MT CO_2e between 1990 and 2012, annual aircraft GHG emissions decreased from 9.1 to 8.0 Million MT CO_2e (Washington State Department of Ecology, 2016) 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

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 (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.

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 42.5 Million MT CO_2e between 1990 and 2012 (Refer to Table 3.16-1 in Section 3.16), annual aircraft GHG emissions decreased from 9.1 to 8.0 Million MT CO_2e over the same period (Washington State Department of Ecology, 2016). 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.

GHG emissions would also be higher under the high-tempo FCLP year conditions across all three action alternatives (see Table 4.16-4 and Appendix B for details). High-tempo FCLP conditions would produce 6 to 7 percent more GHG emissions under Alternative 2 compared to the average conditions, and 4-6 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 Criteria Pollutant and GHG Emissions, All Alternatives

Alternative/Scenario	Average Operations	High-Tempo Operations	Percent Difference
	MT CO_2e		
Alternative 1			
Scenario A	56,829	60,138	6%
Scenario B	47,672	50,137	5%
Scenario C	39,000	40,624	4%
Alternative 2			
Scenario A	57,447	61,434	7%
Scenario B	48,609	51,595	6%
Scenario C	40,134	42,349	6%
Alternative 3			
Scenario A	56,381	59,748	6%
Scenario B	48,051	50,380	5%
Scenario C	39,137	40,766	4%

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 MT CO_2e and were down to 11,371 MT CO_2e in 2014 (see Table 3.16-2). NAS Whidbey Island will continue to work toward the achievement of 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, the Department of the 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.

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, U.S.C. §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 = United States Department of Defense
GHG = greenhouse gas

The Department of 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 will sail a carrier strike group composed of nuclear ships, hybrid electric ships running on biofuel, and aircraft flying on biofuel by 2016.
- 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).

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.

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 mitigation measures for the implementation of action alternatives but does identify measures that could be taken to develop suggested mitigation techniques, including, but not limited to, stormwater retention practices. As the NEPA process continues, mitigation measures may be developed and altered based on comments received during public and regulatory agency review of the EIS. If mitigation measures were identified during this process, they would be identified in the FEIS or Record of Decision. 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*
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		
	Increase in annual operations:		
	• 12,300 at Ault Field • 29,000 at OLF Coupeville Approximately 41,300 annual operations increase for the NAS Whidbey Island complex (47-percent increase over the No Action Alternative)	• 25,400 at Ault Field • 15,800at– OLF Coupeville Approximately, 41,200 annual operations increase for the NAS Whidbey Island complex (47-percent increase over the No Action Alternative)	• 38,700 at Ault Field • 2,700 at OLF Coupeville Approximately 41,400 annual operations increase for the NAS Whidbey Island complex (47-percent increase over the No Action Alternative)
Action Alternative 2	The Navy would add 36 additional Growler aircraft		
	Increase in annual operations:		
	• 13,000 at Ault Field • 27,500 at OLF Coupeville Approximately 40,500 total annual operations increase for the NAS Whidbey Island complex (46-percent increase over the No Action Alternative)	• 25,600 at Ault Field • 14,900 at OLF Coupeville Approximately 40,500 total annual operations increase for the NAS Whidbey Island complex (46-percent increase over the No Action Alternative)	• 38,200 at Ault Field • 2,300 at OLF Coupeville Approximately 40,500 total annual operations increase for the NAS Whidbey Island complex (46-percent increase over the No Action Alternative)

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*
Action Alternative 3	The Navy would add 36 additional Growler Aircraft.		
	Increase in annual operations:		
	• 12,800 at Ault Field • 27,400 at OLF Coupeville Approximately 40,200 total annual operations increase for the NAS Whidbey Island complex (46 percent increase over the No Action Alternative)	• 25,300 at Ault Field • 14,800 at OLF Coupeville Approximately 40,100 total annual operations increase for the NAS Whidbey Island complex (46 percent increase over the No Action Alternative)	• 37,900 at Ault Field • 2,200 at OLF Coupeville Approximately 40,100 total annual operations increase for the NAS Whidbey Island complex (46 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 8,717 people at Ault Field and 2,316 people at OLF Coupeville, for a total of 11,033.		
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	442 people, Ault Field 1,316 people, OLF Coupeville Total increase of 1,758	1,327 people, Ault Field 939 people, OLF Coupeville Total increase of 2,266	1,979 people, Ault Field 535 people, OLF Coupeville Total increase of 2,514
Action Alternative 2	395 people, Ault Field 1,256 people, OLF Coupeville Total increase of 1,651	1,261 people, Ault Field 884 people, OLF Coupeville Total increase of 2,145	1,785 people, Ault Field 512 people, OLF Coupeville Total increase of 2,297
Action Alternative 3	399 people, Ault Field 1,284 people, OLF Coupeville Total increase of 1,683	1,272 people, Ault Field 921 people, OLF Coupeville Total increase of 2,193	1,766 people, Ault Field 526 people, OLF Coupeville Total increase of 2,292
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 up to 30 points of interest (POIs). The following supplemental noise metrics were analyzed: single-event noise levels, indoor speech interference, classroom/learning interference, sleep disturbance; potential noise effects on recreation 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.		

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*
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 increases the risk of an incident; however, current risk management strategies in place at NAS Whidbey Island minimize these risks. Therefore there is no significant impact on flight safety.		
Action Alternative 2	Impacts are similar to those depicted under Alternative 1.		
Action Alternative 3	Impacts are 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 is no significant impact on BASH.		
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.		
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.		
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.
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.
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.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*
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: 2,680 – Average Year and 2,916 – 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	426 – Average Year 301 – High-tempo FCLP Year	473 – Average Year 376 – High-tempo FCLP Year	597 – Average Year 691 – High-tempo FCLP Year
Action Alternative 2	470 – Average Year 18 – High-tempo FCLP Year	536 – Average Year 408 – High-tempo FCLP Year	451 – Average Year 185 – High-tempo FCLP Year
Action Alternative 3	430 – Average Year 173 – High-tempo FCLP Year	471 – Average Year 350 – High-tempo FCLP Year	678 – Average Year 478 – 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 larger in magnitude but like in type to those depicted under Alternative 1. They are also higher in magnitude over Alternative 3. These impacts would be minor and temporary and would not result in any significant impacts.		
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 are larger in magnitude but like in type to those depicted under Alternative 1. They are also higher in magnitude over Alternative 3.		
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*
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	Operational mobile emissions would be like in type (such as Ault Field Growler aircraft, OLF Coupeville Growler aircraft, in-frame maintenance operations, and personal operating vehicles) and magnitude for all Alternatives under Scenario A, and higher compared to Scenarios B and C for all Alternatives. Changes in mobile operational emissions may impact compliance with National Ambient Air Quality Standards under all Alternatives and Scenarios.	Mobile emissions are smaller in magnitude but like in type to those depicted under Alternative 1, Scenario A.	Mobile emissions are like slightly smaller in magnitude and type to those depicted under Alternative 1, Scenario A, and also smaller than Alternative 1, Scenario B.
Action Alternative 2	Mobile emissions are larger in magnitude, but like in type, to those depicted under Alternative 1, Scenario A.	Mobile emissions are larger in magnitude, but like in type, to those depicted under Alternative 1, Scenario B, but smaller than Alternative 2, Scenario A.	Mobile emissions are larger in magnitude, but like in type, to those depicted under Alternative 1, Scenario C, but smaller than Alternative 2 Scenario B.
Action Alternative 3	Mobile emissions are larger in magnitude, but like in type, to those depicted under Alternative 1, Scenario A.	Mobile emissions are larger in magnitude, but like in type, to those depicted under Alternative 1, Scenario B, but smaller than Alternative 3, Scenario A.	Mobile emissions are larger in magnitude, but like in type, to those depicted under Alternative 1, Scenario C, but smaller than Alternative 3, Scenario B.
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*
Increase in residential land use within the greater than 65 dB DNL noise contour as compared to the No Action Alternative:			
Action Alternative 1	8 percent (Ault Field) 48 percent (OLF Coupeville)	12 percent (Ault Field) 42 percent (OLF Coupeville)	17 percent (Ault Field) 28 percent (OLF Coupeville)
Action Alternative 2	7 percent (Ault Field) 47 percent (OLF Coupeville)	11 percent (Ault Field) 41 percent (OLF Coupeville)	16 percent (Ault Field) 26 percent (OLF Coupeville)
Action Alternative 3	7 percent (Ault Field) 48 percent (OLF Coupeville)	12 percent (Ault Field) 42 percent (OLF Coupeville)	16 percent (Ault Field) 27 percent (OLF Coupeville)
Conceptual APZs at OLF Coupeville would impact:			
Action Alternative 1	1,301 acres of residential land use, if developed.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.
Action Alternative 2	1,301 acres of residential land use, if developed.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.
Action Alternative 3	1,301 acres of residential land use, if developed.	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	Due to increased noise exposure from Growler operations, a range of impacts from long-term minor to long-term moderate would be expected at the federal, state, and local recreation areas and parks located within the greater than 65 dB DNL noise contour. Localized significant impacts to recreation at one county park, Driftwood Park, as a result of increased noise exposure. No Congressionally designated wilderness areas or BLM-owned lands with wilderness characteristics in the Study Area.	Impacts similar to those depicted under Alternative 1, Scenario A, except there also would be localized significant impacts on recreation at the Oak Harbor Off-leash Dog Park.	Impacts similar to those depicted under Alternative 1, Scenarios A and B, except there would be no significant impacts on recreation at Driftwood Park.
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.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*
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.
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	Minimal to no impact will result to known or intact archaeological sites within Ault Field during the construction and operation. The Navy is consulting with the Washington State Historic Preservations Officer (SHPO), Advisory Council on Historic Preservation (ACHP), American Indian tribes and nations, and consulting parties regarding 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	Minimal to no direct and indirect impacts are anticipated to occur to on-station historic 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 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	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 OLF Coupeville a lower level of impact

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*
	and C. 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 and C. The Navy is consulting with the Washington SHPO, ACHP, American Indian tribes and nations, and consulting parties regarding architectural resources.		
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.
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.
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 American Indian tribes and nations to the installation. Terrestrial and Marine Resources: There would be no direct 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 Gasses: 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.		
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.		

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*
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 are similar to those depicted under Alternative 1.		
Action Alternative 3	Impacts are 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	Increase in aircraft operations would occur, but since local terrestrial wildlife are already exposed to a high level of long-term air operations and other human-made disturbances, they have presumably habituated to the very high level of noise and visual disturbances at NAS Whidbey Island. Therefore, there would be no significant impacts to terrestrial mammals, fish, and/or reptiles and amphibians with respect to visual and noise disturbances from construction and operation.		
Action Alternative 2	Impacts are similar to those depicted under Alternative 1.		
Action Alternative 3	Impacts are 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	Increase in aircraft operations would occur, but since local bird populations are already exposed to a high level of long-term air operations and other human-made disturbances, they have presumably habituated to the very high level of noise and visual disturbances at NAS Whidbey Island. Therefore, there would be no significant impact on birds with respect to visual and noise disturbances from construction and operation. For military readiness activities, including aircraft operations, DoD installations are exempt from "take" of migratory birds, unless the activities may result in a signification adverse effect at the population level.		
	The potential for aircraft disturbance impacts on Important Bird Areas (IBAs) located in closer proximity to OLF Coupeville would increase with increased aircraft operations, with Scenario A having the highest potential for impacts.	The potential for aircraft disturbance impacts on IBAs would be similar for IBAs in proximity to OLF Coupeville and Ault Field under Scenario B.	The exception that the potential for aircraft disturbance impacts on IBAs located in closer proximity to Ault Field would increase with increased aircraft operations, with Scenario C having the highest potential for impacts.
Action Alternative 2	Impacts are similar to those depicted under Alternative 1, Scenario A.	Impacts are similar to those depicted under Alternative 1, Scenario B.	Impacts are similar to those depicted under Alternative 1, Scenario C.
Action Alternative 3	Impacts are similar to those depicted under Alternative 1, Scenario A.	Impacts are similar to those depicted under Alternative 1, Scenario B.	Impacts are similar to those depicted under Alternative 1, Scenario C.
Aircraft-wildlife Strike 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		

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A *Scenario B* *Scenario C*
	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 are similar to those depicted under Alternative 1.
Action Alternative 3	Impacts are 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 presumably habituated to the very high level of noise and visual disturbances. The Navy has determined that, pursuant to the ESA, the Proposed Action may affect the marbled murrelet. The Navy will consult with the USFWS.
Action Alternative 2	Impacts are similar to those depicted under Alternative 1.
Action Alternative 3	Impacts are 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 presumably habituated to the activity because they 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, so they have presumably habituated to the very high level of noise 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 are similar to those depicted under Alternative 1.
Action Alternative 3	Impacts are similar to those depicted under Alternative 1.
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, Canary 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 such as dolphins and whales are shown to not respond to overflights. In addition, 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 and Southern Resident killer whales, 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 or Southern Resident killer whale. The Proposed Action has the potential to affect green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio, canary rockfish, yelloweye rockfish, and bull trout, but those impacts to fish species 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 above-mentioned fish species.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A *Scenario B* *Scenario C*
Action Alternative 2	Impacts are similar to those depicted under Alternative 1.
Action Alternative 3	Impacts are 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.
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 best management practices.
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 880 people to the region would result in a minor impact.
Action Alternative 2	Net increase of 1,574 people to the region would result in a minor impact.
Action Alternative 3	Net increase of 894 people to the region would result in a minor impact.
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. 371 personnel in the region spending money.
Action Alternative 2	Impacts similar to those depicted under Alternative 1, with the exception of 664 personnel in the region spending money.
Action Alternative 3	Impacts similar to those depicted under Alternative 1, with the exception of 377 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 371 households relocating to the area. Regional housing would be able to handle the increase in demand; therefore, minor impact to housing.
Action Alternative 2	Up to 664 households relocating to the area. Regional housing may not have sufficient vacancies to handle the influx of households. Therefore, there is a moderate impact to housing.
Action Alternative 3	Up to 377 households relocating to the area. Regional housing would be able to handle the increase in demand; therefore, minor impact to housing.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

Scenario A	*Scenario B* *Scenario C*
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 $235,000 and Skagit County by $59,000.
Action Alternative 2	Increase in annual tax receipts in Island County by $421,000 and Skagit County by $105,000.
Action Alternative 3	Increase in annual tax receipts in Island County by $239,000 and Skagit County by $60,000.
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 191 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 341 students projected.
Action Alternative 3	Impacts similar to those depicted under Alternative 1 with the exception of 195 students projected.
Environmental Justice (Environmental justice communities exist, but impacts do not disproportionately impact environmental justice communities.) (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 identified there are minority and low-income populations living within the affected area. Although 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), these impacts do not disproportionately impact environmental justice communities.
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 171 to 2,321 new trips per weekday on major roadways off base. Level of service on State Route (SR) 20 south of Swantown Road would degrade from a level of service C to level of service D; however, it would operate higher than the LOS standard. SR 20 north of Goldie Street currently operates at LOS C but would degrade to LOS D Area of concern at intersection of SR 20 and Banta Road would see an increase of 277 daily trips; however, a traffic signal will be installed by 2021.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

Scenario A	*Scenario B* *Scenario C*
Action Alternative 2	Estimated 306 to 4,154 new trips per weekday on major roadways off base. Level of service on SR 20 south of Swantown Road would degrade from a level of service C to level of service D; however, it would operate higher than the LOS standard. Area of concern at intersection of SR 20 and Banta Road would see an increase of 407 daily trips; however, a traffic signal will be installed by 2021.
Action Alternative 3	Estimated 174 to 2,359 new trips per weekday on major roadways off base. Level of service on SR 20 south of Swantown Road would degrade from a level of service C to level of service D; however, it would operate higher than the LOS standard. Area of concern at intersection of SR 20 and Banta Road would see an increase of 231 daily trips; however, a traffic signal will be installed by 2021.
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 between 700 and 1,300 daily trips (approximately 3 to 8 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	Impacts similar to those depicted under Alternative 1.
Action Alternative 3	Impacts similar to those depicted under Alternative 1.
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 103,900 gallons per day of potable water needed to support 371 additional households in the region and 980 gallons per day to support new facilities.
Action Alternative 2	Approximately 185,900 gallons per day of potable water needed to support 664 additional households in the region and 2,080 gallons per day to support new facilities.
Action Alternative 3	Approximately 105,600 gallons per day of potable water needed to support 377 additional households in the region and 980 gallons per day to support new facilities.
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 93,500 gallons per day of additional wastewater to support 371 additional households in the region and 750 gallons per day to support new facilities.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

Scenario A	*Scenario B* *Scenario C*
Action Alternative 2	Approximately 167,300 gallons per day of additional wastewater to support 664 additional households in the region and 1,840 gallons per day to support new facilities.
Action Alternative 3	Approximately 95,400 gallons per day of potable water needed to support 377 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. Best management practices 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 3,900 pounds of additional solid waste disposed of daily, and 1,300 pounds of additional waste recycled/composted daily.
Action Alternative 2	Approximately 6,900 pounds of additional solid waste disposed of daily, and 2,400 pounds of additional waste recycled/composted daily.
Action Alternative 3	Approximately 3,900 pounds of additional solid waste disposed of daily, and 1,300 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 1,539,600 kilowatt hour (kWh) of electricity per year and 27,750 million British Thermal Units (MMBTU) of additional natural gas needed per year to support 371 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 2,755,400 kWh of electricity per year and 49,670 MMBTU of additional natural gas needed to support 664 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 1,564,500 kWh of electricity per year and 28,200 MMBTU of additional natural gas needed to support 377 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*
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. Best management practices 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 best management practices.
Action Alternative 2	Impacts similar to those depicted under Alternative 1.
Action Alternative 3	Impacts similar to those depicted under Alternative 1.
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 U.S. Navy regulations and management practices; therefore, there would be no significant impact under Alternative 1 (35 aircraft).

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*
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 – 1 percent Mobile – 57 percent	Stationary – 1 percent Mobile – 48 percent	Stationary – 1 percent Mobile – 39 percent
	While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 42.5 Million MT CO_2e, annual aircraft GHG emissions decreased from between 9.1 and 8.0 Million MT CO_2e (Washington State Department of Ecology, 2016).		
Action Alternative 2	Stationary – 3 percent Mobile – 58 percent	Stationary – 3 percent Mobile – 49 percent	Stationary – 3 percent Mobile – 40 percent
Action Alternative 3	Stationary – 1 percent Mobile – 57 percent	Stationary – 1 percent Mobile – 48 percent	Stationary – 1 percent Mobile – 39 percent

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	*Scenario B*	*Scenario C*

Note: This table provides a summary of impacts of the Proposed Action under each alternative and each operational 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
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
MMBTU	=	million British thermal units
NAAQS	=	National Ambient Air Quality Standards
NAS	=	Naval Air Station
OLF	=	Outlying Landing Field
POI	=	Point of Interest
SHPO	=	State Historic Preservation Office
SR	=	State Route

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5 Cumulative Impacts

This section 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 Environmental Impact Statements (EISs), agencies shall 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 U.S. Environmental Protection Agency (USEPA) have published guidance addressing implementation of cumulative impact analyses—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 guidance entitled *Considering Cumulative Impacts Under NEPA* (1997) 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 with respect to the same environmental. 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.

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 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. *It should be noted that this project was not retained for further analysis.*	EA A Finding of No Significant Impact (FONSI) for the EA was signed on October 30, 2012. Action to be completed in 2015
P-8A Multi-Mission Aircraft (MMA) Supplemental EIS (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. *It should be noted that this project was not retained for further analysis.*	EIS/SEIS A ROD for the SEIS was signed in 2014.

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*
Northwest Training Range Complex 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 Northwest Training Range Complex at sea and on shore.	EIS/OEIS A ROD for the EIS/OEIS was signed on October 25, 2010. Action implementation ongoing
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. *It should be noted that this project was not retained for further analysis.*	CATEX 2010 Completed
Present and Reasonably Foreseeable Future Actions		
Environmental Assessment for the Pacific Northwest Electronic Warfare Range	Naval Special Warfare is proposing intermediate to advanced cold-water training in Western Washington State at multiple sites.	EA A FONSI was signed on August 28, 2014.
Environmental Assessment (EA) for the OLF Security Barrier	The Navy is proposing the installation of security blocks on the perimeter of OLF Coupeville.	EA To be determined (TBD)
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 To be determined
Northwest Training and Testing Final EIS/OEIS	The Navy proposes to conduct military readiness training and testing activities in the Northwest Training and Testing 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 United States.	EIS/OEIS The Final EIS/OEIS was published in October 2015 To be determined
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 FONSI was signed on July 14, 2016.

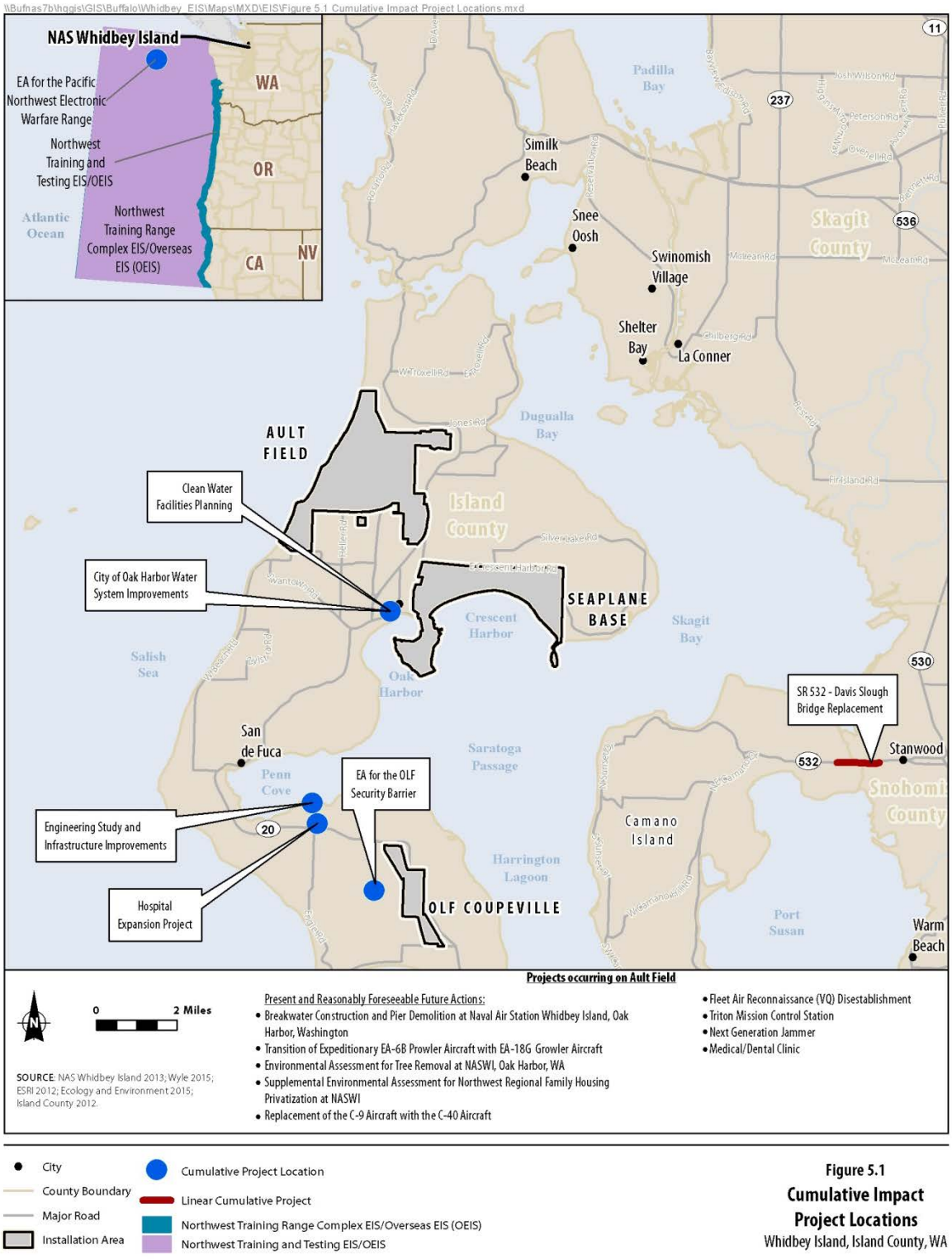
Table 5-1 Other Actions Considered for Potential Cumulative Impacts Associated with the Proposed Action for the NAS Whidbey Island Complex

Action	*Summary of Action*	*NEPA Analysis Completed/Timeframe*
Supplemental Environmental Assessment (SEA) for Northwest Regional Family Housing Privatization at NAS Whidbey Island	The Proposed Action includes the demolition of the nine farmhouses at NAS Whidbey Island.	SEA To be determined
Fleet Air Reconnaissance (VQ) Disestablishment	The DoD has directed the Navy to disestablish the Fleet Air Reconnaissance (VQ) mission capabilities at NAS Whidbey Island by 2020.	2020
Triton Mission Control Station	This project would construct an approximately 30,000-square-foot Broad Area Maritime Surveillance (BAMS) facility to provide space and communications for two mission control stations that would control BAMS aircraft that fly from a remote location.	Analyzed in P-8A Multi-Mission Aircraft (MMA) EIS 2008 Construction anticipated in Fiscal Year 2017 (FY 17)
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.	Level of NEPA, TBD Construction anticipated in FY 19
Medical/Dental Clinic	The Defense Health Administration (DHA) 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.	EA Construction anticipated in FY 21
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.
SR 532 - Davis Slough Bridge Replacement		None; non-federal action Construction from August 2014-Spring 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*
Whidbey General Hospital 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 Whidbey General Hospital.	None; non-federal action Ongoing; anticipated completion date unknown
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
Clean Water Facilities Planning	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

Figure 5-1 Cumulative Impact Project Locations



5.3.1 Past Actions

5.3.1.1 Federal Actions

Three 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 Northwest Training Range Complex Final EIS/Overseas EIS (OEIS), and the Replacement of the C-9 Aircraft with the C-40 Aircraft. However, these projects are complete and included as part of the existing environment analysis in this EIS. Therefore, they are not retained for further cumulative impacts analysis.

The Navy decided in 2008 to provide facilities and functions to support home basing twelve P-8A Multi-Mission Maritime Aircraft (MMA) squadrons and one Fleet Replacement Squadron into the U.S. Navy Fleet. The P-8A MMA will replace the current maritime patrol aircraft, the P-3C Orion, at existing maritime patrol home bases. The action will result in the home basing of six Fleet squadrons (42 aircraft) at NAS Whidbey Island. The Record of Decision (ROD) was signed in June 2014, and the transition to the P-8A aircraft is currently underway. Based on the ROD, P-8A aircraft arrive at NAS Whidbey Island in 2016. There will be an overall increase of 18 aircraft by 2020.

5.3.1.2 Non-federal Actions

There are no past non-federal actions that have been included as part of this analysis.

5.3.2 Present and Reasonably Foreseeable Actions

5.3.2.1 Federal Actions

Environmental Assessment for the OLF Security Barrier

The Navy is proposing the installation of 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 maritime training activities for Navy Special Operations personnel. The action would take place in the coastal and inland waters and selected nearshore lands of western Washington State with permission of willing property owners. The training would involve movements of personnel, in which a key goal is to remain undetected and leave no trace of the trainee's presence, during or after the training activity. Support staff would always be present and would interact with the public, if necessary. All training would be non-invasive, to include no live fire, no digging, no cutting of vegetation, no fires, and no human waste. All training would be compliant with federal and state laws and consistent with existing non-military use of the land.

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 Military Operations Area (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 and Washington State Department of Natural Resources (WSDNR) lands, and (5) the operation of Mobile Electronic Warfare Training System vehicle-mounted emitters on U.S. Forest Service lands within the Okanogan and Roosevelt MOAs. The FONSI was signed on August 28, 2014; however, permits from the U.S. Forest Service are still pending.

Northwest Training and Testing Final EIS/OEIS

An EIS/OEIS was prepared to identify and evaluate the potential environmental consequences associated with training and testing activities primarily within existing range complexes, OPAREAs, testing ranges, and select Navy pier-side locations in the Pacific Northwest. The Proposed Action included pier-side sonar testing conducted as part of overhaul, modernization, maintenance, and repair activities at Puget Sound Naval Shipyard in Bremerton, Naval Base Kitsap at Bangor, and Naval Station Everett. The Proposed Action would ensure the Navy accomplishes its mission to maintain, train, and equip combat-ready military forces. This mission is achieved by conducting realistic training and testing activities 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, which is 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. The Final EIS/OEIS was published in October 2015.

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 FONSI 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.

Fleet Air Reconnaissance Disestablishment

The DoD has directed the Navy to disestablish the Fleet Air Reconnaissance (VQ) mission capabilities at NAS Whidbey Island by 2020. 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.

Triton Mission Control Station

This project would construct an approximately 30,000-square-foot Broad Area Maritime Surveillance facility to provide space and communications for two mission control stations that would control Broad Area Maritime Surveillance aircraft that fly from a remote location. The facility would be constructed on previously disturbed and impervious surface within the existing flight line. Construction is anticipated to occur in FY 17.

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.

Medical/Dental Clinic

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.

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 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).

Whidbey General Hospital 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 Whidbey General Hospital. 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 Facilities Planning

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, 2015a).

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 Northwest Training Range Complex (NWTRC) EIS/OEIS and the disestablishment of the VQ mission capabilities at NAS Whidbey Island by 2020. 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. However, it was determined that the remoteness of the inshore use areas and public notification procedures would substantially reduce possible congestion during 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 2020. 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 38 percent at the NAS Whidbey Island complex. Operations at Ault Field would increase from approximately 7,700 operations (above No Action Alternative) (Alternative 1, Scenario A) up to approximately 34,100 operations (above No Action Alternative) (Alternative 3, Scenario C). Likewise, operations at OLF Coupeville would increase from approximately 1,800 operations (above No Action Alternative) (Alternative 3, Scenario C) up to approximately 28,100 operations (above No Action Alternative) (Alternative 1, Scenario A). However, none of the action 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 proposed projects would 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 38 percent), the cumulative impacts to number of aircraft operations and airspace congestion could be significant. However, with the increases in operations from all combined actions, the airspace would be used more often and remain open for civilian air traffic. Similarly, no changes in the types of classification or civilian and commercial use of the airspace would be anticipated.

5.4.2 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 day-night average sound level (65 DNL) contour 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 Northwest Training and Testing (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 proposed 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, the number of training activities would increase from 5,414 events (No Action Alternative) to 8,140 events in the offshore area. Inland, these activities would decrease from 166 events to 117 events and thus would result in less noise in and around these inland areas.

Disestablishment of the Fleet Air Reconnaissance Capabilities

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2020. 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 decibel (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 22.8 percent, Alternative 2 would result in an increase of up to 20.8 percent, and Alternative 3 would result in an increase of up to 20.8 percent of the total population surrounding the two airfields.

The DNL noise contour that covered the highest estimated population was Alternative 1, Scenario C, with a total population of 13,547. 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 2, Scenario A, with a total population of 12,684 (an approximately 7-percent difference from the high range). Comparing the three 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 operations assigned to those airfields under the three 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 (NIPTS) for individuals would be far less than the values reported in Chapter 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. In addition, some of the other projects evaluated for cumulative impacts will result in slightly more operations, which may have a slight 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/Aircraft Strike Hazard (BASH), 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 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; therefore, the BASH risk would be expected to remain similar to existing levels. 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 required.

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 BASH 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 Washington Intrastate Air Quality Control Region, which includes Island, Skagit, and Whatcom Counties and is managed by the Northwest Clean Air Agency. The Air Quality Control 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 Northwest Training and Testing EIS/OEIS identified emissions that would occur related to the expansion of 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 each Air Quality 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).

Table 5-2 Cumulative Changes in Criteria Pollutant and GHG Emissions, Northwest Air Basin

	Emissions (tpy)[2]						MT CO_2e
Proposed Actions	*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	333.0	284.6	931.8	44.2	131.4	124.3	56,828.7
Alternative 1 B	277.9	243.5	780.4	36.9	111.5	104.4	47,671.6
Alternative 1 C	224.8	209.4	647.6	30.1	92.9	85.8	38,999.7
Alternative 2 A	329.1	300.8	977.3	44.1	138.3	125.6	57,446.7
Alternative 2 B	275.9	261.0	831.2	37.2	119.1	106.3	48,609.4
Alternative 2 C	223.9	228.1	703.0	30.5	100.9	88.2	40,133.5
Alternative 3 A	326.9	298.7	966.4	43.9	131.5	124.2	56,380.9
Alternative 3 B	275.7	266.7	841.1	37.3	113.7	106.4	48,050.8
Alternative 3 C	221.9	226.9	694.9	30.3	94.3	87.1	39,136.7
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

Table 5-2 Cumulative Changes in Criteria Pollutant and GHG Emissions, Northwest Air Basin

	Emissions (tpy)[2]						MT CO_2e
Proposed Actions	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2

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. These emissions are subject to NAS Whidbey Island's Air Operating Permit (AOP) (NWCAA, 2013), although estimated emissions are 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 provides a summary of the total change in emissions from ongoing changes to operations for all alternatives.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

Changes to Operations

The Northwest Training and Testing operation 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 includes 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 2020. The 2008 Final EIS 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. 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

The Proposed Action would have no impact on on-station land use, regional land use, or on-station land use controls. All action alternatives and scenarios would impact off-station land use controls. All action alternatives and scenarios would result in an increase of 14 percent to 19 percent of land within the projected greater than 65 dB DNL contours. Following this EIS process, the Navy would undertake a formal Air Installation Compatible Use Zone update process to formalize the recommendation for new APZs and confirm existing APZs. 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 the proposed APZs under any alternative selected for implementation.

Recreation and Wilderness

Alternative 1, Scenarios A and B; Alternative 2, Scenarios A and B; and Alternative 3, Scenario B, would have localized significant impacts on county and municipal parks as a result of increased annual average noise levels. There would be no significant impacts to recreation as a result of increased demand under these alternatives and no significant impacts to wilderness areas. Alternative 1, Scenario C; Alternative 2, Scenario C; and Alternative 3, Scenarios A and C, would have no significant impacts to the management, use of, or demand for recreational areas and no significant impacts to wilderness areas.

Combined Impacts from Past, Present, and Reasonably Foreseeable Future Actions

The VQ squadron disestablishment that could affect land use over population areas would likely decrease air operations and noise contours, or have only a minor change. As such, cumulative impacts to land use could occur, but no significant cumulative impacts on land use 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 65 dB DNL noise contour (see Figure 3.6-1). As noted on Figure 5-1, these projects include all construction projects located at Ault Field as well as the following projects: Northwest Training and Testing EIS/OEIS; Hospital Expansion Project; and the engineering study and infrastructure 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 actions occurring at Ault Field would require appropriate consultation and permitting in order to avoid and minimize potential impacts to archeological resources, architectural resources, and American Indian traditional resources. 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

There would be minimal to no impact to archaeological sites previously recorded within Ault Field and OLF Coupeville during the construction. The Navy is consulting with the Washington State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation, American Indian tribes and nations, and interested parties regarding archaeological resources.

Architectural Resources

Minimal to no direct and indirect impacts are anticipated to occur to on-station historic 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 resources during operation. The Navy is consulting with the Washington SHPO, American Indian tribes and nations, and consulting parties regarding architectural resources.

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 or historic buildings and structures. Federal and state projects with potential for impacts on cultural resources would undergo Section 106 review under the National Historic Preservation Act, which includes consultation with the Washington SHPO and affected American Indian tribes and nations, other interested parties, and the Advisory Council on Historic Preservation. 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 dBA DNL noise contour areas 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 Northwest Training and Security EIS/OEIS; the Triton Mission Control; and the medical/dental clinic.

Federal agencies are tasked with the requirement to consider traditional resources and the interests of federally recognized American Indian tribes and nations 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 National Historic Preservation Act 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 American Indian tribes and nations regarding its activities that may have the potential to 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 NAS Whidbey Island 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 greenhouse gas emissions. The Navy has 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. To date, no tribes have requested government-to-government consultation on the Proposed Action.

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 American Indian tribes and nations; 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 American Indian tribes and nations. 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 the NWTT EIS/OEIS and improvements to the City of Oak Harbor's clean water facilities and water system. A summary of relevant impacts of each action is described below.

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 EOD use; 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 Biological Opinion (BO). As part of this BO, the NMFS concluded that Navy training and testing activities in the NWTT action area and the NMFS' issuance of the Marine Mammal Protection Act regulations and level of activity are likely to adversely affect but will not appreciably reduce the ability of the threatened and endangered species under the 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 July 21, 2016, 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 Northwest Training and Testing Activities, as proposed, is not likely to jeopardize the continued existence of 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 Northwest Training and Testing 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 Northwest Training and Testing Activities, as proposed, is not likely to jeopardize the continued existence of the short-tailed albatross.

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

Aircraft Operations

Under the Proposed Action, the greatest potential for impacts on biological resources would occur during aircraft operations, when noise and collision impacts could occur.

Aircraft operations at the NAS Whidbey Island complex would increase under each of the action alternatives, as compared to the No Action Alternative; however, mammals inhabiting the study area are already exposed to a high level of long-term aircraft operations and other human-made disturbances. Terrestrial mammals in the study area have presumably habituated to the very high level of noise and visual disturbances at Ault Field and OLF Coupeville, as has been reported for some mammals (i.e., ungulates) in other areas of repeated exposure (Efroymson et al., 2000). Thus, the implementation of the Proposed Action would not significantly affect terrestrial mammals by disturbances from aircraft operations.

Although information regarding reptile and amphibian responses to noise, aircraft noise in particular, is limited, existing data suggest that sound pressure levels of 95 dBA and higher may disturb them or affect their hearing (Bondello, 1976; Brattstrom and Bondello, 1983; Efroymson et al., 2000). Given that reptiles and amphibians occurring in the study area are already exposed to high levels of noise, any reptiles and amphibians that occupy the study area would presumably be habituated to these noise levels, as were desert tortoises in the Bowles et al. (1999) study. Therefore, the aircraft noise impacts on reptiles and amphibians under each of the three alternatives would not differ significantly from the No Action Alternative.

As noted previously, aircraft operations at the NAS Whidbey Island complex would increase under each of the action alternatives, as compared to the No Action Alternative. Birds in the study area are already exposed to high levels of long-term aircraft operations and other human-made disturbances and are presumably habituated. Therefore, implementation of any of the action alternatives would not result in significant impacts on birds during either the breeding or non-breeding seasons. Marbled murrelets have been documented at a number of locations in the study area, and they would be susceptible to disturbances from aircraft operations. However, marbled murrelets in the study area are already exposed to existing aircraft operations on the NAS Whidbey Island, 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, Piatt, and Springer, 2004; Hentze, 2006; Bellefleur, Lee, and Ronconi, 2009). For these reasons, the Proposed Action under each of the three action alternatives would not result in significant aircraft-related, sensory disturbance impacts on marbled murrelets.

Aircraft-wildlife Strike Effects

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 as the increase in air operations is similar. However, 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 wildlife-aircraft strikes at the NAS Whidbey Island complex would remain relatively low compared to the high number of operations. Wildlife-aircraft strikes would not have significant impacts on local wildlife populations, including special status species (such as the marbled murrelet).

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. As noted previously, the full scope of some of the identified present and reasonably foreseeable actions is unknown at this time. Therefore, certain assumptions pertaining to decreases and increases in aircraft operations must be drawn as a result of the individual proposed actions.

As noted in Section 4.8 and also summarized in this section, the Proposed Action is not expected to result in significant sensory disturbance effects or aircraft-wildlife strike effects to any species of mammal, bird, or reptile/amphibian. 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 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.

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 action 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 approximately 2 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 action 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 action 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 action 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. A summary of relevant impacts of each action is 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 2020. The 2008 Final EIS accounted for the VQ mission to be at NAS Whidbey Island beyond 2020. VQ Squadron Two (VQ-2) was disestablished in FY 12, and personnel were consolidated with VQ Squadron One (VQ-1). Personnel loading for VQ-1 following consolidation is approximately 640. Therefore, it would be expected that impacts to socioeconomics would result in a reduction of approximately 640 personnel.

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 786 military personnel and dependents under Alternative 1; 1,407 military personnel and dependents under Alternative 2; and 799 military personnel and dependents under Alternative 3 are expected to reside in the two 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 action 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 371 to 664 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.

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.

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 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.

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 Northwest Training and Testing 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 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 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 2020. 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/scenarios, there are minority populations and low-income populations living within the affected environment. The Navy has concluded that although 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), these impacts do not disproportionately impact environmental justice communities.

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 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 impacts on any environmental justice communities 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.

Although the Navy has determined there to be no disproportionately high or adverse impacts on environmental justice communities under this Proposed Action, 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.

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, and Island County, Washington.

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 Triton mission control station and the medical/dental clinic would likely require additional construction-related traffic during construction activities. Similarly, additional personnel may commute to and from the installation once construction is completed.

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 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 171 and 2,321 new trips per weekday under Alternative 1; 306 to 4,154 new trips per weekday under Alternative 2; and 174 to 2,359 new trips per weekday

under Alternative 3 within the study area on major roadways (i.e., I-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 action 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. 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: Fleet Air Reconnaissance 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, 2015c). 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, approximately 2.1 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 projected 2.1 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 action 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 action 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 (Triton Mission Control Station; Next Generation Jammer; and the Medical/Dental Clinic) 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 approximately 2 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 the use of 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 (Triton Mission Control Station; Next Generation Jammer; and the Medical/Dental Clinic) 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.

Final CEQ guidance (CEQ, 2016) states that 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 NEPA

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*
National Environmental Policy Act (NEPA) (42 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
Executive Order 13045, Environmental Health Risks and Safety Risks to Children	Navy	The Navy does not anticipate any significant disproportionate health impacts to children caused by aircraft noise, and there 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

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 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
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 is being prepared and submitted as part of this EIS. The outcome of the federal consistency process will be presented in the Final EIS.	3.5 and 4.5, Land Use Compatibility; 3.8 and 4.8, 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, and interested parties	The Navy anticipates an overall finding of no adverse effect to historic properties. The Navy has initiated consultation with the Washington State Historic Preservation Officer, federally recognized tribes, and other interested parties. Consultation is being conducted in accordance with established operating procedures as noted in the Integrated Cultural Resources Management Plan (ICRMP) (Navy, 2014a). Consultation is ongoing.	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 anticipates that no adverse effect will occur to historic properties and that, overall, minimal to moderate impacts will occur to archaeological 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, 2014a).	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 American Indian tribes and nations	As part of this EIS, the Navy has considered the potential presence of sacred/religious sites and has evaluated the potential of its action to impact access for members of American Indian tribes and nations. The Navy has initiated 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 these resources. Consultation is being 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

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 Resources Protection Act (ARPA) of 1979	Navy	The Navy anticipates that no adverse effect will occur to historic properties and that, overall, minimal to moderate 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, 2014a).	3.6 and 4.6, Cultural Resources, Appendix C, Section 106 Documentation

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 American Indian tribes and nations	As part of this action, no artifacts or remains attributed to American Indian tribes or nations located within NAS Whidbey Island are anticipated to be impacted. The Navy has initiated consultation with American Indian tribes and nations as part of its responsibilities for government-to-government consultation. Consultation also is being 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, 2014a).	3.6 and 4.6, Cultural Resources; 3.7 and 4.7 American Indian Traditional 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*
Executive Order 13007, Indian Sacred Sites	Navy and American Indian tribes and nations	The Navy has initiated 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 these resources. Consultation is being 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 (RCW 27.44)	Navy, State of Washington SHPO, and American Indian tribes and nations	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
Archaeological Site Public Disclosure Exemption (RCW 42.56.300)	Navy and State of Washington SHPO	Per its ICRMP and in its 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, 2014a).	3.6 and 4.6, Cultural Resources
Discovery of Human Remains (RCW 27.44)	Navy, State of Washington, and American Indian tribes and nations	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*
Executive Order 13175, Consultation and Coordination with Indian Tribal Governments	Navy	The Navy has invited American Indian tribes and nations to government-to-government consultation. Results of the consultation will be provided in the Final EIS.	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 determined that the Proposed Action may affect, but is not likely to adversely affect, the humpback whale or Southern Resident killer whale and all ESA-listed fish species. The Navy has determined that the Proposed Action may affect the marbled murrelet and will consult the USFWS. Results of the consultation will be provided in the Final EIS.	3.8 and 4.8, Biological Resources
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

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*
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. The Navy will consult with the USFWS. Results of the consultation will be provided in the Final EIS.	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 is not to have any significant impacts on eagles. The Navy will consult with the USFWS. Results of the consultation will be provided in the Final EIS.	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*
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 will have an opportunity to comment on this EIS, and responses will be provided in the Final EIS.	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 will have an opportunity to comment on this EIS, and responses will be provided in the Final EIS.	3.8 and 4.8, Biological Resources
Clean Water Act (33 U.S.C. section 1251 et seq.)	U.S. Environmental Protection Agency (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; 3.12 and 4.12, Infrastructure
Executive Order 11988, Floodplain Management	Navy	The Proposed Action would not impact floodplains or floodplain management.	3.9 and 4.9, Water Resources; 3.12 and 4.12, 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; 3.12 and 4.12, 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; 3.12 and 4.12, Infrastructure
Executive Order 11990, Protection of Wetlands	Navy	The Proposed Action would not impact wetlands.	3.9 and 4.9, Water Resources; 3.12 and 4.12, 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; 3.12 and 4.12, 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*
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; 3.12 and 4.12, 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; 3.12 and 4.12, 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; 3.12 and 4.12, 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; 3.12 and 4.12, 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; 3.12 and 4.12, Infrastructure
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; 3.12 and 4.12, 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*
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations	Navy	Environmental Justice communities exist under the affected area from the Proposed Action. The Navy has concluded that although 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), these impacts do not disproportionately impact environmental justice communities.	3.10 and 4.10, Socioeconomics; 3.11 and 4.11, Environmental Justice
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

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 action alternatives. Avoidance and minimization of adverse impacts were integrated into the development of the action 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 action alternatives. These impacts are summarized by resource area below. All impacts from the implementation of the action alternatives are described in detail in Chapter 4 of this EIS.

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 action 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 at one county park, Driftwood Park, under Scenarios A and B, regardless of alternative selected, as a result of increased noise exposure.

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 135 and 242 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 does not identify any mitigation measures for the implementation of action alternatives but does identify measures that could be taken to develop suggested mitigation techniques. As the National Environmental Policy Act (NEPA) process continues, mitigation measures may be developed and altered based on comments received during public and regulatory agency review of the EIS. If mitigation measures were identified during this process, they would be identified in the Final EIS or 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 action 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 action alternatives would increase the flight activity in and around NAS Whidbey Island airspace. Implementation of the action alternatives may require development of Accident Potential Zones at Outlying Landing Field (OLF) Coupeville and would increase noise in the area at both Ault Field and OLF Coupeville during operations. Through implementation of the Air Installation 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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8 List of Preparers

U.S. Department of the Navy, U.S. Fleet Forces
Lisa Padgett, Environmental Readiness (Home Basing NEPA)
Ted Brown, Public Affairs Officer
Rick Keys, Facilities and Operational Readiness
CAPT Joe Romero, Environmental Counsel

U.S. Department of the Navy, Naval Facilities Engineering Command, Atlantic
Sarah Stallings, NEPA Project Manager
Todd Williamson, Deputy Project Manager
Bonnie Curtiss, Noise
Amberly Hall, Environmental Counsel

U.S. Department of the Navy, Commander Naval Air Forces
LCDR Daniel Boyer, VAQ Requirements
BJ McGuire, Environmental

U.S. Department of the Navy, Commander Navy Region Northwest
Renee Wallis, Environmental
Carolyn Winters, Environmental
CAPT Caren McCurdy, Environmental Counsel

U.S. Department of the Navy, Naval Air Station Whidbey Island
CAPT Geoffrey Moore, Commanding Officer
CDR Wallace Gaber, Operations Officer
CDR Sean Michaels, CVWP
Michael Welding, Public Affairs Officer
Brian Knott, Airfield Operations
Melanie Bengston, Environmental
Michael Bianchi, Environmental
Jennifer Meyer, Community Plans and Liaison Officer
Kendall Campbell, Cultural Resources
Tracy Schwartz, Cultural Resources
Bryan Tyhuis, Facilities

U.S. Department of the Navy, Naval Facilities Engineering Command, Northwest
Anna Whalen, Environmental

The consulting firm responsible for the preparation of this document is:

Ecology and Environment, Inc.
368 Pleasant View Drive
Lancaster, New York 14086

William Noble, *Project Director*
B.S. Natural Resources Conservation

Cynthia Shurling, *Project Manager*
B.A. Biology, B.S. Laboratory Animal Science, M.E.M. Environmental Management

Tegan Kondak, *Deputy Project Manager*
B.S. Environmental Studies

Meghan Albers, *Environmental Planner*
B.S. Environmental Science

Matthew Butwin, *Environmental Planner*
B.S. Applied Economics/Business Management

Stephen Czapka, *Biologist*
B.S. Entomology, M.S. Biology

Jessica Forbes, *Environmental Planner*
B.A. Environmental Studies

Jone Guerin, AICP, *Environmental Planner*
B.A. Political Science, M.S. Policy Analysis

Katherine Guttenplan, *Marine Biologist*
B.A. Coordinate Biology and Environmental Studies, M.E.M. Environmental Management

Leslie Kirchler-Owen, Ph.D., AICP, RPA, REP, *Cultural Resource Specialist*
B.S. City and Regional Planning, M.A. Landscape Archaeology, Ph.D. Urban Technological and Environmental Planning, Ph.D. Landscape Architecture

Laurie S. Kutina, CEM, REM, *Air Quality Specialist*
B.S. Physics, M.A. Architecture, M.B.A. Business Administration

Katrina Rabeler, *Environmental Planner*
B.A. Environmental Science

Sarah Ramberg, *Marine Biologist*
B.S. Marine Biology

Carl Sadowski, AICP, *Environmental Planner*
B.A. Environmental Design

Kirsten Shelly, *Economist*
B.A. Economics, M.S. Environmental/Resource Economics

Donald Wardell, *Biologist*
B.A. Environmental Studies, M.S. Natural Resources Sciences

James Welch, PMP, Military Operations
B.S. Math, Management, and Information Systems

Stephen McCabe, *Editor*
B.A. English, M.F.A. Creative Writing

Jenny Mogavero, GISP
B.S. Environmental/Physical Geography, M.A. Geography

Amber Lauzon, mapping
B.S. Geology, M.A. Geography

Danielle Thomas, *Graphic Designer*
A.A. Graphic Design, B.A. Psychology

Nicole Williams, *Word Processor*
A.S. Technical Studies, Certificate, MS Office

Patricia Mooney, *Word Processor*

Contractor, KBR Wyle
Brandon Robinette, Lead Engineer

Patrick Kester, Lead Engineer

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9 Distribution List

This Environmental Impact Statement (EIS) was distributed to federal, state, and local elected officials and agencies, as well as federally recognized tribes and non-governmental organizations. In addition, the EIS was distributed to 758 concerned citizens from around the country. Table 9-1 identifies the number of concerned citizens on the project distribution list. These are members of the public who requested to be added to the project distribution list via either the project website or during the public scoping process.

Table 9-1 Concerned Citizens on the Distribution List.

Area	*Number of citizens on distribution list*[1]
Island County	609
Skagit County	124
Outside of Island and Skagit Counties but within Washington State	601
Outside of Washington State	47
Total	**1,381**

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.

This EIS was distributed to the following agencies/people

Federal Agencies

Mr. Thomas Eaton, Director
U.S. Environmental Protection Agency
Washington Operations Office
300 Desmond Drive SE
Suite 102
Lacey, WA 98503

Mr. Dennis McLerran, Regional Administrator
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Suite 900
Seattle, WA 98101

Ms. Michelle Pirzadeh, Deputy Regional Administrator
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Suite 900
Seattle, WA 98101

Ms. Elaine Somers, Environmental Review and Sediment Management Unit
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Suite 900
Seattle, WA 98101

Ms. Christine Littleton, Environmental Review & Sediment Management Unit
U.S. Environmental Protection Agency
Region 10
1200 6th Avenue
Suite 900
Seattle, WA 98101

Ms. Lacy Edmondson, Office Director
U.S. Environmental Protection Agency
Region 10
1200 6th Avenue
Suite 900
Seattle, WA 98101

Mr. Erik Peterson,
U.S. Environmental Protection Agency
Region 10
1200 6th Avenue
Suite 900
Seattle, WA 98101-3140

Ms. Theogene Mbabaliye,
U.S. Environmental Protection Agency
Region 10
1200 6th Ave., Suite 900
MS ETPA-088
Seattle, WA 98101

Mr. Brad Thompson, Manager
U.S. Dept. of the Interior
U.S. Fish and Wildlife Service, Western Washington Fish and Wildlife Office
510 Desmond Drive SE
Suite 102
Lacey, WA 98503

Ms. Allison O'Brien, Regional Environmental Officer
Regional Office- Portland
620 S.W. Main Street
Suite 201
Portland, OR 97205

The Honorable Sally Jewell, Secretary of the Interior
U.S. Department of the Interior
1849 C Street, Northwest
Washington, DC 20240

Mr. Kevin Ryan, Refuge Manager
U.S. Dept. of the Interior
U.S. Fish and Wildlife Service, Washington Maritime National Wildlife Refuge Complex
715 Holgerson Road
Sequim, WA 98382

Ms. Robyn Thorson, Regional Director
U.S. Dept. of the Interior
911 NE 11th Avenue
Portland, OR 97232

Ms. Laura Joss, Regional Director
U.S. Dept. of the Interior
National Park Service, Pacific West Region
333 Bush Street
Suite 500
San Francisco, CA 94104-2828

Ms. Marcia deChadenedes, National Monument Manager
U.S. Dept. of the Interior
Bureau of Land Management - San Juan Islands National Monument
PO Box 3
Lopez Island, WA 98261

Mr. Nick Teague, Outdoor Recreation Planner
U.S. Dept. of the Interior
Bureau of Land Management - San Juan Islands National Monument
PO Box 3
Lopez Island, WA 98261

Ms. Carol Bernthal, Sanctuary Superintendent
U.S. Dept. of Commerce
NOAA - Olympic Coast National Marine Sanctuary
115 Railroad Ave. East, Suite 301
Port Angeles, WA 98362

Mr. William Stelle, Regional Administrator
U.S. Dept. of Commerce
NOAA Fisheries Northwest Regional Office
7600 Sand Point Way NE
Seattle, WA 98115

Dr. John Stein, Science and Research Director, Northwest Fisheries Science Center
U.S. Dept. of Commerce
NOAA Fisheries, Northwest Fisheries Science Center
2725 Montlake Boulevard E
Seattle, WA 98112

Mr. Ron Wilcox, Project Manager, Regulatory Branch
U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, WA 98124

Mr. Randel Perry, Project Manager, Regulatory Branch
U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, WA 98124

Mr. Frank Nichols, Project Manager, Regulatory Branch
U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, WA 98124

COL John Buck, Seattle District Commander
U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, WA 98124

Mr. Olton Swanson, Seattle District Engineer
U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, WA 98124

Mr. Eric Rickerson, State Supervisor
U.S. Fish and Wildlife Service, Western Washington Office
510 Desmond Drive SE
Suite 102
Lacey, WA 98503

Ms. Jill Roland, Center Director
U.S. Geological Survey, Western Fisheries Research Center
6505 NE 65th Street
Seattle, WA 98115

Mr. David Woodson, Deputy Center Director
U.S. Geological Survey, Western Fisheries Research Center
6505 NE 65th Street
Seattle, WA 98115

Ms. Elizabeth Babcock, North Puget Sound Branch Chief
NOAA Fisheries
North Puget Sound Branch
7600 Sand Point Way NE
Seattle, WA 98115

Ms. Michaela Noble, Director
U.S. Department of the Interior, Office of Environmental Policy and Compliance
1849 C Street, Northwest
MS 2462
Washington, DC 20240

Mr. Daniel Ashe, Director
U.S. Department of the Interior, U.S. Fish & Wildlife Service
1849 C Street Northwest
Room 3331
Washington, DC 20240

Ms. Jennifer Solomon, Assistant Administrator
U.S. Department of Transportation, Federal Aviation Administration, Office of Policy, International Affairs and Environment
800 Independence Ave SW
Suite 1005
Washington, DC 20591

Federal Elected Officials

Ms. Maria Cantwell, State Senator
U.S. Senate
154 Russell Senate Office Building
Washington DC 20515

Ms. Patty Murray, State Senator
U.S. Senate
511 Hart Senate Office Building
Washington DC 20515

Ms. Susan Delbene, House Representative
U.S. House of Representatives
318 Cannon House Office Building
Washington DC 20515

Mr. Rick Larsen House Representative
U.S. House of Representatives
213 Rayburn House Office Building
Washington DC 20515

Federally Recognized Tribes

The Honorable Brian Cladoosby, Chairman
Swinomish Indian Tribal Community
11404 Moorage Way
PO Box 817
LaConner. WA 98257

The Honorable Thomas Wooten, Chairman
Samish Indian Nation
2918 Commercial Avenue
PO Box 217
Anacortes. WA 98221

The Honorable Timothy Ballew II, Chairman
Lummi Tribe of the Lummi Reservation
2616 Kwina Road
Bellingham. WA 98226

The Honorable Shawn Yanity, Chairman
Stillaguamish Tribe of Indians of Washington
3310 Smokey Point Drive
PO Box 277
Arlington. WA 98223

The Honorable Melvin Sheldon, Jr, Chairman
Tulalip Tribes of Washington
6406 Marine Drive NW
Tulalip. WA 98271

The Honorable Jennifer Washington, Chairwoman
Upper Skagit Indian Tribe
25944 Community Plaza
Sedro Woolley. WA 98284

The Honorable Leonard Forsman, Chairman
Suquamish Indian Tribe of the Port Madison Reservation
PO Box 498
Suquamish. WA 98392

The Honorable W. Ron Allen, Chairman
Jamestown S'Klallam Tribe
1033 Old Blyn Highway
Sequim. WA 98382

State Elected Officials

The Honorable Jay Inslee, Governor
Office of the Governor
P.O. Box 40002
Olympia, WA 98504

The Honorable Dave Hayes, Representative, Position 2
Washington House District 10 (home district)
467 John L. O'Brien Building
P.O. Box 40600
Olympia, WA 98504

The Honorable Norma Smith, Representative, Position 1
Washington House District 10 (home district)
435 John L. O'Brien Building
P.O. Box 40600
Olympia, WA 98504

The Honorable Steve Tharinger, Representative, Position 2
Washington House District 24 (adjoining district)
368 John L. O'Brien Building
P.O. Box 40600
Olympia, WA 98504

The Honorable Kevin Van De Wege, Representative, Position 1
Washington House District 24 (adjoining district)
434A Legislative Building
P.O. Box 40600
Olympia, WA 98504

The Honorable John McCoy, State Senator
Washington Senate District 38 (adjoining district)
132A Legislative Building
PO Box 40434
Olympia, WA 98504

The Honorable June Robinson, Representative, Position 1
Washington House District 38 (adjoining district)
JOB 332
PO Box 40600
Olympia, WA 98504

The Honorable Mike Sells, Representative, Position 2
Washington House District 38 (adjoining district)
132B Legislative Building
PO Box 40600
Olympia, WA 98504

The Honorable Barbara Bailey, State Senator - Home District
Washington Senate District 10 (home district)
109B Irv Newhouse Building
P.O. Box 40410
Olympia, WA 98504

The Honorable James Hargrove, State Senator
Washington Senate District 24 (adjoining district)
411 Legislative Building
P.O. Box 40424
Olympia, WA 98504

The Honorable Kirk Pearson, State Senator
Washington Senate District 39 (adjoining district)
115D Irv Newhouse Building
P.O. Box 40439
Olympia, WA 98504

The Honorable Dan Kristiansen, Representative
Washington House District 39 (adjoining district)
434A Legislative Building
PO Box 40600
Olympia, WA 98504

The Honorable Elizabeth Scott, Representative
Washington House District 39 (adjoining district)
434A Legislative Building
PO Box 40600
Olympia, WA 98504

The Honorable Kevin Ranker, State Senator
Washington Senate District 40 (adjoining district)
215 John A. Cherberg Building
PO Box 40440
Olympia, WA 98504

The Honorable Kristine Lytton, Representative
Washington House District 40 (adjoining district)
434A Legislative Building
PO Box 40600
Olympia, WA 98504

The Honorable Jeff Morris, Representative
Washington House District 40 (adjoining district)
434A Legislative Building
PO Box 40600
Olympia, WA 98504

Stage Agencies

Ms. Sheida Sahandy. Executive Director
Puget Sound Partnership
1111 Washington Street SE
Olympia, WA 98504

Mr. Marc Daily. Deputy Director
Puget Sound Partnership
326 E D Street
Tacoma, WA 98421

Mr. Derek Sandison. Policy Assistant to Director/House of Representatives
Washington State Department of Agriculture, Policy and Communications
P.O. Box 42560
Olympia, WA 98504

Dr. Allyson Brooks. State Historic Preservation Officer
Washington State Department of Archaeology & Historic Preservation
P.O. Box 48343
Olympia, WA 98504

Ms. Maia Bellon. Ecology Director
Washington State Department of Ecology
P.O. Box 47600
Olympia, WA 98504

Ms. Annie Szvetecz. Environmental Policy and Review Section
Washington State Department of Ecology
P.O. Box 47600
Olympia, WA 98504

Mr. Peter Goldmark. Commissioner of Public Lands
Washington State Department of Natural Resources
P.O. Box 47000
Olympia, WA 98504

Ms. Kristen Swenddal. Division Manager, Aquatic Resources Division
Washington State Department of Natural Resources
P.O. Box 47027
Olympia, WA 98504

Mr. Jim Unsworth. Director
Washington State Fish and Wildlife Commission
600 Capitol Way N
Olympia, WA 98501

Mr. Doug Thompson. Area Habitat Biologist
Washington State Department of Fish and Wildlife
P.O. Box 1100
La Conner, WA 0

Mr. Randy Kline. Environmental Program Manager
Washington State Parks and Recreation Commission
1111 Israel Road SW
PO Box 42650
Olympia, WA 0

Ms. Kristen Griffin. Reserve Manager
Ebey's Landing National Historic Reserve
PO Box 774
Coupeville, WA 98239

Mr. Roy Zipp. Operations Manager
Ebey's Landing National Historic Reserve
Reuble Farmstead
593 Fort Casey Road
Coupeville, WA 98239

Mr. Wilbur Bishop
Ebey's Landing National Historical Reserve (Chair)
P.O Box 774
162 Cemetery Road
Coupeville, WA 98239

Local Elected Officials

The Honorable Robert Severns, City of Oak Harbor
865 SE Barrington Drive
Oak Harbor, WA 98277

The Honorable Molly Hughes, Mayor
Town of Coupeville
#4 NE Seventh St
PO Box 725
Coupeville, WA 98239

The Honorable Laurie Gere, Mayor
City of Anacortes
904 6th Street
PO Box 547
Anacortes, WA 98221

The Honorable Jill Boudreau, Mayor
City of Mount Vernon
City Hall, 2nd Floor
910 Cleveland Avenue
PO Box 809
Mount Vernon, WA 98273

The Honorable Steve Sexton, Mayor
City of Burlington
833 S. Spruce Street
Burlington, WA 98233

The Honorable Ramon Hayes, Mayor
Town of La Conner
PO Box 400
La Conner, WA 98257

The Honorable Deborah Stinson, Mayor
Town of Port Townsend
205 Madison Street
Suite 2, Port Townsend, WA 98368

Chairman Jill Johnson,
Chairman of the Board of County Commissioners and Commissioner - District 2
Island County
P.O. Box 5000
1 NE 7th Street, Room #214
Coupeville, WA 98239

Ms. Helen Price Johnson, County Commissioner
Island County
P.O. Box 5000
1 NE 7th Street, Room #214
Coupeville, WA 98239

Chairman Richard Hannold, Chairman of the Board of County Commissioners and
Commissioner District 3
Island County
PO BOX 5000
Coupeville, WA 98239

Mr. Ron Wesen, County Commissioner
Skagit County Commissioner
1800 Continental Place
Suite 100
Mt. Vernon, WA 98273

Mr. Ken Dahlstedt, County Commissioner
Skagit County Commissioner
1800 Continental Place
Suite 100
Mt. Vernon, WA 98273

Ms. Lisa Janicki, County Commissioner
Skagit County Commissioner
1800 Continental Place
Suite 100
Mt. Vernon, WA 98273

The Honorable Bob Jarman, San Juan County Commissioner
San Juan County Commissioner
350 Court St #1
Friday Harbor, WA 98250

The Honorable Rick Hughes, San Juan County Commissioner
San Juan County Commissioner
350 Court St #1
Friday Harbor, WA 98250

The Honorable Jamie Stephens, San Juan County Commissioner
San Juan County Commissioner
350 Court St #1
Friday Harbor, WA 98250

The Honorable Phil Johnson, Jefferson County Commissioner
Jefferson County Commissioner
County Courthouse - 1820 Jefferson Street
PO Box 1220
Port Townsend, WA 98368

The Honorable David Sullivan, Jefferson County Commissioner
Jefferson County Commissioner
County Courthouse - 1820 Jefferson Street
PO Box 1220
Port Townsend, WA 98368

Non-Governmental Organizations (NGOs)

Mr. Ken Balcomb III, Executive Director/Principal Investigator/Senior Scientist
Center for Whale Research
P.O. Box 1577
355 Smugglers Cove Road
Friday Harbor, WA 98250

Mr. Steve Mashuda, Staff Attorney
Earth Justice Seattle Regional Office
705 2nd Avenue
Suite 203
Seattle, WA 98104

Mr. Les Welsh, Pacific Region Associate Director
National Wildlife Federation, Pacific Regional Center
2100 Westlake Ave, North
Suite 107
Seattle, WA 98109

Mr. Mike Stevens, State Director
Nature Conservancy Seattle Office
1917 1st Avenue
Seattle, WA 98101

Mr. Bill Robinson, State Director
The Nature Conservancy of Washington
1917 1st Avenue
Seattle, WA 98101

Ms. Ginny Broadhurst, Director
Northwest Straits Commission
10441 Bayview-Edison Road
Mount Vernon, WA 98273

Mr. Cody Young, Conservation Program Coordinator
Sierra Club Washington State Chapter
180 Nickerson Street
Suite 202
Seattle, WA 98109

Mr. Robert Sextro, Chair
Sierra Club North Olympic Group
PO Box 1083
Port Townsend, WA 98368

Ms. Sharon Gauthier, President
Whidbey Audubon Society
P.O. Box 1012
Oak Harbor, WA 98277

Ms. Patricia Powell, Executive Director
Whidbey Camano Land Trust
765 Wonn Road
Barn C-201
Greenbank, WA 98253

Mr. Rob Smith, NW Regional Director
National Parks Conservation Association
1200 5th Ave
Suite 1925
Seattle, WA 98101

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