

4 Environmental Consequences

This chapter presents an analysis of the potential direct and indirect effects of each alternative on the affected environment. The following discussion elaborates on the nature of the characteristics that might relate to resources. “Significantly,” as used in the National Environmental Policy Act (NEPA), requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts, such as society as a whole (for example [e.g.], human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant (40 Code of Federal Regulations [CFR] Section 1508.27). Intensity refers to the severity or extent of the potential environmental impact, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential impact needs to be in order to be considered significant. Likewise, the less sensitive the context, the more intense a potential impact would be expected to be to be categorized as significant.

Construction of new and improved facilities could begin as early as 2018. Personnel and aircraft would arrive incrementally, as aircraft are delivered by the manufacturer, personnel are trained, and families relocate to the area, until the action is complete. The year 2021 is the end-state used in this analysis, which represents full implementation of the Proposed Action. In addition, 2021 is the appropriate baseline because it is when the P-8A Poseidon transition will be complete and therefore represents the existing environment if no action is taken. This includes additional aircraft, facilities, infrastructure, and personnel levels that will exist in 2021. Therefore, with these other actions complete, the analysis isolates the impacts of this Proposed Action of adding additional Growler aircraft, personnel, and associated construction. The analysis of the environmental consequences includes the following: airspace and airfield operations; noise associated with aircraft operations; public health and safety; air quality; land use; cultural resources; American Indian traditional resources; biological resources; water resources; socioeconomics; environmental justice; transportation; infrastructure; geological resources; hazardous materials and waste; and climate change and greenhouse gases. Section 1.5, Scope of Environmental Analysis, provides more detail on which environmental resource areas were considered for analysis in this Environmental Impact Statement (EIS).

The Navy did not identify a Preferred Alternative prior to publication of the Draft EIS in November 2016 because it was evaluating operational and environmental considerations necessary to make that determination. The Navy announced the Preferred Alternative on June 25, 2018, prior to release of the Final EIS, in order to provide timely information to the public once the alternative had been identified. Alternative 2, adding 36 Growler aircraft to the Naval Air Station (NAS) Whidbey Island complex, has been identified as the Preferred Alternative. This alternative best meets operational demands by both establishing two new expeditionary squadrons and adding two aircraft to each squadron that operates off aircraft carriers. Further, Scenario A has been identified as the preferred scenario under Alternative 2 for field carrier landing practice (FCLP) distribution because it results in the least disruption of other operations at Ault Field, provides the best training for Navy pilots, and impacts the fewest number of residents living in the community. No final decision has yet been made. The ultimate decision with respect to force structure and FCLP distribution will be made by the Secretary of the Navy or his representative and announced in a Record of Decision (RoD) no earlier than 30 days following the public release of the Final EIS. For more details on the Preferred Alternative, see Section 2.4.

4.1 Airspace and Airfield Operations

The analysis of airspace management and use involves consideration of many factors, including the types, locations, and frequency of airspace operations, the presence or absence of already designated (controlled) airspace, and the amount of air traffic using or transiting through a given area. Specifically, this assessment examines how the Proposed Action would affect airspace management structure and airfield operations related to the NAS Whidbey Island complex. The communities surrounding Ault Field and Outlying Landing Field (OLF) Coupeville are assessed for impacts from changes to the number of annual operations that would occur from the Proposed Action under each of the alternatives and scenarios. These increases represent levels of operations similar to historic levels of operations experienced over the life of the complex (see Section 1.4).

The alternatives and sub-alternatives, comprised of operational scenarios, are more fully described in Section 2.3 and are summarized below:

- **Scenario A**
20 percent of all FCLP operations conducted at Ault Field, and 80 percent of all FCLPs conducted at OLF Coupeville
- **Scenario B**
50 percent of all FCLPs conducted at Ault Field, and 50 percent of all FCLPs conducted at OLF Coupeville
- **Scenario C**
80 percent of all FCLPs conducted at Ault Field, and 20 percent of all FCLPs conducted at OLF Coupeville
- **Scenario D**
30 percent of all FCLPs conducted at Ault Field, and 70 percent of all FCLPs conducted at OLF Coupeville
- **Scenario E**
70 percent of all FCLPs conducted at Ault Field, and 30 percent of all FCLPs conducted at OLF Coupeville

The analysis includes the continuation and expansion of Growler operations at the NAS Whidbey Island complex, including FCLPs at Ault Field and OLF Coupeville. In addition, the analysis includes all flight operations of other aircraft at the NAS Whidbey Island complex. Total airfield operations are considered all aircraft operations that occur; these include Touch-and-Goes, Depart and Re-enter, Ground

Airspace and Airfield Operations

Net increase of 35 or 36 Growler aircraft; total annual airfield operations for the NAS Whidbey Island complex (Ault Field and OLF Coupeville) would increase up to approximately 112,600 operations, a 33-percent increase, which represents a return to previous levels of airfield operations at the NAS Whidbey Island complex.

Airspace

No changes are proposed to existing airspace under any of the alternatives.

Airfield

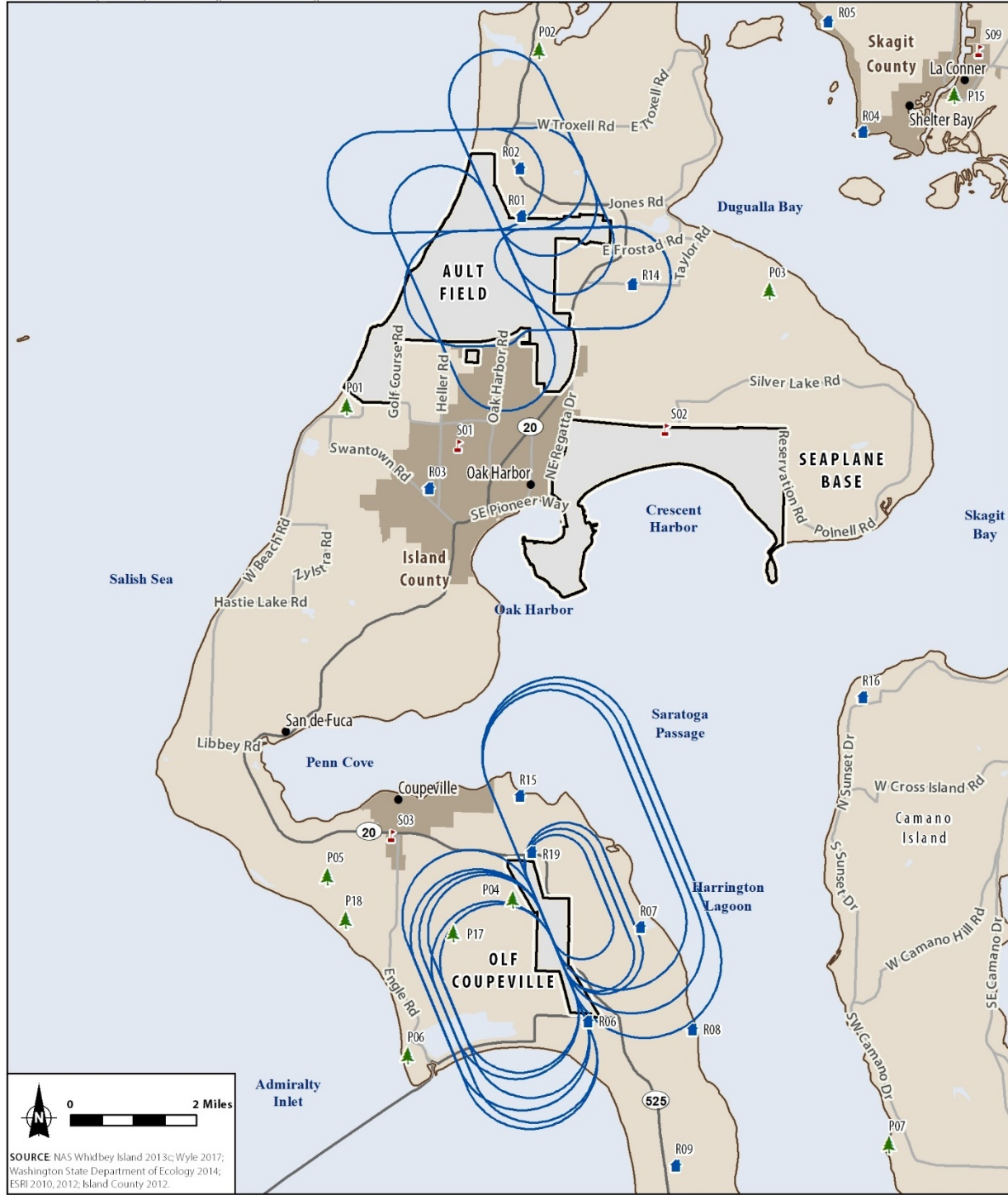
Ault Field and OLF Coupeville meet all the operational requirements and have sufficient capacity under routine operating conditions to support the airfield operations of the additional Growler aircraft. Airfield operations at Ault Field may be adversely impacted under Scenario C of all the action alternatives, with approximately 80 percent of the FCLP operations conducted at Ault Field. Airfield operations at Ault Field under all scenarios would not result in significant adverse impacts to airfields and airspace at the NAS Whidbey Island complex.

Controlled Approaches, and FCLPs. Total airfield operations include all aircraft for Ault Field and OLF Coupeville. Total operations may differ between alternative and scenario due to varying training requirements and randomness inherent in modeling. In addition, the percentages depicted are used for general description of the scenarios.

4.1.1 Airspace and Airfield Operations, No Action Alternative

Under the No Action Alternative, the United States (U.S.) Department of the Navy (Navy) would not add additional EA-18G "Growler" aircraft or increase operations at Ault Field. Under the No Action Alternative, the FCLP patterns at OLF Coupeville would remain unchanged (Figure 4.1-1). The primary mission of OLF Coupeville is to support Growler FCLPs; however, MH-60 helicopter operations would continue to occur at OLF Coupeville. Helicopter operations total fewer than 400 operations annually and would be scheduled on a not-to-interfere basis with Growler operations.

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SOURCE NAS Whidbey Island 2013c; Wyle 2017; Washington State Department of Ecology 2014; ESRI 2010, 2012; Island County 2012.

- City
- County Boundary
- U.S. and State Highway
- Major Road
- City/Town Boundary
- Installation Area
- Points of Interest (POI)
- ▲ Park
- Residential
- School
- FCLP Flight Track

Figure 4.1-1
No Action Alternative FCLP Flight Tracks
 at NAS Whidbey Island Complex
 Whidbey Island, Island County, WA

4.1.2 Airspace and Airfield Operations, Alternative 1

Under Alternative 1, carrier capabilities would be expanded by adding three additional aircraft and associated aircrews to each existing carrier squadron and augmenting the Fleet Replacement Squadron (FRS) with eight additional aircraft and additional squadron personnel (a net increase of 35 aircraft and 335 personnel).

4.1.2.1 Airspace and Airfield Operations, Potential Impacts under Alternative 1

4.1.2.1.1 Airspace, Alternative 1

No changes are proposed to existing airspace under Alternative 1. Proposed Growler operations within controlled airspace and Special Use Airspace (SUA) in the vicinity of the NAS Whidbey Island complex would be similar to current Growler operations. Growler operations would occur in Ault Field's Class C controlled airspace, Class A and E controlled airspace, Alert Area-680, Naval Weapons Systems Training Facility (NWSTF) Boardman Okanogan A/B/C Military Operations Area (MOA), Olympic A/B MOAs, Roosevelt A/B MOAs, W-237 A/B/C/D/E/F/G/H/J, and Instrument Flight Rules (IR) and Visual Flight Rules (VR) Military Training Routes (MTRs) IR-341, IR-342, IR-343, IR-344, IR-346, IR-348, VR-1350, VR-1351, VR-1352, VR-1353, VR-1354, and VR-1355. Training operations are analyzed under other NEPA documents that focus on all training activities, including Growler operations, occurring within a range complex or MOA, and involve many different types of aircraft, ships, and range complex enhancements. Growler training occurring in Okanogan, Roosevelt, and Olympic MOAs and W-237 is analyzed in the 2010 Northwest Training Range Complex Final EIS/Overseas EIS (OEIS). The 2015 Northwest Training and Testing EIS/OEIS analyzed a small increase in Growler training in the Olympic MOAs and W-237.

Existing Growler aircraft that are transiting from Ault Field's Class C controlled airspace to nearby military training areas (Olympic, Okanogan, Roosevelt, and NWSTF Boardman) fly at altitudes between 14,000 feet and 16,000 feet above mean sea level (MSL). The aircrews that train with aircraft in the MOAs and NWSTF Boardman arrive in the SUA via established, standard flight routes within the national airspace system and are under the direct control of the Federal Aviation Administration (FAA).

Under all alternatives, the number of transits to all training areas would increase by approximately two or three flights per day. Proposed Growler operations would transit between Ault Field and military training areas (Olympic, Okanogan, Roosevelt, and NWSTF Boardman) in a similar manner as existing Growlers (at altitudes between 14,000 feet and 23,000 feet above MSL) and would generate similar sound levels. Because the area between Ault Field and the military training areas is mountainous, the associated altitude above ground level (AGL) would range from approximately 6,000 feet AGL to 16,000 feet AGL. Therefore, Growler aircraft operating at these transit altitudes would create a sound exposure level (SEL) at ground level between 69 and 84 decibels (dB) and a maximum A-weighted sound level (L_{max}) of 54 to 72 dB, comparable to the sound level of a passing automobile. Noise metrics are outlined in Section 3.2. The public would hear noise from aircraft overflights if they are in the vicinity of an event. However, these effects would occur on a temporary and intermittent basis. All flight activity within 10 miles of the NAS Whidbey Island complex is analyzed in more detail in Section 4.2.

The cumulative effects of Growler training associated with this alternative and Growler training that occurs outside the study area of this EIS, which are addressed in other NEPA documents, are analyzed in the cumulative impacts chapter of this EIS (see Chapter 5).

Airspace usage and capacity were analyzed by evaluating flight track congestion in the NAS Whidbey Island complex by counting the number of aircraft using a specific flight track at the time the next arriving aircraft requests to use that flight track. Projected MTR operations would increase under Alternative 1 by approximately 32 percent across the 12 MTRs listed above, as shown in Table 4.1-1, and the MTRs would have sufficient capacity for the increased operations. SUA in the vicinity of the NAS Whidbey Island complex (listed above) was evaluated to ensure adequate capacity for increased operations generated by the Proposed Action. Additionally, this alternative would not change existing procedures for airspace access for civil aviation transiting airspace under the control of the NAS Whidbey Island air traffic control (ATC) Facility, located at Ault Field. Therefore, implementation of Alternative 1 would not result in significant impacts to airspace.

Table 4.1-1 Annual Military Training Route Operations¹ in the Affected Environment

<i>Route Type</i>	<i>No Action</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
IR-341	12	16	16	16
IR-342	7	10	10	10
IR-343	0	0	0	0
IR-344	192	254	260	258
IR-346	62	82	85	84
IR-348	34	44	46	45
Total IFR Routes	308	413	417	413
VR-1350	743	980	1,006	997
VR-1351	108	143	146	145
VR-1352	62	82	85	84
VR-1353	26	35	36	35
VR-1354	5	6	7	6
VR-1355	1,058	1,395	1,432	1,420
Total VFR Routes	2,002	2,641	2,712	2,688
Total for All VFR and IFR Routes	2,310	3,046	3,128	3,101

Note:

¹ Estimated

Key:

IFR = Instrument Flight Rules

VFR = Visual Flight Rules

4.1.2.1.2 Airfield Operations, Alternative 1

Table 4.1-2 presents the projected number of aircraft operations at the NAS Whidbey Island complex under Alternative 1 as compared to the No Action Alternative. There is a net increase of 35 Growler aircraft under Alternative 1; total annual airfield operations for the NAS Whidbey Island complex would increase from approximately 84,700 to approximately 112,600, a 33-percent increase. This increase represents a level of operation similar to historical levels of operations experienced over the life of the NAS Whidbey Island complex (see Section 1.4). Under any scenario, the Proposed Action represents an increase in the number of operations at both Ault Field and OLF Coupeville. Aircraft operations are presented for the Growler squadrons, all other aircraft, and total operations ("other aircraft" are defined as all stationed and transient aircraft that utilize Ault Field and OLF Coupeville). Although the

MH-60 helicopters, C-40A aircraft, and transient aircraft would continue to operate at Ault Field, operations of these aircraft types are represented in the category entitled “all other aircraft operations” as part of the Proposed Action because the projected operations are not expected to change. Ault Field and OLF Coupeville meet all the operational requirements and have sufficient capacity under routine operating conditions to support the airfield operations of the additional Growler aircraft, given the increase in operations is consistent with previous levels of operations as described in Section 1.4.

Operation and maintenance of additional Growler aircraft would continue to adhere to established procedures in the affected environment. Further analysis related to impacts from personnel, maintenance operations, and environmental impacts are detailed later in Chapter 4 to include socioeconomics (see Section 4.10.2), hazardous materials (see Section 4.15.2), direct and indirect stationary air emissions (see Section 4.4), and land use (4.5.2).

Ault Field

Projected operations at Ault Field would include arrivals, departures, FCLPs, and other pattern operations, as depicted in Figures 3.1-3 to 3.1-5. FCLPs for Ault Field under Alternative 1 are depicted in Figure 4.1-2. The majority of airfield operations at Ault Field are conducted on runways 14 and 25, primarily due to prevailing wind conditions, but also due to noise-abatement procedures when allowed by weather conditions. See Section 3.2.4.1 for a noise-complaint and noise-abatement discussion. Noise-abatement procedures would continue to be followed under all alternatives analyzed as part of the Proposed Action. See Figure 1.2-2 for runway designations.

During an average year, total airfield operations at Ault Field would result in an increase of 9,100 projected operations under Scenario A, when 20 percent of all FCLPs would be conducted at Ault Field, to an increase of 25,000 projected operations under Scenario C, when 80 percent of all FCLPs would be conducted at Ault Field (Table 4.1-2). Compared to Scenarios A, B, and D, impacts related to airspace congestion would be experienced with greater frequency under Scenarios C and E at Ault Field. Airfield operations at Ault Field would be adversely impacted under the alternatives with 80 percent (Scenario C) or more of the FCLPs conducted at Ault Field. Under Scenario C, an expected increase in scheduling challenges and mission delays could occur at Ault Field, which in turn could cause deficiencies in pilot proficiency and unit readiness. These scheduling delays could result in flights and training occurring at Ault Field later into the night. The numbers above represent the average year conditions. Overall, Alternative 1 would not result in adverse impacts to airspace at Ault Field from proposed Growler operations. There would be an impact to operations when 80 percent of FCLP operations are conducted at Ault Field (Scenario C) due to instances of pattern congestion. As stated in Section 3.1.2, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. Since Ault Field is a major airfield supporting home based aircraft as well as transient aircraft, a significantly greater number of operations occur at Ault Field than at OLF Coupeville, which is primarily used for FCLP.

In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A, Aircraft Noise Study. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations at Ault Field would increase approximately 1 to 2 percent across all operational scenarios as compared to the corresponding alternative (see Appendix A).

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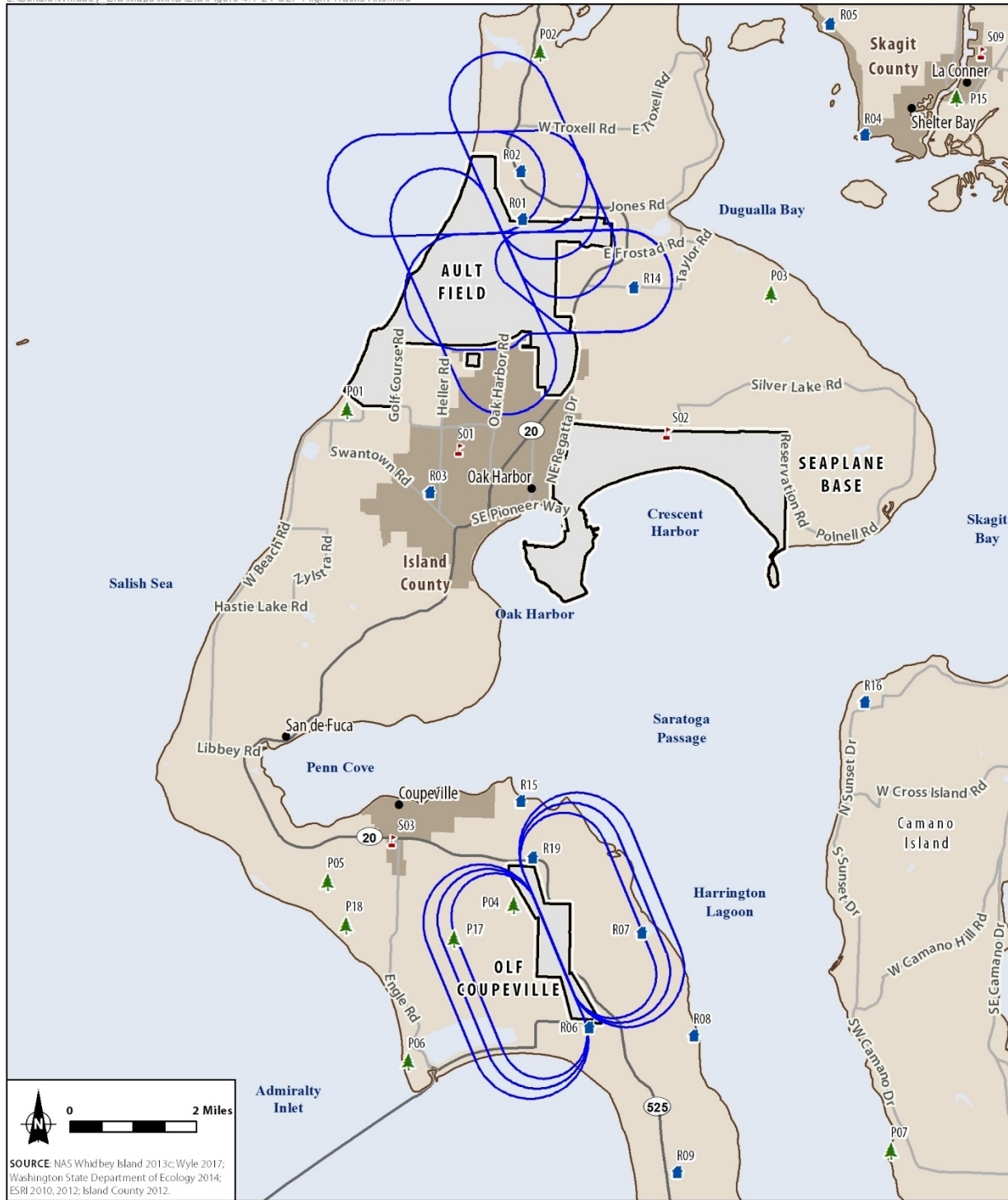


Figure 4.1-2
Alternatives 1-3 FCLP Flight Tracks
 Whidbey Island, Island County, WA

OLF Coupeville

Airfield operations at OLF Coupeville would primarily be conducted by the Growler squadrons and would include arrivals, departures, other pattern operations, and FCLPs, as depicted in Figures 3.1-3 through 3.1-5. FCLPs at OLF Coupeville under Alternative 1 are depicted in Figure 4.1-2. At OLF Coupeville, annual airfield operations would result in an increase of 18,800 operations during an average year under Scenario A, when 80 percent of the FCLPs would be conducted at OLF Coupeville, to an increase of 100 operations during an average year under Scenario C, when 20 percent of the FCLPs would be conducted at OLF Coupeville (Table 4.1-2). The numbers above represent the average year conditions. Overall, Alternative 1 would not result in significant adverse impacts to airspace at OLF Coupeville from proposed Growler operations. There are no congestion concerns for OLF Coupeville under any of the scenarios. As previously stated, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. As such, under all scenarios, periods of concentrated FCLP training would occur more frequently. Periods of FCLP training are often followed by several days or weeks with little or no activity because squadrons are deployed. A typical training session lasts for about 45 minutes, with three to five aircraft participating, and may occur several times during a 24-hour period. FCLP training schedules are managed by NAS Whidbey Island complex Air Operations and the VAQ Wing to ensure operations remain consistent with conditions studied under NEPA.

Historically, the runway utilization goal at OLF Coupeville has been to split FCLPs equally between Runways 14 and 32. In recent years, however, due to a non-standard pattern on Runway 14, the utilization of Runway 14 has been significantly lower. The Proposed Action involves modifications to the FCLP patterns at OLF Coupeville primarily due to the non-standard pattern on Runway 14. This narrower pattern requires an unacceptably steep bank angle for the Growler due to performance differences from the Prowler's flight capabilities, resulting in limited use of Runway 14. The modifications of the FCLP patterns will also maintain the same pattern for both day and night operations as opposed to current operations, which change the pattern between day and night. The proposed OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-2. The proposed flight profile would be similar to the current one, with the downwind leg having a 600-foot altitude relative to the runway. Under Alternative 1 (and all alternatives), these patterns would be used in order to improve the standardization of training and enable more use of Runway 14. The standard FCLP patterns would result in runway use percentages based on the prevailing winds rather than aircraft performance and quality of training. Based on historical meteorological conditions at the OLF, the projected runway utilization for Runway 14 is approximately 30 percent, and the remaining percentage would be utilized on Runway 32.

Implementation of Alternative 1 would increase total airfield operations by up to 289 percent above the No Action Alternative. However, Alternative 1 would not require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures in order to accommodate the increased air traffic.

In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A, Aircraft Noise Study. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations could increase approximately 9 to 10 percent at OLF Coupeville based on the operational scenarios selected as compared to the corresponding alternative (see Appendix A).

4.1.2.1.3 Alternative 1 Conclusion

Overall, Alternative 1 would not result in significant adverse impacts to airfields and airspace at the NAS Whidbey Island complex from proposed Growler operations. There would be impacts to operations when 80 percent of FCLPs (Scenario C) are conducted at Ault Field due to instances of pattern congestion. There would be an increase of 9,100 to 25,000 annual aircraft operations at Ault Field and an increase of 100 to 18,800 annual aircraft operations at OLF Coupeville, depending on the scenario selected. Growler operations would be conducted in a manner similar to the current Navy aircraft training missions conducted at the NAS Whidbey Island complex with the exception of standardizing the FCLP pattern for Runway 14 at OLF Coupeville utilizing the same pattern for day and night operations. There would be increases in the number of annual operations that would be consistent with previous levels, but additional Growler operations would not require changes to the structure of the affected SUA, and current safety procedures would continue to be emphasized.

Table 4.1-2 Comparison of Modeled No Action Alternative and Alternative 1, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex^{1, 5, 7, 8, 9}

<i>Aircraft Type</i>	<i>FCLP²</i>	<i>Other Operations³</i>	<i>Total</i>	<i>Total Change from No Action⁶</i>
Average Year Scenarios for Ault Field				
No Action	11,300	66,900	78,200	
Alternative 1, Scenario A (20% of FCLPs at Ault Field)				
Growler	6,100	67,000	73,100	
All Other Aircraft ^{4, 6}	0	14,200	14,200	
Total Airfield Operations	6,100	81,200	87,300	+9,100
Alternative 1, Scenario B (50% of FCLPs at Ault Field)				
Growler	15,500	65,600	81,100	
All Other Aircraft ^{4, 6}	0	14,200	14,200	
Total Airfield Operations	15,500	79,800	95,300	+17,100
Alternative 1, Scenario C (80% of FCLPs at Ault Field)				
Growler	24,900	64,400	89,300	
All Other Aircraft ^{4, 6}	0	13,900	13,900	
Total Airfield Operations	24,900	78,300	103,200	+25,000
Alternative 1, Scenario D (30% of FCLPs at Ault Field)				
Growler	9,200	66,600	75,800	
All Other Aircraft ^{4, 6}	0	14,200	14,200	
Total Airfield Operations	9,200	80,800	90,000	+11,800
Alternative 1, Scenario E (70% of FCLPs at Ault Field)				
Growler	21,700	64,800	86,500	
All Other Aircraft ^{4, 6}	0	13,900	13,900	
Total Airfield Operations	21,700	78,700	100,400	+22,200

Table 4.1-2 Comparison of Modeled No Action Alternative and Alternative 1, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex^{1, 5, 7, 8, 9}

<i>Aircraft Type</i>	<i>FCLP²</i>	<i>Other Operations³</i>	<i>Total</i>	<i>Total Change from No Action⁶</i>
<i>Average Year Scenarios for OLF Coupeville</i>				
No Action	6,100	400	6,500	
<i>Alternative 1, Scenario A (80% of FCLPs at OLF Coupeville)</i>				
Growler	24,900	0	24,900	
All Other Aircraft ^{4, 6}	0	400	400	
Total Airfield Operations	24,900	400	25,300	+18,800
<i>Alternative 1, Scenario B (50% of FCLPs at OLF Coupeville)</i>				
Growler	15,500	0	15,500	
All Other Aircraft ^{4, 6}	0	400	400	
Total Airfield Operations	15,500	400	15,900	+9,400
<i>Alternative 1, Scenario C (20% of FCLPs at OLF Coupeville)</i>				
Growler	6,200	0	6,200	
All Other Aircraft ^{4, 6}	0	400	400	
Total Airfield Operations	6,200	400	6,600	+100
<i>Alternative 1, Scenario D (70% of FCLPs at OLF Coupeville)</i>				
Growler	21,800	0	21,800	
All Other Aircraft ^{4, 6}	0	400	400	
Total Airfield Operations	21,800	400	22,200	+15,700
<i>Alternative 1, Scenario E (30% of FCLPs at OLF Coupeville)</i>				
Growler	9,300	0	9,300	
All Other Aircraft ^{4, 6}	0	400	400	
Total Airfield Operations	9,300	400	9,700	+3,200
<i>Average Year Scenarios for the NAS Whidbey Island Complex</i>				
No Action Total	17,400	67,300	84,700	
<i>Alternative 1, Scenario A</i>				
Total Airfield Operations	31,000	81,600	112,600	+27,900
<i>Alternative 1, Scenario B</i>				
Total Airfield Operations	31,000	80,200	111,200	+26,500
<i>Alternative 1, Scenario C</i>				
Total Airfield Operations	31,100	78,700	109,800	+25,100
<i>Alternative 1, Scenario D</i>				
Total Airfield Operations	31,000	81,200	112,200	+27,500
<i>Alternative 1, Scenario E</i>				
Total Airfield Operations	31,000	79,100	110,100	+25,400

Table 4.1-2 Comparison of Modeled No Action Alternative and Alternative 1, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex^{1, 5, 7, 8, 9}

<i>Aircraft Type</i>	<i>FCLP²</i>	<i>Other Operations³</i>	<i>Total</i>	<i>Total Change from No Action⁶</i>
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Source: Wyle, 2017

Notes:

- ¹ Three-digit numbers are rounded to nearest 100 if ≥ to 100; two-digit numbers are rounded to the nearest 10 if ≥ 10 or if between 1 and 9.
- ² Each FCLP pass = 2 operations (one arrival and one departure).
- ³ Other operations include Touch-and-Goes, Depart and Re-enter, and Ground Controlled Approaches.
- ⁴ All other aircraft include P-8A, H-60, C-40, and transient aircraft. The 400 other operations at OLF Coupeville are H-60 search and rescue helicopter operations.
- ⁵ An operation is defined as one arrival or one departure.
- ⁶ The number of operations fluctuates slightly between alternative and scenario due to varying training requirements and randomness inherent in modeling.
- ⁷ The NAS Whidbey Island complex includes Ault Field and OLF Coupeville.
- ⁸ Scenario A: 20 percent of FCLPs conducted at Ault Field, and 80 percent conducted at OLF Coupeville; Scenario B: 50 percent of FCLPs conducted at Ault Field, and 50 percent conducted at OLF Coupeville; Scenario C: 80 percent of FCLPs conducted at Ault Field, and 20 percent conducted at OLF Coupeville; Scenario D: 30 percent of FCLPs conducted at Ault Field, and 70 percent conducted at OLF Coupeville; Scenario E: 70 percent of FCLPs conducted at Ault Field, and 30 percent conducted at OLF Coupeville.
- ⁹ Since the publication of the Draft EIS, two new operational scenarios for each action alternative have been added to the analysis. In addition, several updates were applied to the noise analysis; these included incorporation of Precision Landing Mode, which reduces FCLP requirements by approximately 20 percent and leads to a reduction in FCLP operations, across all scenarios and updating the number of pilots per squadron (reduction); see Section 1.13.

Key:

- FCLP = field carrier landing practice
- OLF = outlying landing field

4.1.3 Airspace and Airfield Operations, Alternative 2

Under Alternative 2, expeditionary and carrier capabilities would be expanded by adding two expeditionary squadrons, two additional aircraft to each existing carrier squadron, and eight additional aircraft to the training squadron (a net increase of 36 aircraft and 628 personnel).

4.1.3.1 Airspace and Airfield Operations, Potential Impacts under Alternative 2

The potential impacts and analysis are similar to Alternative 1. The Proposed Action would have a minor impact to local area civil and commercial aviation airspace use because, although the additional Growler aircraft would be operating with an increased frequency, they would be doing so within the same flight parameters currently used by aircraft under existing conditions within the controlled airspace surrounding the NAS Whidbey Island complex. Airfield operations at OLF Coupeville would not be adversely affected under any scenario. Airfield operations at Ault Field will be adversely impacted under the Proposed Action, Alternative 2, with 80 percent or more of the FCLPs conducted at Ault Field, under Scenario C. An expected increase in scheduling challenges and mission delays would occur at Ault Field under Scenario C, which could cause intermittent deficiencies in pilot proficiency and unit readiness. When more FCLPs are flown at Ault Field, other flights and aircrews training with aircraft at Ault Field are restricted or delayed. This causes more people off base to be affected because training is extended later into the night, and more aircraft are held in larger or extended flight patterns while FCLPs are conducted.

4.1.3.1.1 Airspace, Alternative 2

No changes are proposed to existing airspace under Alternative 2. Proposed Growler operations within controlled airspace and SUA in the vicinity of the NAS Whidbey Island complex would be similar to current Growler operations. Proposed Growler operations would transit between Ault Field and military training areas in a similar manner to that used by existing Growlers and would generate similar sound levels. Projected MTR operations would increase under Alternative 2 by approximately 35 percent across the MTRs, as shown in Table 4.1-1, and the MTRs would have sufficient capacity for the increased operations. SUA in the vicinity of the NAS Whidbey Island complex was evaluated to ensure adequate capacity for increased operations generated by the Proposed Action. Additionally, this alternative would not change existing procedures for airspace access for civil aviation transiting airspace under control of the NAS Whidbey Island ATC Facility, located at Ault Field. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced. Therefore, implementation of Alternative 2 would not result in significant impacts to airspace.

4.1.3.1.2 Airfield Operations, Alternative 2

Table 4.1-3 presents the projected number of aircraft operations at the NAS Whidbey Island complex under Alternative 2 as compared to the No Action Alternative. There is a net increase of 36 Growler aircraft under Alternative 2; total annual airfield operations for the NAS Whidbey Island complex would increase from approximately 84,700 to approximately 112,100--a 32-percent increase. Aircraft operations are presented for the Growler squadrons, all other aircraft, and total operations. All other aircraft in addition to transient aircraft would continue to operate at Ault Field as part of the Proposed Action because the projected operations are not expected to change for these aircraft.

Ault Field

Projected operations at Ault Field would include arrivals, departures, FCLPs, and other pattern operations (i.e., touch-and-go [T&G] operations and Ground Controlled Approach [GCA]/Carrier Controlled Approach [CCA] patterns) as depicted in Figures 3.1-3 through 3.1-5. FCLPs for Ault Field under Alternative 2 are depicted in Figure 4.1-2. The majority of airfield operations at Ault Field are conducted on runways 14 and 25, primarily due to prevailing wind conditions but also due to noise-abatement procedures when allowed by weather conditions. See Section 3.2.4.1 for noise-complaint and noise-abatement discussion. Noise-abatement procedures would continue to be followed under the Proposed Action. See Figure 1.2-2 for runway designations.

During an average year, total airfield operations at Ault Field would result in an increase of 9,800 projected operations under Scenario A, when 20 percent of all FCLPs would be conducted at Ault Field, to an increase of 25,000 projected operations under Scenario C, when 80 percent of all FCLPs would be conducted at Ault Field (Table 4.1-3). As compared to Scenarios A, B, and D, impacts related to airspace congestion would be experienced with greater frequency under Scenarios C and E at Ault Field. Airfield operations at Ault Field would be adversely impacted under the alternatives with 80 percent or more of the FCLPs conducted at Ault Field. FCLP schedules are managed by NAS Whidbey Island complex Air Operations and the VAQ Wing. Under Scenario C, an expected increase in scheduling challenges and mission delays could occur at Ault Field, which in turn could cause deficiencies in pilot proficiency and unit readiness. These scheduling delays could result in flights and training occurring at Ault Field later into the night. The numbers above represent the average year conditions. Overall, Alternative 2 would not result in significant adverse impacts to airspace at Ault Field from proposed Growler operations. There would be an impact to operations when 80 percent of operations are conducted at Ault Field (Scenario C) due to instances of pattern congestion. The need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. Since Ault Field is a major airfield supporting home based aircraft as well as transient aircraft, a larger number of operations occur at Ault Field than at OLF Coupeville, which is primarily used for FCLP.

In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A, Aircraft Noise Study. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations at Ault Field increase approximately 1 to 3 percent, based on the operational scenario selected (see Appendix A).

OLF Coupeville

Airfield operations at OLF Coupeville would primarily be conducted by the Growler squadrons and would include arrivals, departures, other pattern operations, and FCLPs, as depicted in Figures 3.1-3 through 3.1-5. FCLPs at OLF Coupeville under Alternative 2 are depicted in Figure 4.1-2. At OLF Coupeville, annual airfield operations would result in an increase of 17,600 operations during an average year under Scenario A, when 80 percent of the FCLPs would be conducted at OLF Coupeville, to a decrease of 200 operations during an average year under Scenario C, when 20 percent of the FCLPs would be conducted at OLF Coupeville (Table 4.1-3). The numbers above represent the average year conditions. Overall, Alternative 2 would not result in significant adverse impacts to airspace at OLF Coupeville from proposed Growler operations. There are no congestion concerns for OLF Coupeville under any of the scenarios. As previously stated, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. As such, under all

scenarios, periods of concentrated FCLP training will occur more frequently. Periods of FCLP training are often followed by several days or weeks with little or no activity because squadrons are deployed. A typical FCLP training session lasts for about 45 minutes, with three to five aircraft participating, and may occur several times during a 24-hour period. FCLP training schedules will be managed by NAS Whidbey Island complex Air Operations and the VAQ Wing to ensure operations remain consistent with conditions studied under NEPA.

The OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-2; under Alternative 2 (as stated for Alternative 1), these patterns would be used in order to improve the standardization of training and enable more use of Runway 14. The standard FCLP patterns would result in runway use percentages based on the prevailing winds. Based on meteorological conditions at the OLF, the projected runway utilization for Runway 14 is approximately 30 percent, and the remaining percentage is to be utilized on Runway 32. Additionally, for aircraft performance, safety, and improved training quality, the increased use of standard FCLP flight tracks for OLF Coupeville is expected to continue.

Implementation of Alternative 2 would increase total airfield operations by up to 270 percent above the No Action Alternative. However, Alternative 2 would not require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures in order to accommodate the increased air traffic.

The numbers above represent the average number of operations. In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations would increase approximately 9 to 10 percent at OLF Coupeville based on the operational scenario selected as compared to the corresponding alternative (see Appendix A).

The OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-2; under Alternative 2 (as stated for Alternative 1), these patterns would be used in order to improve the standardization of training and enable more use of Runway 14. The standard FCLP patterns would result in runway use percentages based on the prevailing winds. Based on meteorological conditions at the OLF, the projected runway utilization for Runway 14 is approximately 30 percent, and the remaining percentage is to be utilized on Runway 32. Additionally, for aircraft performance, safety, and improved training quality, the increased use of standard FCLP flight tracks for OLF Coupeville is expected to continue.

4.1.3.1.3 Alternative 2 Conclusion

Overall, Alternative 2 would not result in significant adverse impacts to airfields and airspace at the NAS Whidbey Island complex from proposed Growler operations. There would be an increase of 9,800 to 25,000 annual aircraft operations at Ault Field and a decrease of 200 to an increase of 17,600 annual aircraft operations at OLF Coupeville, depending on the scenario selected. Growler operations would be conducted in a manner similar to the current Navy missions conducted by aircraft training at the NAS Whidbey Island complex with the exception of standardizing the FCLP pattern for Runway 14 at OLF Coupeville. There would be increases in the number of annual operations, additional Growler operations would not require changes to the structure of the affected SUA, and current safety procedures would continue to be emphasized.

Table 4.1-3 Comparison of Modeled No Action Alternative and Alternative 2, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex^{1, 5, 7, 8, 9}

<i>Aircraft Type</i>	<i>FCLP²</i>	<i>Other Operations³</i>	<i>Total</i>	<i>Total Change from No Action⁶</i>
Average Year Scenarios for Ault Field				
No Action	11,300	66,900	78,200	
Alternative 2, Scenario A (20% of FCLPs at Ault Field)				
Growler	5,900	67,900	73,800	
All Other Aircraft ^{3, 5}	0	14,200	14,200	
Total Airfield Operations	5,900	82,100	88,000	+9,800
Alternative 2, Scenario B (50% of FCLPs at Ault Field)				
Growler	14,800	66,500	81,300	
All Other Aircraft ^{3, 5}	0	14,200	14,200	
Total Airfield Operations	14,800	80,700	95,500	+17,300
Alternative 2, Scenario C (80% of FCLPs at Ault Field)				
Growler	23,700	65,400	89,100	
All Other Aircraft ^{3, 5}	0	14,100	14,100	
Total Airfield Operations	23,700	79,500	103,200	+25,000
Alternative 2, Scenario D (30% of FCLPs at Ault Field)				
Growler	8,900	67,500	76,400	
All Other Aircraft ^{3, 5}	0	14,200	14,200	
Total Airfield Operations	8,900	81,700	90,600	+12,400
Alternative 2, Scenario E (70% of FCLPs at Ault Field)				
Growler	20,800	65,800	86,600	
All Other Aircraft ^{3, 5}	0	14,100	14,100	
Total Airfield Operations	20,800	79,900	100,700	+22,500
Average Year Scenarios for OLF Coupeville				
No Action	6,100	400	6,500	
Alternative 2, Scenario A (80% of FCLPs at OLF Coupeville)				
Growler	23,700	0	23,700	
All Other Aircraft ³	0	400	400	
Total Airfield Operations	23,700	400	24,100	+17,600
Alternative 2, Scenario B (50% of FCLPs at OLF Coupeville)				
Growler	14,800	0	14,800	
All Other Aircraft ³	0	400	400	
Total Airfield Operations	14,800	400	15,200	+8,700
Alternative 2, Scenario C (20% of FCLPs at OLF Coupeville)				
Growler	5,900	0	5,900	
All Other Aircraft ³	0	400	400	
Total Airfield Operations	5,900	400	6,300	-200
Alternative 2, Scenario D (70% of FCLPs at OLF Coupeville)				
Growler	20,800	0	20,800	
All Other Aircraft ^{3, 5}	0	400	400	
Total Airfield Operations	20,800	400	21,200	+14,700
Alternative 2, Scenario E (30% of FCLPs at OLF Coupeville)				
Growler	8,900	0	8,900	
All Other Aircraft ^{3, 5}	0	400	400	
Total Airfield Operations	8,900	400	9,300	+2,800

Table 4.1-3 Comparison of Modeled No Action Alternative and Alternative 2, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex^{1, 5, 7, 8, 9}

<i>Aircraft Type</i>	<i>FCLP²</i>	<i>Other Operations³</i>	<i>Total</i>	<i>Total Change from No Action⁶</i>
Average Year Scenarios for the NAS Whidbey Island Complex				
No Action Total	17,400	67,300	84,700	
Alternative 2, Scenario A				
Total Airfield Operations	29,600	82,500	112,100	+27,400
Alternative 2, Scenario B				
Total Airfield Operations	29,600	81,100	110,700	+26,000
Alternative 2, Scenario C				
Total Airfield Operations	29,600	79,900	109,500	+24,800
Alternative 2, Scenario D				
Total Airfield Operations	29,700	82,100	111,800	+27,100
Alternative 2, Scenario E				
Total Airfield Operations	29,700	80,300	110,000	+25,300

Source: Wyle, 2017

Notes:

- ¹ Three-digit numbers are rounded to nearest 100 if \geq to 100; two-digit numbers are rounded to the nearest 10 if \geq 10 or if between 1 and 9.
- ² Each FCLP pass = 2 operations (one arrival and one departure).
- ³ Other operations include Touch-and-Goes, Depart and Re-enter, and Ground Controlled Approaches.
- ⁴ All other aircraft include P-8A, H-60, C-40, and transient aircraft. The 400 other operations at OLF Coupeville are H-60 search and rescue helicopter operations.
- ⁵ An operation is defined as one arrival or one departure.
- ⁶ The number of operations fluctuates slightly between alternative and scenario due to varying training requirements and randomness inherent in modeling.
- ⁷ The NAS Whidbey Island complex includes Ault Field and OLF Coupeville.
- ⁸ Scenario A: 20 percent of FCLPs conducted at Ault Field, and 80 percent conducted at OLF Coupeville; Scenario B: 50 percent of FCLPs conducted at Ault Field, and 50 percent conducted at OLF Coupeville; Scenario C: 80 percent of FCLPs conducted at Ault Field, and 20 percent conducted at OLF Coupeville; Scenario D: 30 percent of FCLPs conducted at Ault Field, and 70 percent conducted at OLF Coupeville; Scenario E: 70 percent of FCLPs conducted at Ault Field, and 30 percent conducted at OLF Coupeville.
- ⁹ Since the publication of the Draft EIS, two new operational scenarios for each action alternative have been added to the analysis. In addition, several updates were applied to the noise analysis; these included incorporation of Precision Landing Mode, which reduces FCLP requirements by approximately 20 percent and leads to a reduction in FCLP operations, across all scenarios and updating the number of pilots per squadron (reduction); see Section 1.13.

Key:

FCLP = field carrier landing practice
 OLF = outlying landing field

4.1.4 Airspace and Airfield Operations, Alternative 3

Under Alternative 3, expeditionary and carrier capabilities would be expanded by adding three additional aircraft to each existing expeditionary squadron, adding two additional aircraft to each existing carrier squadron, augmenting the FRS with nine additional aircraft, and adding additional squadron personnel (a net increase of 36 aircraft and 341 personnel).

4.1.4.1 Airspace and Airfield Operations, Potential Impacts under Alternative 3

The potential impacts and analysis are similar to those of Alternatives 1 and 2. The Proposed Action would have a minor impact to local area civil and commercial aviation airspace use because although the additional Growler aircraft would be operating with an increased frequency they would be doing so within the same flight parameters currently used by aircraft under existing conditions within the controlled airspace surrounding the NAS Whidbey Island complex. Airfield operations at OLF Coupeville would not be adversely affected under any scenario. Airfield operations at Ault Field will be adversely impacted under the Proposed Action, Alternative 3, with 80 percent or more of the FCLPs conducted at Ault Field. An expected increase in scheduling challenges and mission delays could occur at Ault Field under Scenario C, which could cause intermittent deficiencies in pilot proficiency and unit readiness. When more FCLPs are flown at Ault Field, other flights and aircrews training with aircraft at Ault Field are restricted or delayed. This causes flights and training occurring at Ault Field later into the night, and more aircraft are held in larger or extended flight patterns while FCLP is conducted.

4.1.4.1.1 Airspace, Alternative 3

No changes are proposed to existing airspace under Alternative 3, and analysis is similar to that of Alternatives 1 and 2. Proposed Growler operations within controlled airspace and SUA in the vicinity of the NAS Whidbey Island complex would be similar to current Growler operations. Proposed Growler operations would transit between Ault Field and military training areas in a similar manner to those used by existing Growlers and would generate similar sound levels. Projected MTR operations would increase under Alternative 3 by approximately 34 percent across the MTRs, as shown in Table 4.1-1, and the MTRs would have sufficient capacity for the increased operations. SUA in the vicinity of the NAS Whidbey Island complex was evaluated to ensure adequate capacity for increased operations generated by the Proposed Action. Additionally, this alternative would not change existing procedures for airspace access for civil aviation transiting airspace under the control of the NAS Whidbey Island ATC Facility, located at Ault Field. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced. Therefore, implementation of Alternative 3 would not result in significant impacts to airspace.

4.1.4.1.2 Airfield Operations, Alternative 3

Table 4.1-4 presents the projected number of aircraft operations at the NAS Whidbey Island complex under Alternative 3 as compared to the No Action Alternative. There is a net increase of 36 Growler aircraft under Alternative 3; total annual airfield operations for the NAS Whidbey Island complex would increase from approximately 84,700 to approximately 111,800--a 32-percent increase. Aircraft operations are presented for the Growler squadrons, all other aircraft, and total operations. All other aircraft in addition to transient aircraft would continue to operate at Ault Field as part of the Proposed Action because the projected operations are not expected to change for these aircraft.

Ault Field

Projected operations at Ault Field would include arrivals, departures, FCLPs, and other pattern operations (i.e., T&G and GCA/CCA patterns) as depicted in Figures 3.1-3 through 3.1-5. FCLPs for Ault Field under Alternative 3 are depicted in Figure 4.1-2. The majority of airfield operations at Ault Field are conducted on runways 14 and 25 due to prevailing wind conditions but also due to noise-abatement procedures when allowed by existing weather conditions. See Section 3.2.4.1 for noise-complaint and noise-abatement discussion. Noise-abatement procedures would continue to be followed under the Proposed Action. See Figure 1.2-2 for runway designations.

During an average year, total airfield operations at Ault Field would result in an increase of 9,500 projected operations under Scenario A, when 20 percent of all FCLPs would be conducted at Ault Field, to an increase of 24,700 projected operations under Scenario C, when 80 percent of all FCLPs would be conducted at Ault Field (see Table 4.1-4). As compared to Scenarios A, B, and D, impacts related to airspace congestion would be experienced with greater frequency under Scenarios C and E at Ault Field. Airfield operations at Ault Field would be adversely impacted under the alternatives with 80 percent or more of the FCLPs conducted at Ault Field. Under Scenario C, an expected increase in scheduling challenges and mission delays could occur at Ault Field, which in turn could cause deficiencies in pilot proficiency and unit readiness. These scheduling delays could result in flights and training occurring at Ault Field later into the night. The numbers above represent the average year conditions. Overall, Alternative 3 would not result in significant adverse impacts to airspace at Ault Field from proposed Growler operations. There would be an impact to operations when 80 percent of operations are conducted at Ault Field (Scenario C) due to instances of pattern congestion. As previously stated, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. Since Ault Field is a major airfield supporting home based aircraft as well as transient aircraft, a larger number of operations occur at Ault Field than at OLF Coupeville, which is primarily used for FCLP.

In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations at Ault Field would increase approximately 0.5 to 2 percent based on the operational scenario selected as compared to the corresponding alternative (see Appendix A).

OLF Coupeville

Airfield operations at OLF Coupeville would primarily be conducted by the Growler squadrons and would include arrivals, departures, other pattern operations, and FCLPs, as depicted in Figures 3.1-3 through 3.1-5. FCLPs at OLF Coupeville under Alternative 3 are depicted in Figure 4.1-2. At OLF Coupeville, annual airfield operations would result in an increase of 17,600 operations during an average year under Scenario A, when 80 percent of the FCLPs would be conducted at OLF Coupeville, to a decrease of 200 operations during an average year under Scenario C, when 20 percent of the FCLPs would be conducted at OLF Coupeville (Table 4.1-4). The numbers above represent the average year conditions. Overall, Alternative 3 would not result in significant adverse impacts to airspace at OLF Coupeville from proposed Growler operations. There are no congestion concerns for OLF Coupeville under any of the scenarios. As previously stated, the need for FCLP training is largely dependent on operational deployment schedules and aircraft carrier qualification detachment schedules. As such, under all scenarios, periods of concentrated FCLP training will occur more frequently. Periods of FCLP training are

often followed by several days or weeks with little or no activity because squadrons are deployed. A typical training session lasts for about 45 minutes, with three to five aircraft participating, and may occur several times during a 24-hour period. FCLP training schedules will be managed by NAS Whidbey Island complex Air Operations and the VAQ Wing to ensure operations remain consistent with conditions studied under NEPA.

The OLF Coupeville FCLP patterns (day and night) are depicted in Figure 4.1-2; under Alternative 3 (as stated for Alternative 1), these patterns would be used in order to improve the standardization of training and enable more use of Runway 14. The standard FCLP patterns would result in runway use percentages based on the prevailing winds. Based on meteorological conditions at the OLF, the projected runway utilization for Runway 14 is approximately 30 percent, and the remaining percentage is to be utilized on Runway 32. Additionally, for aircraft performance, safety, and improved training quality, the increased use of standard FCLP flight tracks for OLF Coupeville is expected to continue.

Implementation of Alternative 3 would increase total airfield operations by up to 270 percent above the No Action Alternative. However, Alternative 3 would not require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures in order to accommodate the increased air traffic.

The numbers above represent the average number of operations. In order to provide a more transparent analysis for the public, high-tempo FCLP year data are provided in Appendix A. The high-tempo FCLP year data represent years when the number of events increases due to operational needs. During a high-tempo FCLP year, total airfield operations would increase approximately 9 to 11 percent at OLF Coupeville based on the operational scenario selected as compared to the corresponding alternative (see Appendix A).

4.1.4.1.3 Alternative 3 Conclusion

Overall, Alternative 3 would not result in significant adverse impacts to airfields and airspace at the NAS Whidbey Island complex from proposed Growler operations. There would be an increase of 9,500 to 24,700 annual aircraft operations at Ault Field and a decrease of 200 to an increase of 17,600 in annual aircraft operations at OLF Coupeville depending on the scenario selected. Growler operations would be conducted in a manner similar to the current Navy aircraft training missions conducted by aircraft at the NAS Whidbey Island complex with the exception of standardizing the FCLP pattern for Runway 14 at OLF Coupeville. There would be increases in the number of annual operations, additional Growler operations would not require changes to the structure of the affected SUA, and current safety procedures would continue to be emphasized.

Table 4.1-4 Comparison of Modeled No Action Alternative and Alternative 3, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex^{1, 5, 7, 8, 9}

<i>Aircraft Type</i>	<i>FCLP²</i>	<i>Other Operations³</i>	<i>Total</i>	<i>Total Change from No Action⁶</i>
Average Year Scenarios for Ault Field				
No Action	11,300	66,900	78,200	
Alternative 3, Scenario A (20% of FCLPs at Ault Field)				
Growler	5,900	67,700	73,600	
All Other Aircraft ^{3, 5}	0	14,100	14,100	
Total Airfield Operations	5,900	81,800	87,700	+9,500
Alternative 3, Scenario B (50% of FCLPs at Ault Field)				
Growler	14,800	66,600	81,400	
All Other Aircraft ^{3, 5}	0	13,900	13,900	
Total Airfield Operations	14,800	80,500	95,300	+17,100
Alternative 3, Scenario C (80% of FCLPs at Ault Field)				
Growler	23,700	65,200	88,900	
All Other Aircraft ^{3, 5}	0	14,000	14,000	
Total Airfield Operations	23,700	79,200	102,900	+24,700
Alternative 3, Scenario D (30% of FCLPs at Ault Field)				
Growler	8,900	67,300	76,200	
All Other Aircraft ^{3, 5}	0	14,100	14,100	
Total Airfield Operations	8,900	81,400	90,300	+12,100
Alternative 3, Scenario E (70% of FCLPs at Ault Field)				
Growler	20,700	65,600	86,300	
All Other Aircraft ^{3, 5}	0	14,000	14,000	
Total Airfield Operations	20,700	79,600	100,300	+22,100
Average Year Scenarios for OLF Coupeville				
No Action	6,100	400	6,500	
Alternative 3, Scenario A (80% of FCLPs at OLF Coupeville)				
Growler	23,700	0	23,700	
All Other Aircraft ³	0	400	400	
Total Airfield Operations	23,700	400	24,100	+17,600
Alternative 3, Scenario B (50% of FCLPs at OLF Coupeville)				
Growler	14,800	0	14,800	
All Other Aircraft ³	0	400	400	
Total Airfield Operations	14,800	400	15,200	+8,700
Alternative 3, Scenario C (20% of FCLPs at OLF Coupeville)				
Growler	5,900	0	5,900	
All Other Aircraft ³	0	400	400	
Total Airfield Operations	5,900	400	6,300	-200
Alternative 3, Scenario D (70% of FCLPs at OLF Coupeville)				
Growler	20,700	0	20,700	
All Other Aircraft ^{3, 5}	0	400	400	
Total Airfield Operations	20,700	400	21,100	+14,600
Alternative 3, Scenario E (30% of FCLPs at OLF Coupeville)				
Growler	8,900	0	8,900	
All Other Aircraft ^{3, 5}	0	400	400	
Total Airfield Operations	8,900	400	9,300	+2,800

Table 4.1-4 Comparison of Modeled No Action Alternative and Alternative 3, under All Scenarios (Average Year), Aircraft Operations at the NAS Whidbey Island Complex^{1, 5, 7, 8, 9}

<i>Aircraft Type</i>	<i>FCLP²</i>	<i>Other Operations³</i>	<i>Total</i>	<i>Total Change from No Action⁶</i>
Average Year Scenarios for the NAS Whidbey Island Complex				
No Action Total	17,400	67,300	84,700	
Alternative 3, Scenario A				
Total Airfield Operations	29,600	82,200	111,800	+27,100
Alternative 3, Scenario B				
Total Airfield Operations	29,600	80,900	110,500	+25,800
Alternative 3, Scenario C				
Total Airfield Operations	29,600	79,600	109,200	+24,500
Alternative 3, Scenario D				
Total Airfield Operations	29,600	81,800	111,400	+26,700
Alternative 3, Scenario E				
Total Airfield Operations	29,600	80,000	109,600	+24,900

Source: Wyle, 2017

Notes:

- ¹ Three-digit numbers are rounded to nearest 100 if ≥ to 100; two-digit numbers are rounded to the nearest 10 if ≥ 10 or if between 1 and 9.
- ² Each FCLP pass = two operations (one arrival and one departure).
- ³ Other operations include Touch-and-Goes, Depart and Re-enter, and Ground Controlled Approaches.
- ⁴ All other aircraft include P-8A, H-60, C-40, and transient aircraft. The 400 other operations at OLF Coupeville are H-60 search and rescue helicopter operations.
- ⁵ An operation is defined as one arrival or one departure.
- ⁶ The number of operations fluctuates slightly between alternative and scenario due to varying training requirements and randomness inherent in modeling.
- ⁷ The NAS Whidbey Island complex includes Ault Field and OLF Coupeville.
- ⁸ Scenario A: 20 percent of FCLPs conducted at Ault Field, and 80 percent conducted at OLF Coupeville; Scenario B: 50 percent of FCLPs conducted at Ault Field, and 50 percent conducted at OLF Coupeville; Scenario C: 80 percent of FCLPs conducted at Ault Field, and 20 percent conducted at OLF Coupeville; Scenario D: 30 percent of FCLPs conducted at Ault Field, and 70 percent conducted at OLF Coupeville; Scenario E: 70 percent of FCLPs conducted at Ault Field, and 30 percent conducted at OLF Coupeville.
- ⁹ Since the publication of the Draft EIS, two new operational scenarios for each action alternative have been added to the analysis. In addition, several updates were applied to the noise analysis; these included incorporation of Precision Landing Mode, which reduces FCLP requirements by approximately 20 percent and leads to a reduction in FCLP operations, across all scenarios and updating the number of pilots per squadron (reduction); see Section 1.13.

Key:

- FCLP = field carrier landing practice
- OLF = outlying landing field

4.1.5 Airspace and Airfield Operations Conclusion, Alternatives 1 through 3

4.1.5.1 Airspace Summary

Implementation of Alternatives 1 through 3 would increase total airfield operations by up to 33 percent at the NAS Whidbey Island complex. Table 4.1-5 lists airfield operations at NAS Whidbey Island. Additionally, under Alternatives 1 through 3, operations at Ault Field would increase up to a total of approximately 103,200 total annual airfield operations (Alternative 1, Scenario C, and Alternative 2, Scenario C). Likewise, operations at OLF Coupeville would increase, with a total of approximately 25,300 operations (Alternative 1, Scenario A). However, none of the alternatives would require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures in order to accommodate the increased air traffic. The expected volume of air traffic on each flight track would increase slightly (approximately one to two flights per day).

Table 4.1-5 Comparison of Alternatives, under All Scenarios (Average Year), and No Action Alternative for Total Aircraft Operations at the NAS Whidbey Island Complex^{1, 2, 4, 5}

<i>Aircraft Type</i>	<i>Ault Field³</i>	<i>OLF Coupeville³</i>	<i>Total Airfield Operations^{5, 6}</i>
<i>Average Year Scenarios</i>			
<i>Alternative 1</i>			
Scenario A	87,300	25,300	112,600
Scenario B	95,300	15,900	111,200
Scenario C	103,200	6,600	109,800
Scenario D	90,000	22,200	112,200
Scenario E	100,400	9,700	110,100
<i>Alternative 2</i>			
Scenario A	88,000	24,100	112,100
Scenario B	95,500	15,200	110,700
Scenario C	103,200	6,300	109,500
Scenario D	90,600	21,200	111,800
Scenario E	100,700	9,300	110,000
<i>Alternative 3</i>			
Scenario A	87,700	24,100	111,800
Scenario B	95,300	15,200	110,500
Scenario C	102,900	6,300	109,200
Scenario D	90,300	21,100	111,400
Scenario E	100,300	9,300	109,600
<i>No Action Alternative</i>			
No Action	78,200	6,500	84,700

Table 4.1-5 Comparison of Alternatives, under All Scenarios (Average Year), and No Action Alternative for Total Aircraft Operations at the NAS Whidbey Island Complex^{1, 2, 4, 5}

<i>Aircraft Type</i>	<i>Ault Field³</i>	<i>OLF Coupeville³</i>	<i>Total Airfield Operations^{5, 6}</i>
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Source: Wyle, 2016

Notes:

- ¹ Three-digit numbers are rounded to nearest 100 if ≥ to 100; two-digit numbers are rounded to the nearest 10 if ≥ 10 or if between 1 and 9.
- ² An operation is defined as one landing, one take-off, one approach, or one departure.
- ³ The number of operations fluctuates slightly between alternative and scenario due to varying training requirements and randomness inherent in modeling.
- ⁴ Scenario A: 20 percent of operations conducted at Ault Field and 80 percent conducted at OLF Coupeville; Scenario B: 50 percent of operations conducted at Ault Field; Scenario C: 80 percent of operations conducted at Ault Field.
- ⁵ The NAS Whidbey Island complex includes Ault Field and OLF Coupeville.
- ⁶ Total airfield operations are considered all aircraft operations that occur and include Touch-and-Goes, Depart and Re-enter, Ground Controlled Approaches, and FCLPs. Total airfield operations include all aircraft for Ault Field and OLF Coupeville. Detailed airfield operations tabulated by type of airfield operation are provided above.

Key:

OLF = outlying landing field

The Proposed Action for all alternatives would have no adverse effect on local area civil and commercial aviation airspace use because the additional Growler aircraft would be operating within the same flight parameters currently used by aircraft under existing conditions within the controlled airspace surrounding the NAS Whidbey Island complex. None of the alternatives would change existing procedures for airspace access or have an adverse impact to civil aviation transiting airspace under the control of the NAS Whidbey Island ATC Facility, located at Ault Field. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced. Therefore, implementation of any of the three alternatives would not result in significant impacts to airspace.

4.1.5.2 Airfield Operations Summary

Projected operations at Ault Field would include arrivals, departures, FCLPs, and other pattern operations (i.e., T&G and GCA patterns), as depicted in Figures 3.1-3 through 3.1-5. FCLPs for Ault Field are depicted in Figure 4.1-2. Airfield operations at Ault Field are primarily conducted on Runways 14 and 25 due to noise-abatement procedures and prevailing wind conditions. The primary mission of OLF Coupeville is to support Growler FCLPs; however, MH-60 helicopter operations would continue to occur at OLF Coupeville.

No changes are proposed to existing mission types (e.g., FCLP, T&G, etc.); however, flight operations are expected to increase with the increase in Growler aircraft and aircrews. Ault Field and OLF Coupeville meet all the operational requirements and have sufficient capacity under routine operating conditions to support the airfield operations of the additional Growler aircraft. Airfield operations at OLF Coupeville would not be adversely affected under any alternative or scenario. Airfield operations at Ault Field would be adversely impacted under the alternatives with 80 percent or more of the FCLPs conducted at Ault Field. An expected increase in scheduling challenges and mission delays could occur at Ault Field under Scenario C, which could cause deficiencies in pilot proficiency and unit readiness. These scheduling delays could result in flights and training occurring at Ault Field later into the night.

4.2 Noise Associated with Aircraft Operations

The information presented in this noise section is the result of noise modeling that analyzed the projected noise levels based upon a wide range of inputs (such as flight tracks, aircraft type, and number of aircraft operations, etc.). For a full discussion of noise modeling and background data used for this analysis, refer to Section 3.2.2, Noise Metrics and Modeling, as well as Appendix A, Aircraft Noise Study. The noise levels analyzed and described within this study are from computer-modeled noise and not actual, on-site noise measurements at Ault Field or OLF Coupeville. As discussed in Section 3.2.2, computer modeling provides a tool to assess potential noise impacts. Day-Night Average Sound Level (DNL) noise contours are generated by a computer model that draws from a library of actual aircraft noise measurements. Noise contours produced by the model allow a comparison of existing conditions and proposed changes or alternative actions that do not currently exist or operate at the installation. For these reasons, on-site noise monitoring is seldom used at military air installations, especially when the aircraft mix and operational tempo are not uniform (see Section 3.2.2).

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

The methodology and metrics used for evaluating potential noise impacts associated with the Proposed Action were developed based on guidance from the Department of Defense Noise Working Group as well as public scoping comments received on this project and public comments received on the Draft EIS. The analysis contained within this section, by alternative, is presented in two parts, discussed below. In addition, as discussed in Section 3.2.4, several updates were applied to the noise analysis between release of the Draft EIS and the Final EIS, which included 1) updating the noise model using the latest version of NOISEMAP (Version 7.3); 2) applying refinements to certain flight profiles/aircraft operating assumptions, 3) incorporating the effects of Precision Landing Mode (PLM), also known as Maritime Augmented Guidance with Integrated Controls for Carrier Approach and Recovery Precision Enabling Technologies (MAGIC CARPET), into the noise analysis; and 4) updating the number of pilots per squadron (more details on these four items are discussed individually in Section 3.2.4). In addition, although not a change to the noise analysis, the presentation of the DNL noise contours on the figures for the Final EIS has been revised based upon public comments. The 55 dB DNL noise contour has been added to figures for illustrative purposes (similar to how the 60 dB DNL noise contour was depicted in the Draft EIS). However, the analysis of population and acreage impacts is still based upon the 65 dB DNL noise contour (which is the federal standard for measuring noise impacts consistent with guidance from the FAA, U.S. Environmental Protection Agency [USEPA], U.S. Department of Defense [DoD], Federal Interagency Committee on Noise, American National Standards Institute, and World Health

Noise Associated with Aircraft Operations

The 65 dB DNL noise contour for Alternatives 1 through 3 is larger and covers more area than the No Action Alternative, although some of this increased area is over water. This would result in some additional people living within the 65 dB DNL noise contour compared to the No Action Alternative conditions.

Supplemental metrics utilized in the analysis show additional events for Alternatives 1 through 3 when compared to the No Action Alternative for indoor and outdoor speech interference, an increase in the number of events causing classroom/learning interference, an increase in the probability of awakening, and an increase in the population that may be vulnerable to experiencing potential hearing loss of 5 dB or more.

Organization, among others), where areas with noise levels greater than 65 dB DNL are generally not recommended for residential uses.

These changes applied to both the noise results for the No Action Alternative as well as the action alternatives proposed.

Day-Night Average Sound Level (DNL), which is the federal standard for analyzing the long-term community annoyance with noise exposure from aircraft operations. The data associated with the DNL analysis are presented utilizing the following outputs:

- DNL contour maps
- acreages and population within the projected noise contours

Supplemental Noise Metrics, which are used to provide more detailed information on potential impacts of noise exposure as it relates to specific noise events and their effects. It should be noted that an “event” would be considered an aircraft operation/overflight/activity, and could include an arrival, departure, or pattern operation. The supplemental noise metrics are presented as follows:

- single event noise levels for all 48 points of interest (POIs)
- indoor speech Interference for 30 POIs (residences and schools)
- classroom/learning interference for 12 POIs (schools, residences [where schools may be located])
- sleep disturbance for 30 POIs (residences, schools [in residential locations])
- outdoor speech interference for 48 POIs (residences, schools, and parks)
- Potential hearing loss (PHL) for populations within the 80 dB DNL contour

A review of existing literature addressing nonauditory health effects from aircraft noise exposure was included in the Draft EIS. In addition to this and based upon public comment, specifically from the State of Washington Department of Health, the USEPA), and other public comments, requests were received to review additional published articles. In preparation of the Final EIS, the Navy reviewed 260 published articles as suggested by public comment. An in-depth review of these documents is provided in Appendix A, Aircraft Noise Study. The Navy determined that many of these studies had been already reviewed and included in the Navy’s literature review or were referenced in or by studies the Navy has already considered. However, expanded information has been incorporated as appropriate. The studies did not change the overall findings of the Navy’s original literature review. See Appendix A-8 for details on the literature review process. Although the noise analysis presented in this section is specific to the noise environment as it relates to aircraft operations, there would be other noise generated as part of the Proposed Action, such as construction noise and occupational noise. However, based upon scoping comments received, as well as public comments on the Draft EIS, the location and duration of the potential noise, as well as other factors, these types of noise impacts were not considered potentially significant. They are discussed individually below, and they would generally be the same impact across the three alternatives.

Construction Noise

Construction noise generated by multiple construction, modification, expansion, and demolition projects under each alternative would result in short-term noise impacts at and near Ault Field. Construction activities are described in Section 2.4.2.3. Since the proposed construction is located on

the flight line, aircraft-related noise would likely dominate construction noise. No residential areas or other POIs are located in the vicinity of the proposed construction activity; therefore, there would not be a significant construction-noise-related impact. There is no proposed construction at OLF Coupeville associated with the Proposed Action.

Occupational Noise

Navy occupational noise exposure prevention procedures, such as hearing protection and monitoring, would continue to be required at the NAS Whidbey Island complex in compliance with all applicable Occupational Safety and Health Administration and Navy occupational noise exposure regulations. As a result, these measures are designed to minimize occupational hearing hazards, and no increased risk of hearing impacts associated with occupational noise would be expected to occur under the Proposed Action compared to the affected environment conditions.

4.2.1 Noise, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and the Navy would not operate additional Growler aircraft (see Section 2.4.2.4). Consequently, implementing the No Action Alternative, or taking “no action”, means annual Growler airfield operations would be consistent with levels identified in the 2005 and 2012 transition Environmental Assessments (EAs). The transition of the P-3 to the P-8A aircraft would still take place as it is a separate, ongoing action. In addition and as noted in Section 3.2.4, modeling noise for Calendar Year 21 (CY 21) will also account for the Navy’s full implementation of the PLM technology, which will be implemented regardless of the Proposed Action. Therefore, the DNL noise contours presented in Section 3.2.4, Noise Affected Environment, were modeled based upon the anticipated aircraft operating levels and assuming the full implementation of PLM for CY 21. Implementation of the No Action Alternative would, by default, result in the same acreage and population coverage as noted under the affected environment (see Table 3.2-2).

Similarly, the supplemental analyses (indoor and outdoor speech interference, classroom/learning interference, sleep disturbance, and PHL conditions) presented throughout Section 3.2.4 would be the same under the No Action Alternative, and there would be no change from the affected environment. Therefore, no significant impacts to the noise environment would occur with implementation of the No Action Alternative.

4.2.2 Noise, Alternative 1

This section outlines the noise environment as modeled for Alternative 1 and describes the noise conditions associated with aircraft activity at Ault Field and OLF Coupeville using DNL and several supplemental noise metrics outlined in Section 3.2, including equivalent sound level (L_{eq}), SEL, L_{max} , and the number of events above a threshold (NA), which are used to evaluate such noise effects as community noise exposure, indoor and outdoor speech interference, sleep disturbance, classroom/learning interference, and PHL. Additional information on the noise metrics is also available in Appendix A, Aircraft Noise Study.

The following sections detail potential impacts using projected DNL contours (the federally approved noise metric) and several supplemental metrics (to more fully describe the noise effects).

4.2.2.1 Projected DNL Contours, Alternative 1

As part of the noise analysis and as discussed in Section 3.2.1.1, the DNL noise contours for the alternatives were modeled for an “average year” at Ault Field and OLF Coupeville. An average year represents conditions that are projected to occur on an annual basis, or a typical operating tempo at the NAS Whidbey Island complex. In addition, the five scenarios, which present the optional FCLP allocations, were modeled individually to provide a comparative presentation of the potential noise levels.

Figure 4.2-1 presents the projected DNL noise contours for all scenarios under Alternative 1. This overview figure of the NAS Whidbey Island complex (both Ault Field and OLF Coupeville) presents the 65 dB DNL contour under all scenarios for comparison.

Figures 4.2-2 through 4.2-6 present the five scenarios separately for Ault Field, and Figures 4.2-7 through 4.2-11 present the five scenarios separately for OLF Coupeville²⁶. In these sets of figures, the projected 65 dB, 70 dB, and greater than 75 dB DNL contours for Alternative 1 are compared to the No Action Alternative DNL contours. The 65 dB DNL contour at Ault Field extends approximately 10 miles from the four runway endpoints. Under Alternative 1, the length of these lobes is primarily due to the Growler on the approach portion of the GCA patterns (described in Section 3.1), where the aircraft generally descends on a 3-degree glide slope through 3,000 feet AGL 10 miles from the runway.

The DNL noise exposure at OLF Coupeville is due to the FCLPs. The 65 to less than 70 dB DNL contour range takes the shape of two ovals, on each side of OLF Coupeville’s runway, which corresponds to the FCLP flight tracks. The 65 dB DNL contours extend approximately 2 miles to the north and south of the airfield under all scenarios. Generally speaking, around Ault Field, the 65 dB DNL contours associated with Scenario C extend the farthest from the airfield and cover the most land area (13,922 acres, compared to 13,226 acres under Scenario A). Conversely, around OLF Coupeville, the 65 dB DNL contours associated with Scenario A extend the farthest from the airfield and cover the most land area (10,197 acres, compared to 8,092 acres under Scenario C). The differences between the scenarios at the two airfields are sometimes small (nearly overlapping) and at other times can differ by approximately one mile. The overall difference in the size of the noise contours between the scenarios is more pronounced at OLF Coupeville than at Ault Field due to the larger proportional difference of operations at OLF Coupeville than at Ault Field.

²⁶ In addition and as discussed further in Section 3.2.2.1, 65 dB DNL is the established federal standard for determining potential for high annoyance. This level has been identified in both the Federal Aviation Administration’s (FAA’s) Part 150 Program and the Department of Defense’s (DoD’s) Air Installations Compatible Use Zones (AICUZ) Program (including the individual Air Force and Navy programs) as a threshold for land use recommendations. Consistent with this guidance, 65 dB DNL is used to show areas with potential for high annoyance in this analysis. However, aircraft noise does occur outside the 65 dB DNL contour. In order to more fully reflect the noise environment, the Draft EIS included noise contours of 60 dB DNL as well as detailed noise analysis for specific points of interest (POIs). In response to public comments, the Navy has expanded the analysis in the Final EIS to show geographic areas subject to greater than 55 dB DNL and has analyzed 18 additional POIs.

Table 4.2-1 presents an overall comparison of the number of land acres and population in each of the DNL contour ranges, as well as the difference in conditions between the No Action Alternative and Alternative 1 under all scenarios. As indicated in the table, the total change in population within the entire 65 dB DNL contour increases from the No Action Alternative by between 169 and 1,312 at Ault Field (primarily in and around Oak Harbor), depending on the scenario and, for OLF Coupeville (primarily in and around Coupeville), increases from the No Action Alternative by between 538 and 1,236, depending on the scenario.

As also presented within Table 4.2-1, under several of the alternatives/scenarios, the majority of the increase in population is located within the greater than 75 dB DNL noise contour, especially at OLF Coupeville. The greater than 75 dB DNL noise contour is the area where there is the highest level of community annoyance associated with aircraft noise. Therefore, these populations would be significantly impacted.

For purposes of comparison and to be fully transparent regarding the possible range of impacts that could arise from the Proposed Action, DNL noise contours were also modeled for a high-tempo FCLP year, which represents conditions when pre-deployment training for multiple units overlaps and, therefore, FCLP activity would be expected to increase over average conditions. The high-tempo FCLP year data are depicted on the same figures noted previously, as well as included in Appendix A, Aircraft Noise Study. Figures 4.2-2 through 4.2-11 present both the average year and high-tempo FCLP year DNL noise contours on the same figures for the airfields to illustrate the relatively small differences in the overall noise environment, with many of the areas where they diverge occurring over water.

In addition, Table 4.2-2 shows the percentage change in acreage and population between the average year DNL contour ranges and the high-tempo FCLP year DNL contour ranges. The higher percent change means the deviation between the average year DNL noise contours and the high-tempo FCLP year DNL noise contours is larger; however, most changes are within +/- 5 percent of zero.

Table 4.2-1 Estimated Acreage and Population within the DNL Contour Ranges¹ for the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{2,3}

	<i>DNL Contour Ranges</i>							
	<i>65 to <70 dB DNL</i>		<i>70 to <75 dB DNL</i>		<i>Greater than or equal to 75 dB DNL</i>		<i>Total</i>	
	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>
<i>Ault Field</i>								
<i>No Action Alternative</i>								
Average Year	3,596	3,279	3,269	2,283	5,549	3,379	12,414	8,941
<i>Alternative 1</i>								
Scenario A (20/80 FCLP split)	4,033 (+437)	3,684 (+405)	3,259 (-10)	1,908 (-375)	5,934 (+385)	3,518 (+139)	13,226 (+812)	9,110 (+169)
Scenario B (50/50 FCLP split)	3,922 (+326)	3,619 (+340)	3,271 (+2)	2,450 (+167)	6,423 (+874)	3,786 (+407)	13,616 (+1,202)	9,855 (+914)
Scenario C (80/20 FCLP split)	3,947 (+351)	3,761 (+482)	3,115 (-154)	2,515 (+232)	6,860 (+1,311)	3,977 (+598)	13,922 (+1,508)	10,253 (+1,312)
Scenario D (30/70 FCLP split)	3,976 (+380)	3,712 (+433)	3,184 (-85)	2,171 (-112)	6,235 (+686)	3,679 (+300)	13,395 (+981)	9,562 (+621)
Scenario E (70/30 FCLP split)	3,924 (+328)	3,713 (+434)	3,139 (-130)	2,487 (+204)	6,755 (+1,206)	3,919 (+540)	13,818 (+1,404)	10,119 (+1,178)
<i>OLF Coupeville</i>								
<i>No Action Alternative</i>								
Average Year	3,681	861	3,088	786	638	583	7,407	2,230
<i>Alternative 1</i>								
Scenario A (20/80 FCLP split)	1,562 (-2,119)	573 (-288)	3,248 (+160)	936 (+150)	5,387 (+4,749)	1,957 (+1,374)	10,197 (+2,790)	3,466 (+1,236)
Scenario B (50/50 FCLP split)	2,015 (-1,666)	542 (-319)	3,451 (+363)	1,061 (+275)	4,025 (+3,387)	1,531 (+948)	9,491 (+2,084)	3,134 (+904)
Scenario C (80/20 FCLP split)	3,447 (-234)	1,041 (+180)	3,180 (+92)	1,036 (+250)	1,465 (+827)	691 (+108)	8,092 (+685)	2,768 (+538)
Scenario D (30/70 FCLP split)	1,588 (-2,093)	531 (-330)	3,387 (+299)	992 (+206)	5,032 (+4,394)	1,850 (+1,267)	10,007 (+2,600)	3,373 (+1,143)
Scenario E (70/30 FCLP split)	3,014 (-667)	855 (-6)	3,198 (+110)	1,058 (+272)	2,580 (+1,942)	1,018 (+435)	8,792 (+1,385)	2,931 (+701)

Table 4.2-1 Estimated Acreage and Population within the DNL Contour Ranges¹ for the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{2,3}

	<i>DNL Contour Ranges</i>							
	<i>65 to <70 dB DNL</i>		<i>70 to <75 dB DNL</i>		<i>Greater than or equal to 75 dB DNL</i>		<i>Total</i>	
	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>
NAS Whidbey Island Complex								
No Action Alternative								
Average Year	7,277	4,140	6,357	3,069	6,187	3,962	19,821	11,171
Alternative 1								
Scenario A (20/80 FCLP split)	5,595 (-1,682)	4,257 (+117)	6,507 (+150)	2,844 (-225)	11,321 (+5,134)	5,475 (+1,513)	23,423 (+3,602)	12,576 (+1,405)
Scenario B (50/50 FCLP split)	5,937 (-1,340)	4,161 (+21)	6,722 (+365)	3,511 (+442)	10,448 (+4,261)	5,317 (+1,355)	23,107 (+3,286)	12,989 (+1,818)
Scenario C (80/20 FCLP split)	7,394 (+117)	4,802 (+662)	6,295 (-62)	3,551 (+482)	8,325 (+2,138)	4,668 (+706)	22,014 (+2,193)	13,021 (+1,850)
Scenario D (30/70 FCLP split)	5,564 (-1,713)	4,243 (+103)	6,571 (+214)	3,163 (+94)	11,267 (+5,080)	5,529 (+1,567)	23,402 (+3,581)	12,935 (+1,764)
Scenario E (70/30 FCLP split)	6,938 (-339)	4,568 (+428)	6,337 (-20)	3,545 (+476)	9,335 (+3,148)	4,937 (+975)	22,610 (+2,789)	13,050 (+1,879)

Table 4.2-1 Estimated Acreage and Population within the DNL Contour Ranges¹ for the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{2,3}

<i>DNL Contour Ranges</i>							
<i>65 to <70 dB DNL</i>		<i>70 to <75 dB DNL</i>		<i>Greater than or equal to 75 dB DNL</i>		<i>Total</i>	
<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>

Notes:

- ¹ All five scenarios are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ² Acreage presented does not include areas over water or areas over the NAS Whidbey Island complex.
- ³ The difference between the No Action Alternative and Alternative 1 is noted in parentheses.
- ⁴ Population counts of people within the DNL contour ranges were computed using 2010 Census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour range, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the DNL contour ranges (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville). All population estimates for areas within the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.
- ⁵ Numbers have been rounded to ensure totals sum.

Key:

- dB = decibel
- DNL = day-night average sound level
- FCLP = Field Carrier Landing Practice

Table 4.2-2 Percent Difference in the Estimated Acreage and Population within the Average and High-Tempo FCLP Year DNL Contour Ranges for the NAS Whidbey Island Complex, Alternative 1

DNL Contours	DNL Contour Ranges ¹							
	65 to <70 dB DNL		70 to <75 dB DNL		Greater than or equal to 75 dB DNL		Total	
	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop
Ault Field								
Scenario A	0.8%	0.2%	0.6%	3.4%	1.2%	0.9%	0.9%	1.1%
Scenario B	1.3%	1.3%	0.1%	2.2%	1.6%	1.1%	1.2%	1.4%
Scenario C	1.3%	2.5%	<0.0%	2.0%	2.2%	2.2%	1.4%	2.2%
Scenario D	0.5%	0.6%	0.6%	2.6%	1.2%	1.0%	0.9%	1.2%
Scenario E	1.6%	2.1%	-0.1%	2.4%	2.1%	1.8%	1.4%	2.1%
OLF Coupeville								
Scenario A	1.3%	6.9%	-5.7%	-7.0%	6.0%	4.9%	1.5%	2.0%
Scenario B	-5.8%	-9.1%	0.5%	2.3%	4.7%	4.0%	0.9%	1.1%
Scenario C	0.2%	-0.2%	0.1%	0.2%	2.2%	1.3%	0.5%	0.4%
Scenario D	-2.0%	4.7%	-3.6%	-5.0%	6.1%	5.2%	1.6%	2.1%
Scenario E	-0.6%	-0.8%	-0.1%	-1.0%	1.4%	2.0%	0.2%	0.1%
NAS Whidbey Island Complex								
Scenario A	0.9%	1.1%	-2.5%	<-0.1%	3.5%	2.3%	1.2%	1.4%
Scenario B	-1.1%	<-0.1%	0.3%	2.2%	2.8%	1.9%	1.1%	1.4%
Scenario C	0.8%	1.9%	0.1%	1.5%	2.2%	2.1%	1.1%	1.8%
Scenario D	-0.2%	1.1%	-1.6%	0.3%	3.4%	2.4%	1.2%	1.5%
Scenario E	0.6%	1.6%	-0.1%	1.4%	1.9%	1.9%	1.0%	1.6%

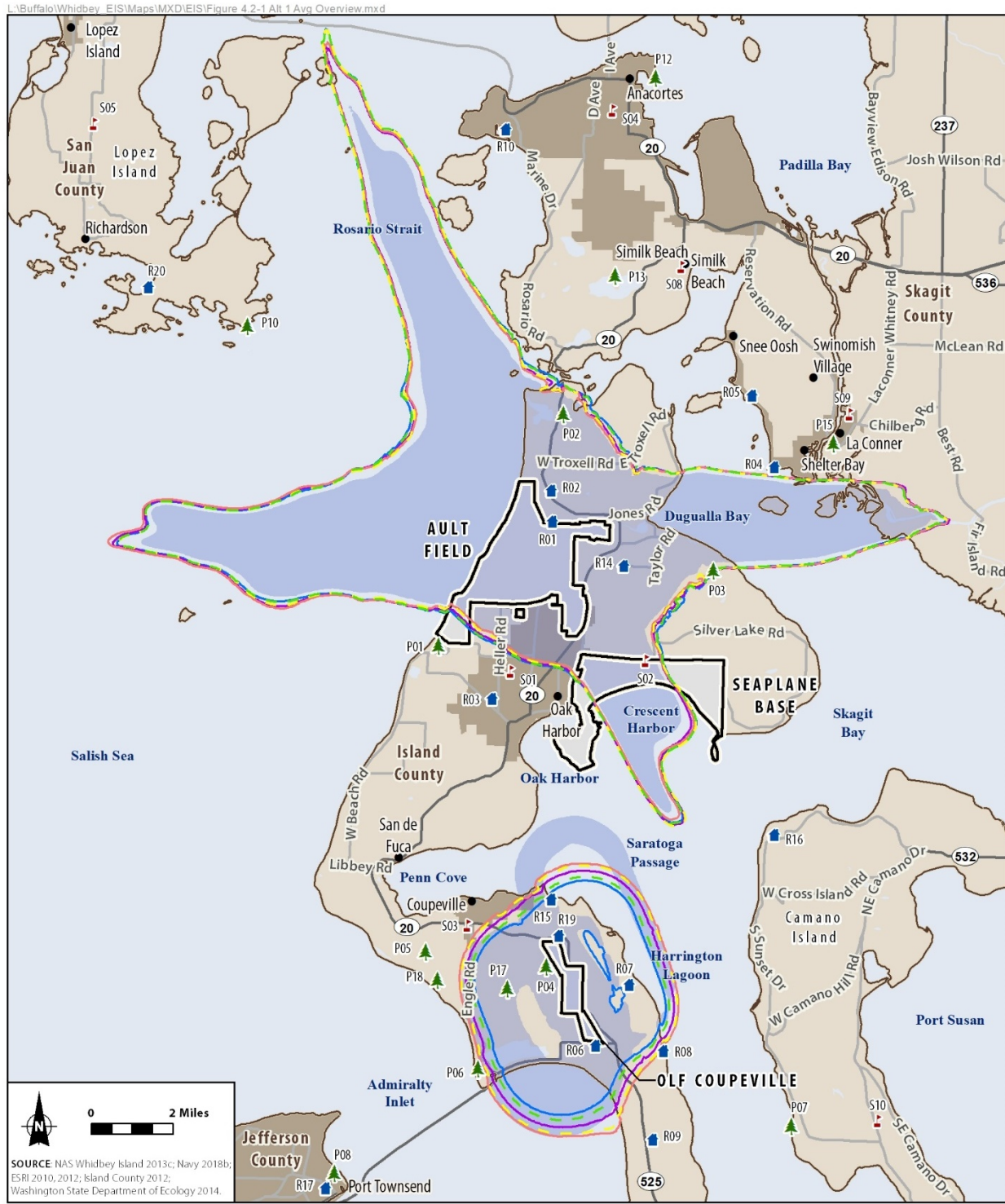
Key:

dB = decibel

DNL = day-night average sound level

NAS = Naval Air Station

OLF = outlying landing field



SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

- | | | | |
|--------------------------|--------------------------|---|---|
| ● City | Points of Interest (POI) | — Alternative 1A (Average Year) DNL Noise Contour (65 dB) | — Alternative 1D (Average Year) DNL Noise Contour (65 dB) |
| — County Boundary | 🌳 Park | — Alternative 1B (Average Year) DNL Noise Contour (65 dB) | — Alternative 1E (Average Year) DNL Noise Contour (65 dB) |
| — U.S. and State Highway | 🏠 Residential | — Alternative 1C (Average Year) DNL Noise Contour (65 dB) | ■ No Action (Average Year) (>=65 dB) |
| — Major Road | 🎓 School | | |
| ■ City/Town Boundary | | | |
| ■ Installation Area | | | |

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

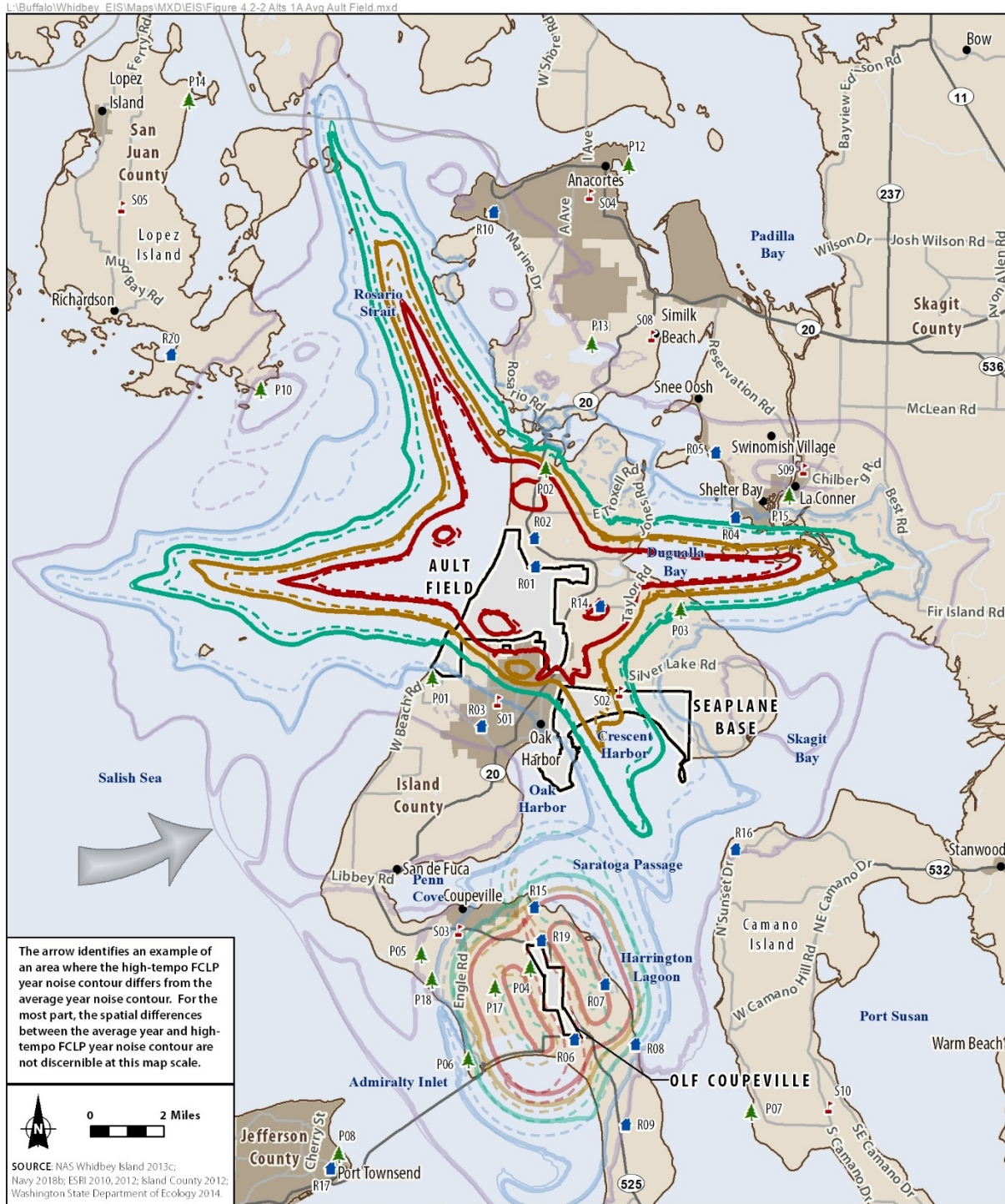
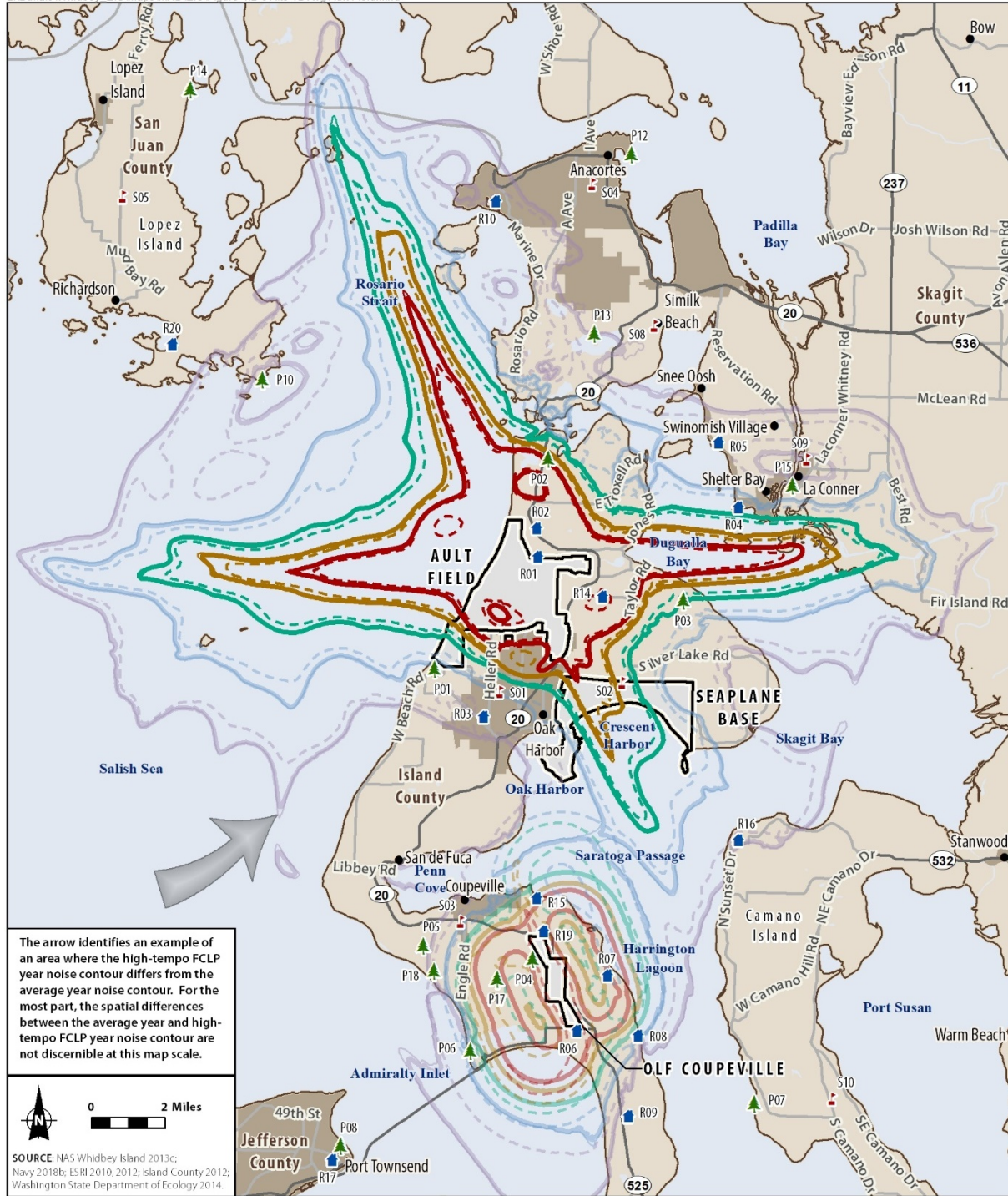


Figure 4.2-2
Alternative 1A DNL Noise
Contours for Ault Field
 Whidbey Island, Island County, WA

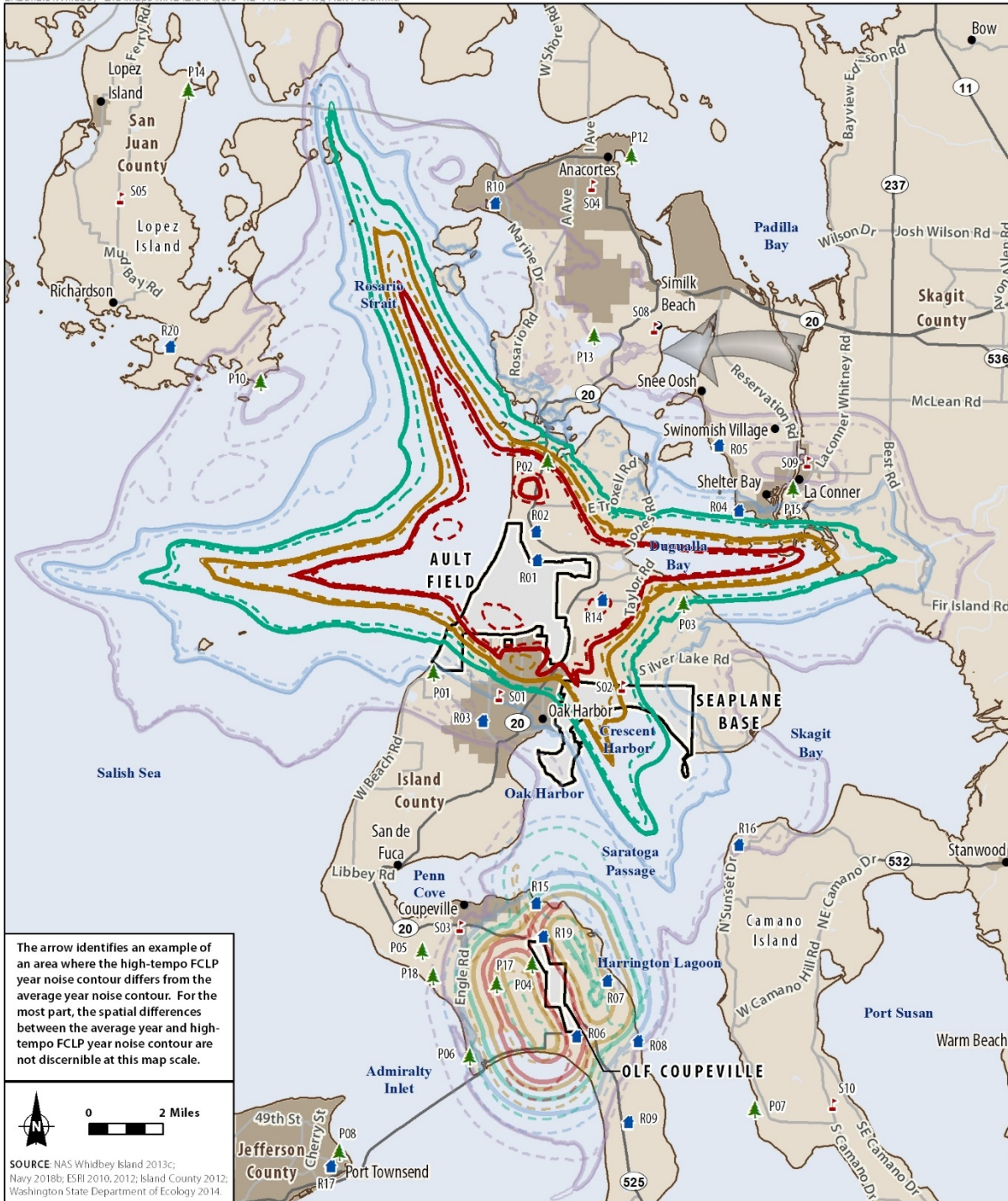
Symbol	Description	No Action (Average) DNL Noise Contour (dB)	Alternative 1A (Average) DNL Noise Contour (dB)	Alternative 1A (High Tempo FCLP) DNL Noise Contour (dB)
●	City	55*	55*	55*
—	County Boundary	60*	60*	60*
—	U.S. and State Highway	65	65	65
—	Major Road	70	70	70
—	City/Town Boundary	75	75	75
□	Installation Area			
▲	Park			
🏠	Residential			
🎓	School			

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

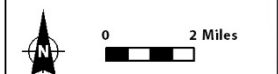
L:\Buffalo\Whidbey_EIS\Map\MXD\EIS\Figure 4.2-3 Alts 1B Avg Ault Field.mxd



L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.2-4 Alts 1C Avg Ault Field.mxd



The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.



SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

	Points of Interest (POI)	No Action (Average) DNL Noise Contour (dB)	Alternative 1C (Average) DNL Noise Contour (dB)	Alternative 1C (High Tempo FCLP) DNL Noise Contour (dB)
●	City	55*	55*	55*
—	County Boundary	60*	60*	60*
—	U.S. and State Highway	65	65	65
—	Major Road	70	70	70
—	City/Town Boundary	75	75	75
□	Installation Area			
▲	Park			
🏠	Residential			
🎓	School			

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

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

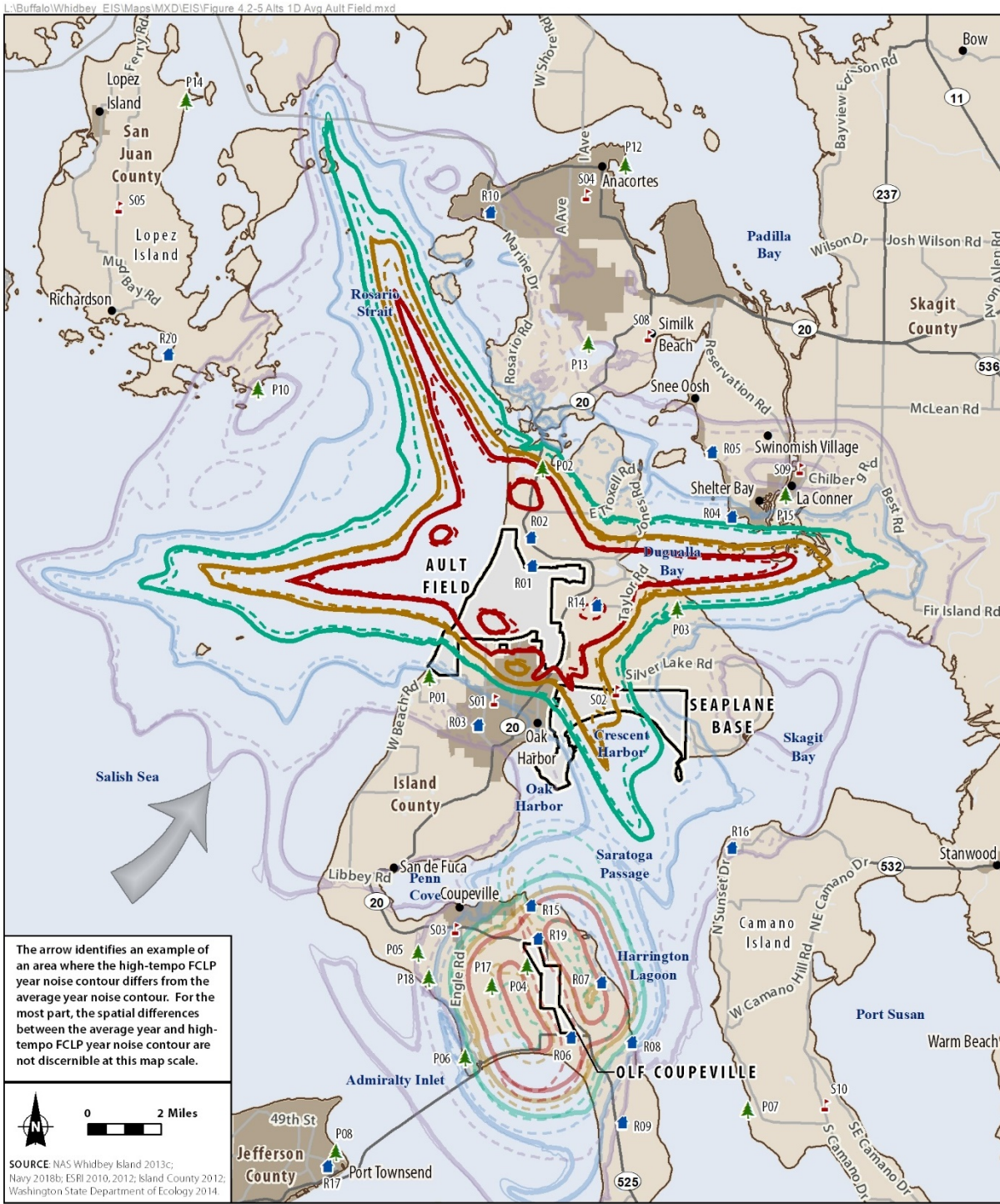


Figure 4.2-5
Alternative 1D DNL Noise Contours for Ault Field Whidbey Island, Island County, WA

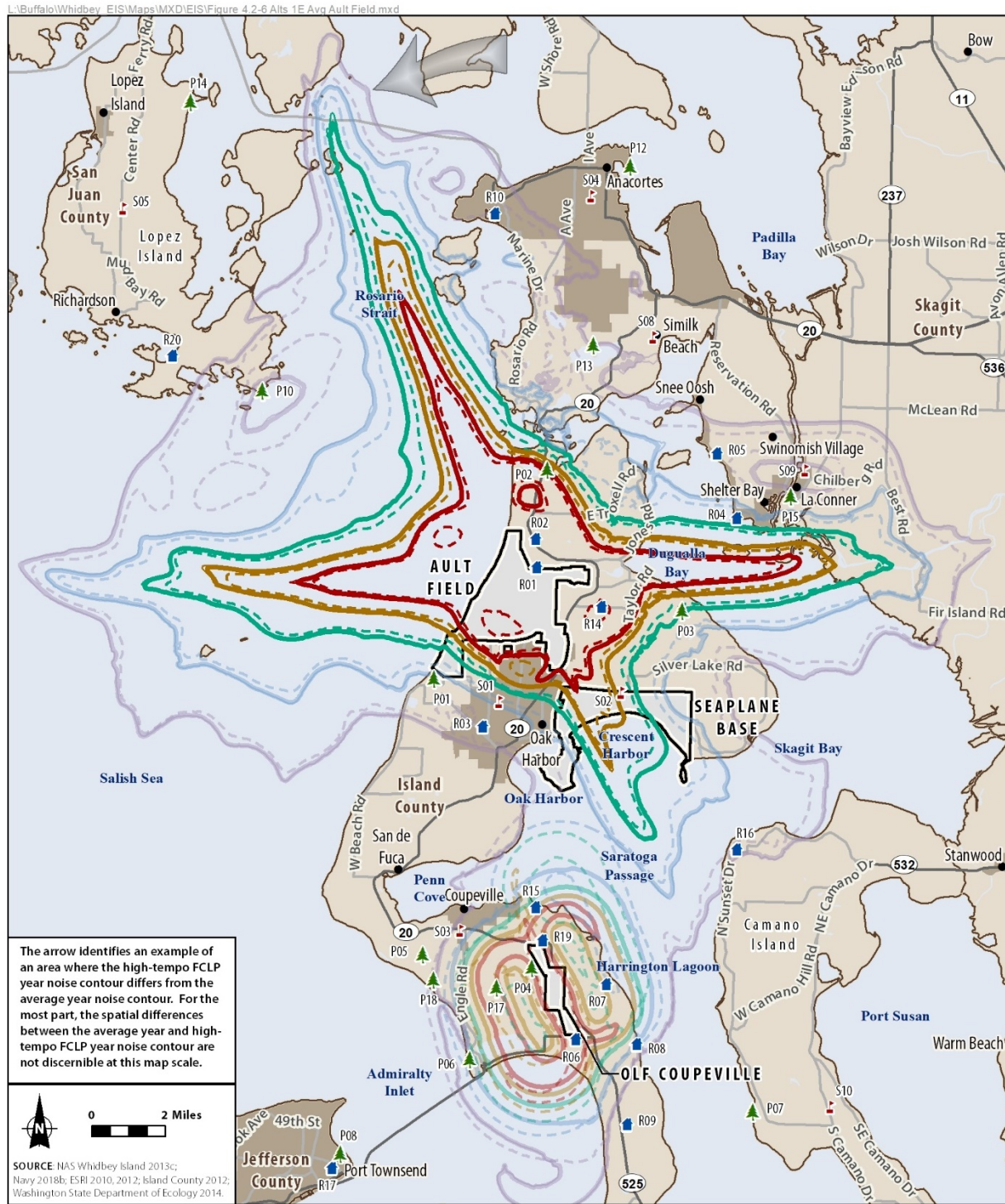
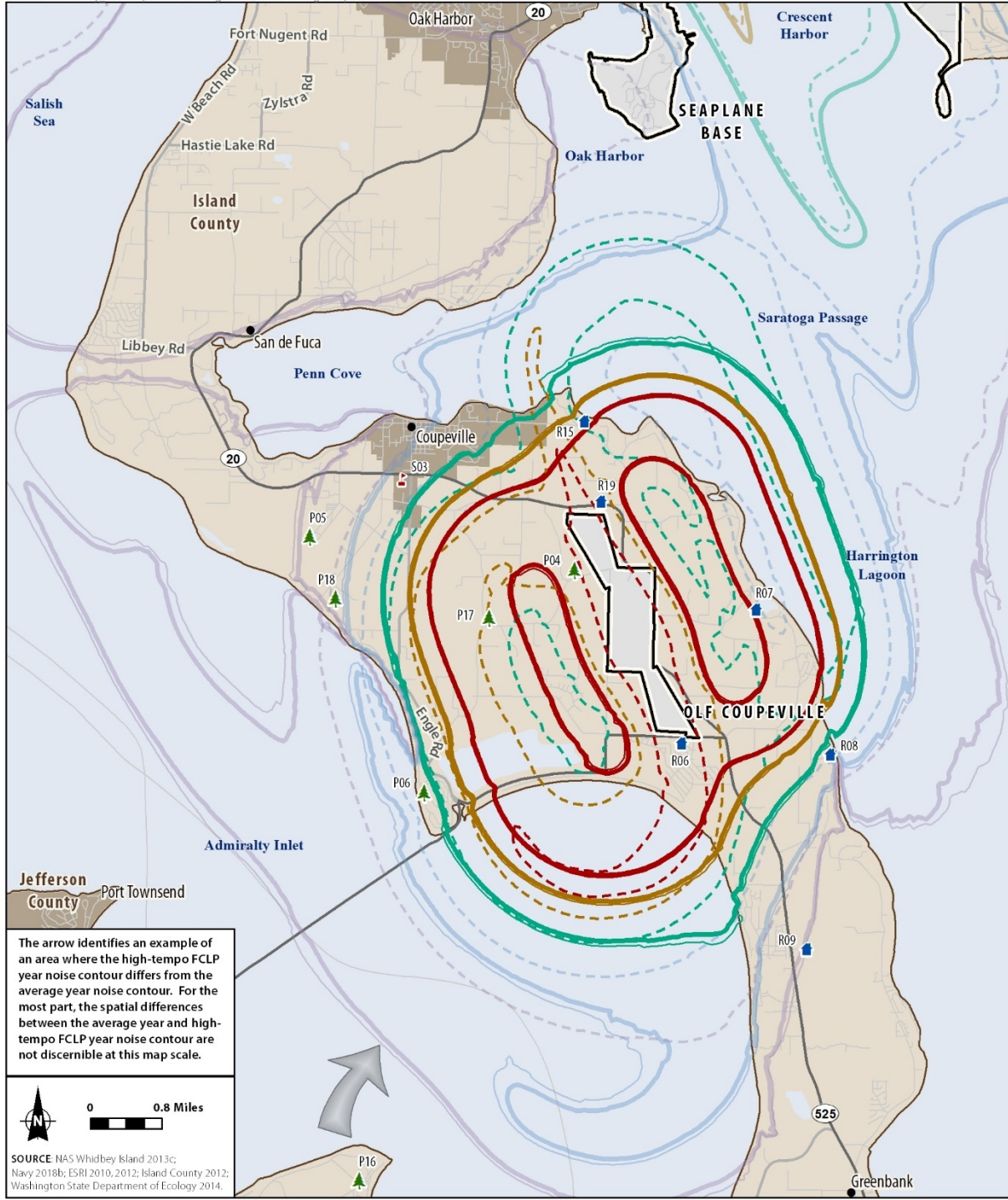


Figure 4.2-6
Alternative 1E DNL Noise
Contours for Ault Field
 Whidbey Island, Island County, WA

	No Action (Average) DNL Noise Contour (dB)	Alternative 1E (Average) DNL Noise Contour (dB)	Alternative 1E (High Tempo FCLP) DNL Noise Contour (dB)
55*	55*	55*	55*
60*	60*	60*	60*
65	65	65	65
70	70	70	70
75	75	75	75

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.2-7 Alt 1A Avg Coupeville.mxd



The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.



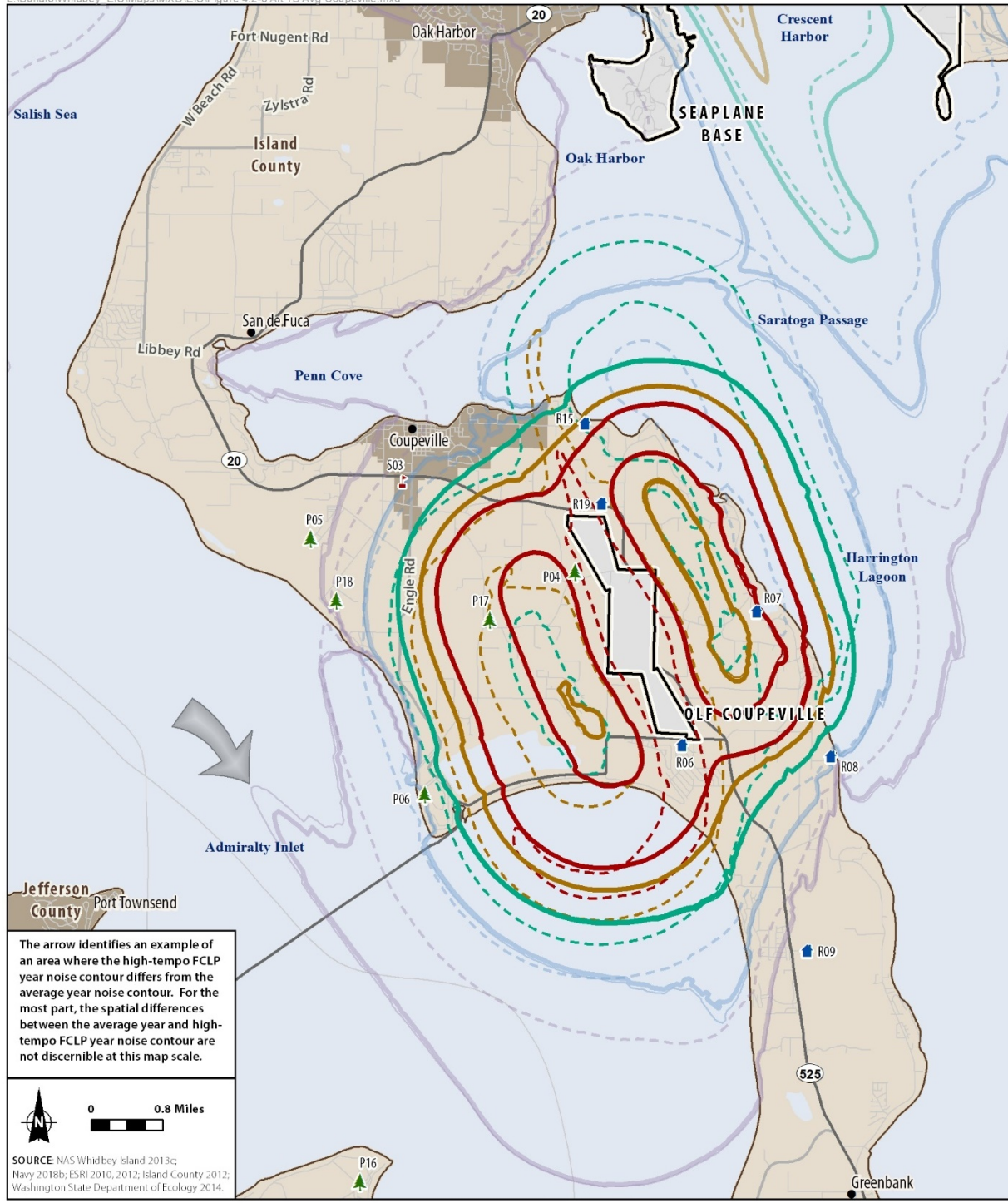
SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

	Points of Interest (POI)	No Action (Average) DNL Noise Contour (dB)	Alternative 1A (Average) DNL Noise Contour (dB)	Alternative 1A (High Tempo FCLP) DNL Noise Contour (dB)
●	City	55*	55*	55*
—	County Boundary	60*	60*	60*
—	U.S. and State Highway	65	65	65
—	Major Road	70	70	70
—	Minor Road	75	75	75
■	City/Town Boundary			
□	Installation Area			
▲	Park			
■	Residential			
■	School			

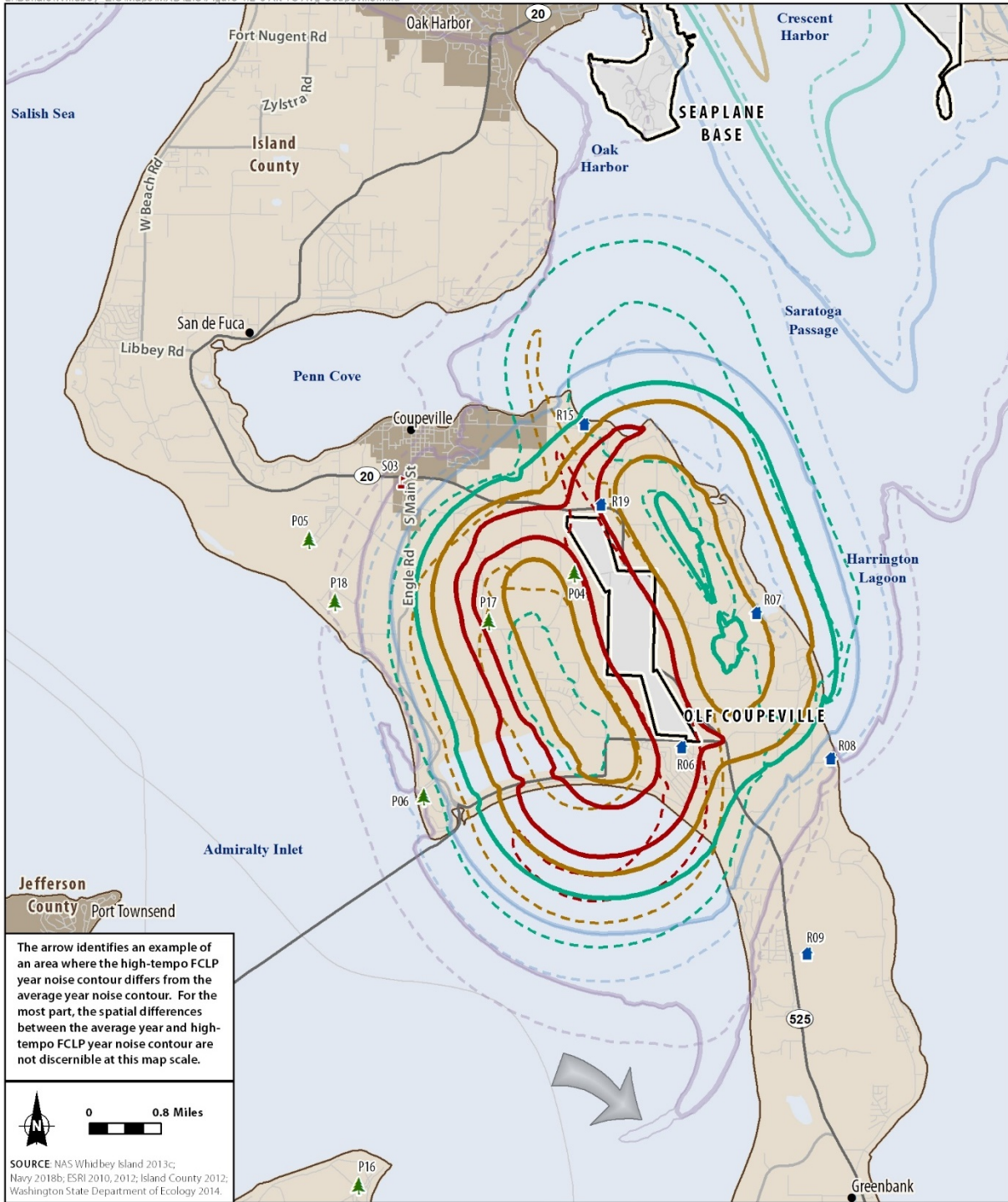
* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

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

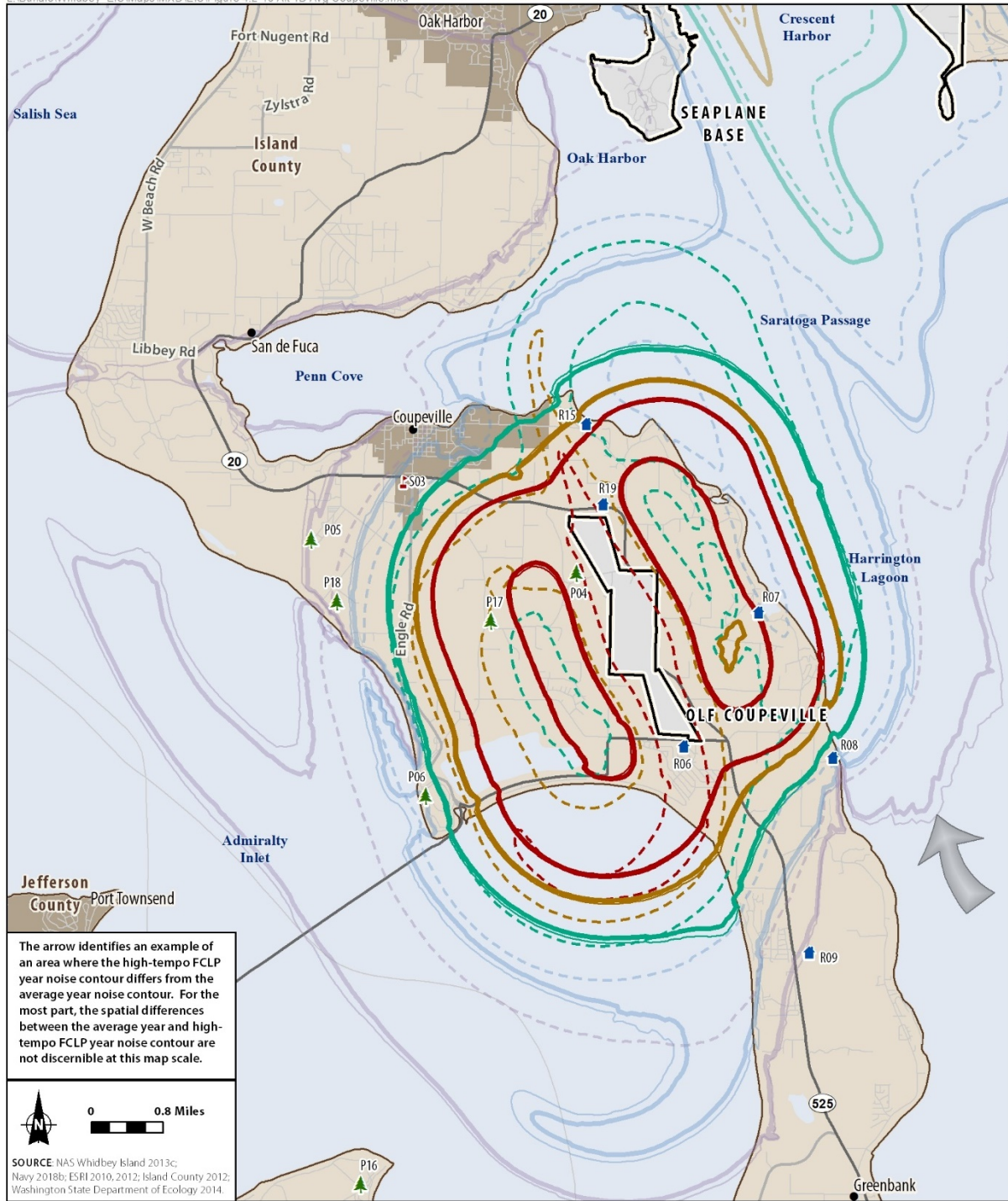
L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.2-8 Alt 1B Avg Coupeville.mxd



L:\Buffalo\Whidbey EIS\Maps\MXD\EIS\Figure 4.2-9 Alt 1C Avg Coupeville.mxd



L:\BuffaloWhidbey_EIS\Maps\MXD\EIS\Figure 4.2-10 Alt 1D Avg Coupeville.mxd



The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.

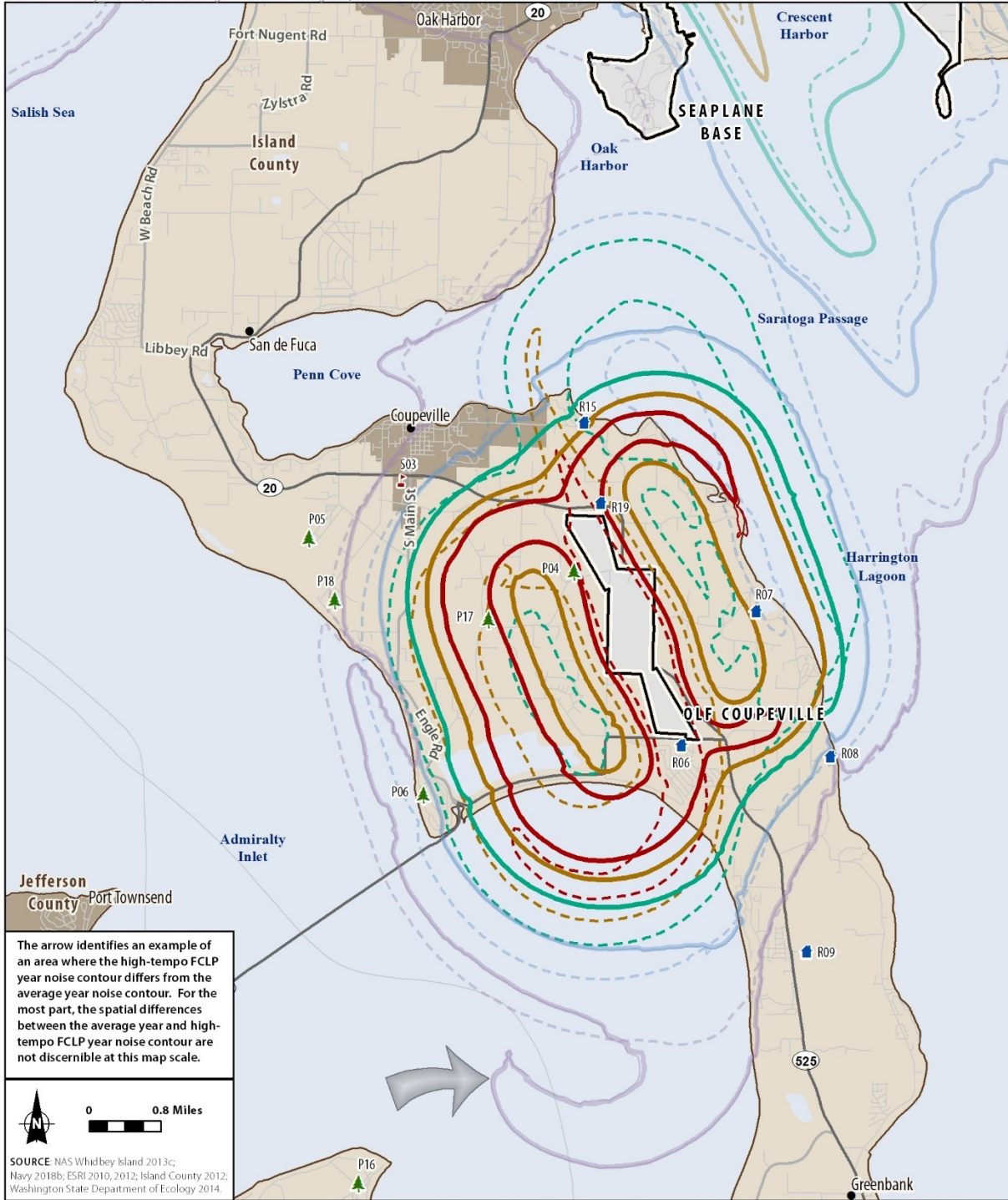
SOURCE NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

Symbol	Description	No Action (Average) DNL Noise Contour (dB)	Alternative 1D (Average) DNL Noise Contour (dB)	Alternative 1D (High Tempo FCLP) DNL Noise Contour (dB)
●	City	55*	55*	55*
—	County Boundary	60*	60*	60*
—	U.S. and State Highway	65	65	65
—	Major Road	70	70	70
—	Minor Road	75	75	75
■	City/Town Boundary			
□	Installation Area			
🌲	Park			
🏠	Residential			
🎓	School			

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-10
Alternative 1D DNL Noise
Contours for OLF Coupeville
Whidbey Island, Island County, WA

L:\Buffalo\Whidbey EIS\Maps\MXD\EIS\Figure 4.2-11 Alt 1E Avg Coupeville.mxd



The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.

SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

	No Action (Average)	Alternative 1E (Average)	Alternative 1E (High Tempo FCLP)
City	●	●	●
County Boundary	—	—	—
U.S. and State Highway	—	—	—
Major Road	—	—	—
Minor Road	—	—	—
City/Town Boundary	—	—	—
Installation Area	—	—	—
Points of Interest (POI)	<ul style="list-style-type: none"> ● Park ● Residential ● School 		
DNL Noise Contour (dB)	<ul style="list-style-type: none"> 55* 60* 65 70 75 	<ul style="list-style-type: none"> 55* 60* 65 70 75 	<ul style="list-style-type: none"> 55* 60* 65 70 75

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-11
Alternative 1E DNL Noise
Contours for OLF Coupeville
 Whidbey Island, Island County, WA

4.2.2.2 Supplemental Noise Analyses, Alternative 1

Additional supplemental noise analyses were conducted for a variety of representative POIs identified in the communities surrounding Ault Field and OLF Coupeville. The wide geographic distribution of POIs provides broad coverage and context to compare the noise effects under each of the alternatives with the noise effects for the No Action Alternative. These supplemental noise analyses include single event noise, indoor speech interference, classroom/learning interference, sleep disturbance, outdoor speech interference, and PHL. The POIs chosen for this analysis are presented in Section 3.2, and they are depicted on Figure 3.2-6. Not all POIs are used for each analysis because the location and type of POI dictates whether the particular analysis would apply; however, for the Final EIS, an analysis of outdoor speech interference was also included for all POIs, including residential areas and schools, as individuals would spend time outdoors at both of those types of locations. In addition, between the Draft EIS and Final EIS, an additional 18 POIs were added to the analysis to provide the public and decision makers with more data to compare. These included additional residential areas, schools, and parks, as well as two points from the National Park Service's (NPS's) acoustical monitoring report. The two points from that report (designated as EBLA001 [Reuble Farmstead] and EBLA002 [Ferry House]) correspond to POIs P17 and P18, respectively.

In general, the POIs were chosen based upon several factors, including geographic dispersal from the airfields and under flight operations, major/identifiable landmarks, and areas that have had a history of noise impacts. It should be noted that for POIs located close to one another (i.e., within about 0.25 mile, depending on topography), the results will most likely be the same or very similar and thus not add value to the analysis.

4.2.2.2.1 Single Event Noise, Alternative 1

As noted in Section 3.2.4.3.1, several types of metrics are presented in this subsection that address the question of "how loud" the aircraft are and "how often" someone will hear them. To understand the "how loud" question, the single events can be compared for the 48 POIs evaluated, which was done using two different noise metrics: SEL and L_{max} . The SEL metric is a composite metric that represents both the intensity of a sound and its duration. SEL provides a measure of total sound energy of an entire acoustic event (i.e., arrival, departure, or touch-and-go [T&G]). The L_{max} metric is the maximum, instantaneous level of noise that a particular event produces, and it is most closely related to what an individual would hear. The SEL and L_{max} provide the noise level of a single aircraft event. These events are intermittent in nature, and, therefore, the noise levels do not represent a continuous source of noise. For more details on SEL or L_{max} , see Section 3.2.2 as well as Appendix A, Aircraft Noise Study.

The SEL and L_{max} values for the loudest single event (i.e., arrival, departure, or T&G) for each POI under Alternative 1 at Ault Field and OLF Coupeville are presented in Table 4.2-3. Under Alternative 1, the maximum SEL/ L_{max} values vary depending on the location of the POI and its proximity to the airfields and flight tracks. These noise level measurements under Alternative 1 are compared to the noise level measurements that were modeled under the No Action Alternative, and the difference is noted in the table.

As shown in the data, many of the maximum SEL and L_{max} values modeled under Alternative 1 are identical to those modeled in the No Action Alternative analysis. Measurements at 12 of the 48 POIs changed from the No Action Alternative to Alternative 1. These include increases at R06 and R07, and decreases at R08, R15, R19, S03, P04, P05, P06, P16, and P18, while at R09, the SEL decreased slightly and the L_{max} increased slightly. In addition, the SEL and L_{max} values for the representative POIs are all identical under all of the scenarios analyzed; therefore, they are not broken down and presented individually.

Table 4.2-3 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{1,2}

ID	Description	Maximum SEL (dB)		L _{max} (dB)	
		No Action Alternative	Alt 1	No Action Alternative	Alt 1
Residences					
R01	Sullivan Rd.	121	121 (0)	114	114 (0)
R02	Salal St. and N. Northgate Dr.	110	110 (0)	101	101 (0)
R03	Central Whidbey	101	101 (0)	49	49 (0)
R04	Pull and Be Damned Point	99	99 (0)	91	91 (0)
R05	Snee-Oosh Point	92	92 (0)	84	84 (0)
R06	Admirals Dr. and Byrd Dr.	118	120 (+2)	115	117 (+2)
R07	Race Lagoon	114	115 (+1)	109	110 (+1)
R08	Pratts Bluff	112	101 (-11)	106	93 (-13)
R09	Cox Rd. and Island Ridge Way	92	90 (-2)	46	51 (+5)
R10	Skyline	100	100 (0)	90	90 (0)
R11	Sequim	73	73 (0)	60	60 (0)
R12	Port Angeles	75	75 (0)	65	65 (0)
R13	Beverly Beach, Freeland	75	75 (0)	63	63 (0)
R14	E. Sleeper Road and Slumber Lane	104	104 (0)	96	96 (0)
R15	Long Point Manor	110	109 (-1)	105	103 (-2)
R16	Rocky Point Heights	100	100 (0)	91	91 (0)
R17	Port Townsend	85	85 (0)	N/A	N/A
R18	Marrowstone Island (Nordland)	68	68 (0)	N/A	N/A
R19	Island Transit Offices, Coupeville	120	115 (-5)	117	108 (-9)
R20	South Lopez Island (Agate Beach)	95	95 (0)	87	87 (0)

Table 4.2-3 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{1,2}

ID	Description	Maximum SEL (dB)		L _{max} (dB)	
		No Action Alternative	Alt 1	No Action Alternative	Alt 1
Schools					
S01	Oak Harbor High School	98	98 (0)	90	90 (0)
S02	Crescent Harbor Elementary School	104	104 (0)	94	94 (0)
S03	Coupeville Elementary School	98	94 (-4)	90	86 (-4)
S04	Anacortes High School	93	93 (0)	83	83 (0)
S05	Lopez Island School	76	76 (0)	68	68 (0)
S06	Friday Harbor Elementary School	51	51 (0)	39	39 (0)
S07	Sir James Douglas Elementary	61	61 (0)	51	51 (0)
S08	Fidalgo Elementary School	93	93 (0)	59	59 (0)
S09	La Conner Elementary School	92	92 (0)	86	86 (0)
S10	Elger Bay Elementary School	83	83 (0)	N/A	N/A
Parks					
P01	Joseph Whidbey State Park	93	93 (0)	60	60 (0)
P02	Deception Pass State Park	107	107 (0)	104	104 (0)
P03	Dugwalla State Park	105	105 (0)	88	88 (0)
P04	Ebey's Landing – Rhododendron Park	114	111 (-3)	111	105 (-6)
P05	Ebey's Landing – Ebey's Prairie	91	88 (-3)	78	76 (-2)
P06	Fort Casey State Park	102	96 (-6)	91	86 (-5)
P07	Cama Beach State Park	82	82 (0)	73	73 (0)
P08	Port Townsend	85	85 (0)	N/A	N/A
P09	Moran State Park	62	62 (0)	51	51 (0)
P10	San Juan Island National Monument	95	95 (0)	85	85 (0)
P11	San Juan Island Visitors Center	64	64 (0)	50	50 (0)

Table 4.2-3 Maximum Sound Exposure Level (dB) and Maximum Sound Level (dB) for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{1,2}

ID	Description	Maximum SEL (dB)		L _{max} (dB)	
		No Action Alternative	Alt 1	No Action Alternative	Alt 1
P12	Cap Sante Park	82	82 (0)	74	74 (0)
P13	Lake Campbell	94	94 (0)	86	86 (0)
P14	Spencer Spit State Park	76	76 (0)	63	63 (0)
P15	Pioneer Park	92	92 (0)	83	83 (0)
P16	Marrowstone Island (Fort Flagler)	85	79 (-6)	70	67 (-3)
P17	Reuble Farm	115	115 (0)	110	110 (0)
P18	Ferry House	96	91 (-5)	85	82 (-3)

Notes:

- ¹ The difference between the No Action Alternative and Alternative 1 is noted in parentheses for both the maximum SEL and L_{max} metrics, as well as the number of annual events.
- ² Typically, and as is the case for the majority of the points of interest (POIs) in this analysis, the same aircraft event generates both the SEL and the L_{max}. However, in certain cases when a POI is a farther distance from the airfield, a different event may generate the highest SEL and the L_{max}.

Key:

- dB = decibel
- L_{max} = maximum sound level
- n/a = not available; the aircraft that generates the highest L_{max} at this POI is the P-8A.
- SEL = sound exposure level

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

Table 4.2-4 presents the number of events above the three identified thresholds for the POIs analyzed (note, for 21 of the 48 POIs analyzed, the noise model indicated there would be zero events above the 80 dB L_{max} ; therefore, they were omitted from the table).

As presented in the table, there is a large range in the number of events based upon the location of the POI. Under certain scenarios, some POIs would experience an increase in the range of 10,000 to over 15,000 annual events above 80 dB L_{max} (i.e., the sound of a garbage disposal). This would be approximately 27 to 41 events per day when averaged. Other POIs would experience some degree less than these numbers. The POIs with the highest number of events above these thresholds were very close to Ault Field. In addition, the results show that as the L_{max} threshold is increased, the number of events decrease, as would be expected. Therefore, when looking at the number of events above a threshold of 100 dB L_{max} , the highest increase is 11,655 at R01 over the No Action Alternative conditions.

What this combined analysis shows is that while there may not be a substantive difference in the loudest event (i.e., SEL or L_{max}) at a particular POI, there may be a substantial increase in the number of loud or disruptive events that occur between alternatives or scenarios when compared to the No Action Alternative.

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{1,2}

ID	Description	L_{max} (db)	Number of Annual Events ³					
			No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D	Alt 1 E
Residences								
R01	Sullivan Rd.	Above 80 dB	48,311	56,395 (+8,084)	59,719 (+11,408)	63,333 (+15,022)	57,571 (+9,260)	62,145 (+13,834)
		Above 90 dB	43,603	50,606 (+7,003)	54,168 (+10,565)	57,792 (+14,189)	51,836 (+8,233)	56,575 (+12,972)
		Above 100 dB	30,199	34,019 (+3,820)	37,992 (+7,793)	41,865 (+11,666)	35,149 (+4,950)	40,509 (+10,310)
R02	Salal St. and N. Northgate Dr.	Above 80 dB	38,892	45,522 (+6,630)	48,692 (+9,800)	53,045 (+14,153)	46,963 (+8,071)	51,807 (+12,915)
		Above 90 dB	36,058	41,690 (+5,632)	45,344 (+9,286)	49,897 (+13,839)	43,344 (+7,286)	48,566 (+12,508)
		Above 100 dB	4,771	6,073 (+1,302)	5,672 (+901)	6,204 (+1,433)	6,667 (+1,896)	6,289 (+1,518)
R04	Pull and Be Damned Point	Above 80 dB	4,985	6,324 (+1,339)	6,189 (+1,204)	5,949 (+964)	6,005 (+1,020)	5,949 (+964)
		Above 90 dB	370	431 (+61)	402 (+32)	402 (+32)	406 (+36)	402 (+32)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R05	Snee-Oosh Point	Above 80 dB	2,767	3,665 (+898)	3,665 (+898)	3,501 (+734)	3,501 (+734)	3,501 (+734)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R06	Admirals Dr. and Byrd Dr.	Above 80 dB	3,101	12,787 (+9,686)	8,003 (+4,902)	3,207 (+106)	11,197 (+8,096)	4,813 (+1,712)
		Above 90 dB	2,451	11,310 (+8,859)	7,090 (+4,639)	2,836 (+385)	9,910 (+7,459)	4,256 (+1,805)
		Above 100 dB	2,227	8,078 (+5,851)	4,925 (+2,698)	1,998 (-229)	6,981 (+4,754)	2,998 (+771)
R07	Race Lagoon	Above 80 dB	938	4,923 (+3,985)	3,251 (+2,313)	1,298 (+360)	4,418 (+3,480)	1,928 (+990)
		Above 90 dB	230	3,402 (+3,172)	2,272 (+2,042)	881 (+651)	3,080 (+2,207)	1,323 (+1,093)
		Above 100 dB	183	2,641 (+2,458)	1,763 (+1,580)	684 (+501)	2,390 (+2,207)	1,027 (+844)
R08	Pratts Bluff	Above 80 dB	368	3,837 (+3,469)	2,564 (+2,196)	995 (+627)	3,475 (+3,107)	1,494 (+1,126)
		Above 90 dB	223	948 (+725)	635 (+412)	246 (+23)	860 (+637)	370 (+147)
		Above 100 dB	65	0 (-65)	0 (-65)	0 (-65)	0 (-65)	0 (-65)

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{1,2}

ID	Description	L_{max} (db)	Number of Annual Events ³					
			No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D	Alt 1 E
R10	Skyline	Above 80 dB	1,548	2,167 (+619)	2,092 (+544)	2,339 (+791)	2,344 (+796)	2,339 (+791)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R14	E. Sleeper Road and Slumber Lane	Above 80 dB	40,516	46,545 (+6,029)	50,726 (+10,210)	54,058 (+13,542)	47,785 (+7,269)	52,778 (+12,262)
		Above 90 dB	10,220	11,031 (+811)	13,752 (+3,532)	16,310 (+6,090)	11,595 (+1,375)	15,372 (+5,152)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R15	Long Point Manor	Above 80 dB	2,524	5,054 (2,530)	3,446 (+922)	1,706 (-818)	4,596 (+2,072)	2,288 (-236)
		Above 90 dB	847	4,522 (+3,675)	2,953 (2,106)	1,160 (+313)	4,046 (+3,199)	1,724 (+877)
		Above 100 dB	41	2,284 (+2,243)	1,530 (+1,489)	592 (+551)	2,070 (+2,029)	888 (+847)
R16	Rocky Point Heights	Above 80 dB	1,525	1,921 (+396)	1,830 (+305)	1,970 (+445)	1,990 (+465)	1,970 (+445)
		Above 90 dB	69	63 (-6)	78 (+9)	62 (-7)	63 (-6)	62 (-7)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R19	Island Transit Offices, Coupeville	Above 80 dB	3,172	12,849 (+9,677)	8,081 (+4,909)	3,269 (+97)	11,260 (+8,088)	4,876 (+1,704)
		Above 90 dB	2,412	12,414 (+10,002)	7,790 (+5,378)	3,155 (+743)	10,866 (+8,454)	4,705 (+2,293)
		Above 100 dB	847	4,522 (+3,675)	2,953 (+2,106)	1,160 (+313)	4,046 (+3,199)	1,742 (+895)
R20	South Lopez Island (Agate Beach)	Above 80 dB	112	142 (+30)	131 (+19)	150 (+38)	151 (+39)	150 (+38)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Schools								
S01	Oak Harbor High School	Above 80 dB	997	624 (-373)	952 (-45)	1,003 (+6)	788 (-209)	961 (-36)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{1,2}

ID	Description	L_{max} (db)	Number of Annual Events ³					
			No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D	Alt 1 E
S02	Crescent Harbor Elementary School	Above 80 dB	4,436	5,525 (+1,089)	5,278 (+842)	5,712 (+1,276)	5,759 (+1,323)	5,712 (+1,276)
		Above 90 dB	3,957	5,109 (+1,152)	4,748 (+791)	5,243 (+1,286)	5,288 (+1,331)	5,243 (+1,286)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S03	Coupeville Elementary School	Above 80 dB	1,852	3,077 (+1,225)	1,870 (+18)	761 (-1,091)	2,655 (+803)	1,144 (-708)
		Above 90 dB	316	0 (-316)	0 (-316)	0 (-316)	0 (-316)	0 (-316)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S04	Anacortes High School	Above 80 dB	112	142 (+30)	131 (+19)	150 (+38)	151 (+39)	150 (+38)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S09	La Conner Elementary School	Above 80 dB	352	387 (+35)	397 (+45)	375 (+23)	379 (+27)	375 (+23)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parks								
P02	Deception Pass State Park	Above 80 dB	8,950	9,762 (+812)	10,877 (+1,927)	13,382 (+4,432)	10,763 (+1,813)	12,867 (+3,917)
		Above 90 dB	5,479	5,683 (+204)	6,711 (+1,232)	9,033 (+3,554)	6,576 (+1,097)	8,546 (+3,067)
		Above 100 dB	5,449	5,492 (+43)	6,583 (+1,134)	8,983 (+3,534)	6,402 (+953)	8,471 (+3,022)
P03	Dugwalla State Park	Above 80 dB	16,278	18,310 (+2,032)	20,953 (+4,675)	22,293 (+6,015)	18,798 (+2,520)	21,583 (+5,305)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P04	Ebey's Landing – Rhododendron Park	Above 80 dB	3,172	12,849 (+9,677)	8,081 (+4,909)	3,269 (+97)	11,260 (+8,088)	4,876 (+1,704)
		Above 90 dB	3,103	12,787 (+9,684)	8,003 (+4,900)	3,207 (+104)	11,197 (+8,094)	4,813 (+1,710)
		Above 100 dB	2,720	4,522 (+1,802)	2,953 (+233)	1,160 (-1,560)	4,046 (+1,326)	1,742 (-978)

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{1,2}

ID	Description	L_{max} (db)	Number of Annual Events ³					
			No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D	Alt 1 E
P06	Fort Casey State Park	Above 80 dB	2,189	7,830 (+5,641)	4,759 (+2,570)	1,933 (-256)	6,756 (+4,567)	2,900 (+711)
		Above 90 dB	547	0 (-547)	0 (-547)	0 (-547)	0 (-547)	0 (-547)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P10	San Juan Island National Monument	Above 80 dB	481	549 (+68)	536 (+55)	626 (+145)	631 (+150)	626 (+145)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P13	Lake Campbell	Above 80 dB	254	177 (-77)	235 (-19)	293 (+39)	296 (+42)	293 (+39)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P15	Pioneer Park	Above 80 dB	370	431 (+61)	402 (+32)	402 (+32)	406 (+36)	402 (+32)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P17	Reuble Farm	Above 80 dB	3,061	12,429 (+9,368)	7,770 (+4,709)	3,115 (+54)	10,877 (+7,816)	4,675 (+1,614)
		Above 90 dB	1,641	7,830 (+6,189)	4,759 (+3,118)	1,933 (+292)	6,756 (+5,115)	2,900 (+1,259)
		Above 100 dB	693	5,872 (+5,179)	3,569 (+2,876)	1,450 (+757)	5,067 (+4,374)	2,175 (+1,482)
P18	Ferry House	Above 80 dB	1,180	1,957 (+777)	1,190 (+10)	483 (-697)	1,689 (+509)	725 (-455)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-4 Number of Events Above a Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)^{1,2}

ID	Description	L _{max} (db)	Number of Annual Events ³				
			No Action Alternative	Alt 1 A	Alt 1 B	Alt 1 C	Alt 1 D

Notes:

- ¹ The difference between the No Action Alternative and Alternative 1 is noted in parentheses for the number of events above the specified noise.
- ² POIs that had zero events above an L_{max} of 80 dB, 90 dB, and 100 dB were omitted from the table. These included POIs R03, R09, R11, R12, R13, R17, R18, S05, S06, S07, S08, S10, P01, P05, P07, P08, P09, P11, P12, P14, and P16.

Key:

dB = decibel

L_{max} = maximum sound level

4.2.2.2 Speech Interference (Indoor), Alternative 1

Conversations or indoor speech are assumed to be interrupted when a single aircraft event exceeds the maximum sound level, or L_{max}, of 50 dB indoors (Sharp et al, 2009). Normal conversation is about 60 dB; therefore, the use of a 50 dB indoor level is a very conservative threshold such that a soft speaking voice could be heard. For this analysis, the model calculated the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level, or L_{max}, of 50 dB at the 20 residential POIs and the 10 schools, since they are commonly located in residential areas. Because the individual is assumed to be indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis was conducted assuming both “windows-open” and “windows-closed” conditions. Table 4.2-5 presents the average daily (7:00 a.m. to 10:00 p.m.) events per hour that exceed an L_{max} of 50 dB indoors at these POIs under Alternative 1, all scenarios.

Compared to the No Action Alternative, Alternative 1 would result in between zero and two additional events per hour at representative POIs during which conversations or indoor speech would be interrupted. The largest change (with two additional events per daytime hour) would occur at several POIs, including R01, R02, R06, R07, R08, R14, and R15, under various scenarios. However, there are also several POIs at which no change would occur under any of the scenarios compared to the No Action Alternative.

Table 4.2-5 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)¹

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour ²											
		Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³
Residences													
R01	Sullivan Rd.	8	8	9 (+1)	9 (+1)	10 (+2)	10 (+2)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R02	Salal St. and N. Northgate Dr.	8	8	9 (+1)	9 (+1)	9 (+1)	9 (+1)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R03	Central Whidbey	5	-	5 (0)	- (0)	6 (+1)	- (0)	6 (+1)	- (0)	5 (0)	- (0)	6 (+1)	- (0)
R04	Pull and Be Damned Point	2	1	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)
R05	Snee-Oosh Point	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R06	Admirals Dr. and Byrd Dr.	-	-	2 (+2)	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	2 (+2)	2 (+2)	1 (+1)	1 (+1)
R07	Race Lagoon	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	1 (+1)	- (0)	2 (+2)	1 (+1)	1 (+1)	- (0)
R08	Pratts Bluff	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	2 (+2)	1 (+1)	1 (+1)	- (0)
R09	Cox Rd and Island Ridge	-	-	1 (+1)	- (0)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R10	Skyline	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R11	Sequim	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R12	Port Angeles	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R13	Beverly Beach, Freeland	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R14	E. Sleeper Rd. and Slumber Ln.	8	7	9 (+1)	8 (+1)	9 (+1)	8 (+1)	10 (+2)	9 (+2)	9 (+1)	8 (+1)	10 (+2)	9 (+2)

Table 4.2-5 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)¹

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour ²											
		Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³
R15	Long Point Manor	1	1	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R16	Rocky Point Heights	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R17	Port Townsend	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	1	1	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R20	South Lopez Island (Agate Beach)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Schools													
S01	Oak Harbor High School	6	2	6 (0)	2 (0)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	6 (0)	3 (+1)	7 (+1)	3 (+1)
S02	Crescent Harbor Elementary	5	2	5 (0)	2 (0)	6 (+1)	2 (0)	6 (+1)	3 (+1)	6 (+1)	2 (0)	6 (+1)	3 (+1)
S03	Coupeville Elementary	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
S04	Anacortes High School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Table 4.2-5 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)¹

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour ²											
		Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³
S09	La Conner Elementary School	1	-	1 (0)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S10	Elger Bay Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Notes:

- ¹ The difference between the No Action Alternative and Alternative 1 is noted in parentheses. Hyphens (-) indicate result equals zero.
- ² Number of annual average daily daytime (7:00 a.m. to 10:00 p.m.) events at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 decibels (dB). See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as “quiet urban daytime” at 40 dB and a garbage disposal at 80 dB.
- ³ Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation and other building features that reduce the noise levels inside (FICON, 1992).

4.2.2.2.3 Classroom/Learning Interference, Alternative 1

Two metrics were analyzed to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights: interior equivalent sound level during an 8-hour school day ($L_{eq(8)}$) (8:00 a.m. to 4:00 p.m.), and the average number of interfering aircraft events per hour during that time period. Single aircraft events that generate interior sound levels (L_{max}) greater than 50 dB have the potential to interfere with student and teacher interaction by affecting conversation and comprehension (Sharp et al, 2009). Because the classroom interaction occurs indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis considered both windows-open and windows-closed conditions. Table 4.2-6 presents the 8-hour equivalent sound level ($L_{eq(8)}$) and the number of events that exceed an L_{max} of 50 dB indoors under Alternative 1, all scenarios, at the representative POIs, which are schools (and the two residential POIs located in the vicinity of schools). It is important to note that Table 4.2-6 presents average values, and there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all and therefore have no potential for classroom/learning interference.

Most schools would experience interior $L_{eq(8)}$ due to Navy aircraft operations close to ambient levels of 45 dB or less, which would not impact learning and conversation. Crescent Harbor Elementary School (S02) would experience the highest $L_{eq(8)}$ of 52 dB for No Action and the highest under Scenarios C and E of 54 dB when windows are open. When windows are closed, the $L_{eq(8)}$ at Crescent Harbor Elementary School (S02) would drop to less than 45 dB. Given the relatively cool climate in the area, it is likely that windows at schools would be closed a majority of the time.

The potential for classroom interference from single aircraft events generating sound levels inside classrooms greater than 50 dB L_{max} would increase under Alternative 1 by up to two events per hour (at S01, S02, and S03, as well as school surrogate R03) compared to the No Action Alternative; that is, on average, no school would experience an increase of more than two learning-disrupting events per hour under any scenario under Alternative 1 compared to the No Action Alternative. Oak Harbor High School (S01) under Scenarios B, C, and E (with windows open) shows an increase in classroom/learning interference of an additional two events per hour. Crescent Harbor Elementary (S02) under Scenarios B and C (with windows open) shows an increase in classroom/learning interference of an additional two events per hour. Under Scenarios A and D, the Coupeville Elementary School (S03) also shows an increase in classroom/learning interference of an average of an additional two events per hour (with windows open). School surrogate location for Central Whidbey (R03) shows an additional two events per hour (with windows open) under Scenarios C and E as well. All other schools either show no change from the No Action Alternative or an increase of one event per hour during the school day, primarily under the windows-open condition. Under the windows-closed condition, nearly all of the schools would be expected to experience no more than one additional event per hour of classroom/learning interference, with most being unchanged from the No Action Alternative. Many modern schools have central air conditioning and heating systems; therefore, it is more likely that classroom windows would remain closed the majority of the time.

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

Table 4.2-6 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)¹

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
ID	Description	Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²	
		<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴
School Surrogates																									
R03	Central Whidbey	<45	4	<45	-	<45	5 (+1)	<45	-	<45	5 (+1)	<45	-	<45	6 (+2)	<45	-	<45	5 (+1)	<45	-	<45	6 (+2)	<45	-
R11	Sequim	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
Schools																									
S01	Oak Harbor High School	<45	5	<45	2	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)
S02	Crescent Harbor Elementary	52	4	<45	2	53	5 (+1)	<45	2 (0)	53	6 (+2)	<45	2 (0)	54	6 (+2)	<45	3 (+1)	53	5 (0)	<45	2 (0)	54	6 (+1)	<45	2 (0)
S03	Coupeville Elementary	<45	-	<45	-	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	-	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	-
S04	Anacortes High School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S05	Lopez Island School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S06	Friday Harbor Elementary	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S07	Sir James Douglas Elementary	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S08	Fidalgo Elementary School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S09	La Conner Elementary School	<45	1	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-
S10	Elger Bay Elementary School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-

Table 4.2-6 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)¹

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²	
ID	Description	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴

Notes:

- ¹ The difference between the No Action Alternative and Alternative 1 is noted in parentheses. Hyphens (-) indicate result equals zero.
- ² Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
- ³ For this metric, daily classroom hours are assumed to be 8:00 a.m. to 4:00 p.m.
- ⁴ Number of average school-day events per hour during an 8-hour school day (8:00 a.m. to 4:00 p.m.) at or above an indoor maximum single event sound level (*L*_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 dB. See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as “quiet urban daytime” at 40 dB and a garbage disposal at 80 dB.

Key:

- dB = decibel
- L*_{eq(8)} = 8-hour sound level equivalent
- L*_{max} = maximum A-weighted sound level

4.2.2.2.4 Sleep Disturbance, Alternative 1

The analysis of sleep disturbance is a calculation of the probability of awakening from aircraft overflights. Thus, it is based on the outdoor SEL at each of the residential POIs, converted to an indoor SEL. Events that were considered are those that occur between 10:00 p.m. and 7:00 a.m. Although individuals sleep outside of these hours, these are considered typical sleeping hours for this type of analysis. Table 4.2-7 presents the results of the sleep disturbance analysis for the 20 POI locations that are in the residential category, as well as the 10 schools, which are commonly located in residential areas.

Under Alternative 1, the majority of the POIs analyzed show an increase in the percent probability of awakening for all scenarios during nights of average aircraft activity. The highest percent increase is for R06 (Admirals Drive and Byrd Drive), where there would be an increase of 32 percent under Scenario A with windows open, meaning that there is a 32-percent greater probability or chance of awakening at least once under windows-open conditions compared to the No Action Alternative. Generally, the POIs around OLF Coupeville had a higher percent probability of awakening under Scenario A than under the other scenarios, and for the POIs around Ault Field, there was a larger increase in the percent probability of awakening for Scenario C than for the other scenarios.

Table 4.2-7 Average Indoor Nightly¹ Probability of Awakening² for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)³

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴
Residences													
R01	Sullivan Rd.	58%	43%	68% (+10%)	52% (+9%)	72% (+14%)	56% (+13%)	77% (+19%)	61% (+18%)	69% (+11%)	53% (+10%)	75% (+17%)	60% (+17%)
R02	Salal St. and N. Northgate Dr.	41%	29%	50% (+9%)	36% (+7%)	53% (+12%)	39% (+10%)	58% (+17%)	43% (+14%)	51% (+10%)	37% (+8%)	57% (+16%)	42% (+13%)
R03	Central Whidbey	16%	8%	20% (+4%)	11% (+3%)	22% (+6%)	12% (+4%)	25% (+9%)	13% (+5%)	21% (+5%)	11% (+3%)	24% (+8%)	13% (+5%)
R04	Pull and Be Damned Point	19%	9%	25% (+6%)	12% (+3%)	27% (+8%)	13% (+4%)	29% (+10%)	13% (+4%)	26% (+7%)	12% (+3%)	28% (+9%)	13% (+4%)
R05	Snee-Oosh Point	15%	5%	21% (+6%)	8% (+3%)	22% (+7%)	8% (+3%)	24% (+9%)	8% (+3%)	21% (+6%)	8% (+3%)	23% (+8%)	8% (+3%)
R06	Admirals Dr. and Byrd Dr.	9%	6%	41% (+32%)	29% (+23%)	27% (+18%)	19% (+13%)	12% (+3%)	8% (+2%)	37% (+28%)	26% (+20%)	17% (+8%)	11% (+5%)
R07	Race Lagoon	5%	2%	19% (+14%)	9% (+7%)	14% (+9%)	6% (+4%)	7% (+2%)	2% (0%)	18% (+13%)	8% (+6%)	9% (+4%)	3% (+1%)
R08	Pratts Bluff	4%	2%	15% (+11%)	9% (+7%)	10% (+6%)	6% (+4%)	4% (0%)	2% (0%)	13% (+9%)	8% (+6%)	6% (+2%)	4% (+2%)
R09	Cox Rd and Island Ridge Way	3%	2%	12% (+9%)	8% (+6%)	7% (+4%)	5% (+3%)	3% (0%)	2% (0%)	11% (+8%)	7% (+5%)	5% (+2%)	3% (+1%)
R10	Skyline	5%	2%	8% (+2%)	3% (+1%)	8% (+3%)	3% (+1%)	10% (+5%)	3% (+1%)	9% (+4%)	3% (+1%)	10% (+5%)	3% (+1%)
R11	Sequim	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R12	Port Angeles	0%	0%	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	0% (0%)	0% (0%)	1% (+1%)	0% (0%)
R13	Beverly Beach, Freeland	2%	0%	6% (+4%)	0% (0%)	4% (+2%)	0% (0%)	2% (0%)	0% (0%)	5% (+3%)	0% (0%)	2% (0%)	0% (0%)
R14	E. Sleeper Rd. and Slumber Ln.	37%	25%	45% (+8%)	32% (+7%)	49% (+12%)	35% (+10%)	53% (+16%)	39% (+14%)	46% (+9%)	33% (+8%)	52% (+15%)	37% (+12%)
R15	Long Point Manor	11%	4%	24% (+13%)	13% (+9%)	19% (+8%)	8% (+4%)	14% (+3%)	4% (0%)	22% (+11%)	11% (+7%)	16% (+5%)	5% (+1%)

Table 4.2-7 Average Indoor Nightly¹ Probability of Awakening² for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)³

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴
R16	Rocky Point Heights	9%	3%	11% (+2%)	4% (+1%)	12% (+3%)	4% (+1%)	14% (+5%)	4% (+1%)	12% (+3%)	4% (+1%)	13% (+4%)	4% (+1%)
R17	Port Townsend	1%	0%	1% (0%)	0% (0%)	1% (0%)	0% (0%)	0% (-1%)	0% (0%)	1% (0%)	0% (0%)	1% (0%)	0% (0%)
R18	Marrowstone Island (Nordland)	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R19	Island Transit Offices, Coupeville	9%	5%	34% (+25%)	22% (+17%)	23% (+14%)	14% (+9%)	12% (+3%)	6% (+1%)	31% (+22%)	19% (+14%)	16% (+7%)	9% (+4%)
R20	South Lopez Island (Agate Beach)	3%	1%	4% (+1%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)
Schools (near residential areas)⁵													
S01	Oak Harbor High School	20%	12%	26% (+6%)	15% (+3%)	28% (+8%)	17% (+5%)	31% (+11%)	19% (+7%)	27% (+7%)	16% (+4%)	30% (+10%)	19% (+7%)
S02	Crescent Harbor Elementary	21%	12%	27% (+6%)	16% (+4%)	29% (+8%)	18% (+6%)	32% (+11%)	20% (+8%)	28% (+7%)	17% (+5%)	31% (+10%)	19% (+7%)
S03	Coupeville Elementary	5%	3%	17% (+12%)	11% (+8%)	11% (+6%)	7% (+4%)	6% (+1%)	3% (0%)	16% (+11%)	10% (+7%)	8% (+3%)	4% (+1%)
S04	Anacortes High School	2%	1%	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)
S05	Lopez Island School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S06	Friday Harbor Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S07	Sir James Douglas Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S08	Fidalgo Elementary School	6%	2%	9% (+3%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)	10% (+4%)	3% (+1%)	10% (+4%)	3% (+1%)
S09	La Conner Elementary School	8%	3%	11% (+3%)	5% (+2%)	11% (+3%)	5% (+2%)	10% (+2%)	5% (+2%)	11% (+3%)	5% (+2%)	10% (+2%)	5% (+2%)
S10	Elger Bay Elementary School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)

Table 4.2-7 Average Indoor Nightly¹ Probability of Awakening² for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)³

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴

Notes:

- ¹ For this metric, nightly sleeping hours are assumed to be 10:00 p.m. to 7:00 a.m.
- ² This metric represents the probability of awakening at least once during a night of average aircraft noise activities.
- ³ The difference between the No Action Alternative and Alternative 1 is noted in parentheses.
- ⁴ Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
- ⁵ All school points of interest were included in the potential sleep disturbance analysis because of their typical proximity to residential areas.

4.2.2.2.5 Outdoor Speech Interference: Potential Noise Effects on Recreation and Outdoor Activities, Alternative 1

The analysis of outdoor speech interference is based on the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). Details on the analysis of outdoor speech interference are available in Section 3.2, as well as in Appendix A, Aircraft Noise Study. Table 4.2-8 presents the results of the analysis for Alternative 1 for all 48 of the POIs because individuals could experience outdoor speech interference when outside in their yard (residential), outside at school for recess or outdoor learning (schools), or recreating at a park or recreational center (parks).

Under Alternative 1, the data in the table show a slight increase for several POIs where there would be potential for up to an average of two additional daytime events per hour during which an individual may experience outdoor speech interference while outside their home or school or while recreating at a park. For many of the POIs, there is no change from the No Action Alternative. As the data indicate and as expected, when the POI is closer to OLF Coupeville, there would be more events under Scenario A, whereas if the POI is located closer to Ault Field, there would be more events under Scenario C. Section 4.5 has additional discussion on parks and recreation in the vicinity of the airfields. The data show that there is a range of potential outdoor speech interference that may disturb individuals participating in outdoor activities depending on the location of the POI relative to the airfields and flight tracks. The average number of events is mostly consistent with those expected under the No Action Alternative conditions; however, some POIs may experience an increase in the average daily events. These increases range from zero to an increase of two events per hour depending on the scenario.

In addition, the number of events per hour that could cause nighttime outdoor speech interference, which would give an estimation of how much an individual tent-camping or sleeping outdoors may be disturbed during the night, was also analyzed. These range from an increase of two events per hour at three of the POIs (P10, R05, and R15) to no change in the number of events per hour at several of the POIs, depending upon the scenario.

Table 4.2-8 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)¹

ID Description		No Action Alternative		Alternative 1									
				Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	
$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	
Parks													
P01	Joseph Whidbey State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	9 (+1)	3 (+1)
P02	Deception Pass State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	10 (+2)	3 (+1)
P03	Dugualla State Park	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	3 (+1)	9 (+2)	2 (0)	9 (+2)	3 (+1)
P04	Ebey's Landing – Rhododendron Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
P05	Ebey's Landing – Ebey's Prairie	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	3 (+1)	1 (+1)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
P06	Fort Casey State Park	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	- (0)
P07	Cama Beach State Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	5 (+2)	1 (+1)	4 (+1)	1 (+1)
P08	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
P09	Moran State Park	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P10	San Juan Island National Monument	7	1	8 (+1)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	3 (+2)	8 (+1)	2 (+1)	9 (+2)	2 (+1)
P11	San Juan Island Visitors Center	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P12	Cap Sante Park	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
P13	Lake Campbell	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)

Table 4.2-8 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)¹

ID Description		Alternative 1											
		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
		NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	
		L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	
P14	Spencer Spit State Park	-	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
P15	Pioneer Park	4	1	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
P16	Marrowstone Island (Fort Flagler)	-	-	(+1)	(+1)	(+1)	(0)	(0)	(0)	(+1)	(+1)	(+1)	
P17	Reuble Farm	2	-	(+2)	(+1)	(+1)	(+1)	(0)	(0)	(+2)	(+1)	(+1)	
P18	Ferry House	2	-	(+2)	(+1)	(+1)	(+1)	(0)	(0)	(+2)	(+1)	(+1)	
Residences													
R01	Sullivan Road	8	2	(+1)	(0)	(+2)	(0)	(+2)	(+1)	(+1)	(0)	(+2)	
R02	Salal Street and N. Northgate Drive	8	2	(+1)	(0)	(+2)	(0)	(+2)	(+1)	(+1)	(0)	(+2)	
R03	Central Whidbey	7	2	(+1)	(0)	(+2)	(0)	(+2)	(+1)	(+1)	(0)	(+2)	
R04	Pull and Be Damned Point	7	2	(+1)	(0)	(+2)	(0)	(+2)	(+1)	(+2)	(0)	(+2)	
R05	Snee-Oosh Point	7	1	(+1)	(+1)	(+1)	(+1)	(+2)	(+2)	(+1)	(+1)	(+2)	
R06	Admirals Drive and Byrd Drive	1	-	(+2)	(+1)	(+1)	(+1)	(0)	(0)	(+2)	(+1)	(+1)	
R07	Race Lagoon	3	-	(+2)	(+1)	(+1)	(+1)	(0)	(+1)	(+1)	(+1)	(0)	
R08	Pratts Bluff	1	-	(+2)	(+1)	(+1)	(+1)	(0)	(0)	(+2)	(+1)	(+1)	

Table 4.2-8 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)¹

ID Description		No Action Alternative		Alternative 1											
				Scenario A		Scenario B		Scenario C		Scenario D		Scenario E			
		Annual Average Outdoor Daily Events per Hour													
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50		
L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾		
R09	Cox Road and Island Ridge Way	1	-	2 (+1)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)		
R10	Skyline	4	1	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)		
R11	Sequim	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)		
R12	Port Angeles	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)		
R13	Beverly Beach, Freeland	-	-	1 (+1)	- (0)	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)		
R14	E. Sleeper Road and Slumber Lane	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	10 (+2)	3 (+1)		
R15	Long Point Manor	7	1	8 (+1)	3 (+2)	8 (+1)	2 (+1)	8 (+1)	3 (+2)	8 (+1)	2 (+1)	8 (+1)	3 (+2)		
R16	Rocky Point Heights	4	1	5 (+1)	1 (0)	5 (+1)	2 (+1)	5 (+1)	2 (+1)	5 (+1)	1 (0)	5 (+1)	2 (+1)		
R17	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	- (0)	- (-1)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)		
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)		
R19	Island Transit Offices, Coupeville	3	1	5 (+2)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)		
R20	South Lopez Island (Agate Beach)	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)		
Schools															
S01	Oak Harbor High School	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	3 (+1)	9 (+1)	2 (0)	9 (+1)	3 (+1)		

Table 4.2-8 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 1 (Average Year)¹

ID	Description	No Action Alternative		Alternative 1									
				Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	
S02	Crescent Harbor Elementary School	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	3 (+1)	8 (+1)	2 (0)	9 (+2)	2 (0)
S03	Coupeville Elementary School	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
S04	Anacortes High School	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	4	1	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)
S09	La Conner Elementary School	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
S10	Elger Bay Elementary School	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)

Notes:

¹ The difference between the No Action Alternative and Alternative 1 is noted in parentheses. A hyphen (-) indicates the result equals zero.

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

Key:

dB = decibel

L_{max} = maximum A-weighted sound level

NA50 = Number of Events above an L_{max} of 50 dB

4.2.2.2.6 Potential Hearing Loss, Alternative 1

The available literature on the subject of permanent threshold shifts and aircraft noise exposure indicates that exposure to military aviation noise has not resulted in permanent threshold shifts, even in sensitive populations such as children. Ludlow and Sixsmith (1999) found that exposure to aircraft noise at levels typical of those who live on or near a jet station was unlikely to cause permanent threshold shifts. Additionally, the report found that there were no major differences in audiometric test results between military personnel who, as children, had lived on or near installations where jet aircraft operations were based and military personnel who, as children, had no such exposure (Ludlow and Sixsmith, 1999; ACRP [Aircraft Cooperative Research Program], 2008).

As part of this analysis, an evaluation of the risk of PHL for populations in the areas around the NAS Whidbey Island complex was conducted (including both Ault Field and OLF Coupeville). Details on the PHL metric, methodology for the analysis, and assumptions are outlined in Section 3.2, as well as Appendix A, Aircraft Noise Study. The 1982 *U.S. EPA Guidelines for Noise Impact Analysis* provides that people who experience continuous, daily exposure to high noise over a normal working lifetime of 40 years, with exposure lasting 8 hours per day for 5 days per week, beginning at an age of 20 years old, may be at risk for a type of hearing loss called Noise Induced Permanent Threshold Shift (NIPTS). NIPTS defines a permanent change in hearing level, or threshold, caused by exposure to noise (USEPA, 1982). This workplace exposure standard, which is being applied to outdoor noise levels, is not intended to accurately describe the impact of intermittent noise events such as periodic aircraft overflights but is presented as a “worst-case” analytical tool. To put the conservative nature of this analysis into context, the national average of time spent indoors is approximately 87 percent (or almost 21 hours of the day) (Klepeis et al., n.d.). With intermittent aircraft operations and the time most people spend indoors, it is very unlikely that individuals would experience noise exposure that would result in hearing loss. In fact, it is highly unlikely for an individual living around Ault Field or OLF Coupeville to meet all of the criteria upon which the PHL metric is based. Nonetheless, this analysis is provided per DoD policy directive to support informed decision making and provide a standard for comparison across a wide range of proposed actions that result in community exposure to aircraft noise.

The procedure for determining PHL includes first identifying the number of persons residing in the greater than or equal to 80 dB DNL contour. Then, $L_{eq(24)}$ contours are developed by 1 dB increments in order to determine the potential for NIPTS for both the population with average sensitivity to noise and the population with the most sensitivity to noise. Table 4.2-9 presents the potentially affected populations in and near Ault Field and OLF Coupeville by 1 dB increments of the 24-hour equivalent sound level ($L_{eq(24)}$) 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 (USEPA, 1974). Therefore, using the data provided in Table 4.2-9 for the population with average sensitivity to noise, the level at which there may be a noticeable NIPTS would be at the 84 to 85 dB $L_{eq(24)}$ range and above. There is an increase in the population within the 80 dB DNL noise contour (i.e., potential at-risk population) under Alternative 1 at both Ault Field and OLF Coupeville. The largest increase in the potential at-risk population in the vicinity of Ault Field would be under Scenario C (47 additional people) and for OLF Coupeville would be under Scenario A (45 additional people). The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville. The potential NIPTS values presented in Table 4.2-9 are only applicable in the extreme case of continuous outdoor exposure at one's residence to all aircraft events occurring over a period of 40 years. Because it is highly unlikely for any individuals to meet all those criteria, the actual potential NIPTS for individuals would be far less than the values reported here.

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). This noise-sensitive population could be considered the young, the elderly, or those predisposed to hearing sensitivity for other reasons. Therefore, to capture this, the USEPA guidelines provided information on the estimated NIPTS exceeded by the 10 percent of the population most sensitive to noise. Using the same 1 dB incremental data in Table 4.2-9 and the column identified as the 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 most noise-sensitive population around Ault Field and up to 12.0 dB for the most noise-sensitive population around OLF Coupeville. As noted previously, it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period; therefore, the actual potential NIPTS for individuals would be far less than the values reported here.

Table 4.2-9 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 1 at NAS Whidbey Island Complex (Average Year)

Band of Leq(24) (dB) ¹	Avg NIPTS (dB) ^{2,3}	10 th Pct NIPTS (dB) ²	Estimated Population ^{4,5,6}											
			Ault Field						OLF Coupeville					
			No Action	Alt 1A	Alt 1B	Alt 1C	Alt 1D	Alt 1E	No Action	Alt 1A	Alt 1B	Alt 1C	Alt 1D	Alt 1E
75-76	1.0	4.0	0	0 (0)	3 (+3)	38 (+38)	0 (0)	30 (+30)	31	141 (+110)	73 (+42)	32 (+1)	125 (+94)	39 (+8)
76-77	1.0	4.5	123	176 (+53)	393 ⁷ (+270)	561 ⁸ (+438)	214 (+91)	507 ⁹ (+384)	45	168 (+123)	94 (+49)	57 (+12)	167 (+122)	65 (+20)
77-78	1.5	5.0	233	262 (+29)	337 (+104)	434 (+201)	310 (+77)	357 (+124)	47	144 (+97)	77 (+30)	66 (+19)	102 (+55)	58 (+11)
78-79	2.0	5.5	145	147 (+2)	246 (+101)	296 (+151)	174 (+29)	294 (+149)	24	96 (+72)	67 (+43)	39 (+15)	85 (+61)	59 (+35)
79-80	2.5	6.0	92	132 (+40)	165 (+73)	250 (+158)	142 (+50)	221 (+129)	7	76 (+69)	60 (+53)	1 (-6)	72 (+65)	86 (+79)
80-81	3.0	7.0	73	78 (+5)	94 (+21)	130 (+57)	81 (+8)	117 (+44)	0	68 (+60)	58 (+58)	0 (0)	64 (+64)	4 (+4)
81-82	3.5	8.0	51	62 (+11)	72 (+21)	80 (+29)	67 (+16)	76 (+25)	0	60 (+60)	67 (+67)	0 (0)	54 (+54)	0 (0)
82-83	4.0	9.0	37	48 (+11)	58 (+21)	64 (+27)	48 (+11)	61 (+24)	0	56 (+56)	32 (+32)	0 (0)	62 (+62)	0 (0)
83-84	4.5	10.0	34	33 (-1)	35 (+1)	38 (+4)	35 (+1)	36 (+2)	0	65 (+65)	1 (+1)	0 (0)	69 (+69)	0 (0)
84-85	5.5	11.0	11	26 (+15)	26 (+15)	29 (+18)	28 (+17)	28 (+17)	0	44 (+44)	0 (0)	0 (0)	2 (+2)	0 (0)
85-86	6.0	12.0	9	9 (0)	22 (+13)	26 (+17)	10 (+1)	24 (+15)	0	1 (+1)	0 (0)	0 (0)	0 (0)	0 (0)
86-87	7.0	13.5	6	8 (+2)	9 (+3)	10 (+4)	9 (+3)	10 (+4)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
87-88	7.5	15.0	4	6 (+2)	6 (+2)	7 (+3)	6 (+2)	7 (+3)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
88-89	8.5	16.5	2	4 (+2)	4 (+2)	5 (+3)	4 (+2)	4 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
89-90	9.5	18.0	0	1 (+1)	2 (+2)	2 (+2)	1 (+1)	2 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-9 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 1 at NAS Whidbey Island Complex (Average Year)

Band of <i>Leq(24)</i> (dB) ¹	Avg NIPTS (dB) ^{2,3}	10 th Pct NIPTS (dB) ²	Estimated Population ^{4,5,6}												
			Ault Field						OLF Coupeville						
			No Action	Alt 1A	Alt 1B	Alt 1C	Alt 1D	Alt 1E	No Action	Alt 1A	Alt 1B	Alt 1C	Alt 1D	Alt 1E	
90-91	10.5	19.5	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Notes:

- ¹ *Leq* bands with no population were omitted from table.
- ² NIPTS values rounded to nearest 0.5 dB.
- ³ NIPTS below 5 dB are generally not considered noticeable.
- ⁴ This analysis assumes the population is outdoors at one’s residence and exposed to all aircraft noise events for 40 years. Given the amount of time spent indoors and the intermittent occurrence of aircraft noise events, it is highly unlikely that individuals would meet all those criteria, and the actual potential for hearing loss would be far less than the values reported here.
- ⁵ Estimated Population was determined by those living within the 80 dB DNL noise contour around each airfield, including those living on-base at Ault Field (there is no on-base population at OLF Coupeville).
- ⁶ Population counts of people within the DNL contours were computed using 2010 census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). In addition, per guidance on potential hearing loss, on-base populations at Ault Field have been included in the analysis. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.
- ⁷ Of this estimated population, 58 are military personnel living on base at Ault Field.
- ⁸ Of this estimated population, 195 are military personnel living on base at Ault Field.
- ⁹ Of this estimated population, 96 are military personnel living on base at Ault Field.

Key:

- dB = decibel
- Leq(24)* = 24-hour Equivalent Sound Level
- NIPTS = Noise Induced Permanent Threshold Shift

4.2.2.3 Nonauditory Health Effects, Alternative 1

Per studies noted and evaluated in Section 3.2.3, the data and research are inconclusive with respect to the linkage between potential nonauditory health effects of aircraft noise exposure. As outlined within the analysis of DNL contours and supplemental metrics presented within this section, the data show that the Proposed Action would result in both an increase in the number of people exposed to noise as well as those individuals exposed to higher levels of noise. However, research conducted to date has not made a definitive connection between intermittent military aircraft noise and nonauditory health effects. The results of most cited studies are inconclusive and cannot identify a causal link between aircraft noise exposure and the various type of nonauditory health effects that were studied. An individual's health is greatly influenced by many factors known to cause health issues, such as hereditary factors, medical history, and life style choices regarding smoking, diet, and exercise. Research has demonstrated that these factors have a larger and more direct effect on a person's health than aircraft noise.

Based upon public comments received on the Draft EIS, the Navy has expanded its nonauditory health effects literature review, using journals and published articles referred to by the Washington State Department of Health, the USEPA, and public comment submittals. Additional topics discussed included, but were not limited to, hypertension and cardiovascular health, lack of sleep, stress, and anxiety, and details can be found in Appendix A1 of the Aircraft Noise Study (Appendix A).

4.2.2.4 Vibration Effects from Aircraft Operations, Alternative 1

In addition to the noise effects on the population outlined above, noticeable structural vibration may result from certain aircraft operations at either Ault Field or OLF Coupeville. Depending on the aircraft operation, altitude, heading, power settings, and the structure, certain vibration effects may be observed. Typically, the structural elements that are most susceptible to vibration from aircraft noise are windows and sometimes walls or ceilings. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (CHABA, 1977). Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. See Appendix A, Aircraft Noise Study, and the Noise and Vibration Associated with Operational Impacts discussion in Section 4.6.2.1 for additional details on noise-induced vibration effects.

The data show that the Proposed Action will result in both an increase in the number of aircraft operations and area/structures exposed to noise. Therefore, there could be an increase in vibration effects due to the Proposed Action. However, as shown in Table 4.2-3, for the representative POIs analyzed, the highest L_{max} value was 117 dB, and therefore sound levels damaging to structural components of buildings are not likely to occur.

4.2.2.5 Noise Conclusion, Alternative 1

Overall, Alternative 1 would have significant noise impacts in the communities surrounding Ault Field and OLF Coupeville. Both the total number of acres and the total number of individuals within the DNL noise contours would increase for all scenarios analyzed. There would be a larger impact to the

communities around Ault Field under Scenario C, while there would be a larger impact for the communities around OLF Coupeville under Scenario A.

There would be a slight increase in the number of incidents of indoor and outdoor speech interference, and classroom interference. There would also be a higher probability of awakening under all scenarios, especially for POIs located closer to the airfields. In addition, depending on the scenario, the population potentially at risk for PHL would increase. The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville for the population with average sensitivity to noise and up to 18.0 dB at Ault Field and 12.0 dB at OLF Coupeville for the population highly sensitive to noise (the 10 percent of the population with the most sensitivity to noise). The potential NIPTS values are only applicable in the extreme case of continuous outdoor exposure at one's residence to all aircraft events occurring over a period of 40 years. As it is highly unlikely any individuals would meet all these criteria, the actual potential NIPTS for individuals would be far less than the values reported here. With intermittent aircraft operations and the time most people spend indoors, it is very unlikely that individuals would experience noise exposure that would result in hearing loss. Nonetheless, this analysis is provided per DoD policy directive to support informed decision making.

4.2.3 Noise, Alternative 2

This section outlines the noise environment as modeled for Alternative 2 and describes the noise conditions associated with aircraft activity at Ault Field and OLF Coupeville using DNL and several supplemental noise metrics outlined in Section 3.2, including L_{eq} , SEL, L_{max} , and NA, which are used to evaluate such noise effects as community noise exposure, indoor and outdoor speech interference, sleep disturbance, classroom/learning interference, and PHL. Additional information on the noise metrics is also available in Appendix A, Aircraft Noise Study.

The following sections detail potential impacts using projected DNL contours (the federally approved noise metric) and several supplemental metrics (to more fully describe the noise effects).

4.2.3.1 Projected DNL Contours, Alternative 2

As part of the noise analysis and as discussed in Section 3.2.1.1, the DNL noise contours for the alternatives were modeled for an "average year" at Ault Field and OLF Coupeville. An average year represents conditions that are projected to occur on an annual basis, or a typical operating tempo at the NAS Whidbey Island complex. In addition, the five scenarios, which present the optional FCLP allocations, were modeled individually to provide a comparative presentation of the potential noise levels.

Figure 4.2-12 presents the projected DNL noise contours for all scenarios under Alternative 2. This overview figure of the NAS Whidbey Island complex (both Ault Field and OLF Coupeville) presents the 65 dB DNL contour under all scenarios for comparison.

Figures 4.2-13 through 4.2-17 present the five scenarios separately for Ault Field, and Figures 4.2-18 through 4.2-22 present the five scenarios separately for OLF Coupeville²⁷. In these sets of figures, the projected 60 dB, 65 dB, 70 dB, and greater than 75 dB DNL contours for Alternative 2 are compared to the No Action Alternative DNL contours. The 65 dB DNL contour at Ault Field extends approximately 10 miles from the four runway endpoints. Under Alternative 2, the length of these contour lobes is primarily due to the Growler on the approach portion of the GCA patterns (described in Section 3.1), where the aircraft generally descends on a 3-degree glide slope through 3,000 feet AGL 10 miles from the runway.

Similar to the No Action Alternative and other alternatives, the shape of the DNL contour at OLF Coupeville would be determined by the FCLPs conducted at the airfield. The 65 to less than 70 dB DNL contour range takes the shape of two ovals, one on each side of OLF Coupeville's runway, which correspond to the FCLP flight tracks. Generally speaking, around Ault Field, the 65 dB DNL contours associated with Scenario C extend the farthest from the airfield and cover the most land area (13,788 acres, compared to 13,164 acres under Scenario A). Conversely, around OLF Coupeville, the 65 dB DNL contours associated with Scenario A extend the farthest from the airfield and cover the most land area (10,082 acres, compared to 7,877 acres under Scenario C). The differences between the scenarios at the two airfields are sometimes small (nearly overlapping) and at other times can differ by approximately one mile. The overall difference in the size of the noise contours between the scenarios is more pronounced at OLF Coupeville than at Ault Field due to the larger proportional difference of operations at OLF Coupeville than at Ault Field.

Table 4.2-10 presents an overall comparison of the number of land acres and population in each of the DNL contour ranges, as well as the difference in conditions between the No Action Alternative and Alternative 2 under all scenarios. As indicated in the table, the total change in population within the entire 65 dB DNL contour increases from the No Action Alternative by between 137 and 1,154 at Ault Field (primarily in and around Oak Harbor), depending on the scenario and, for OLF Coupeville (primarily in and around Coupeville), increases from the No Action Alternative by between 489 and 1,179, depending on the scenario.

²⁷ In addition, as discussed further in Section 3.2.2.1, 65 dB DNL is the established federal standard for determining potential for high annoyance. This level has been identified in both the FAA's Part 150 Program and the DoD's AICUZ Program (including the individual Air Force and Navy programs) as a threshold for land use recommendations. Consistent with this guidance, 65 dB DNL is used to show areas with potential for high annoyance in this analysis. However, aircraft noise does occur outside the 65 dB DNL contour. In order to more fully reflect the noise environment, the Draft EIS included noise contours of 60 dB DNL as well as detailed noise analysis for specific POIs. In response to public comments, the Navy has expanded the analysis in the Final EIS to show geographic areas subject to greater than 55 dB DNL and has analyzed 18 additional POIs.

As also presented within Table 4.2-10, under several of the alternatives/scenarios, the majority of the increase in population is located within the greater than 75 dB DNL noise contour, especially at OLF Coupeville. The greater than 75 dB DNL noise contour is the area where there is the highest level of community annoyance associated with aircraft noise. Therefore, these populations would be significantly impacted.

For purposes of comparison and to be fully transparent regarding the possible range of impacts that could arise from the Proposed Action, DNL noise contours were also modeled for a high-tempo FCLP year, which represents conditions when pre-deployment training for multiple units overlaps and, therefore, FCLP activity would be expected to increase over average conditions. The high-tempo FCLP year data are depicted on the same figures noted previously, as well as included in Appendix A, Aircraft Noise Study. Figures 4.2-13 through 4.2-22 present both the average year and high-tempo FCLP year DNL noise contours on the same figures for the airfields to illustrate the relatively small differences in the overall noise environment, with many of the areas where the contours diverge occurring over water.

In addition, Table 4.2-11 shows the percentage change in acreage and population between the average year DNL contour ranges and the high-tempo FCLP year DNL contour ranges. The higher the percent change means the deviation between the average year DNL noise contours and the high-tempo FCLP year DNL contours is larger; however, most changes are within +/- 5 percent of zero.

Table 4.2-10 Estimated Acreage and Population within the DNL Contour Ranges¹ for the NAS Whidbey Island Complex, Alternative 2 (Average Year)^{2,3}

	<i>DNL Contour Ranges</i>							
	<i>65 to <70 dB DNL</i>		<i>70 to <75 dB DNL</i>		<i>Greater than or equal to 75 dB DNL</i>		<i>Total</i>	
	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>
<i>Ault Field</i>								
<i>No Action Alternative</i>								
Average Year	3,596	3,279	3,269	2,283	5,549	3,379	12,414	8,941
<i>Alternative 2</i>								
Scenario A (20/80 FCLP split)	4,015 (+419)	3,699 (+420)	3,263 (-6)	1,886 (-397)	5,886 (+337)	3,493 (+114)	13,164 (+750)	9,078 (+137)
Scenario B (50/50 FCLP split)	3,899 (+303)	3,595 (+316)	3,266 (-3)	2,423 (+140)	6,370 (+821)	3,763 (+384)	13,535 (+1,121)	9,781 (+840)
Scenario C (80/20 FCLP split)	3,903 (+307)	3,701 (+422)	3,130 (-139)	2,472 (+189)	6,755 (+1,206)	3,922 (+543)	13,788 (+1,374)	10,095 (+1,154)
Scenario D (30/70 FCLP split)	3,966 (+370)	3,703 (+424)	3,234 (-35)	2,189 (-94)	6,129 (+580)	3,606 (+227)	13,329 (+915)	9,498 (+557)
Scenario E (70/30 FCLP split)	3,898 (+302)	3,667 (+388)	3,152 (-117)	2,435 (+152)	6,657 (+1,108)	3,876 (+497)	13,707 (+1,293)	9,978 (+1,037)
<i>OLF Coupeville</i>								
<i>No Action Alternative</i>								
Average Year	3,681	861	3,088	786	638	583	7,407	2,230
<i>Alternative 2</i>								
Scenario A (20/80 FCLP split)	1,553 (-2,128)	539 (-322)	3,380 (+292)	987 (+201)	5,149 (+4,511)	1,883 (+1,300)	10,082 (+2,675)	3,409 (+1,179)
Scenario B (50/50 FCLP split)	2,124 (-1,557)	583 (-278)	3,470 (+382)	1,065 (+279)	3,784 (+3,146)	1,447 (+864)	9,378 (+1,971)	3,095 (+865)
Scenario C (80/20 FCLP split)	3,442 (-239)	1,059 (+198)	3,148 (+60)	1,018 (+232)	1,287 (+649)	642 (+59)	7,877 (+470)	2,719 (+489)
Scenario D (30/70 FCLP split)	1,651 (-2,030)	518 (-343)	3,443 (+355)	1,027 (+241)	4,793 (+4,155)	1,774 (+1,191)	9,887 (+2,480)	3,319 (+1,089)
Scenario E (70/30 FCLP split)	3,136 (-545)	896 (+35)	3,157 (+69)	1,047 (+261)	2,413 (+1,775)	968 (+385)	8,706 (+1,299)	2,911 (+681)

Table 4.2-10 Estimated Acreage and Population within the DNL Contour Ranges¹ for the NAS Whidbey Island Complex, Alternative 2 (Average Year)^{2,3}

	<i>DNL Contour Ranges</i>							
	<i>65 to <70 dB DNL</i>		<i>70 to <75 dB DNL</i>		<i>Greater than or equal to 75 dB DNL</i>		<i>Total</i>	
	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>
NAS Whidbey Island Complex								
No Action Alternative								
Average Year	7,277	4,140	6,357	3,069	6,187	3,962	19,821	11,171
Alternative 2								
Scenario A (20/80 FCLP split)	5,568 (-1,709)	4,238 (+98)	6,643 (+286)	2,873 (-196)	11,035 (+4,848)	5,376 (+1,414)	23,246 (+3,425)	12,487 (+1,316)
Scenario B (50/50 FCLP split)	6,023 (-1,254)	4,178 (+38)	6,736 (+379)	3,488 (+419)	10,154 (+3,967)	5,210 (+1,248)	22,913 (+3,092)	12,876 (+1,705)
Scenario C (80/20 FCLP split)	7,345 (+68)	4,760 (+620)	6,278 (-79)	3,490 (+421)	8,042 (+1,855)	4,564 (+602)	21,665 (+1,844)	12,814 (+1,643)
Scenario D (30/70 FCLP split)	5,617 (-1,660)	4,221 (+81)	6,677 (+320)	3,216 (+147)	10,922 (+4,735)	5,380 (+1,418)	23,216 (+3,395)	12,817 (+1,646)
Scenario E (70/30 FCLP split)	7,034 (-243)	4,563 (+423)	6,309 (-48)	3,482 (+413)	9,070 (+2,883)	4,844 (+882)	22,413 (+2,592)	12,889 (+1,718)

Table 4.2-10 Estimated Acreage and Population within the DNL Contour Ranges¹ for the NAS Whidbey Island Complex, Alternative 2 (Average Year)^{2,3}

<i>DNL Contour Ranges</i>							
<i>65 to <70 dB DNL</i>		<i>70 to <75 dB DNL</i>		<i>Greater than or equal to 75 dB DNL</i>		<i>Total</i>	
<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>

Notes:

- ¹ All five scenarios are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ² Acreage presented does not include areas over water or areas over the NAS Whidbey Island complex.
- ³ The difference between the No Action Alternative and Alternative 1 is noted in parentheses.
- ⁴ Population counts of people within the DNL contour ranges were computed using 2010 Census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour range, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the DNL contour ranges (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville). A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.
- ⁵ Numbers have been rounded to ensure totals sum.

Key:

- dB = decibel
- DNL = day-night average sound level
- FCLP = Field Carrier Landing Practice

Table 4.2-11 Percent Difference in the Estimated Acreage and Population within the Average and High-Tempo FCLP Year DNL Contour Ranges for the NAS Whidbey Island Complex, Alternative 2

DNL Contours	DNL Contour Ranges ¹							
	65 to <70 dB DNL		70 to <75 dB DNL		Greater than or equal to 75 dB DNL		Total	
	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop
Ault Field								
Scenario A	1.7%	1.1%	0.3%	2.3%	1.1%	0.6%	1.1%	1.2%
Scenario B	1.4%	1.8%	0.0%	2.8%	1.9%	1.4%	1.3%	1.9%
Scenario C	2.3%	1.8%	0.3%	1.8%	1.3%	1.0%	1.4%	1.5%
Scenario D	1.5%	1.4%	0.3%	1.6%	1.0%	0.7%	1.0%	1.2%
Scenario E	1.8%	1.5%	0.3%	2.1%	1.3%	0.8%	1.2%	1.4%
OLF Coupeville								
Scenario A	0.6%	4.3%	-2.9%	-3.9%	3.4%	2.9%	0.9%	1.2%
Scenario B	-2.9%	-3.7%	-0.3%	-0.5%	3.6%	3.4%	0.7%	0.7%
Scenario C	0.1%	-3.1%	0.9%	2.4%	26.6%	14.6%	4.8%	3.1%
Scenario D	-3.9%	1.8%	-0.5%	-2.0%	3.6%	3.2%	0.9%	1.3%
Scenario E	-6.8%	-7.9%	2.1%	0.4%	12.6%	10.9%	1.8%	1.3%
NAS Whidbey Island Complex								
Scenario A	1.4%	1.5%	-1.3%	0.2%	2.2%	1.4%	1.0%	1.2%
Scenario B	-0.1%	1.1%	-0.1%	1.8%	2.5%	1.9%	1.1%	1.6%
Scenario C	1.3%	0.7%	0.6%	2.0%	5.4%	2.9%	2.6%	1.8%
Scenario D	-0.1%	1.4%	-0.1%	0.5%	2.2%	1.5%	1.0%	1.2%
Scenario E	-2.0%	-0.4%	1.2%	1.6%	4.3%	2.8%	1.4%	1.4%

Key:

- dB = decibel
- DNL = day-night average sound level
- NAS = Naval Air Station
- OLF = outlying landing field

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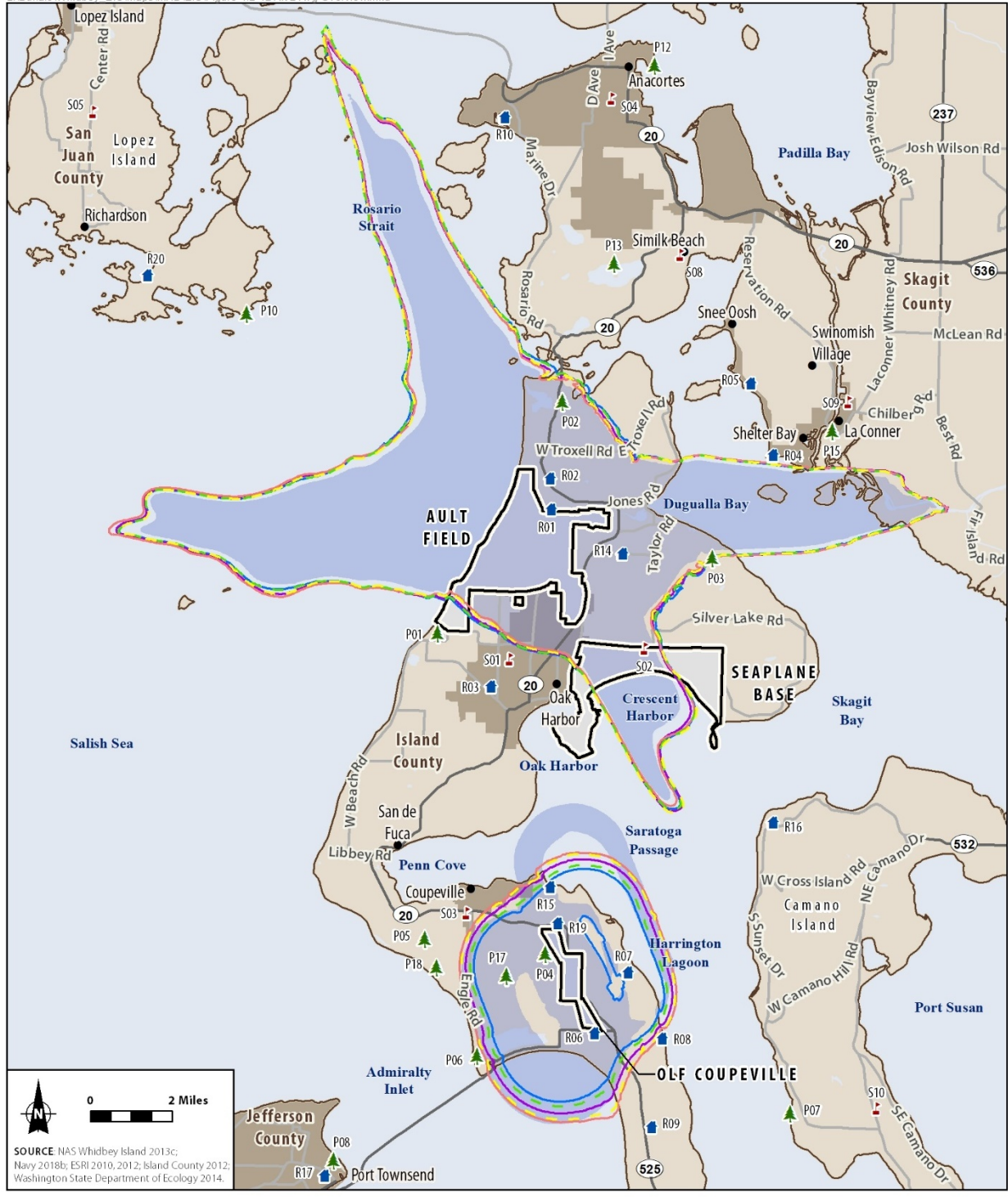
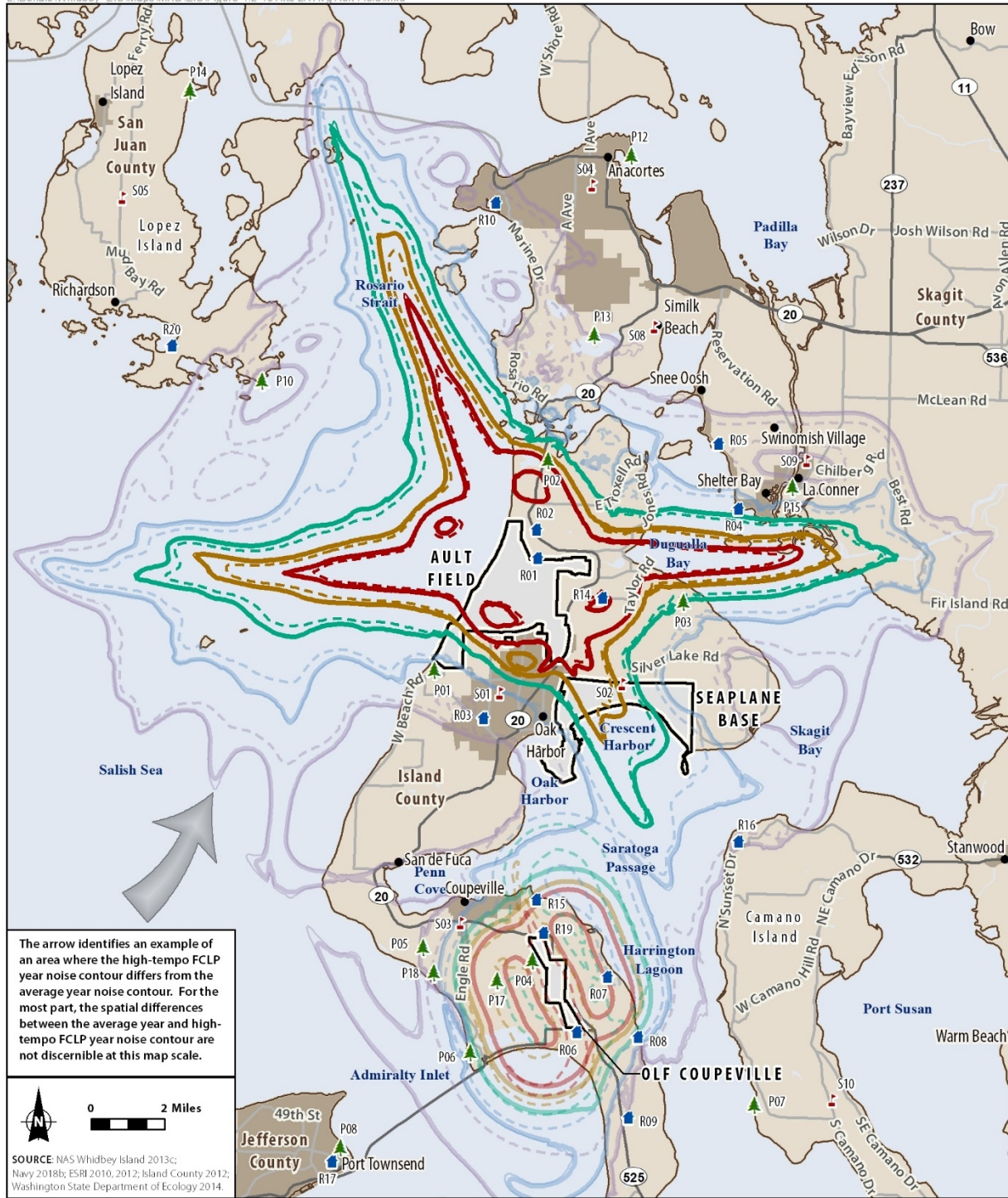


Figure 4.2-12
Alternative 2 Overview
of the 65 dB DNL Noise Contours for
the NAS Whidbey Island Complex
 Whidbey Island, Island County, WA

- City
 - County Boundary
 - U.S. and State Highway
 - Major Road
 - City/Town Boundary
 - ▭ Installation Area
- | | |
|---|--|
| <ul style="list-style-type: none"> ▲ Points of Interest (POI) ▲ Park ■ Residential ■ School | <ul style="list-style-type: none"> — Alternative 2A (Average Year) DNL Noise Contour (65 dB) — Alternative 2B (Average Year) DNL Noise Contour (65 dB) — Alternative 2C (Average Year) DNL Noise Contour (65 dB) — Alternative 2D (Average Year) DNL Noise Contour (65 dB) — Alternative 2E (Average Year) DNL Noise Contour (65 dB) — No Action (Average Year) (≥65 dB) |
|---|--|

L:\Buffalo\Whidbey FEIS\Maps\MXD\EIS\Figure 4.2-13 Alts 2A Avg Ault Field.mxd



L:\Buffalo\Whidbey EIS\Maps\MXD\EIS\Figure 4.2-14 Alts 2B Avg Ault Field.mxd



The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.

0 2 Miles

SOURCE: NAS Whidbey Island 2013; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

	Points of Interest (POI)	No Action (Average) DNL Noise Contour (dB)	Alternative 2B (Average) DNL Noise Contour (dB)	Alternative 2B (High Tempo FCLP) DNL Noise Contour (dB)
●	City	55*	55*	55*
—	County Boundary	60*	60*	60*
—	U.S. and State Highway	65	65	65
—	Major Road	70	70	70
—	City/Town Boundary	75	75	75
□	Installation Area			
▲	Park			
■	Residential			
■	School			

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-14
Alternative 2B DNL Noise
Contours for Ault Field
 Whidbey Island, Island County, WA

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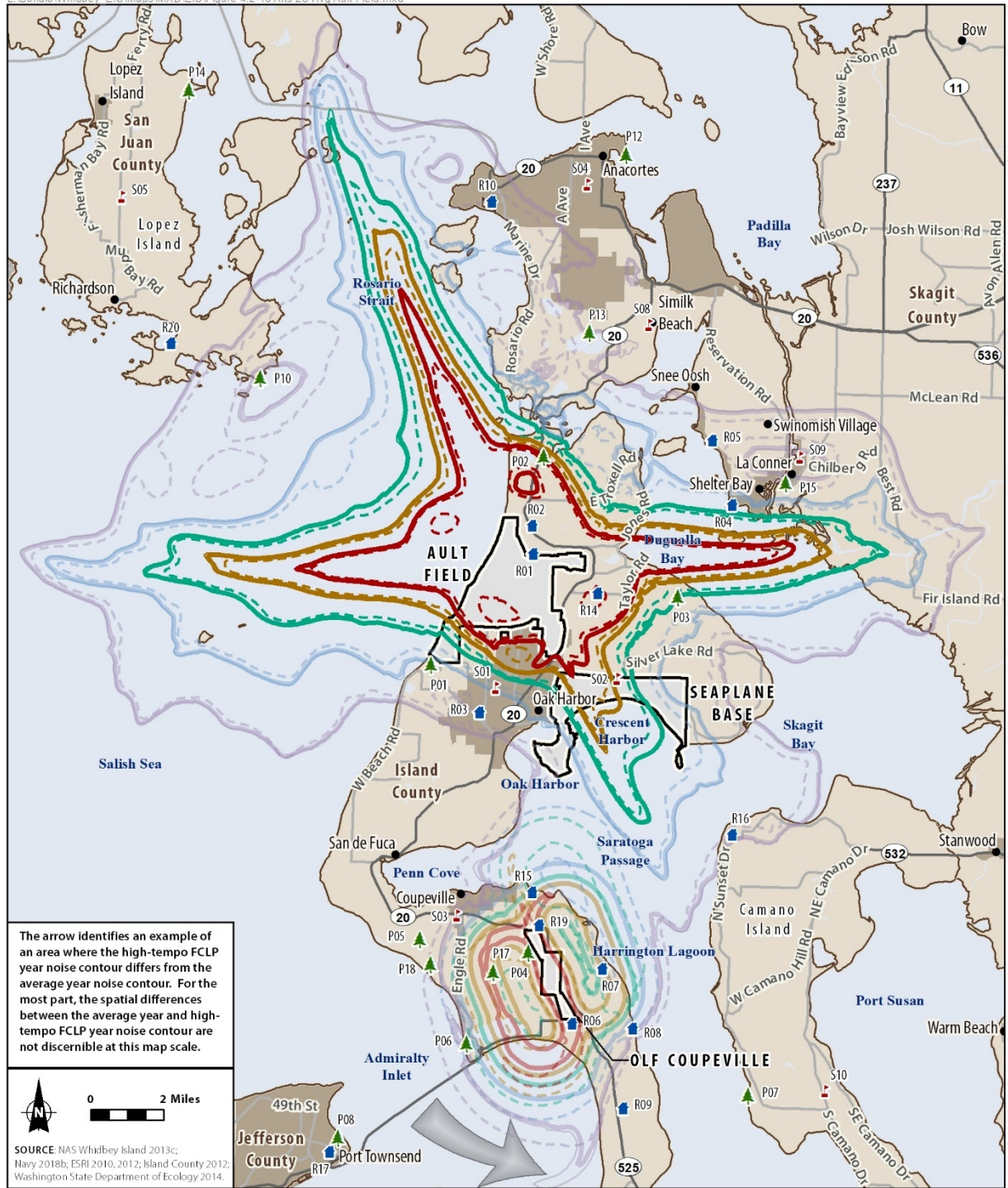
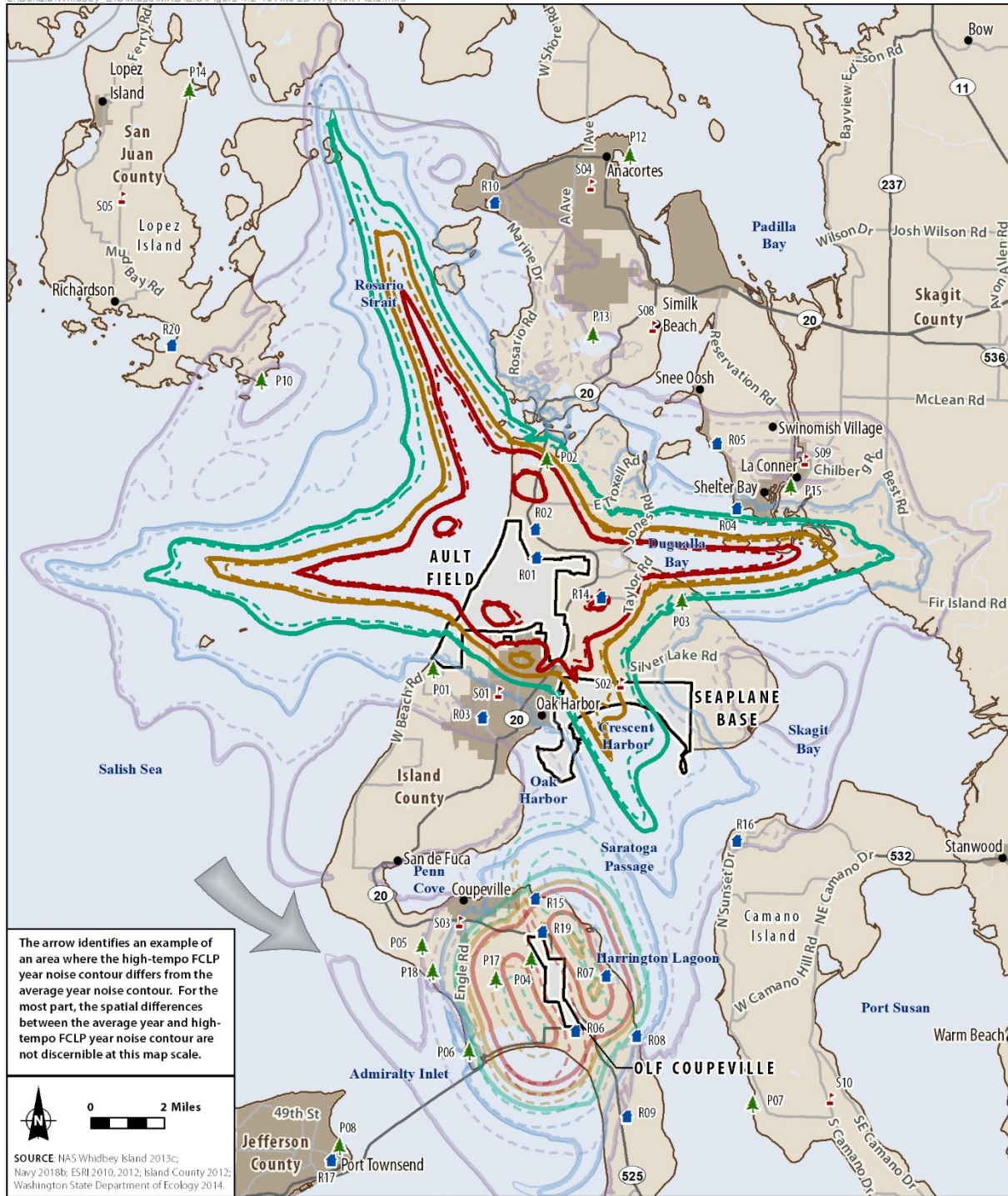


Figure 4.2-15
Alternative 2C DNL Noise
Contours for Ault Field
 Whidbey Island, Island County, WA

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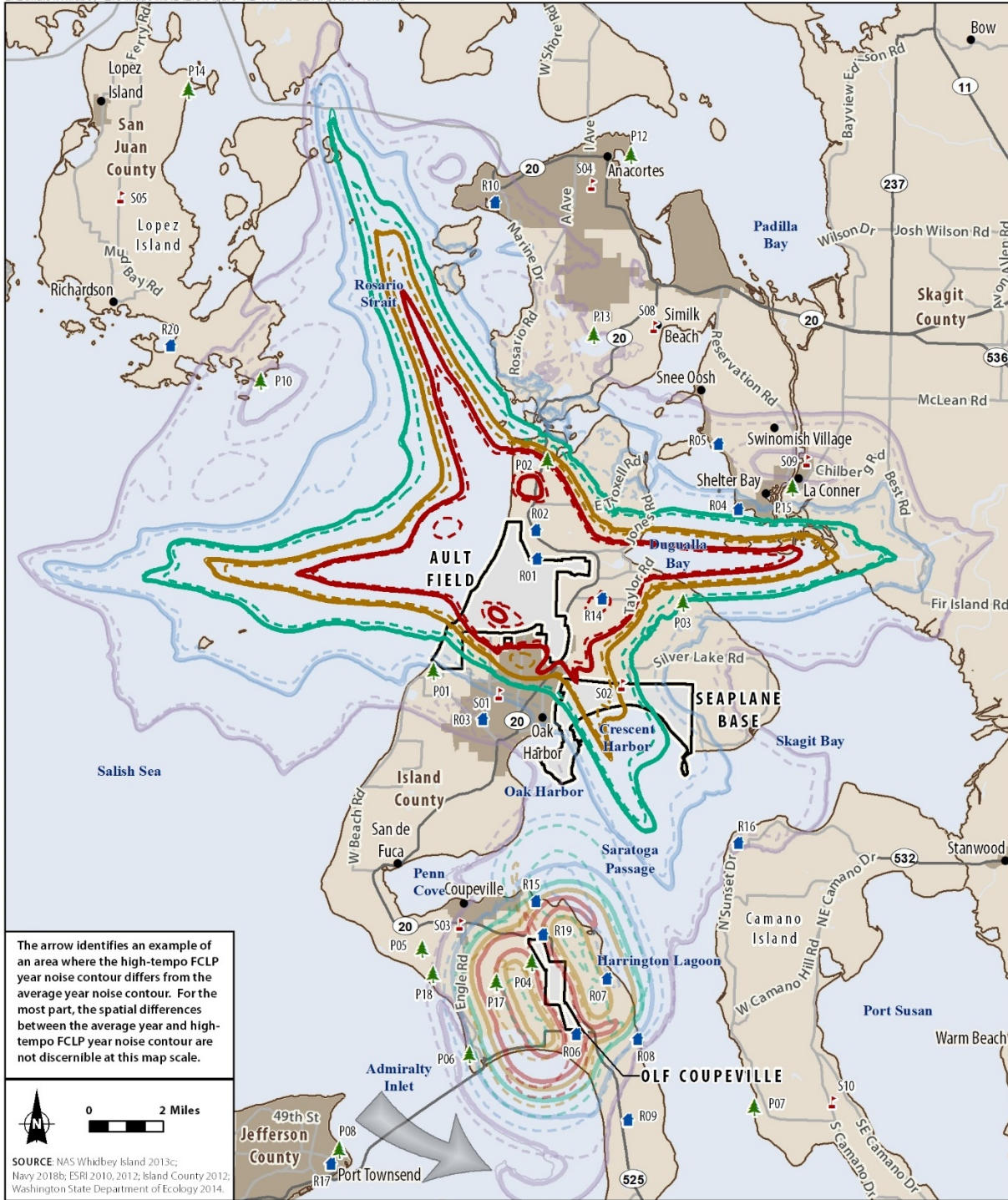


- | | | | | |
|--------------------------|--------------------------|--|---|---|
| ● City | Points of Interest (POI) | No Action (Average) DNL Noise Contour (dB) | Alternative 2D (Average) DNL Noise Contour (dB) | Alternative 2D (High Tempo FCLP) DNL Noise Contour (dB) |
| — County Boundary | 🌳 Park | — 55* | — 55* | — 55* |
| — U.S. and State Highway | 🏠 Residential | — 60* | — 60* | — 60* |
| — Major Road | 🎓 School | — 65 | — 65 | — 65 |
| — City/Town Boundary | | — 70 | — 70 | — 70 |
| ▭ Installation Area | | — 75 | — 75 | — 75 |

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-16
Alternative 2D DNL Noise
Contours for Ault Field
Whidbey Island, Island County, WA

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I:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.2-18 Alt 2A Avg Coupeville.mxd

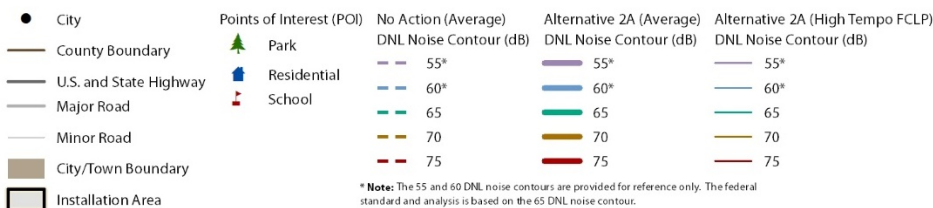
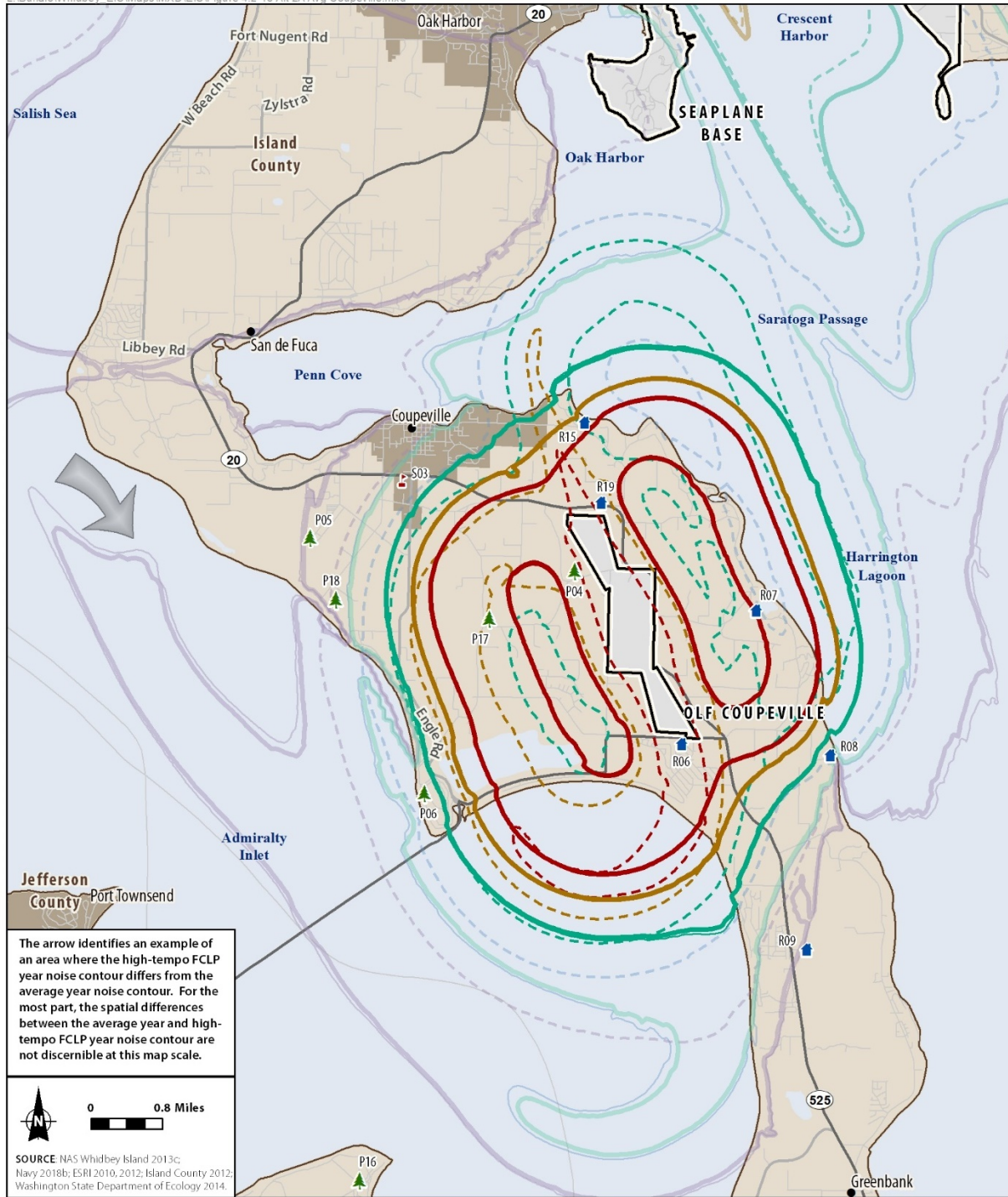


Figure 4.2-18
Alternative 2A DNL Noise
Contours for OLF Coupeville
 Whidbey Island, Island County, WA

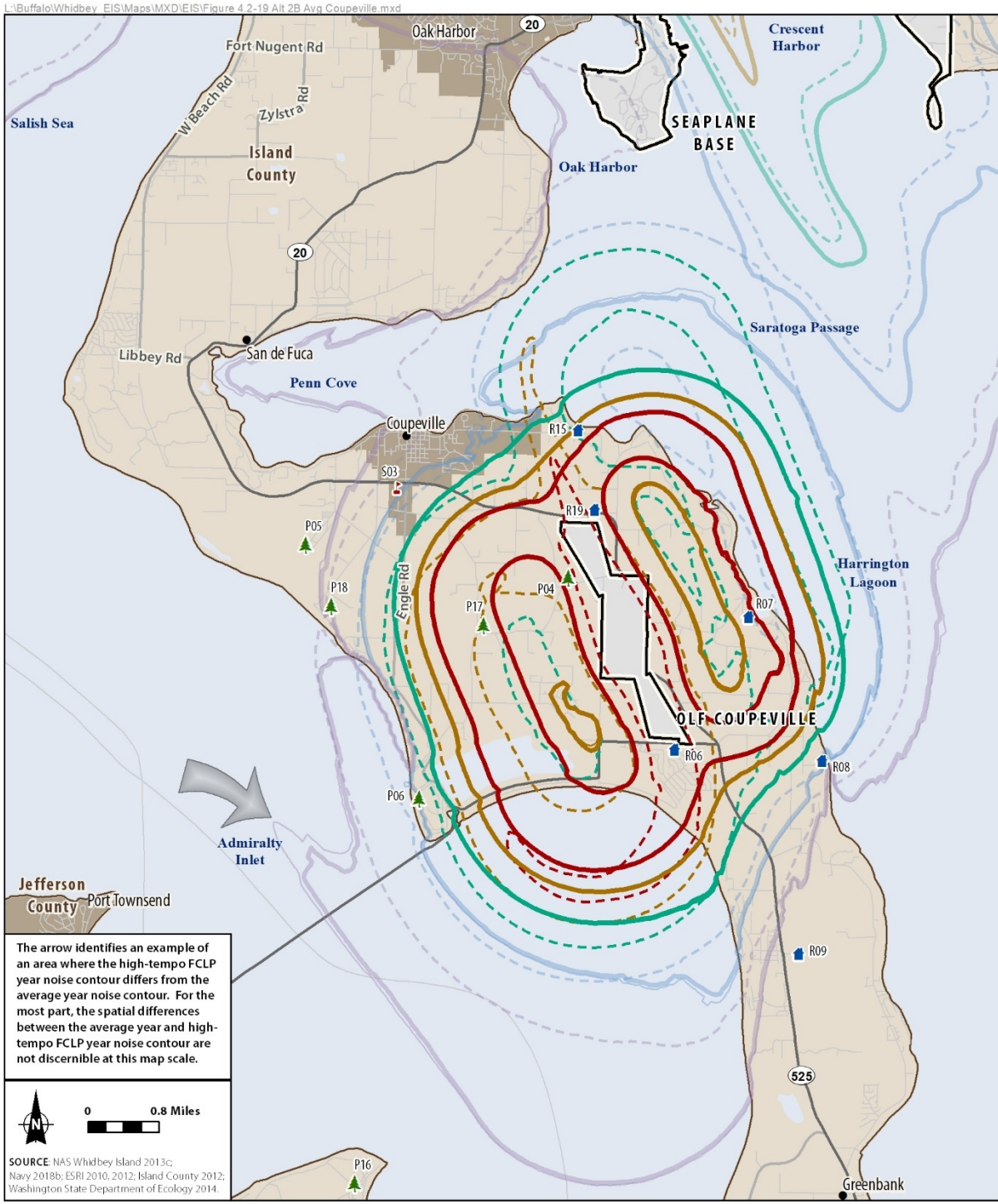


Figure 4.2-19
Alternative 2B DNL Noise
Contours for OLF Coupeville
 Whidbey Island, Island County, WA

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

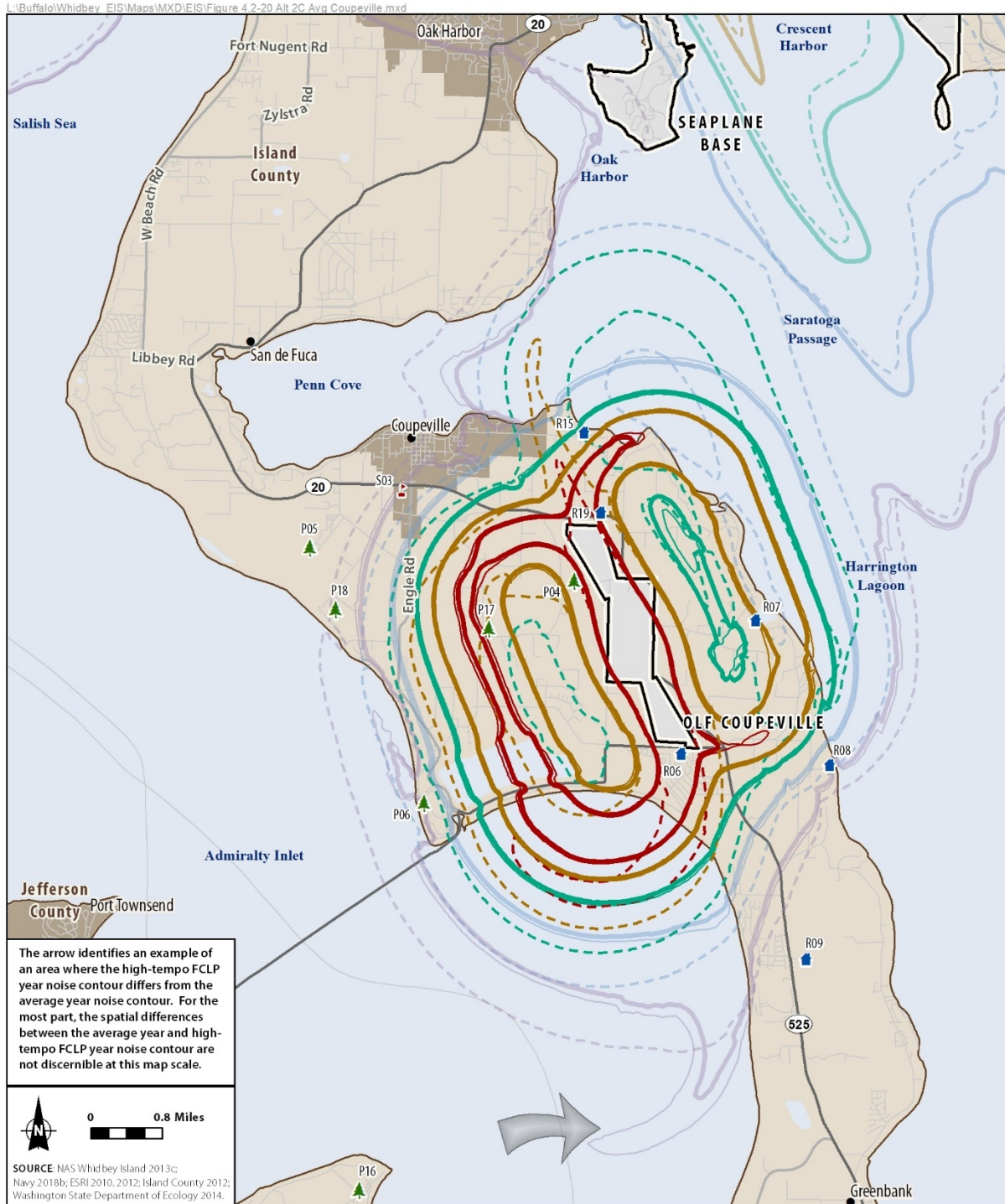
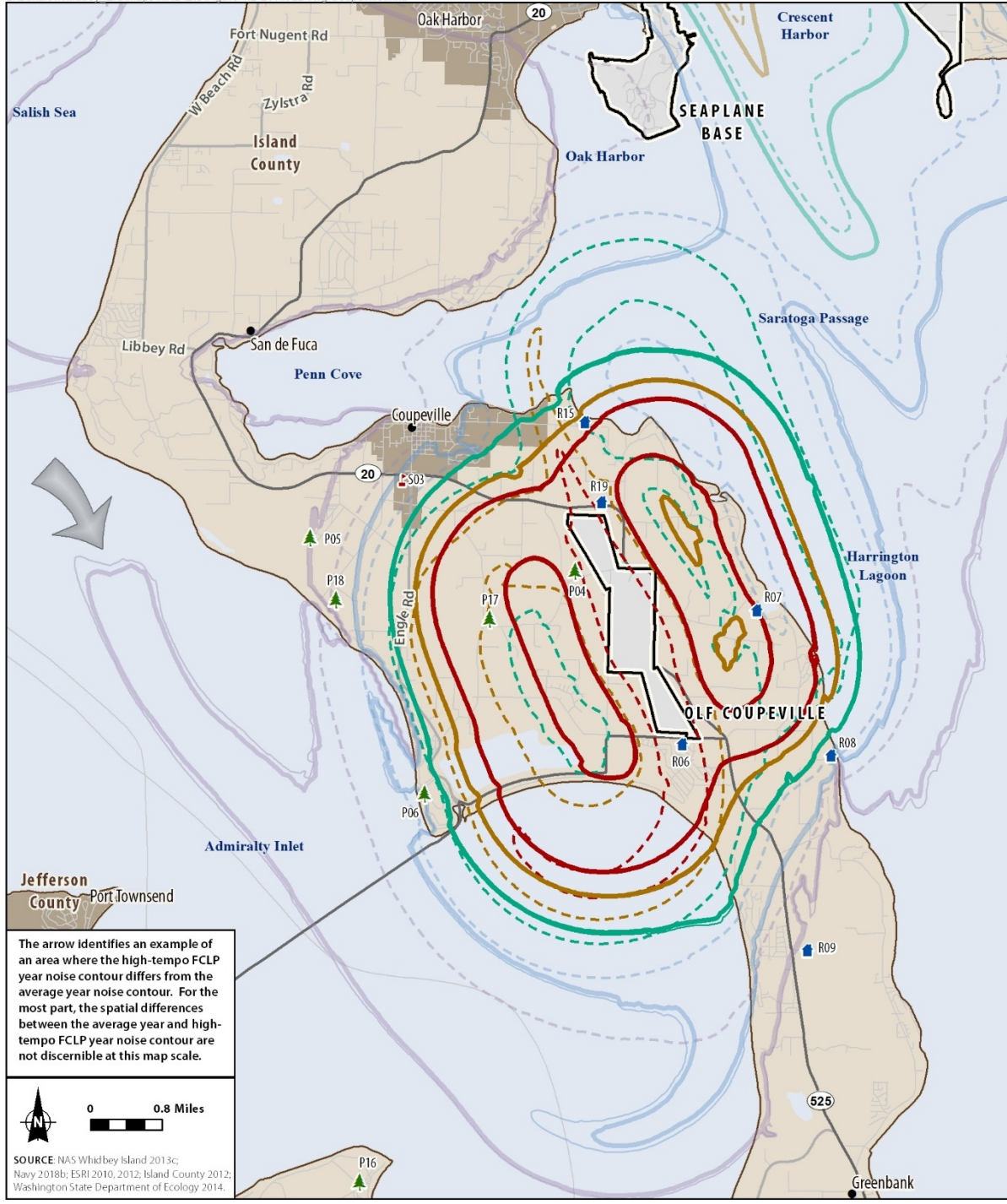


Figure 4.2-20
Alternative 2C DNL Noise
Contours for OLF Coupeville
 Whidbey Island, Island County, WA

	Points of Interest (POI)	No Action (Average) DNL Noise Contour (dB)	Alternative 2C (Average) DNL Noise Contour (dB)	Alternative 2C (High Tempo FCLP) DNL Noise Contour (dB)
●	●	- - - 55*	— 55*	— 55*
—	🌲	- - - 60*	— 60*	— 60*
—	🏠	- - - 65	— 65	— 65
—	🎓	- - - 70	— 70	— 70
—		- - - 75	— 75	— 75

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

L:\Buffalo\Whidbey EIS\Maps\MXD\EIS\Figure 4.2-21 Alt 2D Avg Coupeville.mxd



The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.

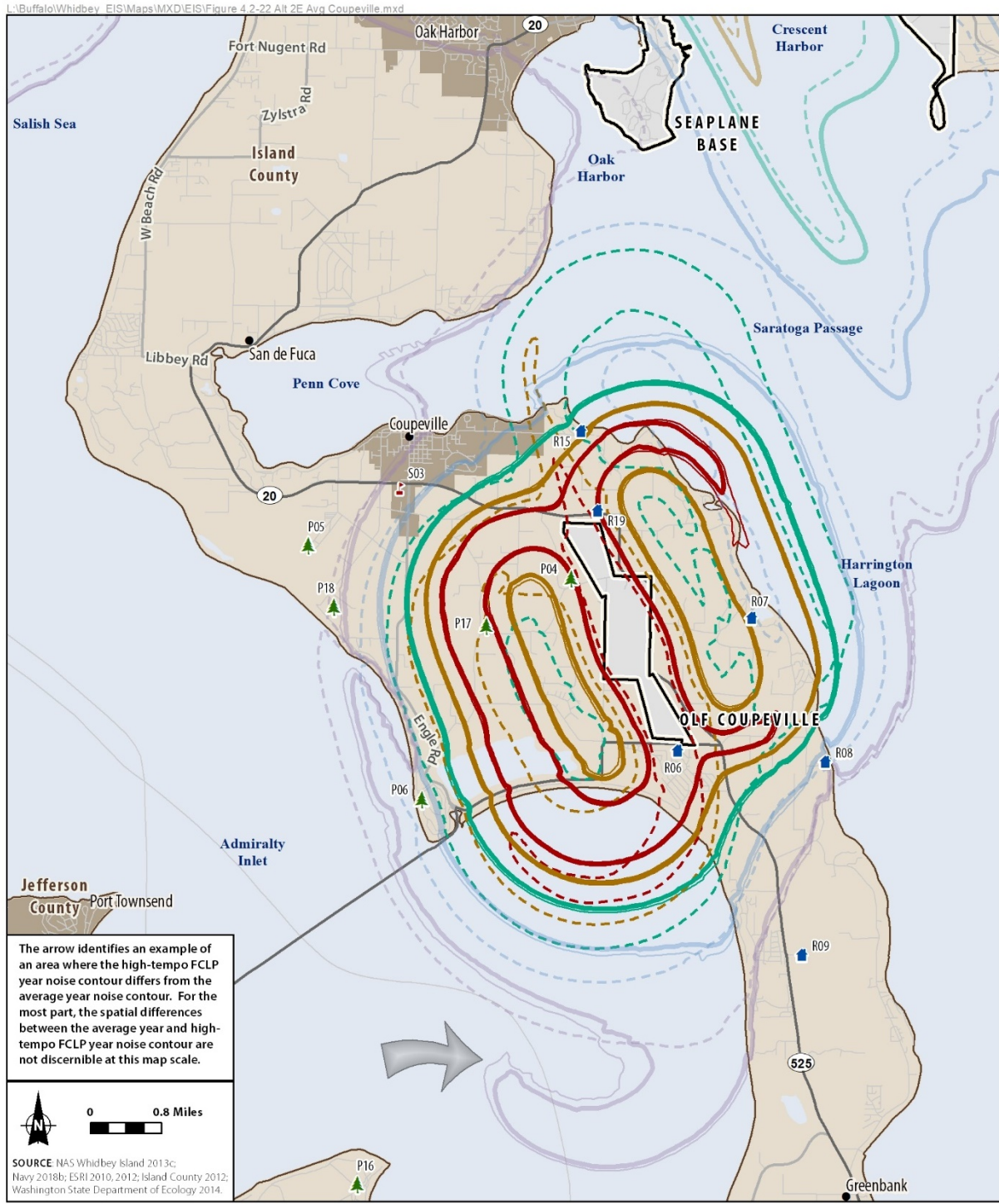


SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

● City	Points of Interest (POI)	No Action (Average) DNL Noise Contour (dB)	Alternative 2D (Average) DNL Noise Contour (dB)	Alternative 2D (High Tempo FCLP) DNL Noise Contour (dB)
— County Boundary	🌳 Park	— 55*	— 55*	— 55*
— U.S. and State Highway	🏠 Residential	— 60*	— 60*	— 60*
— Major Road	🎓 School	— 65	— 65	— 65
— Minor Road		— 70	— 70	— 70
— City/Town Boundary		— 75	— 75	— 75
▭ Installation Area				

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-21
Alternative 2D DNL Noise
Contours for OLF Coupeville
Whidbey Island, Island County, WA



	Points of Interest (POI)	No Action (Average) DNL Noise Contour (dB)	Alternative 2E (Average) DNL Noise Contour (dB)	Alternative 2E (High Tempo FCLP) DNL Noise Contour (dB)
●	City	55*	55*	55*
—	County Boundary	60*	60*	60*
—	U.S. and State Highway	65	65	65
—	Major Road	70	70	70
—	Minor Road	75	75	75
■	City/Town Boundary			
□	Installation Area			
▲	Park			
■	Residential			
■	School			

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-22
Alternative 2E DNL Noise
Contours for OLF Coupeville
 Whidbey Island, Island County, WA

4.2.3.2 Supplemental Noise Analyses, Alternative 2

Additional supplemental noise analyses were conducted for a variety of representative POIs identified in the communities surrounding Ault Field and OLF Coupeville. The wide geographic distribution of POIs provides broad coverage and context to compare the noise effects under each of the alternatives with the noise effects for the No Action Alternative. These supplemental noise analyses include single event noise, indoor speech interference, classroom/learning interference, sleep disturbance, outdoor speech interference, and PHL. The POIs chosen for this analysis are presented in Section 3.2 and are depicted on Figure 3.2-6. Not all POIs are used for each analysis because the location and type of POI dictates whether the particular analysis would apply; however, for the Final EIS, an analysis of outdoor speech interference was also included for all POIs, including residential areas and schools, as individuals would spend time outdoors at both of those types of locations. In addition, between the Draft EIS and Final EIS, an additional 18 POIs were added to the analysis to provide the public and decision makers with more data to compare. These included additional residential areas, schools, and parks, as well as two points from the NPS's acoustical monitoring report. The two points from that report (designated as EBLA001 [Reuble Farmstead] and EBLA002 [Ferry House]) correspond to POIs P17 and P18, respectively.

In general, the POIs were chosen based upon several factors, including their geographic dispersal from the airfields and being located under flight operations, major or identifiable landmarks, and areas that have had a history of noise impacts. It should be noted that for POIs located close to one another (i.e., within about 0.25 mile, depending on topography), the results will most likely be the same or very similar and thus not add value to the analysis.

4.2.3.2.1 Single Event Noise, Alternative 2

As noted in Section 3.2.4.3.1, several types of metrics are presented in this subsection that address question of "how loud" the aircraft are and "how often" someone will hear them. To understand the "how loud" question, certain single noise events may be relative to the 48 POIs, and two different noise metrics are utilized: SEL and L_{max} . The SEL metric is a composite metric that represents both the intensity of a sound and its duration. SEL provides a measure of total sound energy of an entire acoustic event (i.e., arrival, departure, or T&G). The L_{max} metric is the maximum, instantaneous level of noise that a particular event produces, and it is most closely related to what an individual would hear. The SEL and L_{max} provide the noise level of a single aircraft event. These events are intermittent in nature, and, therefore, the noise levels do not represent a continuous source of noise. For more details on SEL or L_{max} , see Section 3.2.2 as well as Appendix A, Aircraft Noise Study.

The SEL and L_{max} values for the loudest single event (i.e., arrival, departure, or T&G) for each POI under Alternative 2 at Ault Field and OLF Coupeville are identical to those presented under Alternative 1 in Table 4.2-3. As with Alternative 1, under Alternative 2, the maximum SEL/ L_{max} values vary depending on the location of the POI and its proximity to the airfields and flight tracks. These noise level measurements under Alternative 2 are compared to the noise level measurements that were modeled under the No Action Alternative, and the difference is noted in the table.

As shown in the data, many of the maximum SEL and L_{max} values modeled under Alternative 2 are identical to those modeled in the No Action Alternative analysis. Measurements at 12 of the 48 POIs changed from the No Action Alternative to Alternative 2. These include increases at R06 and R07, and decreases at R08, R15, R19, S03, P04, P05, P06, P16, and P18, while at R09, the SEL decreased slightly and the L_{max} increased slightly. In addition, the SEL and L_{max} values for the representative POIs are all

identical under all of the scenarios analyzed; therefore, they are not broken down and presented individually.

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

Table 4.2-12 presents the number of events above the three identified thresholds for the POIs analyzed (note, for 21 of the 48 POIs analyzed, the noise model indicated there would be zero events above the 80 dB L_{max} ; therefore, they were omitted from the table).

As presented in the table, there is a large range in the number of events based upon the location of the POI. Under certain scenarios, some POIs would experience an increase in the range of 10,000 to over 15,000 annual events above 80 dB L_{max} (i.e., the sound of a garbage disposal). This would be approximately 27 to 41 events per day when averaged. Other POIs would experience some degree less than these numbers. The POIs with the highest number of events above these thresholds were very close to Ault Field. In addition, the results show that as the L_{max} threshold is increased, the number of events decrease, as would be expected. Therefore, when looking at the number of events above a threshold of 100 dB L_{max} , the highest increase is 11,551 at R01 over the No Action Alternative conditions.

What this combined analysis shows is that while there may not be a substantive difference in the loudest event (i.e., SEL or L_{max}) at a particular POI, there may be a substantial increase in the number of loud or disruptive events that occur between alternatives and scenarios when compared to the No Action Alternative.

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)^{1,2}

ID	Description		Number of Annual Events ³					
			No Action Alternative	Alt 2 A	Alt 2 B	Alt 2 C	Alt 2 D	Alt 2 E
Residences								
R01	Sullivan Rd.	Above 80 dB	48,311	57,195 (+8,884)	60,310 (+11,999)	63,748 (+15,437)	58,335 (+10,024)	62,611 (+14,300)
		Above 90 dB	43,603	51,303 (+7,700)	54,666 (+11,063)	58,108 (+14,505)	52,501 (+8,898)	56,943 (+13,340)
		Above 100 dB	30,199	34,324 (+4,125)	38,067 (+7,868)	41,750 (+11,551)	35,408 (+5,209)	40,454 (+10,255)
R02	Salal St. and N. Northgate Dr.	Above 80 dB	38,892	46,046 (+7,154)	48,993 (+10,101)	53,184 (+14,292)	47,455 (+8,563)	51,999 (+13,107)
		Above 90 dB	36,058	42,152 (+6,094)	45,574 (+9,516)	49,955 (+13,897)	43,774 (+7,716)	48,683 (+12,625)
		Above 100 dB	4,771	6,221 (+1,450)	5,821 (+1,050)	6,376 (+1,605)	6,827 (+2,056)	6,457 (+1,686)
R04	Pull and Be Damned Point	Above 80 dB	4,985	6,310 (+1,325)	6,142 (+1,157)	5,928 (+943)	5,991 (+1,006)	5,928 (+943)
		Above 90 dB	370	444 (+74)	414 (+44)	414 (+44)	418 (+48)	414 (+44)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R05	Snee-Oosh Point	Above 80 dB	2,767	3,616 (+849)	3,616 (+849)	3,454 (+687)	3,454 (+687)	3,454 (+687)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R06	Admirals Dr. and Byrd Dr.	Above 80 dB	3,101	12,206 (+9,105)	7,642 (+4,541)	3,061 (-40)	10,689 (+7,588)	4,594 (+1,493)
		Above 90 dB	2,451	10,798 (+8,349)	6,770 (+4,319)	2,709 (+258)	9,462 (+7,011)	4,064 (+1,613)
		Above 100 dB	2,227	7,712 (+5,485)	4,703 (+2,476)	1,908 (-319)	6,665 (+4,438)	2,863 (+636)
R07	Race Lagoon	Above 80 dB	938	4,702 (+3,764)	3,108 (+2,170)	1,242 (+304)	4,220 (+3,282)	1,842 (+904)
		Above 90 dB	230	3,248 (+3,018)	2,170 (+1,940)	842 (+612)	2,941 (+2,711)	1,263 (+1,033)
		Above 100 dB	183	2,521 (+2,338)	1,683 (+1,500)	653 (+470)	2,282 (+2,099)	980 (+797)
R08	Pratts Bluff	Above 80 dB	368	3,663 (+3,295)	2,448 (+2,080)	950 (+582)	3,317 (+2,949)	1,426 (+1,058)
		Above 90 dB	223	905 (+682)	607 (+384)	235 (+12)	821 (+598)	353 (+130)
		Above 100 dB	65	0 (-65)	0 (-65)	0 (-65)	0 (-65)	0 (-65)

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)^{1,2}

ID	Description		Number of Annual Events ³					
			No Action Alternative	Alt 2 A	Alt 2 B	Alt 2 C	Alt 2 D	Alt 2 E
R10	Skyline	Above 80 dB	1,548	2,164 (+616)	2,090 (+542)	2,337 (+789)	2,341 (+793)	2,337 (+789)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R14	E. Sleeper Road and Slumber Lane	Above 80 dB	40,516	47,129 (+6,613)	51,097 (+10,581)	54,232 (+13,716)	48,325 (+7,809)	53,007 (+12,491)
		Above 90 dB	10,220	11,023 (+803)	13,584 (+3,364)	16,019 (+5,799)	11,553 (+1,333)	15,121 (+4,901)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R15	Long Point Manor	Above 80 dB	2,524	4,864 (+2,340)	3,327 (+803)	1,669 (-855)	4,429 (+1,905)	2,224 (-300)
		Above 90 dB	847	4,315 (+3,468)	2,819 (+1,972)	1,107 (+260)	3,862 (+3,015)	1,661 (+814)
		Above 100 dB	41	2,180 (+2,139)	1,461 (+1,420)	566 (+525)	1,976 (+1,935)	849 (+808)
R16	Rocky Point Heights	Above 80 dB	1,525	1,976 (+451)	1,879 (+354)	2,026 (+501)	2,047 (+522)	2,026 (+501)
		Above 90 dB	69	65 (-4)	81 (+12)	65 (-4)	65 (-4)	65 (-4)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R19	Island Transit Offices, Coupeville	Above 80 dB	3,172	12,271 (+9,099)	7,722 (+4,550)	3,126 (-46)	10,755 (+7,583)	4,659 (+1,487)
		Above 90 dB	2,412	11,856 (+9,444)	7,444 (+5,032)	3,018 (+606)	10,378 (+7,966)	4,497 (+2,085)
		Above 100 dB	847	4,315 (+3,468)	2,819 (+1,972)	1,107 (+260)	3,862 (+3,015)	1,661 (+814)
R20	South Lopez Island (Agate Beach)	Above 80 dB	112	147 (+35)	136 (+24)	156 (+44)	157 (+45)	156 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Schools								
S01	Oak Harbor High School	Above 80 dB	997	635 (-362)	952 (-45)	998 (+1)	796 (-201)	958 (-39)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)^{1,2}

ID	Description		Number of Annual Events ³					
			No Action Alternative	Alt 2 A	Alt 2 B	Alt 2 C	Alt 2 D	Alt 2 E
S02	Crescent Harbor Elementary School	Above 80 dB	4,436	5,685 (+1,249)	5,423 (+987)	5,871 (+1,435)	5,922 (+1,486)	5,871 (+1,435)
		Above 90 dB	3,957	5,261 (+1,304)	4,884 (+927)	5,395 (+1,438)	5,445 (+1,488)	5,395 (+1,438)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S03	Coupeville Elementary School	Above 80 dB	1,852	2,937 (+1,085)	1,786 (-66)	726 (-1,126)	2,534 (+682)	1,091 (-761)
		Above 90 dB	316	0 (-316)	0 (-316)	0 (-316)	0 (-316)	0 (-316)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S04	Anacortes High School	Above 80 dB	112	147 (+35)	136 (+24)	156 (+44)	157 (+45)	156 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S09	La Conner Elementary School	Above 80 dB	352	400 (+48)	412 (+60)	389 (+37)	392 (+40)	389 (+37)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parks								
P02	Deception Pass State Park	Above 80 dB	8,950	9,734 (+784)	10,786 (+1,836)	13,208 (+4,258)	10,741 (+1,791)	12,714 (+3,764)
		Above 90 dB	5,479	5,741 (+262)	6,709 (+1,230)	8,943 (+3,464)	6,620 (+1,141)	8,477 (+2,998)
		Above 100 dB	5,449	5,558 (+109)	6,587 (+1,138)	8,895 (+3,446)	6,455 (+1,006)	8,406 (+2,957)
P03	Dugualla State Park	Above 80 dB	16,278	18,577 (+2,299)	21,094 (+4,816)	22,329 (+6,051)	19,029 (+2,751)	21,650 (+5,372)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P04	Ebey's Landing – Rhododendron Park	Above 80 dB	3,172	12,271 (+9,099)	7,722 (+4,550)	3,126 (-46)	10,755 (+7,583)	4,659 (+1,487)
		Above 90 dB	3,103	12,206 (+9,103)	7,642 (+4,539)	3,061 (-42)	10,689 (+7,586)	4,594 (+1,491)
		Above 100 dB	2,720	4,315 (+1,595)	2,819 (+99)	1,107 (-1,613)	3,862 (+1,142)	1,661 (-1,059)

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)^{1,2}

ID	Description		Number of Annual Events ³					
			No Action Alternative	Alt 2 A	Alt 2 B	Alt 2 C	Alt 2 D	Alt 2 E
P06	Fort Casey State Park	Above 80 dB	2,189	7,476 (+5,287)	4,544 (+2,355)	1,847 (-342)	6,451 (+4,262)	2,770 (+581)
		Above 90 dB	547	0 (-547)	0 (-547)	0 (-547)	0 (-547)	0 (-547)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P10	San Juan Island National Monument	Above 80 dB	481	568 (+87)	556 (+75)	649 (+168)	653 (+172)	649 (+168)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P13	Lake Campbell	Above 80 dB	254	183 (-74)	242 (-12)	302 (+48)	305 (+51)	302 (+48)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P15	Pioneer Park	Above 80 dB	370	444 (+74)	414 (+44)	414 (+44)	418 (+48)	414 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P17	Reuble Farm	Above 80 dB	3,061	11,865 (+8,804)	7,419 (+4,358)	2,974 (-87)	10,384 (+7,323)	4,462 (+1,401)
		Above 90 dB	1,641	7,476 (+5,835)	4,544 (+2,903)	1,847 (+206)	6,451 (+4,810)	2,770 (+1,129)
		Above 100 dB	693	5,606 (+4,913)	3,408 (+2,715)	1,385 (+692)	4,838 (+4,145)	2,078 (+1,385)
P18	Ferry House	Above 80 dB	1,180	1,869 (+689)	1,136 (-44)	462 (-718)	1,613 (+433)	692 (-488)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-12 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)^{1,2}

<i>ID</i>	<i>Description</i>	<i>Number of Annual Events³</i>				
		<i>No Action Alternative</i>	<i>Alt 2 A</i>	<i>Alt 2 B</i>	<i>Alt 2 C</i>	<i>Alt 2 D</i>

Notes:

- ¹ The difference between the No Action Alternative and Alternative 2 is noted in parentheses for the number of events above the specified noise.
- ² POIs that had zero events above an L_{max} of 80 dB, 90 dB, and 100 dB were omitted from the table. These included POIs R03, R09, R11, R12, R13, R17, R18, S05, S06, S07, S08, S10, P01, P05, P07, P08, P09, P11, P12, P14, and P16.

Key:

dB = decibel

L_{max} = maximum sound level

4.2.3.2.2 Speech Interference (Indoor), Alternative 2

Conversation or indoor speech is assumed to be interrupted when a single aircraft event exceeds the maximum sound level, or L_{max}, of 50 dB indoors (Sharp et al, 2009). Normal conversation is about 60 dB; therefore, the use of a 50 dB indoor level is a very conservative threshold such that a soft speaking voice could be heard. For this analysis, the model calculated the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level, or L_{max}, of 50 dB at the 20 residential POIs and the 10 schools, since they are commonly located in residential areas. Because the individual is assumed to be indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis was conducted assuming both windows-open and windows-closed conditions. Table 4.2-13 presents the average daily (7:00 a.m. to 10:00 p.m.) events per hour that exceed an L_{max} of 50 dB indoors at these POIs under Alternative 2, all scenarios.

Compared to the No Action Alternative, Alternative 2 would result in between zero and two additional events per hour at representative POIs during which conversations or indoor speech would be interrupted. The largest change (with two additional events per daytime hour) would occur at several POIs, including R01, R02, R06, R07, R08, R14, and R15 under various scenarios. However, there are several POIs at which no change would occur under any of the scenarios compared to the No Action Alternative.

Table 4.2-13 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)¹

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour ²											
		Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³
Residences													
R01	Sullivan Rd.	8	8	9 (+1)	9 (+1)	10 (+2)	10 (+2)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R02	Salal St. and N. Northgate Dr.	8	8	9 (+1)	9 (+1)	10 (+2)	9 (+1)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R03	Central Whidbey	5	-	5 (0)	- (0)	6 (+1)	- (0)	6 (+1)	- (0)	5 (0)	- (0)	6 (+1)	- (0)
R04	Pull and Be Damned Point	2	1	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)
R05	Snee-Oosh Point	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R06	Admirals Dr. and Byrd Dr.	-	-	2 (+2)	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	2 (+2)	2 (+2)	1 (+1)	1 (+1)
R07	Race Lagoon	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	1 (+1)	- (0)	2 (+2)	1 (+1)	1 (+1)	0 (0)
R08	Pratts Bluff	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	2 (+2)	1 (+1)	1 (+1)	0 (0)
R09	Cox Rd and Island Ridge	-	-	1 (+1)	- (0)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R10	Skyline	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R11	Sequim	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R12	Port Angeles	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R13	Beverly Beach, Freeland	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R14	E. Sleeper Rd. and Slumber Ln.	8	7	9 (+1)	8 (+1)	9 (+1)	9 (+2)	10 (+2)	9 (+2)	9 (+1)	8 (+1)	10 (+2)	9 (+2)

Table 4.2-13 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)¹

		<i>No Action Alternative</i>		<i>Scenario A</i>		<i>Scenario B</i>		<i>Scenario C</i>		<i>Scenario D</i>		<i>Scenario E</i>	
		<i>Average Number of Events per Daytime Hour²</i>											
<i>ID</i>	<i>Description</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>
R15	Long Point Manor	1	1	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R16	Rocky Point Heights	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R17	Port Townsend	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	1	1	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R20	South Lopez Island (Agate Beach)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Schools													
S01	Oak Harbor High School	6	2	6 (0)	2 (0)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	7 (+1)	3 (+1)
S02	Crescent Harbor Elementary	5	2	5 (0)	2 (0)	6 (+1)	2 (0)	6 (+1)	3 (+1)	6 (+1)	2 (0)	6 (+1)	3 (+1)
S03	Coupeville Elementary	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
S04	Anacortes High School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Table 4.2-13 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)¹

		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour ²											
ID	Description	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³
S09	La Conner Elementary School	1	-	1 (0)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S10	Elger Bay Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Notes:

- ¹ The difference between the No Action Alternative and Alternative 2 is noted in parentheses. Hyphens (-) indicate result equals zero.
- ² Number of annual average daily daytime (7:00 a.m. to 10:00 p.m.) events at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 decibels (dB). See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as “quiet urban daytime” at 40 dB and a garbage disposal at 80 dB.
- ³ Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation and other building features that reduce the noise levels inside (FICON, 1992).

4.2.3.2.3 Classroom/learning Interference, Alternative 2

Two metrics were analyzed to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights: interior $L_{eq(8)}$ during an 8-hour school day (8:00 a.m. to 4:00 p.m.), and the average number of interfering aircraft events per hour during that time period. Single aircraft events that generate interior sound levels (L_{max}) greater than 50 dB have the potential to interfere with student and teacher interaction by affecting conversation and comprehension (Sharp et al, 2009). Because the classroom interaction occurs indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis considered both windows-open and windows-closed conditions. Table 4.2-14 presents the $L_{eq(8)}$ and the number of events that exceed an L_{max} of 50 dB indoors under Alternative 2, all scenarios, at the representative POIs that are schools (and the two residential POIs located in the vicinity of schools). It is important to note that Table 4.2-14 presents average values, and there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all, and therefore would have no potential for classroom/learning interference.

Most schools would experience interior $L_{eq(8)}$ due to Navy aircraft operations close to ambient levels of 45 dB or less, which would not impact learning and conversation. Crescent Harbor Elementary School (S02) would experience the highest $L_{eq(8)}$ of 52 dB for the No Action Alternative and the highest under Scenarios A, C, D, and E of 54 dB when windows are open. When windows are closed, the $L_{eq(8)}$ at Crescent Harbor Elementary School (S02) would drop to less than 45 dB. Given the relatively cool climate in the area, it is likely that windows at schools would be closed a majority of the time.

The potential for classroom interference from single aircraft events generating sound levels inside classrooms greater than 50 dB L_{max} would increase under Alternative 2 by an average of up to two events per hour (at S01, S02, and S03, as well as school surrogate R03) compared to the No Action Alternative; that is, on average, no school would experience an increase of more than two learning-disrupting events per hour under any scenario under Alternative 2 compared to the No Action Alternative. The highest increase of an additional two events is shown for Oak Harbor High School (S01) and Crescent Harbor Elementary School (S02) under Scenarios B, C, and E with windows open. Under Scenario A, the Coupeville Elementary School (S03) also shows an increase in classroom/learning interference by an average of an additional two events per hour (with windows open). In addition, school surrogate Central Whidbey (R03) would experience an average increase of two events per hour (with windows open) under Scenarios C and E. All other schools either show no change from the No Action Alternative or an increase of one event per hour during the school day, primarily under the windows-open condition. Under the windows-closed condition, nearly all of the schools would be expected to experience no more than one additional event per hour of classroom/learning interference, with most being unchanged from the No Action Alternative. Many modern schools have central air conditioning and heating systems; therefore, it is more likely that classroom windows would remain closed the majority of the time.

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

Table 4.2-14 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)¹

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
ID	Description	Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²	
		<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴
School Surrogates																									
R03	Central Whidbey	<45	4	<45	-	<45	5 (+1)	<45	-	<45	5 (+1)	<45	-	<45	6 (+2)	<45	-	<45	5 (+1)	<45	-	<45	6 (+2)	<45	-
R11	Sequim	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
Schools																									
S01	Oak Harbor High School	<45	5	<45	2	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)
S02	Crescent Harbor Elementary	52	4	<45	2	54	5 (+1)	<45	2 (0)	53	6 (+2)	<45	2 (0)	54	6 (+2)	<45	3 (+1)	54	5 (+1)	<45	2 (0)	54	6 (+2)	<45	2 (0)
S03	Coupeville Elementary	<45	-	<45	-	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	-	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	-
S04	Anacortes High School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S05	Lopez Island School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S06	Friday Harbor Elementary	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S07	Sir James Douglas Elementary	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S08	Fidalgo Elementary School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S09	La Conner Elementary School	<45	1	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-
S10	Elger Bay Elementary School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-

Table 4.2-14 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)¹

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²	
ID	Description	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴

Notes:

- ¹ The difference between the No Action Alternative and Alternative 2 is noted in parentheses. Hyphens (-) indicate result equals zero.
- ² Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
- ³ For this metric, daily classroom hours are assumed to be 8:00 a.m. to 4:00 p.m.
- ⁴ Number of average school-day events per hour during an 8-hour school day (8:00 a.m. to 4:00 p.m.) at or above an indoor maximum single event sound level (*L*_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 dB. See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as “quiet urban daytime” at 40 dB and a garbage disposal at 80 dB.

Key:

- dB = decibel
- L*_{eq(8)} = 8-hour sound level equivalent
- L*_{max} = maximum sound level

4.2.3.2.4 Sleep Disturbance, Alternative 2

The analysis of sleep disturbance is a calculation of the probability of awakening from aircraft overflights. Thus, it is based on the outdoor SEL at each of the residential POIs being converted to an indoor SEL. Events that were considered are those that occur between 10:00 p.m. and 7:00 a.m. Although individuals sleep outside of these hours, these are considered typical sleeping hours for this type of analysis. Table 4.2-15 presents the results of the sleep disturbance analysis for the 20 POI locations that are in the residential category, as well as the 10 schools, which are commonly located in residential areas.

Under Alternative 2, the majority of the POIs analyzed show an increase in the percent probability of awakening for all scenarios during nights of average aircraft activity. The highest percent increase is for R06 (Admirals Drive and Byrd Drive), where there would be an increase of 29 percent under Scenario A with windows open, meaning that there is a 29-percent greater probability or chance of awakening at least once under windows-open conditions compared to the No Action Alternative. Generally, the POIs around OLF Coupeville had a higher percent probability of awakening under Scenario A than under the other scenarios, and for the POIs around Ault Field, there was a larger increase in the percent probability of awakening for Scenario C than for the other scenarios.

Table 4.2-15 Average Indoor Nightly¹ Probability of Awakening² 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		Scenario D		Scenario E	
		Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴
Residences													
R01	Sullivan Rd.	58%	43%	67% (+9%)	51% (+8%)	71% (+13%)	55% (+12%)	74% (+16%)	58% (+15%)	68% (+10%)	52% (+9%)	73% (+15%)	57% (+14%)
R02	Salal St. and N. Northgate Dr.	41%	29%	49% (+8%)	35% (+6%)	52% (+11%)	38% (+9%)	56% (+15%)	41% (+12%)	50% (+9%)	36% (+7%)	55% (+14%)	40% (+11%)
R03	Central Whidbey	16%	8%	19% (+3%)	10% (+2%)	21% (+5%)	11% (+3%)	23% (+7%)	12% (+4%)	20% (+4%)	11% (+3%)	23% (+7%)	12% (+4%)
R04	Pull and Be Damned Point	19%	9%	25% (+6%)	12% (+3%)	26% (+7%)	12% (+3%)	27% (+8%)	12% (+3%)	25% (+6%)	12% (+3%)	27% (+8%)	12% (+3%)
R05	Snee-Oosh Point	15%	5%	20% (+5%)	7% (+2%)	21% (+6%)	7% (+2%)	22% (+7%)	7% (+2%)	20% (+5%)	7% (+2%)	22% (+7%)	7% (+2%)
R06	Admirals Dr. and Byrd Dr.	9%	6%	38% (+29%)	27% (+21%)	25% (+16%)	17% (+11%)	11% (+2%)	7% (+1%)	34% (+25%)	24% (+18%)	16% (+7%)	11% (+5%)
R07	Race Lagoon	5%	2%	18% (+13%)	8% (+6%)	13% (+8%)	5% (+3%)	7% (+2%)	2% (0%)	17% (+12%)	7% (+5%)	9% (+4%)	3% (+1%)
R08	Pratts Bluff	4%	2%	13% (+9%)	8% (+6%)	9% (+5%)	5% (+3%)	4% (0%)	2% (0%)	12% (+8%)	8% (+6%)	6% (+2%)	3% (+1%)
R09	Cox Rd and Island Ridge Way	3%	2%	11% (+8%)	7% (+5%)	7% (+4%)	4% (+2%)	3% (0%)	2% (0%)	10% (+7%)	6% (+4%)	4% (+1%)	3% (+1%)
R10	Skyline	5%	2%	8% (+3%)	3% (+1%)	8% (+2%)	3% (+1%)	9% (+4%)	3% (+1%)	8% (+3%)	3% (+1%)	9% (+4%)	3% (+1%)
R11	Sequim	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R12	Port Angeles	0%	0%	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	0% (0%)	0% (0%)	1% (+1%)	0% (0%)	0% (0%)	0% (0%)
R13	Beverly Beach, Freeland	2%	0%	5% (+3%)	0% (0%)	3% (+1%)	0% (0%)	2% (0%)	0% (0%)	5% (+3%)	0% (0%)	2% (0%)	0% (0%)
R14	E. Sleeper Rd. and Slumber Ln.	37%	25%	44% (+7%)	31% (+6%)	47% (+10%)	34% (+9%)	51% (+14%)	37% (+12%)	45% (+8%)	32% (+7%)	50% (+13%)	36% (+11%)
R15	Long Point Manor	11%	4%	22% (+11%)	12% (+8%)	18% (+7%)	8% (+4%)	14% (+3%)	4% (0%)	21% (+10%)	10% (+6%)	15% (+4%)	5% (+1%)

Table 4.2-15 Average Indoor Nightly¹ Probability of Awakening² 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		Scenario D		Scenario E	
		Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴
R16	Rocky Point Heights	9%	3%	11% (+2%)	4% (+1%)	12% (+3%)	4% (+1%)	13% (+4%)	3% (0%)	12% (+3%)	4% (+1%)	13% (+4%)	3% (0%)
R17	Port Townsend	1%	0%	1% (0%)	0% (0%)	1% (0%)	0% (0%)	0% (-1%)	0% (0%)	1% (0%)	0% (0%)	1% (0%)	0% (0%)
R18	Marrowstone Island (Nordland)	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R19	Island Transit Offices, Coupeville	9%	5%	31% (+22%)	20% (+15%)	22% (+13%)	13% (+8%)	11% (+2%)	5% (0%)	28% (+19%)	18% (+13%)	15% (+5%)	8% (+3%)
R20	South Lopez Island (Agate Beach)	3%	1%	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)
Schools (near residential areas)⁵													
S01	Oak Harbor High School	20%	12%	25% (+5%)	14% (+2%)	27% (+7%)	16% (+4%)	29% (+9%)	18% (+6%)	26% (+6%)	15% (+3%)	29% (+9%)	17% (+5%)
S02	Crescent Harbor Elementary	21%	12%	26% (+5%)	15% (+3%)	28% (+7%)	17% (+5%)	30% (+9%)	19% (+7%)	27% (+6%)	16% (+4%)	30% (+9%)	18% (+6%)
S03	Coupeville Elementary	5%	3%	16% (+11%)	10% (+7%)	11% (+6%)	6% (+3%)	5% (0%)	3% (0%)	14% (+9%)	9% (+6%)	7% (+2%)	4% (+1%)
S04	Anacortes High School	2%	1%	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)
S05	Lopez Island School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S06	Friday Harbor Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S07	Sir James Douglas Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S08	Fidalgo Elementary School	6%	2%	9% (+3%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)
S09	La Conner Elementary School	8%	3%	11% (+3%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)
S10	Elger Bay Elementary School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)

Table 4.2-15 Average Indoor Nightly¹ Probability of Awakening² 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		Scenario D		Scenario E	
		Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴

Notes:

- ¹ For this metric, nightly sleeping hours are assumed to be 10:00 p.m. to 7:00 a.m.
- ² This metric represents the probability of awakening at least once during a night of average aircraft noise activities.
- ³ The difference between the No Action Alternative and Alternative 2 is noted in parentheses.
- ⁴ Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
- ⁵ All school points of interest were included in the potential sleep disturbance analysis because of their typical proximity to residential areas.

4.2.3.2.5 Outdoor Speech Interference: Potential Noise Effects on Recreation and Outdoor Activities, Alternative 2

The analysis of outdoor speech interference is based on the number of events occurring per DNL daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). Details on the analysis of outdoor speech interference are available in Section 3.2, as well as Appendix A, Aircraft Noise Study. Table 4.2-16 presents the results of the analysis for Alternative 2 for all 48 of the POIs because individuals could experience outdoor speech interference when outside in their yard (residential), outside at school for recess or outdoor learning (schools), and recreating at a park or recreational center (parks).

Under Alternative 2, the data in the table show a slight increase for several POIs where there would be potential for up to an average of two additional daytime events per hour during which individuals may experience outdoor speech interference while outside their home or school, or recreating at a park. For many of the POIs, there is no change from the No Action Alternative. As the data in the table indicate and as expected, when the POI is closer to OLF Coupeville, there would be more events under Scenario A, whereas if the POI is located closer to Ault Field, there would be more events under Scenario C. Section 4.5 has additional discussion on parks and recreation in the vicinity of the airfields. The data show that there is a range of potential outdoor speech interference that may disturb individuals participating in outdoor recreational activities depending on the location of the POI in relation to the airfields and flight tracks. The average number of events is mostly consistent with those expected under the No Action Alternative conditions; however, some POIs may experience an increase in the average daily events. This increase ranges from zero to three events per hour, depending on the scenario.

In addition, the number of events per hour that could cause nighttime outdoor speech interference, which would give an estimation of how much an individual tent-camping or sleeping outdoors may be disturbed during the night, was also analyzed. These range from an increase of zero to one event per hour and are dependent on the location of the POI and the scenario.

Table 4.2-16 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)¹

ID Description		No Action Alternative		Alternative 2									
				Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	
		$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	$L_{max}^{(2)}$	
Parks													
P01	Joseph Whidbey State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)
P02	Deception Pass State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)
P03	Dugualla State Park	7	2	9 (+2)	2 (0)	9 (+2)	2 (0)	10 (+3)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
P04	Ebey's Landing – Rhododendron Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
P05	Ebey's Landing – Ebey's Prairie	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	3 (+1)	1 (+1)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
P06	Fort Casey State Park	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	2 (+1)	- (0)
P07	Cama Beach State Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	- (0)	5 (+2)	1 (+1)	4 (+1)	1 (+1)
P08	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
P09	Moran State Park	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P10	San Juan Island National Monument	7	1	8 (+1)	2 (+1)	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	2 (+1)
P11	San Juan Island Visitors Center	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P12	Cap Sante Park	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
P13	Lake Campbell	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)

Table 4.2-16 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)¹

ID Description		Alternative 2											
		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
		NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	
		L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	
P14	Spencer Spit State Park	-	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
P15	Pioneer Park	4	1	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	
P16	Marrowstone Island (Fort Flagler)	-	-	1 (+1)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	1 (+1)	1 (+1)	
P17	Reuble Farm	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	
P18	Ferry House	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	
Residences													
R01	Sullivan Road	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	
R02	Salal Street and N. Northgate Drive	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	
R03	Central Whidbey	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	
R04	Pull and Be Damned Point	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	
R05	Snee-Oosh Point	7	1	8 (+1)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	
R06	Admirals Drive and Byrd Drive	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	
R07	Race Lagoon	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	
R08	Pratts Bluff	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	

Table 4.2-16 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)¹

ID Description		Alternative 2											
		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
		NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50
		L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾
R09	Cox Road and Island Ridge Way	1	-	2 (+1)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
R10	Skyline	4	1	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)
R11	Sequim	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R12	Port Angeles	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
R13	Beverly Beach, Freeland	-	-	1 (+1)	- (0)	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R14	E. Sleeper Road and Slumber Lane	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	2 (0)
R15	Long Point Manor	7	1	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+2)	2 (+1)
R16	Rocky Point Heights	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	2 (+1)	5 (+1)	1 (0)	5 (+1)	2 (+1)
R17	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	- (0)	- (-1)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	3	1	5 (+2)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
R20	South Lopez Island (Agate Beach)	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
Schools													
S01	Oak Harbor High School	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)

Table 4.2-16 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 2 (Average Year)¹

ID	Description	Alternative 2											
		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	
S02	Crescent Harbor Elementary School	7	2	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
S03	Coupeville Elementary School	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
S04	Anacortes High School	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)
S09	La Conner Elementary School	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
S10	Elger Bay Elementary School	-	-	1 (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)

Notes:

¹ The difference between the No Action Alternative and Alternative 2 is noted in parentheses. A hyphen (-) indicates the result equals zero.

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

Key:

dB = decibel

L_{max} = maximum A-weighted sound level

NA50 = Number of Events above an L_{max} of 50 dB

4.2.3.2.6 Potential Hearing Loss, Alternative 2

The underlying analytical methodology and metric for hearing loss are explained in Section 4.2.2.2.6. Table 4.2-17 presents the potentially affected populations in and near Ault Field and OLF Coupeville under Alternative 2, by 1 dB increments of $L_{eq(24)}$, as compared to the No Action Alternative numbers presented in Section 3.2.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable (USEPA, 1974). Therefore, using the data provided in Table 4.2-17 for the population with average sensitivity to noise, the level at which there may be a noticeable NIPTS would be at

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

the 84 to 85 dB $L_{eq(24)}$ range and above. There is an increase in the population within the 80 dB DNL noise contour (i.e., potential at-risk population) under Alternative 2 at both Ault Field and OLF Coupeville. The largest increase in the potential at-risk population in the vicinity of Ault Field would be under Scenario C (48 additional people) and for OLF Coupeville would be under Scenario A (29 additional people). The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville. The potential NIPTS values presented in Table 4.2-17 are only applicable in the extreme case of continuous outdoor exposure at one's residence to all aircraft events occurring over a period of 40 years. Because it is highly unlikely for any individuals to meet all those criteria, the actual potential NIPTS for individuals would be far less than the values reported here.

In addition, the actual value of NIPTS for any given person will depend on his or her physical sensitivity to noise; some could experience more hearing loss than others (DNWG, 2013). This noise-sensitive population could be considered the young, the elderly, or those predisposed to hearing sensitivity for other reasons. Therefore, to capture this, the USEPA guidelines provided information on the estimated NIPTS exceeded by the 10 percent of the population most sensitive to noise. Using the same 1 dB incremental data in Table 4.2-17 and the column identified as the 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 12.0 dB for the population most sensitive to noise around OLF Coupeville. As noted previously, it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period; therefore, the actual potential NIPTS for individuals would be far less than the values reported here.

Table 4.2-17 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 2 at NAS Whidbey Island Complex (Average Year)

Band of Leq(24) (dB) ¹	Avg NIPTS (dB) ^{2,3}	10 th Pct NIPTS (dB) ²	Estimated Population ^{4,5,6}											
			Ault Field						OLF Coupeville					
			No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E	No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E
75-76	1.0	4.0	0	0 (0)	1 (+1)	9 (+9)	0 (0)	5 (+5)	31	102 (+71)	47 (+16)	24 (-7)	83 (+52)	31 (0)
76-77	1.0	4.5	123	127 (+4)	319 ⁷ (+196)	411 ⁸ (+288)	165 ⁹ (+42)	355 (+232)	45	164 (+119)	90 (+45)	58 (+13)	160 (+115)	63 (+18)
77-78	1.5	5.0	233	263 (+30)	336 (+103)	402 (+169)	310 (+77)	354 (+121)	47	127 (+80)	75 (+28)	88 (+41)	100 (+53)	57 (+10)
78-79	2.0	5.5	145	148 (+3)	243 (+98)	296 (+151)	175 (+30)	295 (+150)	24	92 (+68)	65 (+41)	5 (-19)	78 (+54)	61 (+37)
79-80	2.5	6.0	92	135 (+43)	163 (+71)	241 (+149)	141 (+49)	211 (+119)	7	75 (+68)	59 (+52)	0 (-7)	70 (+63)	76 (+69)
80-81	3.0	7.0	73	78 (+5)	97 (+24)	130 (+57)	85 (+12)	119 (+46)	0	66 (+66)	59 (+59)	0 (0)	62 (+62)	3 (+3)
81-82	3.5	8.0	51	63 (+12)	72 (+21)	80 (+29)	68 (+17)	77 (+26)	0	58 (+58)	84 (+84)	0 (0)	55 (+55)	0 (0)
82-83	4.0	9.0	37	48 (+11)	58 (+21)	63 (+26)	48 (+11)	61 (+24)	0	58 (+58)	4 (+4)	0 (0)	64 (+64)	0 (0)
83-84	4.5	10.0	34	35 (+1)	36 (+2)	38 (+4)	35 (+1)	37 (+3)	0	69 (+69)	0 (0)	0 (0)	56 (+56)	0 (0)
84-85	5.5	11.0	11	27 (+16)	26 (+15)	29 (+18)	29 (+18)	28 (+17)	0	28 (+28)	0 (0)	0 (0)	1 (+1)	0 (0)
85-86	6.0	12.0	9	10 (+1)	22 (+13)	26 (+17)	10 (+1)	24 (+15)	0	1 (+1)	0 (0)	0 (0)	0 (0)	0 (0)
86-87	7.0	13.5	6	9 (+3)	9 (+3)	10 (+4)	9 (+3)	10 (+4)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
87-88	7.5	15.0	4	6 (+2)	6 (+2)	8 (+4)	6 (+2)	7 (+3)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
88-89	8.5	16.5	2	4 (+2)	4 (+2)	5 (+3)	4 (+2)	5 (+3)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
89-90	9.5	18.0	0	1 (+1)	2 (+2)	2 (+2)	1 (+1)	2 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-17 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 2 at NAS Whidbey Island Complex (Average Year)

Band of <i>Leq(24)</i> (dB) ¹	Avg NIPTS (dB) ^{2,3}	10 th Pct NIPTS (dB) ²	Estimated Population ^{4,5,6}												
			Ault Field						OLF Coupeville						
			No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E	No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E	
90-91	10.5	19.5	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Notes:

- ¹ *Leq* bands with no population were omitted from table.
- ² NIPTS values rounded to nearest 0.5 dB.
- ³ NIPTS below 5 dB are generally not considered noticeable.
- ⁴ This analysis assumes the population is outdoors at one’s residence and exposed to all aircraft noise events for 40 years. Given the amount of time spent indoors and the intermittent occurrence of aircraft noise events, it is highly unlikely that individuals would meet all those criteria, and the actual potential for hearing loss would be far less than the values reported here.
- ⁵ Estimated Population was determined by those living within the 80 dB DNL noise contour around each airfield, including those living on-base at Ault Field (there is no on-base population at OLF Coupeville).
- ⁶ Population counts of people within the DNL contours were computed using 2010 census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). In addition, per guidance on potential hearing loss, on-base populations at Ault Field have been included in the analysis. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.
- ⁷ Of this estimated population, 25 are military personnel living on base at Ault Field.
- ⁸ Of this estimated population, 70 are military personnel living on base at Ault Field.
- ⁹ Of this estimated population, 24 are military personnel living on base at Ault Field.

Key:

- dB = decibel
- Leq(24)* = 24-hour Equivalent Sound Level
- NIPTS = Noise Induced Permanent Threshold Shift

4.2.3.3 Nonauditory Health Effects, Alternative 2

Per studies noted and evaluated in Section 3.2.3, the data and research are inconclusive with respect to the linkage between potential nonauditory health effects of aircraft noise exposure. As outlined within the analysis of DNL contours and supplemental metrics presented within this section, the data show that the Proposed Action would result in both an increase in the number of people exposed to noise as well as those individuals exposed to higher levels of noise. However, research conducted to date has not made a definitive connection between intermittent military aircraft noise and nonauditory health effects. The results of most cited studies are inconclusive and cannot identify a causal link between aircraft noise exposure and the various types of nonauditory health effects that were studied. An individual's health is greatly influenced by many factors known to cause health issues, such as hereditary factors, medical history, and life style choices regarding smoking, diet, and exercise. Research has demonstrated that these factors have a larger and more direct effect on a person's health than aircraft noise.

Based upon public comments received on the Draft EIS, the Navy has expanded its nonauditory health effects literature review, using journals and published articles referred to by the Washington State Department of Health, the USEPA, and public comment submittals. Additional topics discussed included, but were not limited to, hypertension and cardiovascular health, lack of sleep, stress, and anxiety, and details can be found in Appendix A1 of the Aircraft Noise Study (Appendix A).

4.2.3.4 Vibration Effects from Aircraft Operations, Alternative 2

In addition to the noise effects on the population outlined above, noticeable structural vibration may result from certain aircraft operations at either Ault Field or OLF Coupeville. Depending on the aircraft operation, altitude, heading, power settings, and the structure, certain vibration effects may be observed. Typically, the structural elements that are most susceptible to vibration from aircraft noise are windows and sometimes walls or ceilings. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (CHABA, 1977). Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. See Appendix A, Aircraft Noise Study, and the Noise and Vibration Associated with Operational Impacts discussion in Section 4.6.2.1 for additional details on noise-induced vibration effects.

The data show that the Proposed Action would result in both an increase in the number of aircraft operations and area/structures exposed to noise. Therefore, there could be an increase in vibration effects due to the Proposed Action. However, as shown in Table 4.2-3, for the representative POIs analyzed, the highest L_{max} value was 117 dB, and, therefore, sound levels damaging to structural components of buildings are not likely to occur.

4.2.3.5 Noise Conclusion, Alternative 2

Overall, Alternative 2 would have significant noise impacts in the communities surrounding Ault Field and OLF Coupeville. Both the total number of acres and the total number of individuals within the DNL noise contours would increase for all scenarios analyzed. There would be a larger impact to the communities around Ault Field under Scenario C, while there would be a larger impact for the communities around OLF Coupeville under Scenario A.

The number of incidents of indoor and outdoor speech interference and classroom interference would increase slightly. There would also be a higher probability of awakening under all scenarios, especially for POIs located closer to the airfields. In addition, depending on the scenario, the population potentially at risk for PHL would increase. The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville for the population with average noise sensitivity and up to 18.0 dB at Ault Field and 12.0 dB at OLF Coupeville for the population highly sensitive to noise (the 10 percent of the population with the most sensitive hearing). As it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period, the actual potential NIPTS for individuals would be far less than the values reported here.

4.2.4 Noise, Alternative 3

This section outlines the noise environment as modeled for Alternative 3 and describes the noise conditions associated with aircraft activity at Ault Field and OLF Coupeville using DNL and several supplemental noise metrics outlined in Section 3.2, including L_{eq} , SEL, L_{max} , and NA, which are used to evaluate such noise effects as community noise exposure, indoor and outdoor speech interference, sleep disturbance, classroom/learning interference, and PHL. Additional information on the noise metrics is also available in Appendix A, Aircraft Noise Study.

The following sections detail potential impacts using projected DNL contours (the federally approved noise metric) and several supplemental metrics (to more fully describe the noise effects).

4.2.4.1 Projected DNL Contours, Alternative 3

As part of the noise analysis and as discussed in Section 3.2.1.1, the DNL noise contours for the alternatives were modeled for an "average year" at Ault Field and OLF Coupeville. An average year represents conditions that are projected to occur on an annual basis, a typical operating tempo at the NAS Whidbey Island complex. In addition, the five scenarios, which present the optional FCLP allocations, were modeled individually to provide a comparative presentation of the potential noise levels.

Figure 4.2-23 presents the projected DNL noise contours for all scenarios under Alternative 3. This overview figure of the NAS Whidbey Island complex (both Ault Field and OLF Coupeville) presents the 65 dB DNL contour under all scenarios for comparison.

Figures 4.2-24 through 4.2-28 present the five scenarios separately for Ault Field, and Figures 4.2-29 through 4.2-33 present the five scenarios separately for OLF Coupeville²⁸. In these sets of figures, the projected 60 dB, 65 dB, 70 dB, and greater than 75 dB DNL contours for Alternative 3 are compared to the No Action Alternative DNL contours. The 65 dB DNL contour at Ault Field extends approximately 10 miles from the four runway endpoints. Under Alternative 3, the length of these contour lobes is primarily due to the Growler on the approach portion of the GCA patterns (described in Section 3.1),

²⁸ In addition, as discussed further in Section 3.2.2.1, 65 dB DNL is the established federal standard for determining potential for high annoyance. This level has been identified in both the FAA's Part 150 Program and the DoD's AICUZ Program (including the individual Air Force and Navy programs) as a threshold for land use recommendations. Consistent with this guidance, 65 dB DNL is used to show areas with potential for high annoyance in this analysis. However, aircraft noise does occur outside the 65 dB DNL contour. In order to more fully reflect the noise environment, the Draft EIS included noise contours of 60 dB DNL as well as detailed noise analysis for specific POIs. In response to public comments, the Navy has expanded the analysis in the Final EIS to show geographic areas subject to greater than 55 dB DNL and has analyzed 18 additional POIs.

where the aircraft generally descends on a 3-degree glide slope through 3,000 feet AGL 10 miles from the runway.

Similar to the No Action Alternative and other alternatives, the DNL contour at OLF Coupeville would be driven by the FCLPs conducted at the airfield. The 65 to less than 70 dB DNL contour range takes the shape of two ovals, one on each side of OLF Coupeville's runway, which correspond to the FCLP flight tracks. Generally speaking, around Ault Field, the 65 dB DNL contours associated with Scenario C extend the farthest from the airfield and cover the most land area (13,766 acres, compared to 13,133 acres under Scenario A). Conversely, around OLF Coupeville, the 65 dB DNL contours associated with Scenario A extend the farthest from the airfield and cover the most land area (10,132 acres, compared to 7,998 acres under Scenario C). The differences in DNL contours between the scenarios at the two airfields are sometimes small (nearly overlapping) and at other times can differ by approximately one mile. The overall difference in the size of the noise contours between the scenarios is more pronounced at OLF Coupeville than at Ault Field due to the larger proportional difference of operations at OLF Coupeville than at Ault Field.

Table 4.2-18 presents an overall comparison of the number of land acres and population in each of the DNL contour ranges, as well as the difference between the No Action Alternative and Alternative 3 under all scenarios. As indicated in the table, the total change in population within the entire 65 dB DNL contour increases from the No Action Alternative by between 109 and 1,136 at Ault Field (primarily in and around Oak Harbor), depending on the scenario, and for OLF Coupeville (primarily in and around Coupeville) increases from the No Action Alternative by between 517 and 1,203, also depending on the scenario.

As also presented within Table 4.2-18, under several of the alternatives/scenarios, the majority of the increase in population is located within the greater than 75 dB DNL noise contour, especially at OLF Coupeville. The greater than 75 dB DNL noise contour is the area where there is the highest level of community annoyance associated with aircraft noise. Therefore, these populations would be significantly impacted.

For purposes of comparison and to be fully transparent regarding the possible range of impacts that could arise from the Proposed Action, DNL noise contours were also modeled for a high-tempo FCLP year, which represents conditions when pre-deployment training for multiple units overlaps and, therefore, FCLP activity would be expected to increase over average conditions. The high-tempo FCLP year data are depicted on the same figures noted previously, as well as included in Appendix A, Aircraft Noise Study. Figures 4.2-24 through 4.2-33 present both the average year and high-tempo FCLP year DNL noise contours on the same figures for the airfields to illustrate the relatively small differences in the overall noise environment, with many of the areas where they diverge occurring over water.

In addition, Table 4.2-19 shows the percentage change in acreage and population between the average year DNL contour ranges and the high-tempo FCLP year DNL contour ranges. The higher the percent change, the larger the deviation between the average year DNL noise contours and the high-tempo FCLP year DNL noise contours; however, most changes are within +/- 5 percent of zero.

Table 4.2-18 Estimated Acreage and Population within the DNL Contour Ranges¹ for the NAS Whidbey Island Complex, Alternative 3 (Average Year)^{2,3}

	<i>DNL Contour Ranges</i>							
	<i>65 to <70 dB DNL</i>		<i>70 to <75 dB DNL</i>		<i>Greater than or equal to 75 dB DNL</i>		<i>Total</i>	
	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>
<i>Ault Field</i>								
<i>No Action Alternative</i>								
Average Year	3,596	3,279	3,269	2,283	5,549	3,379	12,414	8,941
<i>Alternative 3</i>								
Scenario A (20/80 FCLP split)	4,005 (+409)	3,690 (+411)	3,262 (-7)	1,874 (-409)	5,866 (+317)	3,486 (+107)	13,133 (+719)	9,050 (+109)
Scenario B (50/50 FCLP split)	3,907 (+311)	3,591 (+312)	3,271 (+2)	2,415 (+132)	6,357 (+808)	3,756 (+377)	13,535 (+1,121)	9,762 (+821)
Scenario C (80/20 FCLP split)	3,897 (+301)	3,698 (+419)	3,129 (-140)	2,466 (+183)	6,740 (+1,191)	3,913 (+534)	13,766 (+1,352)	10,077 (+1,136)
Scenario D (30/70 FCLP split)	3,958 (+362)	3,695 (+416)	3,233 (-36)	2,182 (-101)	6,109 (+560)	3,597 (+218)	13,300 (+886)	9,474 (+533)
Scenario E (70/30 FCLP split)	3,875 (+279)	3,661 (+382)	3,151 (-118)	2,430 (+147)	6,643 (+1,094)	3,869 (+490)	13,669 (+1,255)	9,960 (+1,019)
<i>OLF Coupeville</i>								
<i>No Action Alternative</i>								
Average Year	3,681	861	3,088	786	638	583	7,407	2,230
<i>Alternative 3</i>								
Scenario A (20/80 FCLP split)	1,563 (-2,118)	554 (-307)	3,323 (+235)	965 (+179)	5,246 (+4,608)	1,914 (+1,331)	10,132 (+2,725)	3,433 (+1,203)
Scenario B (50/50 FCLP split)	2,058 (-1,623)	559 (-302)	3,458 (+370)	1,059 (+273)	3,931 (+3,293)	1,500 (+917)	9,447 (+2,040)	3,118 (+888)
Scenario C (80/20 FCLP split)	3,432 (-249)	1,045 (+184)	3,168 (+80)	1,030 (+244)	1,398 (+760)	672 (+89)	7,998 (+591)	2,747 (+517)
Scenario D (30/70 FCLP split)	1,582 (-2,099)	515 (-346)	3,467 (+379)	1,023 (+237)	4,890 (+4,252)	1,805 (+1,222)	9,939 (+2,532)	3,343 (+1,113)
Scenario E (70/30 FCLP split)	3,063 (-618)	871 (+10)	3,178 (+90)	1,053 (+267)	2,518 (+1,880)	1,000 (+417)	8,759 (+1,352)	2,924 (+694)

Table 4.2-18 Estimated Acreage and Population within the DNL Contour Ranges¹ for the NAS Whidbey Island Complex, Alternative 3 (Average Year)^{2,3}

	<i>DNL Contour Ranges</i>							
	<i>65 to <70 dB DNL</i>		<i>70 to <75 dB DNL</i>		<i>Greater than or equal to 75 dB DNL</i>		<i>Total</i>	
	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>
NAS Whidbey Island Complex								
No Action Alternative								
Average Year	7,277	4,140	6,357	3,069	6,187	3,962	19,821	11,171
Alternative 3								
Scenario A (20/80 FCLP split)	5,568 (-1,709)	4,244 (+104)	6,585 (+228)	2,839 (-230)	11,112 (+4,925)	5,400 (+1,438)	23,265 (+3,444)	12,483 (+1,312)
Scenario B (50/50 FCLP split)	5,965 (-1,312)	4,150 (+10)	6,729 (+372)	3,474 (+405)	10,288 (+4,101)	5,256 (+1,294)	22,982 (+3,161)	12,880 (+1,709)
Scenario C (80/20 FCLP split)	7,329 (+52)	4,743 (+603)	6,297 (-60)	3,496 (+427)	8,138 (+1,951)	4,585 (+623)	21,764 (+1,943)	12,824 (+1,653)
Scenario D (30/70 FCLP split)	5,540 (-1,737)	4,210 (+70)	6,700 (+343)	3,205 (+136)	10,999 (+4,812)	5,402 (+1,440)	23,239 (+3,418)	12,817 (+1,646)
Scenario E (70/30 FCLP split)	6,938 (-339)	4,532 (+392)	6,329 (-28)	3,483 (+414)	9,161 (+2,974)	4,869 (+907)	22,428 (+2,607)	12,884 (+1,713)

Table 4.2-18 Estimated Acreage and Population within the DNL Contour Ranges¹ for the NAS Whidbey Island Complex, Alternative 3 (Average Year)^{2,3}

<i>DNL Contour Ranges</i>							
<i>65 to <70 dB DNL</i>		<i>70 to <75 dB DNL</i>		<i>Greater than or equal to 75 dB DNL</i>		<i>Total</i>	
<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>	<i>Area (acres)</i>	<i>Pop⁴</i>

Notes:

- ¹ All five scenarios are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ² Acreage presented does not include areas over water or areas over the NAS Whidbey Island complex.
- ³ The difference between the No Action Alternative and Alternative 1 is noted in parentheses.
- ⁴ Population counts of people within the DNL contour ranges were computed using 2010 Census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour range, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the DNL contour ranges (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville). A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.
- ⁵ Numbers have been rounded to ensure totals sum.

Key:

- dB = decibel
- DNL = day-night average sound level
- FCLP = Field Carrier Landing Practice

Table 4.2-19 Percent Difference in the Estimated Acreage and Population within the Average and High-Tempo FCLP Year DNL Contour Ranges for the NAS Whidbey Island Complex, Alternative 3

DNL Contours	DNL Contour Ranges ¹							
	65 to <70 dB DNL		70 to <75 dB DNL		Greater than or equal to 75 dB DNL		Total	
	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop	Area (acres)	Pop
Ault Field								
Scenario A	0.5%	-0.1%	0.0%	2.5%	1.0%	0.8%	0.6%	0.8%
Scenario B	0.7%	1.1%	0.0%	1.9%	1.4%	1.0%	0.8%	1.3%
Scenario C	1.3%	1.1%	0.0%	1.3%	1.0%	0.8%	0.9%	1.0%
Scenario D	1.0%	-0.6%	0.8%	1.9%	0.9%	1.8%	0.9%	0.9%
Scenario E	1.7%	1.3%	2.1%	4.6%	0.3%	1.1%	1.1%	2.0%
OLF Coupeville								
Scenario A	0.6%	7.8%	-5.8%	-7.4%	6.6%	5.5%	1.6%	2.2%
Scenario B	-8.3%	-11.8%	0.1%	2.0%	8.0%	6.9%	1.6%	1.9%
Scenario C	0.5%	-1.4%	0.8%	1.5%	13.5%	7.8%	2.9%	1.9%
Scenario D	-2.0%	4.3%	-4.5%	-6.1%	7.1%	6.3%	1.6%	2.2%
Scenario E	-4.6%	-5.2%	1.1%	-0.5%	7.7%	7.5%	1.0%	0.8%
NAS Whidbey Island Complex								
Scenario A	0.6%	0.9%	-2.9%	-0.8%	3.6%	2.4%	1.0%	1.2%
Scenario B	-2.4%	-0.6%	0.0%	1.9%	3.9%	2.7%	1.1%	1.4%
Scenario C	0.9%	0.5%	0.4%	1.4%	3.2%	1.9%	1.6%	1.2%
Scenario D	0.1%	0.0%	-2.0%	-0.7%	3.7%	3.3%	1.2%	1.2%
Scenario E	-1.1%	0.1%	1.6%	3.1%	2.4%	2.4%	1.1%	1.8%

Key:

- dB = decibel
- DNL = day-night average sound level
- NAS = Naval Air Station
- OLF = outlying landing field

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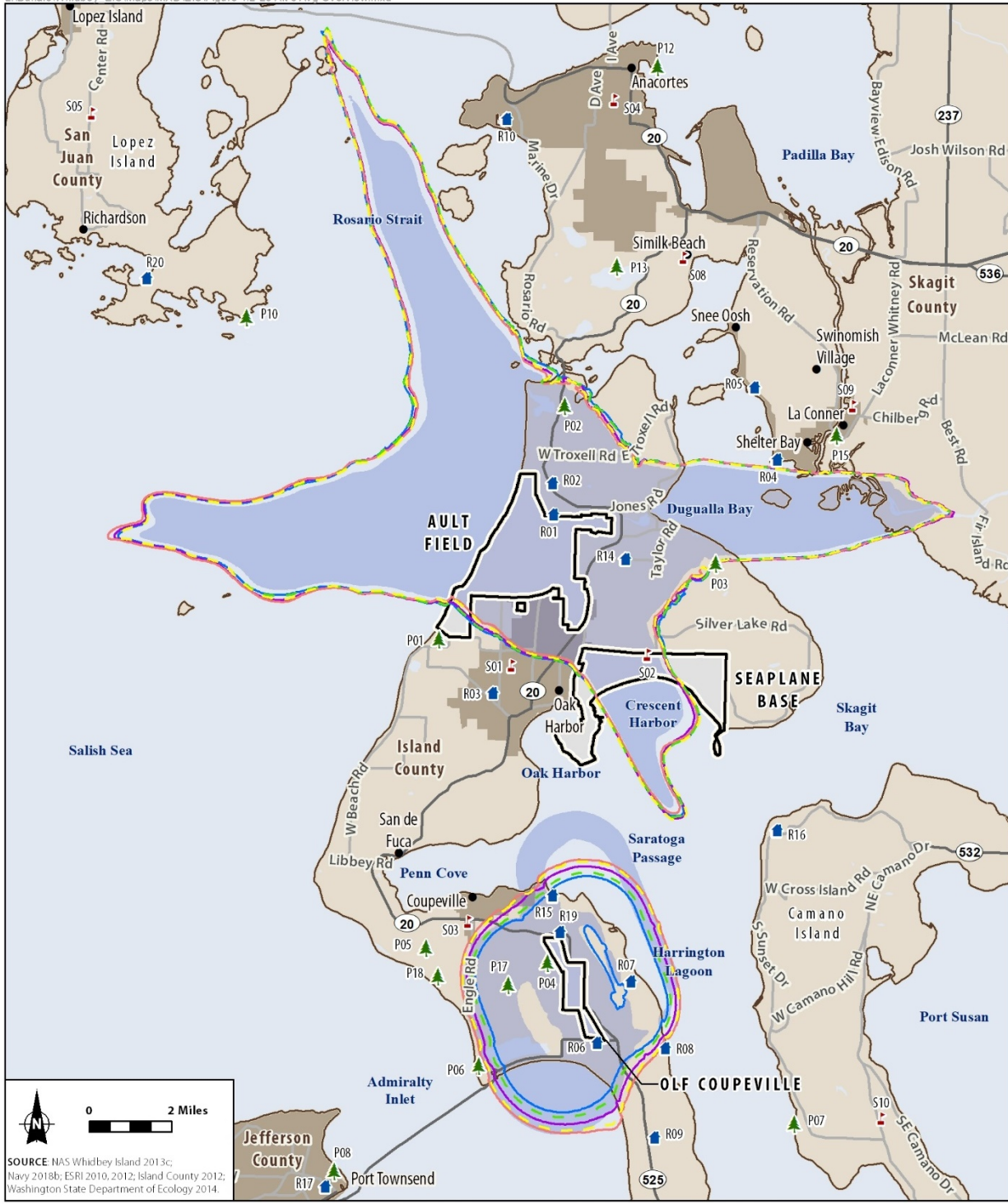
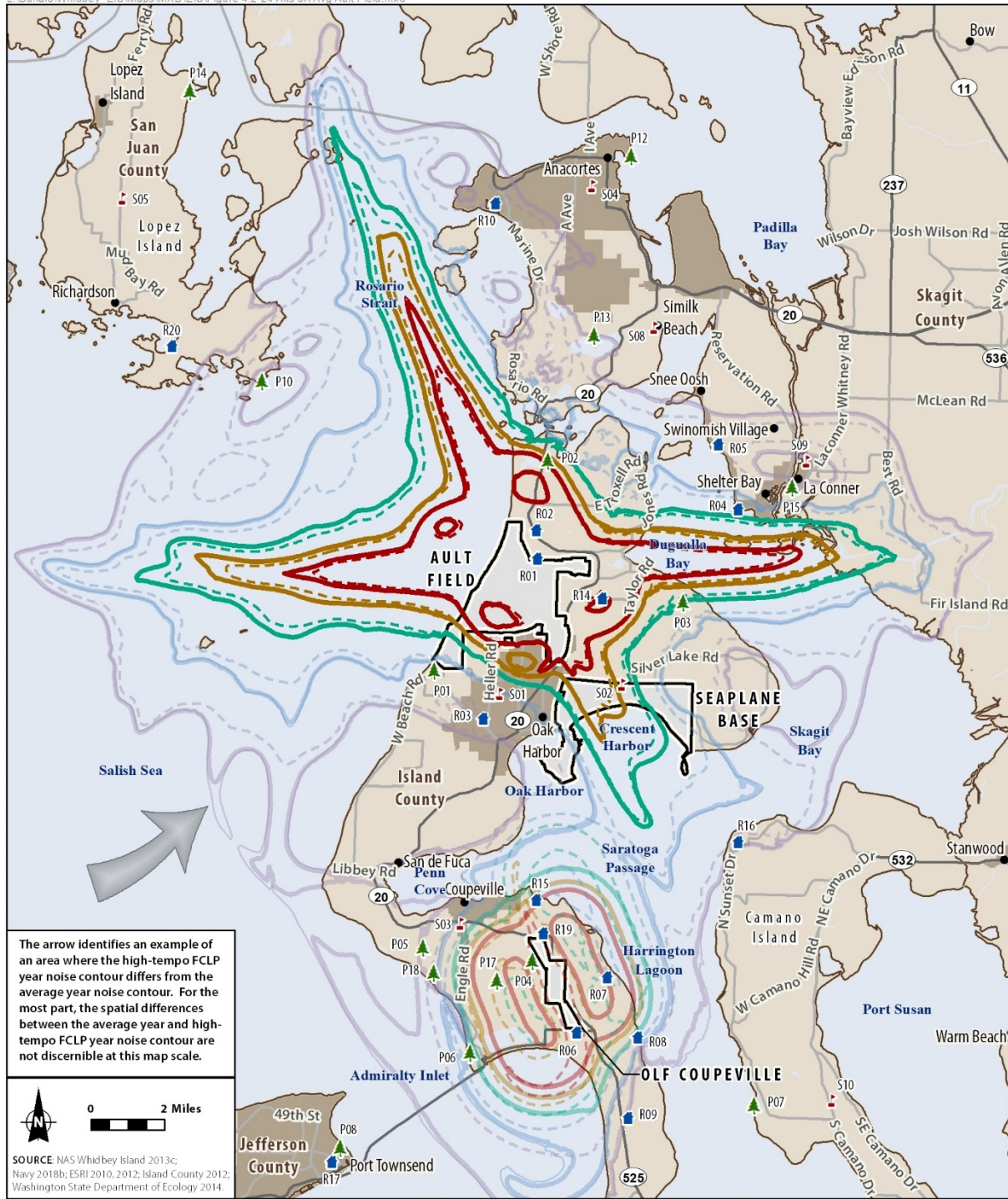


Figure 4.2-23
Alternative 3 Overview
of the 65 dB DNL Noise Contours for
the NAS Whidbey Island Complex
 Whidbey Island, Island County, WA

- City
 - County Boundary
 - U.S. and State Highway
 - Major Road
 - City/Town Boundary
 - ▭ Installation Area
- Points of Interest (POI)
- ▲ Park
 - Residential
 - ▲ School
- Alternative 3A (Average Year) DNL Noise Contour (65 dB)
 - Alternative 3B (Average Year) DNL Noise Contour (65 dB)
 - Alternative 3C (Average Year) DNL Noise Contour (65 dB)
 - Alternative 3D (Average Year) DNL Noise Contour (65 dB)
 - Alternative 3E (Average Year) DNL Noise Contour (65 dB)
 - No Action (Average Year) (≥65 dB)

L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.2-24 Alls 3A Avg Ault Field.mxd



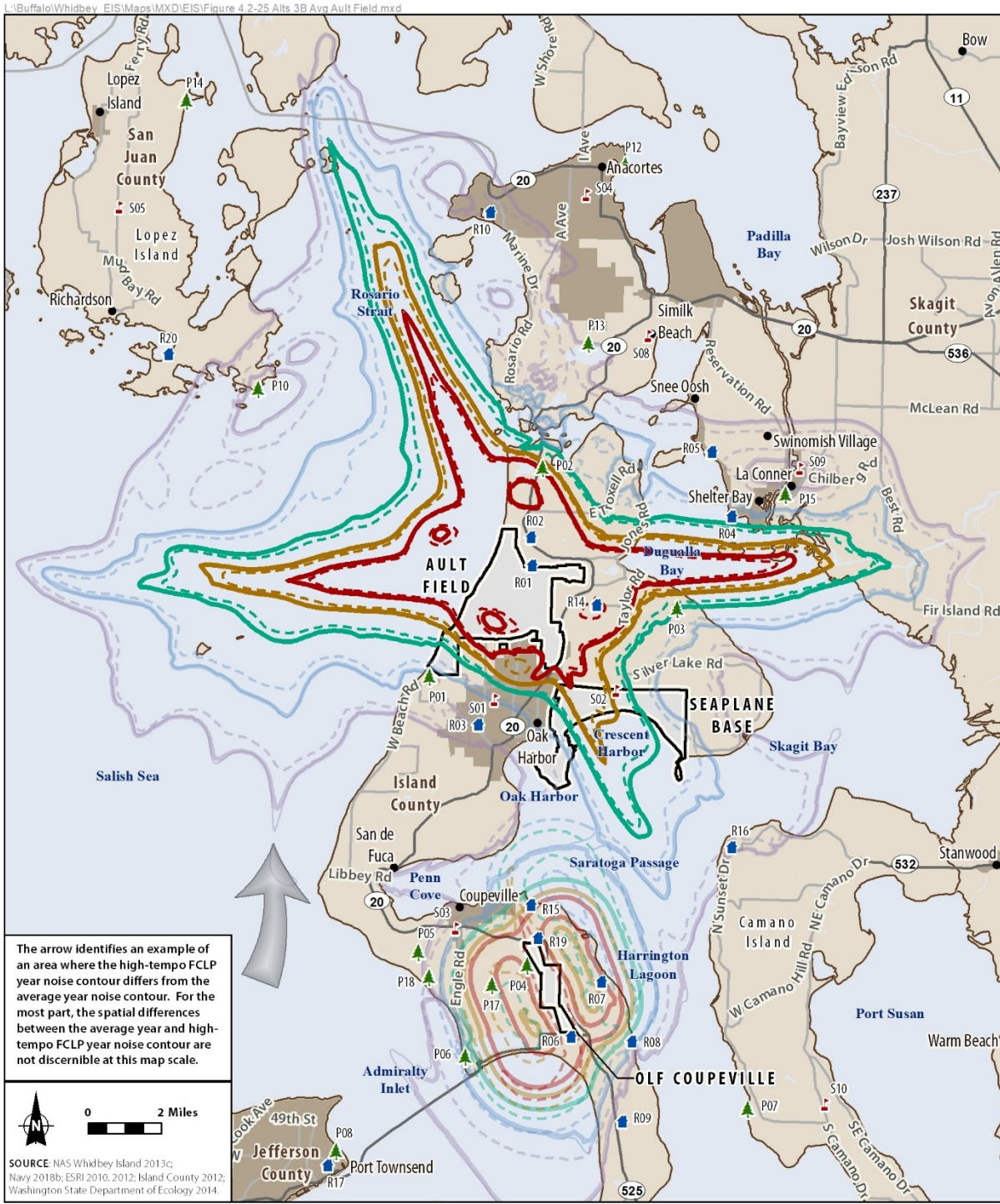
The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.

SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

Symbol	Description	No Action (Average) DNL Noise Contour (dB)	Alternative 3A (Average) DNL Noise Contour (dB)	Alternative 3A (High Tempo FCLP) DNL Noise Contour (dB)
●	City	55*	55*	55*
—	County Boundary	60*	60*	60*
—	U.S. and State Highway	65	65	65
—	Major Road	70	70	70
—	City/Town Boundary	75	75	75
□	Installation Area			
▲	Park			
■	Residential			
■	School			

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-24
Alternative 3A DNL Noise Contours for Ault Field
 Whidbey Island, Island County, WA



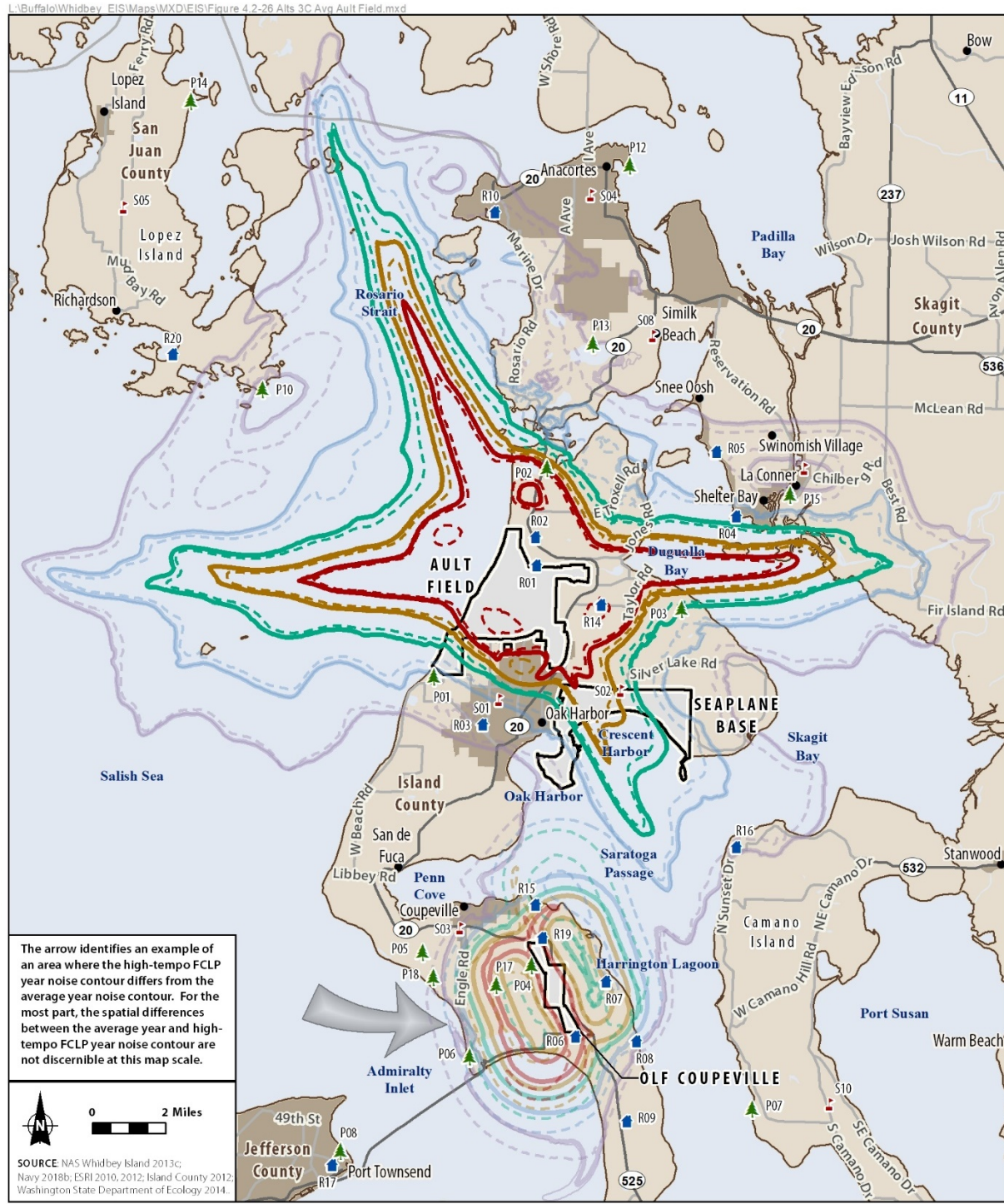
The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.

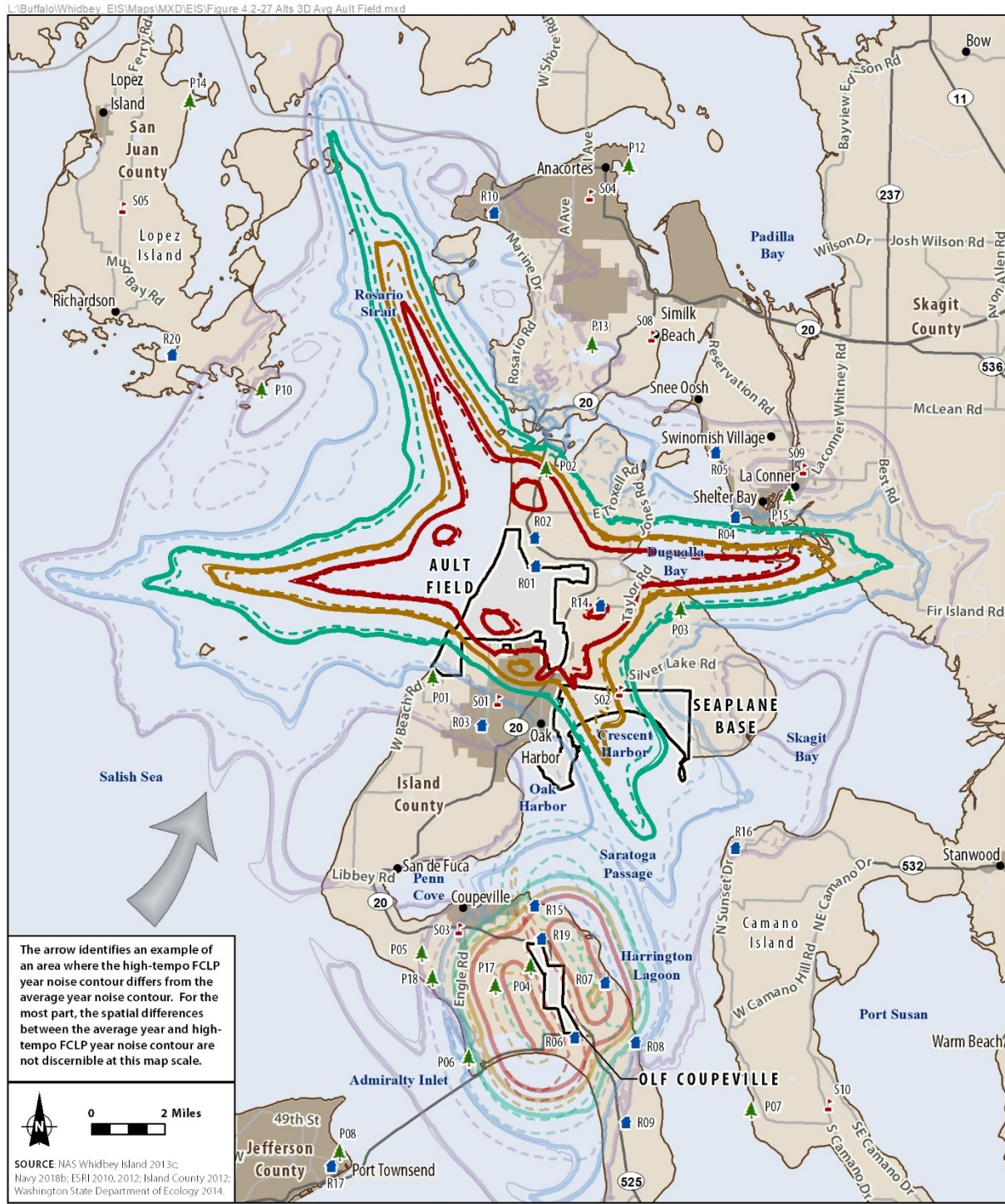
SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

- | | | | | |
|--------------------------|--------------------------|--|---|---|
| ● City | Points of Interest (POI) | No Action (Average) DNL Noise Contour (dB) | Alternative 3B (Average) DNL Noise Contour (dB) | Alternative 3B (High Tempo FCLP) DNL Noise Contour (dB) |
| — County Boundary | 🌳 Park | — 55* | — 55* | — 55* |
| — U.S. and State Highway | 🏠 Residential | — 60* | — 60* | — 60* |
| — Major Road | 🎓 School | — 65 | — 65 | — 65 |
| — City/Town Boundary | | — 70 | — 70 | — 70 |
| ▭ Installation Area | | — 75 | — 75 | — 75 |

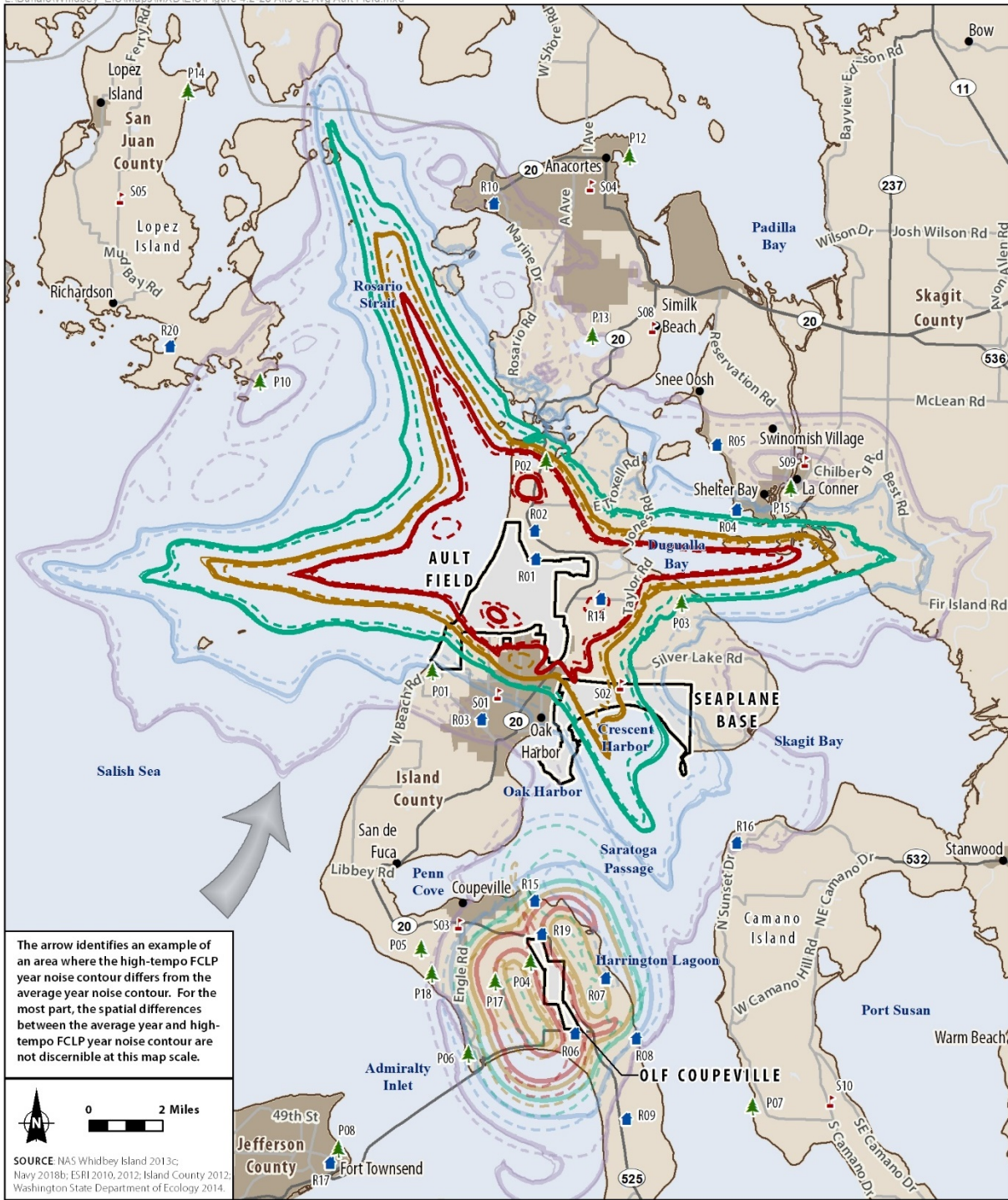
* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-25
Alternative 3B DNL Noise
Contours for Ault Field
Whidbey Island, Island County, WA





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The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.

0 2 Miles

SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

	No Action (Average)	Alternative 3E (Average)	Alternative 3E (High Tempo FCLP)
City	●	●	●
County Boundary	—	—	—
U.S. and State Highway	—	—	—
Major Road	—	—	—
City/Town Boundary	—	—	—
Installation Area	—	—	—
Points of Interest (POI)	▲ Park	▲ Park	▲ Park
	■ Residential	■ Residential	■ Residential
	■ School	■ School	■ School
DNL Noise Contour (dB)	55*	55*	55*
	60*	60*	60*
	65	65	65
	70	70	70
	75	75	75

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-28
Alternative 3E DNL Noise
Contours for Ault Field
Whidbey Island, Island County, WA

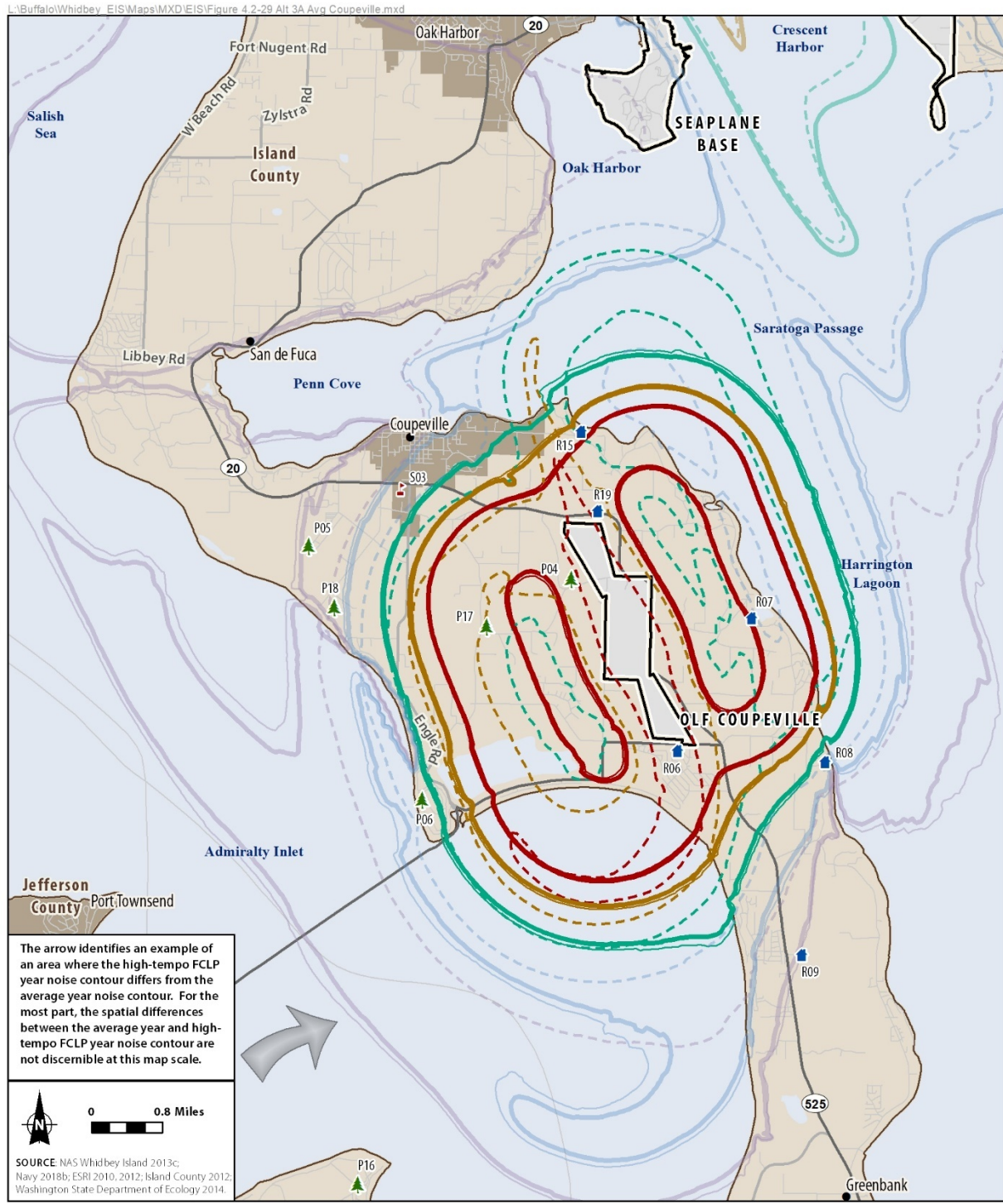
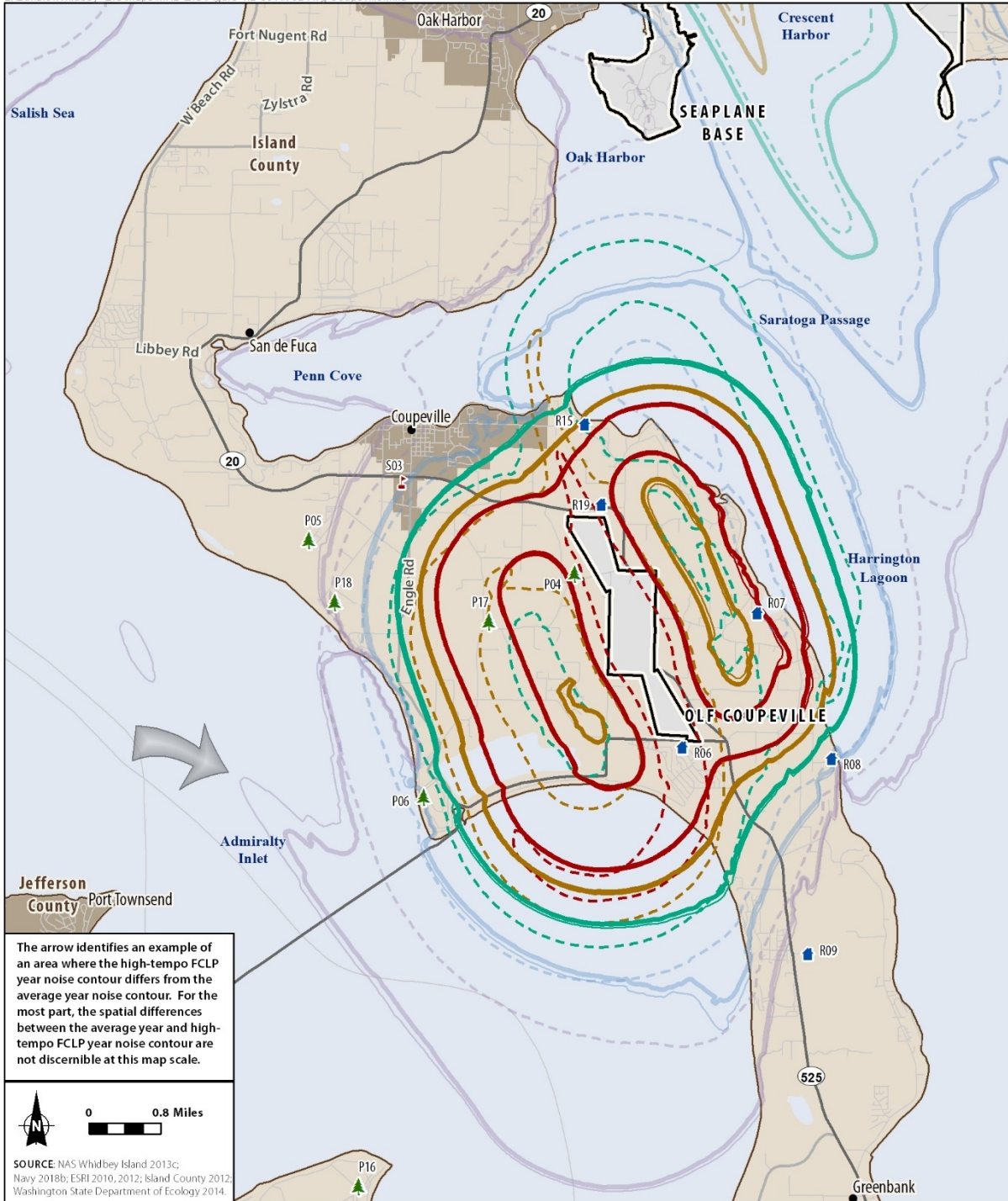


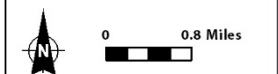
Figure 4.2-29
Alternative 3A DNL Noise
Contours for OLF Coupeville
 Whidbey Island, Island County, WA

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.2-30 Alt 3B Avg Coupeville.mxd



The arrow identifies an example of an area where the high-tempo FCLP year noise contour differs from the average year noise contour. For the most part, the spatial differences between the average year and high-tempo FCLP year noise contour are not discernible at this map scale.



SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2010, 2012; Island County 2012; Washington State Department of Ecology 2014.

	Points of Interest (POI)	No Action (Average) DNL Noise Contour (dB)	Alternative 3B (Average) DNL Noise Contour (dB)	Alternative 3B (High Tempo FCLP) DNL Noise Contour (dB)
●	City	55*	55*	55*
—	County Boundary	60*	60*	60*
—	U.S. and State Highway	65	65	65
—	Major Road	70	70	70
—	Minor Road	75	75	75
■	City/Town Boundary			
□	Installation Area			
▲	Park			
■	Residential			
■	School			

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-30
Alternative 3B DNL Noise Contours for OLF Coupeville
Whidbey Island, Island County, WA

L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.2-31 Alt 3C Avg Coupeville.mxd

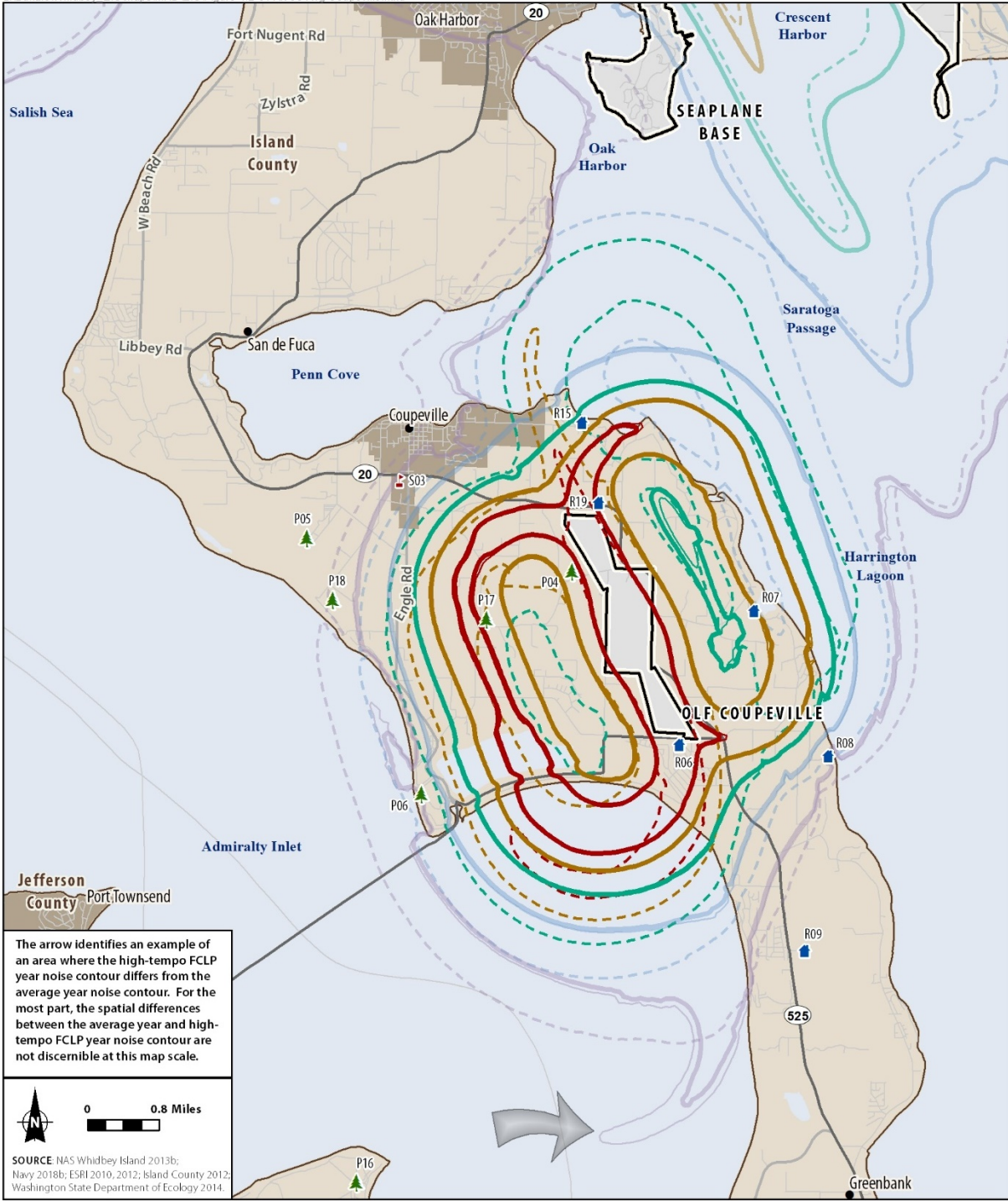


Figure 4.2-31
Alternative 3C DNL Noise
Contours for OLF Coupeville
 Whidbey Island, Island County, WA

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.2-32 Alt 3D Avg Coupeville.mxd

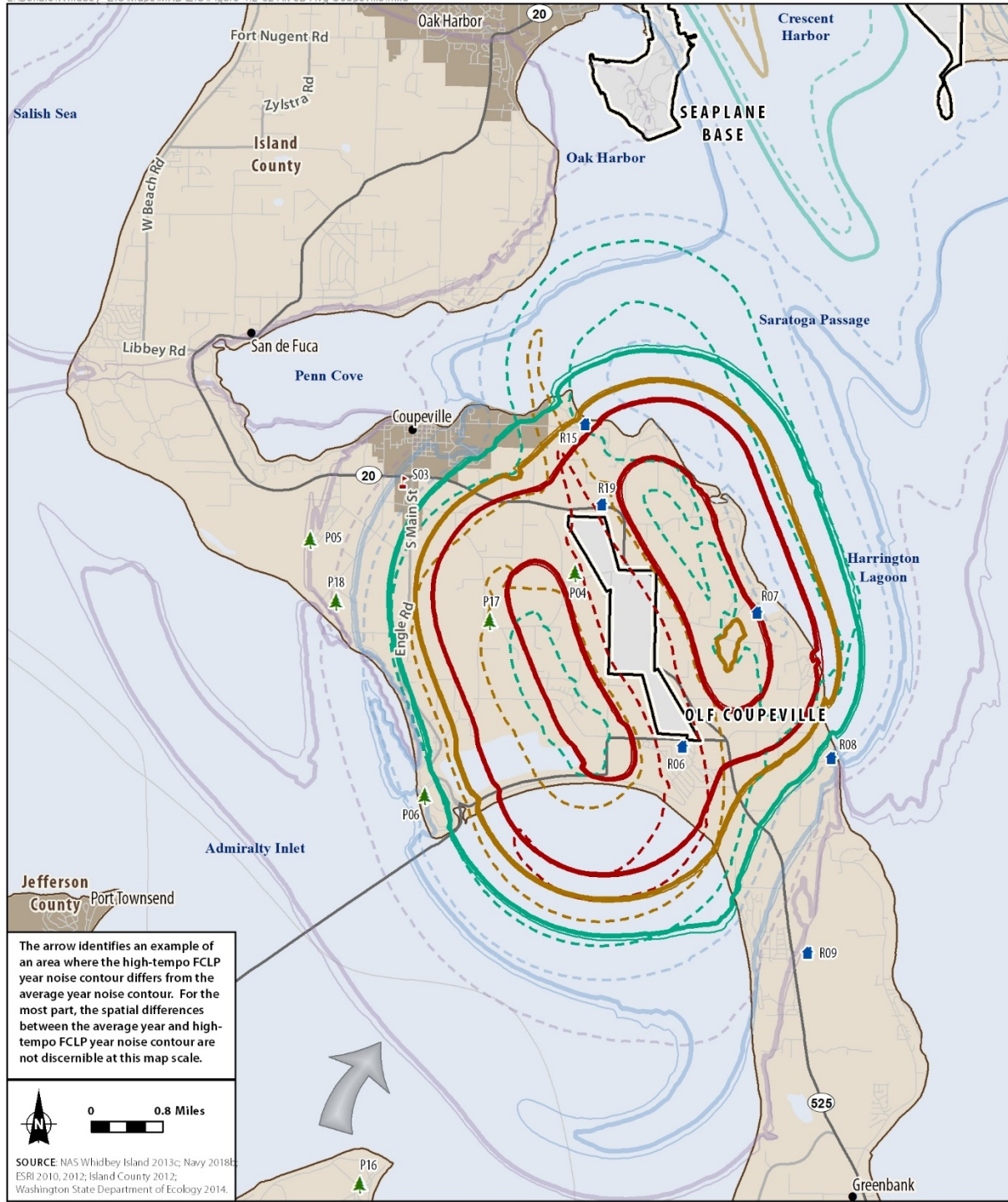
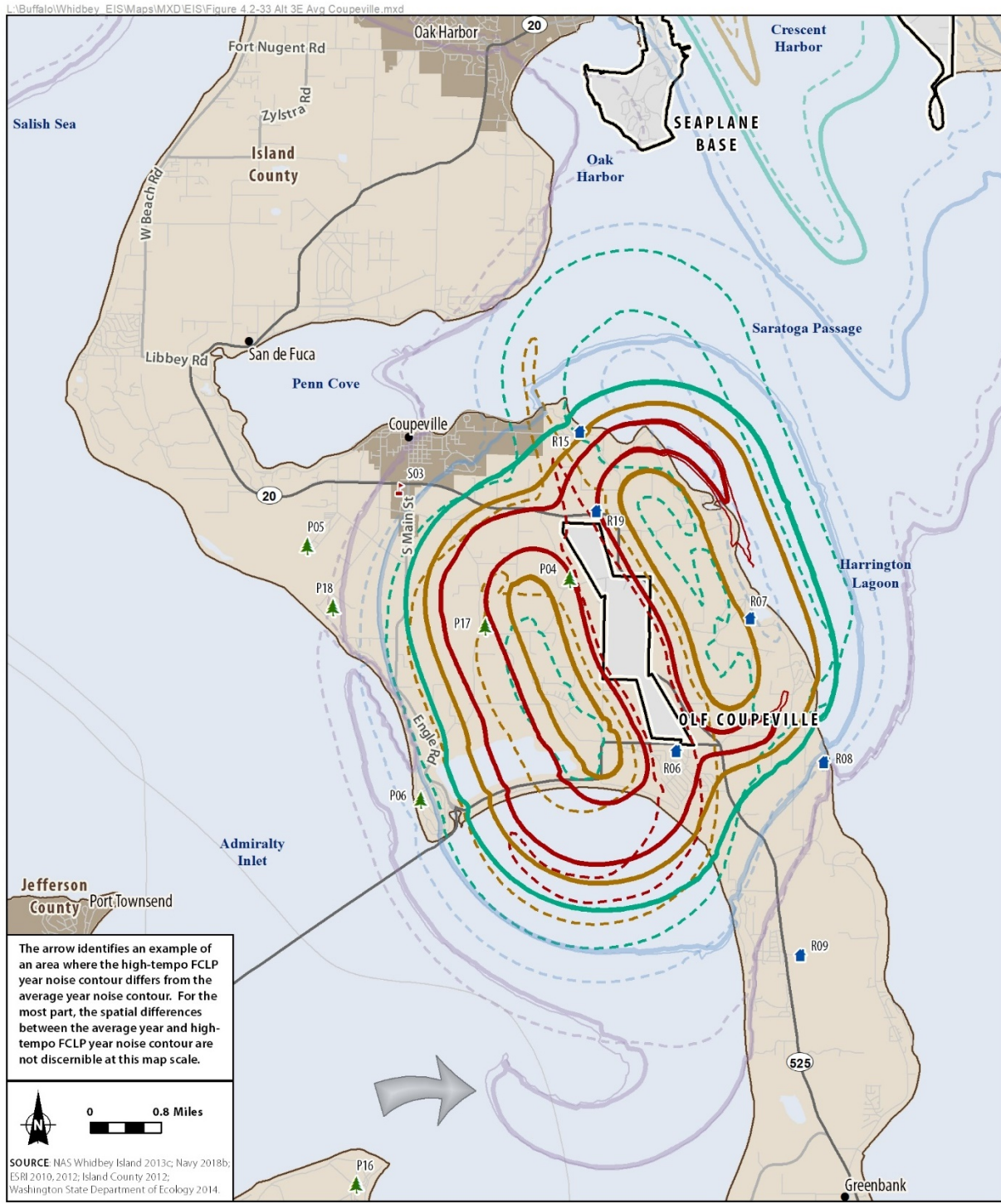


Figure 4.2-32
Alternative 3D DNL Noise
Contours for OLF Coupeville
 Whidbey Island, Island County, WA

City	Points of Interest (POI)	No Action (Average) DNL Noise Contour (dB)	Alternative 3D (Average) DNL Noise Contour (dB)	Alternative 3D (High Tempo FCLP) DNL Noise Contour (dB)
● City	🌳 Park	55*	55*	55*
— County Boundary	🏠 Residential	60*	60*	60*
— U.S. and State Highway	🎓 School	65	65	65
— Major Road		70	70	70
— Minor Road		75	75	75
— City/Town Boundary				
▭ Installation Area				

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.



	No Action (Average) DNL Noise Contour (dB)	Alternative 3E (Average) DNL Noise Contour (dB)	Alternative 3E (High Tempo FCLP) DNL Noise Contour (dB)
● City	55*	55*	55*
— County Boundary	60*	60*	60*
— U.S. and State Highway	65	65	65
— Major Road	70	70	70
— Minor Road	75	75	75
■ City/Town Boundary			
□ Installation Area			
▲ Park			
■ Residential			
■ School			

* Note: The 55 and 60 DNL noise contours are provided for reference only. The federal standard and analysis is based on the 65 DNL noise contour.

Figure 4.2-33
Alternative 3E DNL Noise
Contours for OLF Coupeville
Whidbey Island, Island County, WA

4.2.4.2 Supplemental Noise Analyses, Alternative 3

Additional supplemental noise analyses were conducted for a variety of representative POIs identified in the communities surrounding Ault Field and OLF Coupeville. The wide geographic distribution of POIs provides broad coverage and context to compare the noise effects under each of the alternatives with the noise effects for the No Action Alternative. These supplemental analyses include single event noise, indoor speech interference, classroom/learning interference, sleep disturbance, outdoor speech interference, and PHL. The POIs chosen for this analysis are presented in Section 3.2 and are depicted on Figure 3.2-6. Not all POIs are used for each analysis because the location and type of POI dictates whether the particular analysis would apply; however, for the Final EIS, an analysis of outdoor speech interference was also included for all POIs, including residential areas and schools, as individuals would spend time outdoors at both of those types of locations. In addition, between the Draft EIS and Final EIS, an additional 18 POIs were added to the analysis to provide the public and decision makers with more data to compare. These included additional residential areas, schools, and parks, as well as two points from the NPS's acoustical monitoring report. The two points from that report (designated as EBLA001 [Reuble Farmstead] and EBLA002 [Ferry House]), correspond, respectively, to POIs P17 and P18.

In general, the POIs were chosen based upon several factors, including their geographic dispersal from the airfields and being located under flight operations, major or identifiable landmarks, and areas that have had a history of noise impacts. It should be noted that for POIs located close to one another (i.e., within about 0.25 mile, depending on topography), the results will most likely be the same or very similar and thus not add value to the analysis.

4.2.4.2.1 Single Event Noise, Alternative 3

As noted in Section 3.2.4.3.1, several types of metrics are presented in this subsection that address the question of "how loud" the aircraft are and "how often" someone will hear them. To understand the "how loud" question, certain single noise events may be relative to the 48 POIs, and two different noise metrics are utilized: SEL and L_{max} . The SEL metric is a composite metric that represents both the intensity of a sound and its duration. SEL provides a measure of total sound energy of an entire acoustic event (i.e., arrival, departure, or T&G). The L_{max} metric is the maximum, instantaneous level of noise that a particular event produces, and it is most closely related to what an individual would hear. The SEL and L_{max} provide the noise level of a single aircraft event. These events are intermittent in nature, and, therefore, the noise levels do not represent a continuous source of noise. For more details on SEL or L_{max} , see Section 3.2.2 as well as Appendix A, Aircraft Noise Study.

The SEL and L_{max} values for the loudest single event (i.e., arrival, departure, or T&G) for each POI under Alternative 3 at Ault Field and OLF Coupeville are identical to those presented under Alternative 1 in Table 4.2-3. As with Alternative 1, under Alternative 3, the maximum SEL/ L_{max} values vary depending on the location of the POI and its proximity to the airfields and flight tracks. These noise level measurements under Alternative 3 are compared to the noise level measurements that were modeled under the No Action Alternative, and the difference is noted in the table.

As shown in the data, many of the maximum SEL and L_{max} values modeled under Alternative 1 are identical to those modeled in the No Action Alternative analysis. Measurements at 12 of the 48 POIs changed from the No Action Alternative to Alternative 3. These include increases at R06 and R07, and decreases at R08, R15, R19, S03, P04, P05, P06, P16, and P18, while at R09, the SEL decreased slightly and the L_{max} increased slightly. In addition, the SEL and L_{max} values for the representative POIs are all

identical under all of the scenarios analyzed; therefore, they are not broken down and presented individually.

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

Table 4.2-20 presents the number of events above the three identified thresholds for the POIs analyzed (note, for 21 of the 48 POIs analyzed, the noise model indicated there would be zero events above the 80 dB L_{max} ; therefore, they were omitted from the table).

As presented in the table, there is a large range in the number of events based upon the location of the POI. Under certain scenarios, some POIs would experience an increase in the range of 10,000 to over 15,000 annual events above 80 dB L_{max} (i.e., the sound of a garbage disposal). This would be approximately 27 to 41 events per day when averaged. Other POIs would experience some degree less than these numbers. The POIs with the highest number of events above these thresholds were very close to Ault Field. In addition, the results show that as the L_{max} threshold is increased, the number of events decrease, as would be expected. Therefore, when looking at the number of events above a threshold of 100 dB L_{max} , the highest increase is 11,476 at R01 over the No Action Alternative conditions.

What this combined analysis shows is that while there may not be a substantive difference in the loudest event (i.e., SEL or L_{max}) at a particular POI, there may be a substantial increase in the number of loud or disruptive events that occur between alternatives and scenarios when compared to the No Action Alternative.

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)^{1,2}

ID	Description	Lmax (dB)	Number of Annual Events					
			No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D	Alt 3 E
Residences								
R01	Sullivan Rd.	Above 80 dB	48,311	57,033 (+8,722)	60,474 (+12,163)	63,606 (+15,295)	58,172 (+9,861)	62,471 (+14,160)
		Above 90 dB	43,603	51,152 (+7,549)	54,770 (+11,167)	57,952 (+14,349)	52,347 (+8,744)	56,790 (+13,187)
		Above 100 dB	30,199	34,249 (+4,050)	38,148 (+7,949)	41,675 (+11,476)	35,332 (+5,133)	40,381 (+10,182)
R02	Salal St. and N. Northgate Dr.	Above 80 dB	38,892	45,917 (+7,025)	49,088 (+10,196)	53,064 (+14,172)	47,324 (+8,432)	51,881 (+12,989)
		Above 90 dB	36,058	42,044 (+5,986)	45,667 (+9,609)	49,849 (+13,791)	43,663 (+7,605)	48,580 (+12,552)
		Above 100 dB	4,771	6,201 (+1,430)	5,856 (+1,085)	6,363 (+1,592)	6,805 (+2,034)	6,443 (+1,672)
R04	Pull and Be Damned Point	Above 80 dB	4,985	6,330 (+1,345)	6,267 (+1,282)	5,985 (+1,000)	6,010 (+1,025)	5,985 (+1,000)
		Above 90 dB	370	443 (+73)	417 (+47)	414 (+44)	416 (+46)	414 (+44)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R05	Snee-Oosh Point	Above 80 dB	2,767	3,638 (+871)	3,638 (+871)	3,475 (+708)	3,475 (+708)	3,475 (+708)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R06	Admirals Dr. and Byrd Dr.	Above 80 dB	3,101	12,176 (+9,075)	7,623 (+4,522)	3,051 (-50)	10,664 (+7,563)	4,579 (+1,478)
		Above 90 dB	2,451	10,771 (+8,320)	6,754 (+4,303)	2,700 (+249)	9,438 (+6,987)	4,052 (+1,601)
		Above 100 dB	2,227	7,693 (+5,466)	4,691 (+2,464)	1,902 (-325)	6,648 (+4,421)	2,854 (+627)
R07	Race Lagoon	Above 80 dB	938	4,691 (+3,753)	3,101 (+2,163)	1,237 (+299)	4,211 (+3,273)	1,835 (+897)
		Above 90 dB	230	3,240 (+3,010)	2,165 (+1,935)	839 (+609)	2,934 (+2,704)	1,259 (+1,029)
		Above 100 dB	183	2,516 (+2,333)	1,679 (+1,496)	651 (+468)	2,277 (+2,094)	977 (+794)
R08	Pratts Bluff	Above 80 dB	368	3,655 (+3,287)	2,442 (+2,074)	947 (+579)	3,309 (+2,941)	1,421 (+1,053)
		Above 90 dB	223	903 (+680)	605 (+382)	234 (+11)	819 (+596)	351 (+128)
		Above 100 dB	65	0 (-65)	0 (-65)	0 (-65)	0 (-65)	0 (-65)

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)^{1,2}

ID	Description	Lmax (dB)	Number of Annual Events					
			No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D	Alt 3 E
R10	Skyline	Above 80 dB	1,548	2,172 (+624)	2,101 (+553)	2,347 (+799)	2,349 (+801)	2,347 (+799)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R14	E. Sleeper Road and Slumber Lane	Above 80 dB	40,516	47,015 (+6,499)	51,241 (+10,725)	54,124 (+13,608)	48,209 (+7,693)	52,903 (+12,387)
		Above 90 dB	10,220	10,991 (+771)	13,569 (+3,349)	15,975 (+5,755)	11,519 (+1,299)	15,080 (+4,860)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R15	Long Point Manor	Above 80 dB	2,524	4,852 (+2,328)	3,323 (+799)	1,663 (-861)	4,419 (+1,895)	2,216 (-308)
		Above 90 dB	847	4,305 (+3,458)	2,812 (+1,965)	1,103 (+256)	3,854 (+3,007)	1,656 (+809)
		Above 100 dB	41	2,175 (+2,134)	1,457 (+1,416)	564 (+523)	1,971 (+1,930)	846 (+805)
R16	Rocky Point Heights	Above 80 dB	1,525	1,970 (+445)	1,900 (+375)	2,025 (+500)	2,040 (+515)	2,025 (+500)
		Above 90 dB	69	65 (-4)	81 (+12)	65 (-4)	65 (-4)	65 (-4)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
R19	Island Transit Offices, Coupeville	Above 80 dB	3,172	12,241 (+9,069)	7,704 (+4,532)	3,116 (-56)	10,729 (+7,557)	4,644 (+1,472)
		Above 90 dB	2,412	11,827 (+9,415)	7,426 (+5,014)	3,008 (+596)	10,353 (+7,941)	4,482 (+2,070)
		Above 100 dB	847	4,305 (+3,458)	2,812 (+1,965)	1,103 (+256)	3,854 (+3,007)	1,656 (+809)
R20	South Lopez Island (Agate Beach)	Above 80 dB	112	146 (+34)	136 (+24)	156 (+44)	156 (+44)	156 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Schools								
S01	Oak Harbor High School	Above 80 dB	997	633 (-364)	948 (-49)	992 (-5)	793 (-204)	952 (-45)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)^{1,2}

ID	Description	Lmax (dB)	Number of Annual Events					
			No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D	Alt 3 E
S02	Crescent Harbor Elementary School	Above 80 dB	4,436	5,667 (+1,231)	5,465 (+1,029)	5,864 (+1,428)	5,904 (+1,468)	5,864 (+1,428)
		Above 90 dB	3,957	5,244 (+1,287)	4,925 (+968)	5,387 (+1,430)	5,427 (+1,470)	5,387 (+1,430)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S03	Coupeville Elementary School	Above 80 dB	1,852	2,929 (+1,077)	1,781 (-71)	723 (-1,129)	2,529 (+677)	1,087 (-765)
		Above 90 dB	316	0 (-316)	0 (-316)	0 (-316)	0 (-316)	0 (-316)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S04	Anacortes High School	Above 80 dB	112	146 (+34)	136 (+24)	156 (+44)	156 (+44)	156 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
S09	La Conner Elementary School	Above 80 dB	352	399 (+47)	412 (+60)	389 (+37)	390 (+38)	389 (+37)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parks								
P02	Deception Pass State Park	Above 80 dB	8,950	9,708 (+758)	10,758 (+1,808)	13,149 (+4,199)	10,713 (+1,763)	12,656 (+3,706)
		Above 90 dB	5,479	5,721 (+242)	6,682 (+1,203)	8,892 (+3,413)	6,599 (+1,120)	8,428 (+2,949)
		Above 100 dB	5,449	5,539 (+90)	6,560 (+1,111)	8,845 (+3,396)	6,434 (+985)	8,357 (+2,908)
P03	Dugualla State Park	Above 80 dB	16,278	18,523 (+2,245)	21,153 (+4,875)	22,280 (+6,002)	18,976 (+2,698)	21,603 (+5,325)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P04	Ebey's Landing – Rhododendron Park	Above 80 dB	3,172	12,241 (+9,069)	7,704 (+4,532)	3,116 (-56)	10,729 (+7,557)	4,644 (+1,472)
		Above 90 dB	3,103	12,176 (+9,073)	7,623 (+4,520)	3,051 (-52)	10,664 (+7,561)	4,579 (+1,476)
		Above 100 dB	2,720	4,305 (+1,585)	2,812 (+92)	1,103 (-1,617)	3,854 (+1,134)	1,656 (-1,064)

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)^{1,2}

ID	Description	Lmax (dB)	Number of Annual Events					
			No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D	Alt 3 E
P06	Fort Casey State Park	Above 80 dB	2,189	7,457 (+5,268)	4,533 (+2,344)	1,841 (-348)	6,434 (+4,245)	2,762 (+573)
		Above 90 dB	547	0 (-547)	0 (-547)	0 (-547)	0 (-547)	0 (-547)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P10	San Juan Island National Monument	Above 80 dB	481	566 (+85)	557 (+76)	649 (+168)	651 (+170)	649 (+168)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P13	Lake Campbell	Above 80 dB	254	182 (-72)	243 (-11)	301 (+47)	304 (+50)	301 (+47)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P15	Pioneer Park	Above 80 dB	370	443 (+73)	417 (+47)	414 (+44)	416 (+46)	414 (+44)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
P17	Reuble Farm	Above 80 dB	3,061	11,836 (+8,775)	7,401 (+4,340)	2,963 (-98)	10,358 (+7,297)	4,448 (+1,387)
		Above 90 dB	1,641	7,457 (+5,816)	4,533 (+2,892)	1,841 (+200)	6,434 (+4,793)	2,762 (+1,121)
		Above 100 dB	693	5,593 (+4,900)	3,400 (+2,707)	1,380 (+687)	4,826 (+4,133)	2,071 (+1,378)
P18	Ferry House	Above 80 dB	1,180	1,864 (+684)	1,133 (-47)	460 (-720)	1,609 (+429)	691 (-489)
		Above 90 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		Above 100 dB	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-20 Maximum Sound Exposure Level (dB) and Maximum Sound Level of 80 dB, 90 dB, and 100 dB for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)^{1,2}

ID	Description	L _{max} (dB)	Number of Annual Events				
			No Action Alternative	Alt 3 A	Alt 3 B	Alt 3 C	Alt 3 D

Notes:

- ¹ The difference between the No Action Alternative and Alternative 3 is noted in parentheses for the number of events above the specified noise.
- ² POIs that had zero events above an L_{max} of 80 dB, 90 dB, and 100 dB were omitted from the table. These included POIs R03, R09, R11, R12, R13, R17, R18, S05, S06, S07, S08, S10, P01, P05, P07, P08, P09, P11, P12, P14, and P16.

Key:

dB = decibel

L_{max} = maximum sound level

4.2.4.2.2 Speech Interference (Indoor), Alternative 3

Conversation or indoor speech is assumed to be interrupted when a single aircraft event exceeds the maximum sound level, or L_{max}, of 50 dB indoors (Sharp et al, 2009). Normal conversation is about 60 dB; therefore, the use of a 50 dB indoor level is a very conservative threshold such that a soft speaking voice could be heard. For this analysis, the model calculated the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level, or L_{max}, of 50 dB at the 20 residential POIs and the 10 schools, since they are commonly located in residential areas. Because the individual is assumed to be indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis was conducted assuming both windows-open and windows-closed conditions. Table 4.2-21 presents the average daily (7:00 a.m. to 10:00 p.m.) events per hour that exceed an L_{max} of 50 dB indoors at these POIs under Alternative 3, all scenarios.

Compared to the No Action Alternative, Alternative 3 would result in between zero and two additional events per hour at representative POIs during which conversations or indoor speech would be interrupted. The largest change (with two additional events per daytime hour) would occur at several POIs, including R01, R02, R06, R07, R08, R14, and R15 under various scenarios. However, at several POIs, no change would occur under any of the scenarios compared to the No Action Alternative.

Table 4.2-21 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)¹

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour ²											
		Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³
Residences													
R01	Sullivan Rd.	8	8	9 (+1)	9 (+1)	10 (+2)	10 (+2)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R02	Salal St. and N. Northgate Dr.	8	8	9 (+1)	9 (+1)	10 (+2)	10 (+2)	10 (+2)	10 (+2)	9 (+1)	9 (+1)	10 (+2)	10 (+2)
R03	Central Whidbey	5	-	5 (0)	- (0)	6 (+1)	- (0)	6 (+1)	- (0)	5 (0)	- (0)	6 (+1)	- (0)
R04	Pull and Be Damned Point	2	1	3 (+1)	1 (0)	3 (+1)	2 (+1)	3 (+1)	1 (0)	3 (+1)	1 (0)	3 (+1)	1 (0)
R05	Snee-Oosh Point	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R06	Admirals Dr. and Byrd Dr.	-	-	2 (+2)	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	2 (+2)	2 (+2)	1 (+1)	1 (+1)
R07	Race Lagoon	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	1 (+1)	- (0)	2 (+2)	1 (+1)	1 (+1)	- (0)
R08	Pratts Bluff	-	-	2 (+2)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	2 (+2)	1 (+1)	1 (+1)	- (0)
R09	Cox Rd and Island Ridge	-	-	1 (+1)	- (0)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R10	Skyline	-	-	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R11	Sequim	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R12	Port Angeles	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R13	Beverly Beach, Freeland	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R14	E. Sleeper Rd. and Slumber Ln.	8	7	9 (+1)	8 (+1)	9 (+1)	9 (+2)	10 (+2)	9 (+2)	9 (+1)	8 (+1)	10 (+2)	9 (+2)

Table 4.2-21 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)¹

		<i>No Action Alternative</i>		<i>Scenario A</i>		<i>Scenario B</i>		<i>Scenario C</i>		<i>Scenario D</i>		<i>Scenario E</i>	
		<i>Average Number of Events per Daytime Hour²</i>											
<i>ID</i>	<i>Description</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>	<i>Windows Open³</i>	<i>Windows Closed³</i>
R15	Long Point Manor	1	1	3 (+2)	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R16	Rocky Point Heights	2	1	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)	2 (0)	1 (0)
R17	Port Townsend	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	1	1	2 (+1)	2 (+1)	1 (0)	1 (0)	1 (0)	1 (0)	2 (+1)	2 (+1)	1 (0)	1 (0)
R20	South Lopez Island (Agate Beach)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Schools													
S01	Oak Harbor High School	6	2	6 (0)	2 (0)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	7 (+1)	3 (+1)	7 (+1)	3 (+1)
S02	Crescent Harbor Elementary	5	2	5 (0)	2 (0)	6 (+1)	2 (0)	6 (+1)	3 (+1)	6 (+1)	2 (0)	6 (+1)	3 (+1)
S03	Coupeville Elementary	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
S04	Anacortes High School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Table 4.2-21 Average Number of Events per Hour of Indoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)¹

ID	Description	No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Average Number of Events per Daytime Hour ²											
		Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³	Windows Open ³	Windows Closed ³
S09	La Conner Elementary School	1	-	1 (0)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S10	Elger Bay Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)

Notes:

- ¹ The difference between the No Action Alternative and Alternative 3 is noted in parentheses. Hyphens (-) indicate result equals zero.
- ² Number of annual average daily daytime (7:00 a.m. to 10:00 p.m.) events at or above an indoor maximum single event sound level (L_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 decibels (dB). See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as “quiet urban daytime” at 40 dB and a garbage disposal at 80 dB.
- ³ Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation and other building features that reduce the noise levels inside (FICON, 1992).

4.2.4.2.3 Classroom/learning Interference, Alternative 3

Two metrics were analyzed to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights: interior $L_{eq(8)}$ during an 8-hour school day (8:00 a.m. to 4:00 p.m.), and the average number of interfering aircraft events per hour during that time period. Single aircraft events that generate interior sound levels (L_{max}) greater than 50 dB have the potential to interfere with student and teacher interaction by affecting conversation and comprehension (Sharp et al., 2009). Because the classroom interaction occurs indoors for this analysis, noise level reduction factors were applied because the walls, doors, insulation, and other building features reduce the noise levels inside. The analysis considered both windows-open and windows-closed conditions. Table 4.2-22 presents the $L_{eq(8)}$ and the number of events that exceed an L_{max} of 50 dB indoors under Alternative 3, all scenarios, at the representative POIs that are schools (and the two residential POIs located in the vicinity of schools). It is important to note that Table 4.2-22 presents average values, and there may be periods when aircraft are operating more frequently, thereby generating more interfering events, and other periods when they are not operating at all and therefore have no potential for classroom/learning interference.

Most schools would experience interior $L_{eq(8)}$ due to Navy aircraft operations close to ambient levels of 45 dB or less, which would not impact learning and conversation. Crescent Harbor Elementary School (S02) would experience the highest $L_{eq(8)}$ (52 dB) for the No Action Alternative and the highest under Scenario C of 54 dB when windows are open. When windows are closed, the $L_{eq(8)}$ at Crescent Harbor Elementary School (S02) would drop to less than 45 dB. Given the relatively cool climate in the area, it is likely that windows at schools would be closed a majority of the time.

The potential for classroom interference from single aircraft events generating sound levels inside classrooms greater than 50 dB L_{max} would increase under Alternative 3 by up to two events per hour (at S01, S02, and S03, as well as school surrogate R03) compared to the No Action Alternative; that is, on average, no school would experience an increase of more than two learning-disrupting events per hour under any scenario under Alternative 3 compared to the No Action Alternative. The highest increase of an additional two events is shown for Oak Harbor High School (S01) under Scenarios B, C, and E with windows open. Crescent Harbor Elementary School shows an increase in classroom/learning interference by an average of an additional two events per hour (with windows open) under Scenarios B and C. Under Scenarios A and D, the Coupeville Elementary School (S03) also shows an increase in classroom/learning interference by an average of an additional two events per hour (with windows open). In addition, school surrogate Central Whidbey (R03) could expect an average increase of two additional events per hour (with windows open) under Scenarios C and E. All other schools either show no change from the No Action Alternative or an increase of one event per daytime hour during the school day, primarily under the windows-open condition. Under the windows-closed condition, nearly all of the schools would be expected to experience an increase of no more than one event per hour of classroom/learning interference, with most being unchanged from the No Action Alternative. Many modern schools have central air conditioning and heating systems; therefore, it is more likely that classroom windows would remain closed the majority of the time.

Table 4.2-22 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)¹

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
ID	Description	Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²	
		<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴	<i>L_{eq(8)}</i> ³ (dB)	Events per Hour ⁴
School Surrogates																									
R03	Central Whidbey	<45	4	<45	-	<45	5 (+1)	<45	-	<45	5 (+1)	<45	-	<45	6 (+2)	<45	-	<45	5 (+1)	<45	-	<45	6 (+2)	<45	-
R11	Sequim	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
Schools																									
S01	Oak Harbor High School	<45	5	<45	2	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)	<45	7 (+2)	<45	3 (+1)	<45	6 (+1)	<45	2 (0)	<45	7 (+2)	<45	3 (+1)
S02	Crescent Harbor Elementary	52	4	<45	2	53	5 (+1)	<45	2 (0)	53	6 (+2)	<45	2 (0)	54	6 (+2)	<45	3 (+1)	50	5 (+1)	<45	2 (0)	50	6 (+1)	<45	2 (0)
S03	Coupeville Elementary	<45	-	<45	-	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	1 (+1)	<45	-	<45	2 (+2)	<45	1 (+1)	<45	1 (+1)	<45	-
S04	Anacortes High School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S05	Lopez Island School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S06	Friday Harbor Elementary	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S07	Sir James Douglas Elementary	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S08	Fidalgo Elementary School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-
S09	La Conner Elementary School	<45	1	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-	<45	1 (0)	<45	-
S10	Elger Bay Elementary School	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-	<45	-

Table 4.2-22 Average Number of Events per Hour of Indoor Classroom/Learning Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)¹

		No Action Alternative				Scenario A				Scenario B				Scenario C				Scenario D				Scenario E			
		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²		Windows Open ²		Windows Closed ²	
ID	Description	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴	<i>L</i> _{eq(8)} ³ (dB)	Events per Hour ⁴		

Notes:

- ¹ The difference between the No Action Alternative and Alternative 3 is noted in parentheses. Hyphens (-) indicate result equals zero.
- ² Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
- ³ For this metric, daily classroom hours are assumed to be 8:00 a.m. to 4:00 p.m.
- ⁴ Number of average school-day events per hour during an 8-hour school day (8:00 a.m. to 4:00 p.m.) at or above an indoor maximum single event sound level (*L*_{max}) of 50 dB, which is a conservative threshold as normal conversation is about 60 dB. See Figure 3.2-1 for examples of sound levels (in dB) from some typical sources, such as “quiet urban daytime” at 40 dB and a garbage disposal at 80 dB.

Key:

- dB = decibel
- L*_{eq(8)} = 8-hour sound level equivalent
- L*_{max} = maximum A-weighted sound level

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

4.2.4.2.4 Sleep Disturbance, Alternative 3

The analysis of sleep disturbance is a calculation of the probability of awakening from aircraft overflights. Thus, it is based on the outdoor SEL at each of the residential POIs being converted to an indoor SEL. Events that were considered are those that occur between 10:00 p.m. and 7:00 a.m. Although individuals sleep outside of these hours, these are considered typical sleeping hours for this type of analysis. Table 4.2-23 presents the results of the sleep disturbance analysis for the 20 POI locations that are in the residential category, as well as the 10 schools, which are commonly located in residential areas.

Under Alternative 3, the majority of the POIs analyzed show an increase in the percent probability of awakening for all scenarios during nights of average aircraft activity. The highest percent increase is for R06 (Admirals Drive and Byrd Drive), where there would be an increase of 31 percent under Scenario A with windows open, meaning that there is a 31-percent greater probability or chance of awakening at least once under windows-open conditions compared to the No Action Alternative. Generally, the POIs around OLF Coupeville had a higher percent probability of awakening under Scenario A than under the other scenarios, and, for the POIs around Ault Field, there was a larger increase in the percent probability of awakening under Scenario C than under the other scenarios.

Table 4.2-23 Average Indoor Nightly¹ Probability of Awakening² 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		Scenario D		Scenario E	
		Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴
Residences													
R01	Sullivan Rd.	58%	43%	67% (+9%)	51% (+8%)	70% (+12%)	54% (+11%)	74% (+16%)	58% (+15%)	68% (+10%)	52% (+9%)	73% (+15%)	57% (+14%)
R02	Salal St. and N. Northgate Dr.	41%	29%	49% (+8%)	35% (+6%)	52% (+11%)	37% (+8%)	56% (+15%)	41% (+12%)	50% (+9%)	36% (+7%)	55% (+14%)	40% (+11%)
R03	Central Whidbey	16%	8%	19% (+3%)	10% (+2%)	21% (+5%)	11% (+3%)	23% (+7%)	12% (+4%)	20% (+5%)	11% (+3%)	23% (+7%)	12% (+4%)
R04	Pull and Be Damned Point	19%	9%	25% (+6%)	12% (+3%)	26% (+7%)	12% (+3%)	27% (+8%)	12% (+3%)	25% (+6%)	12% (+3%)	27% (+8%)	12% (+3%)
R05	Snee-Oosh Point	15%	5%	20% (+5%)	7% (+2%)	21% (+6%)	7% (+2%)	22% (+7%)	7% (+2%)	20% (+5%)	7% (+2%)	22% (+7%)	7% (+2%)
R06	Admirals Dr. and Byrd Dr.	9%	6%	40% (+31%)	28% (+22%)	27% (+18%)	18% (+12%)	12% (+3%)	8% (+2%)	36% (+27%)	25% (+19%)	17% (+8%)	11% (+5%)
R07	Race Lagoon	5%	2%	19% (+14%)	8% (+6%)	13% (+8%)	6% (+4%)	7% (+2%)	4% (+2%)	17% (+12%)	8% (+6%)	9% (+4%)	3% (+1%)
R08	Pratts Bluff	4%	2%	14% (+10%)	9% (+7%)	9% (+5%)	6% (+4%)	4% (0%)	2% (0%)	13% (+9%)	8% (+6%)	6% (+2%)	3% (+1%)
R09	Cox Rd and Island Ridge Way	3%	2%	12% (+9%)	8% (+6%)	7% (+4%)	5% (+3%)	3% (0%)	2% (0%)	10% (+7%)	7% (+5%)	4% (+1%)	3% (+1%)
R10	Skyline	5%	2%	7% (+1%)	3% (+1%)	8% (+3%)	3% (+1%)	9% (+4%)	3% (+1%)	8% (+3%)	3% (+1%)	9% (+4%)	3% (+1%)
R11	Sequim	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R12	Port Angeles	0%	0%	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)	1% (+1%)	0% (0%)
R13	Beverly Beach, Freeland	2%	0%	6% (+4%)	0% (0%)	4% (+2%)	0% (0%)	2% (0%)	0% (0%)	5% (+3%)	0% (0%)	2% (0%)	0% (0%)
R14	E. Sleeper Rd. and Slumber Ln.	37%	25%	43% (+6%)	30% (+5%)	47% (+10%)	33% (+8%)	51% (+14%)	37% (+12%)	44% (+7%)	31% (+6%)	50% (+13%)	36% (+11%)
R15	Long Point Manor	11%	4%	23% (+112%)	12% (+8%)	18% (+7%)	8% (+4%)	14% (+3%)	4% (0%)	22% (+11%)	11% (+7%)	15% (+4%)	5% (+1%)

Table 4.2-23 Average Indoor Nightly¹ Probability of Awakening² 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		Scenario D		Scenario E	
		Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴
R16	Rocky Point Heights	9%	3%	11% (+2%)	4% (+1%)	12% (+3%)	4% (+1%)	13% (+4%)	4% (+1%)	12% (+3%)	4% (+1%)	13% (+4%)	4% (+1%)
R17	Port Townsend	1%	0%	1% (0%)	0% (0%)	1% (0%)	0% (0%)	0% (-1%)	0% (0%)	1% (0%)	0% (0%)	1% (0%)	0% (0%)
R18	Marrowstone Island (Nordland)	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
R19	Island Transit Offices, Coupeville	10%	5%	32% (+22%)	21% (+16%)	23% (+13%)	14% (+9%)	12% (+2%)	6% (+1%)	30% (+20%)	18% (+13%)	16% (+6%)	8% (+3%)
R20	South Lopez Island (Agate Beach)	3%	1%	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)	3% (0%)	1% (0%)
Schools (near residential areas)⁵													
S01	Oak Harbor High School	20%	12%	25% (+5%)	14% (+2%)	27% (+7%)	16% (+4%)	29% (+9%)	18% (+6%)	26% (+6%)	15% (+3%)	29% (+9%)	17% (+5%)
S02	Crescent Harbor Elementary	21%	12%	26% (+5%)	15% (+3%)	28% (+7%)	17% (+5%)	31% (+10%)	19% (+7%)	27% (+6%)	16% (+4%)	30% (+9%)	18% (+6%)
S03	Coupeville Elementary	5%	3%	17% (+12%)	10% (+7%)	11% (+6%)	7% (+4%)	6% (+1%)	3% (0%)	15% (+10%)	9% (+6%)	7% (+2%)	4% (+1%)
S04	Anacortes High School	2%	1%	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)	3% (+1%)	1% (0%)
S05	Lopez Island School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S06	Friday Harbor Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S07	Sir James Douglas Elementary	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
S08	Fidalgo Elementary School	6%	2%	9% (+3%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)	9% (+3%)	3% (+1%)	10% (+4%)	3% (+1%)
S09	La Conner Elementary School	8%	3%	11% (+3%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)	10% (+2%)	5% (+2%)
S10	Elger Bay Elementary School	0%	0%	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)

Table 4.2-23 Average Indoor Nightly¹ Probability of Awakening² 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		Scenario D		Scenario E	
		Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴	Windows Open ⁴	Windows Closed ⁴

Notes:

- ¹ For this metric, nightly sleeping hours are assumed to be 10:00 p.m. to 7:00 a.m.
- ² This metric represents the probability of awakening at least once during a night of average aircraft noise activities.
- ³ The difference between the No Action Alternative and Alternative 3 is noted in parentheses.
- ⁴ Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
- ⁵ All school points of interest were included in the potential sleep disturbance analysis because of their typical proximity to residential areas.

4.2.4.2.5 Outdoor Speech Interference: Potential Noise Effects on Recreation and Outdoor Activities, Alternative 3

The analysis of outdoor speech interference is based on the number of events occurring per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). Details on the analysis of outdoor speech interference are available in Section 3.2, as well as Appendix A, Aircraft Noise Study. Table 4.2-24 presents the results of the analysis for Alternative 3 for all 48 of the POIs because individuals could experience outdoor speech interference when outside in their yard (residential), outside at school for recess or outdoor learning (schools,) and recreating at a park or recreational center (parks).

Under Alternative 3, the table shows a slight increase for several POIs where there would be potential for up to an average of two additional DNL daytime events per hour during which individuals may experience outdoor speech interference while outside their home or school, or recreating at a park. For many of the POIs, there is no change from the No Action Alternative. As the table indicates and as expected, when the POI is closer to OLF Coupeville, there would be more events under Scenario A, whereas if the POI is located closer to Ault Field, there would be more events under Scenario C. Section 4.5 has additional discussion on parks and recreation in the vicinity of the airfields. The data show that there is a range of potential outdoor speech interference that may disturb individuals participating in outdoor activities depending on the location of the POI in relation to the airfields and flight tracks. The average number of events is mostly consistent with those expected under the No Action Alternative conditions; however, some POIs may experience an increase in the average daily events. These increases range from zero to an increase of two events per hour, depending on the scenario.

In addition, the number of events per hour that could cause nighttime outdoor speech interference, which would give an estimation of how much an individual tent-camping or sleeping outdoors may be disturbed during the night, was also analyzed. This number ranges from an increase of zero to one event per hour, and it is dependent on the location of the POI and the scenario.

Table 4.2-24 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)¹

ID Description		No Action Alternative		Alternative 3									
				Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	NA50 <i>L_{max}</i> ⁽²⁾	
Parks													
P01	Joseph Whidbey State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)
P02	Deception Pass State Park	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)
P03	Dugualla State Park	7	2	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
P04	Ebey's Landing – Rhododendron Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
P05	Ebey's Landing – Ebey's Prairie	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	3 (+1)	1 (+1)	4 (+2)	1 (+1)	3 (+1)	1 (+1)
P06	Fort Casey State Park	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	2 (+1)	- (0)
P07	Cama Beach State Park	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	5 (+2)	1 (+1)	4 (+1)	1 (+1)
P08	Port Townsend	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
P09	Moran State Park	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P10	San Juan Island National Monument	7	1	8 (+1)	2 (+1)	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	2 (+1)
P11	San Juan Island Visitors Center	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
P12	Cap Sante Park	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
P13	Lake Campbell	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)

Table 4.2-24 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)¹

ID Description		Alternative 3											
		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
		NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	
		L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	
P14	Spencer Spit State Park	-	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
P15	Pioneer Park	4	1	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	
P16	Marrowstone Island (Fort Flagler)	-	-	1 (+1)	1 (+1)	1 (+1)	- (0)	- (0)	- (0)	1 (+1)	1 (+1)	1 (+1)	
P17	Reuble Farm	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	
P18	Ferry House	2	-	4 (+2)	1 (+1)	3 (+1)	1 (+1)	2 (0)	- (0)	4 (+2)	1 (+1)	3 (+1)	
Residences													
R01	Sullivan Road	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	
R02	Salal Street and N. Northgate Drive	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	
R03	Central Whidbey	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	
R04	Pull and Be Damned Point	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	
R05	Snee-Oosh Point	7	1	8 (+1)	2 (+1)	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	9 (+2)	
R06	Admirals Drive and Byrd Drive	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	
R07	Race Lagoon	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	
R08	Pratts Bluff	1	-	3 (+2)	1 (+1)	2 (+1)	1 (+1)	1 (0)	- (0)	3 (+2)	1 (+1)	2 (+1)	

Table 4.2-24 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)¹

ID Description		Alternative 3											
		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
		NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50	NA50
		L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾	L_{max}⁽²⁾
R09	Cox Road and Island Ridge Way	1	-	2 (+1)	1 (+1)	1 (0)	1 (+1)	1 (0)	- (0)	2 (+1)	1 (+1)	1 (0)	- (0)
R10	Skyline	4	1	4 (0)	1 (0)	4 (0)	1 (0)	5 (+1)	1 (0)	4 (0)	1 (0)	4 (0)	1 (0)
R11	Sequim	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)
R12	Port Angeles	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
R13	Beverly Beach, Freeland	-	-	1 (+1)	- (0)	- (0)	- (0)	- (0)	- (0)	1 (+1)	- (0)	- (0)	- (0)
R14	E. Sleeper Road and Slumber Lane	8	2	9 (+1)	2 (0)	10 (+2)	2 (0)	10 (+2)	3 (+1)	10 (+2)	2 (0)	10 (+2)	2 (0)
R15	Long Point Manor	7	1	9 (+2)	2 (+1)	9 (+2)	2 (+1)	8 (+1)	2 (+1)	8 (+1)	2 (+1)	8 (+1)	2 (+1)
R16	Rocky Point Heights	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	2 (+1)	5 (+1)	1 (0)	5 (+1)	2 (+1)
R17	Port Townsend	1	-	1 (0)	1 (+1)	1 (0)	- (0)	- (-1)	- (0)	1 (0)	1 (+1)	1 (0)	- (0)
R18	Marrowstone Island (Nordland)	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
R19	Island Transit Offices, Coupeville	3	1	5 (+2)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)	4 (+1)	1 (0)	3 (0)	1 (0)
R20	South Lopez Island (Agate Beach)	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
Schools													
S01	Oak Harbor High School	8	2	9 (+1)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)	9 (+1)	2 (0)	10 (+2)	2 (0)

Table 4.2-24 Average Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest in the Vicinity of the NAS Whidbey Island Complex, Alternative 3 (Average Year)¹

ID	Description	Alternative 3											
		No Action Alternative		Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
		Annual Average Outdoor Daily Events per Hour											
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	NA50 L _{max} ⁽²⁾	
S02	Crescent Harbor Elementary School	7	2	8 (+1)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)	9 (+2)	2 (0)
S03	Coupeville Elementary School	3	-	5 (+2)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)	4 (+1)	1 (+1)	3 (0)	1 (+1)
S04	Anacortes High School	1	-	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)	1 (0)	- (0)
S05	Lopez Island School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S06	Friday Harbor Elementary School	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S07	Sir James Douglas Elementary	-	-	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
S08	Fidalgo Elementary School	4	1	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)	5 (+1)	1 (0)
S09	La Conner Elementary School	3	1	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)	4 (+1)	1 (0)
S10	Elger Bay Elementary School	-	-	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)	1 (+1)	- (0)

Notes:

¹ The difference between the No Action Alternative and Alternative 3 is noted in parentheses. A hyphen (-) indicates the result equals zero.

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

Key:

dB = decibel

L_{max} = maximum A-weighted sound level

NA50 = Number of Events above an L_{max} of 50 dB

4.2.4.2.6 Potential Hearing Loss, Alternative 3

The underlying analytical methodology and metric for hearing loss are explained in Section 4.2.2.2.6. Table 4.2-25 presents the potentially affected populations in and near Ault Field and OLF Coupeville under Alternative 3, by 1 dB increments of the $L_{eq(24)}$, as compared to the No Action Alternative numbers presented in Section 3.2.

According to the USEPA, changes in hearing level of less than 5 dB are generally not considered noticeable (USEPA, 1974).

Therefore, using the data provided in Table 4.2-25, for the population with average sensitivity to noise, the level at which there may be a noticeable NIPTS would be at the 84 to

85 dB $L_{eq(24)}$ range and above. There is an increase in the population within the 80 dB DNL noise contour (i.e., potential at-risk population) under Alternative 3 at both Ault Field and OLF Coupeville. The largest increase in the potential at-risk population in the vicinity of Ault Field would be under Scenario C (47 additional people) and for OLF Coupeville would be under Scenario A (28 additional people). The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville. The potential NIPTS values presented in Table 4.2-25 are only applicable in the extreme case of continuous outdoor exposure at one's residence to all aircraft events occurring over a period of 40 years. Because it is highly unlikely for any individuals to meet all those criteria, the actual potential NIPTS for individuals would be far less than the values reported here.

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). This noise-sensitive population could be considered the young, the elderly, or those predisposed to hearing sensitivity for other reasons. Therefore, to capture this, the USEPA guidelines provided information on the estimated NIPTS exceeded by the 10 percent of the population most sensitive to noise. Using the same 1 dB incremental data in Table 4.2-25 and the column identified as the 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 12.0 dB for the population most sensitive to noise around OLF Coupeville. As noted previously, it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period; therefore, the actual potential NIPTS for individuals would be far less than the values reported here.

Table 4.2-25 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 3 at NAS Whidbey Island Complex (Average Year)

Band of Leq(24) (dB) ¹	Avg NIPTS (dB) ^{2,3}	10 th Pct NIPTS (dB) ²	Estimated Population ^{4,5,6}											
			Ault Field						OLF Coupeville					
			No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E
75-76	1.0	4.0	0	0 (0)	0 (0)	6 (+6)	0 (0)	3 (+3)	31	143 (+112)	74 (+43)	35 (+4)	116 (+85)	46 (+15)
76-77	1.0	4.5	123	126 (+3)	308 ⁷ (+185)	406 ⁸ (+283)	140 (+17)	371 ⁹ (+248)	45	164 (+119)	90 (+45)	59 (+14)	159 (+114)	63 (+18)
77-78	1.5	5.0	233	259 (+26)	337 (+104)	398 (+165)	307 (+74)	352 (+119)	47	126 (+79)	75 (+28)	87 (+40)	100 (+53)	56 (+9)
78-79	2.0	5.5	145	147 (+2)	241 (+96)	296 (+151)	173 (+28)	295 (+150)	24	92 (+68)	65 (+41)	4 (-20)	78 (+45)	61 (+37)
79-80	2.5	6.0	92	134 (+42)	162 (+70)	239 (+147)	141 (+49)	209 (+117)	7	75 (+68)	58 (+51)	0 (0)	70 (+63)	75 (+68)
80-81	3.0	7.0	73	78 (+5)	97 (+24)	129 (+56)	84 (+11)	118 (+45)	0	66 (+66)	59 (+59)	0 (0)	62 (+62)	3 (+3)
81-82	3.5	8.0	51	62 (+11)	72 (+21)	79 (+28)	67 (+16)	76 (+25)	0	58 (+58)	83 (+83)	0 (0)	55 (+55)	0 (0)
82-83	4.0	9.0	37	48 (+11)	58 (+21)	63 (+26)	48 (+11)	60 (+23)	0	58 (+58)	4 (+4)	0 (0)	64 (+64)	0 (0)
83-84	4.5	10.0	34	35 (+1)	37 (+3)	38 (+4)	35 (+1)	37 (+3)	0	69 (+69)	0 (0)	0 (0)	55 (+55)	0 (0)
84-85	5.5	11.0	11	27 (+16)	26 (+15)	29 (+18)	29 (+18)	28 (+17)	0	27 (+27)	0 (0)	0 (0)	1 (+1)	0 (0)
85-86	6.0	12.0	9	9 (0)	22 (+13)	26 (+17)	10 (+1)	24 (+15)	0	1 (+1)	0 (0)	0 (0)	0 (0)	0 (0)
86-87	7.0	13.5	6	9 (+3)	9 (+3)	10 (+4)	9 (+3)	10 (+4)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
87-88	7.5	15.0	4	6 (+2)	7 (+3)	7 (+3)	6 (+2)	7 (+3)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
88-89	8.5	16.5	2	4 (+2)	4 (+2)	5 (+3)	4 (+2)	4 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
89-90	9.5	18.0	0	1 (+1)	2 (+2)	2 (+2)	1 (+1)	2 (+2)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 4.2-25 Average and 10th Percentile Noise Induced Permanent Threshold Shifts as a Function of Equivalent Sound Level under Alternative 3 at NAS Whidbey Island Complex (Average Year)

Band of Leq(24) (dB) ¹	Avg NIPTS (dB) ^{2,3}	10 th Pct NIPTS (dB) ²	Estimated Population ^{4,5,6}												
			Ault Field						OLF Coupeville						
			No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	
90-91	10.5	19.5	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Notes:

- ¹ Leq bands with no population were omitted from table.
- ² NIPTS values rounded to nearest 0.5 dB.
- ³ NIPTS below 5 dB are generally not considered noticeable.
- ⁴ This analysis assumes the population is outdoors at one’s residence and exposed to all aircraft noise events for 40 years. Given the amount of time spent indoors and the intermittent occurrence of aircraft noise events, it is highly unlikely that individuals would meet all those criteria, and the actual potential for hearing loss would be far less than the values reported here.
- ⁵ Estimated Population was determined by those living within the 80 dB DNL noise contour around each airfield, including those living on-base at Ault Field (there is no on-base population at OLF Coupeville).
- ⁶ Population counts of people within the DNL contours were computed using 2010 census block-level data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range (e.g., if 25 percent of the census block is within a DNL contour, then 25 percent of the population is included in the population count). This calculation assumes an even distribution of the population across the census block. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). In addition, per guidance on potential hearing loss, on-base populations at Ault Field have been included in the analysis. These data should be used for comparative purposes only and are not considered actual numbers within the DNL contour range.
- ⁷ Of this estimated population, 23 are a military service member living on base at Ault Field.
- ⁸ Of this estimated population, 68 are military personnel living on base at Ault Field.
- ⁹ Of this estimated population, 23 are military personnel living on base at Ault Field.

Key:

- dB = decibel
- Leq(24) = 24-hour Equivalent Sound Level
- NIPTS = Noise Induced Permanent Threshold Shift

4.2.4.3 Nonauditory Health Effects, Alternative 3

Per studies noted and evaluated in Section 3.2.3, the data and research are inconclusive with respect to the linkage between potential nonauditory health effects of aircraft noise exposure. As outlined within the analysis of DNL contours and supplemental metrics presented within this section, the data show that the Proposed Action would result in both an increase in the number of people exposed to noise as well as those individuals exposed to higher levels of noise. However, research conducted to date has not made a definitive connection between intermittent military aircraft noise and nonauditory health effects. The results of most cited studies are inconclusive and cannot identify a causal link between aircraft noise exposure and the various types of nonauditory health effects that were studied. An individual's health is greatly influenced by many factors known to cause health issues, such as hereditary factors, medical history, and life style choices regarding smoking, diet, and exercise. Research has demonstrated that these factors have a larger and more direct effect on a person's health than aircraft noise.

Based upon public comments received on the Draft EIS, the Navy has expanded its nonauditory health effects literature review, using journals and published articles referred to by the Washington State Department of Health, the USEPA, and public comment submittals. Additional topics discussed included, but were not limited to, hypertension and cardiovascular health, lack of sleep, stress, and anxiety, and details can be found in Appendix A1 of the Aircraft Noise Study (Appendix A).

4.2.4.4 Vibration Effects from Aircraft Operations, Alternative 3

In addition to the noise effects on the population outlined above, noticeable structural vibration may result from certain aircraft operations at either Ault Field or OLF Coupeville. Depending on the aircraft operation, altitude, heading, power settings, and the structure, certain vibration effects may be observed. Typically, the structural elements that are most susceptible to vibration from aircraft noise are windows and sometimes walls or ceilings. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (CHABA, 1977). Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. See Appendix A, Aircraft Noise Study, and the Noise and Vibration Associated with Operational Impacts discussion in Section 4.6.2.1 for additional details on noise-induced vibration effects.

The data show that the Proposed Action would result in both an increase in the number of aircraft operations and area/structures exposed to noise. Therefore, there could be an increase in vibration effects due to the Proposed Action. However, as shown in Table 4.2-3, for the representative POIs analyzed, the highest L_{max} value was 117 dB, and, therefore, sound levels damaging to structural components of buildings are not likely to occur.

4.2.4.5 Noise Conclusion, Alternative 3

Overall, Alternative 3 would have significant noise impacts in the communities surrounding Ault Field and OLF Coupeville. Both the total number of acres and the total number of individuals within the DNL noise contours would increase for all scenarios analyzed at Ault Field, and the total number of individuals within the DNL noise contours would increase for all scenarios analyzed at OLF Coupeville. There would be a larger impact to the communities around Ault Field under Scenario C, while there would be a larger impact for the communities around OLF Coupeville under Scenario A.

There would be a slight increase in the number of incidents of indoor and outdoor speech interference, and classroom interference. There would also be a higher probability of awakening under all scenarios, especially at POIs located closer to the airfields. In addition, depending on the scenario, the population potentially at risk for PHL would increase. The range of potential NIPTS could be up to 9.5 dB at Ault Field and 6.0 dB at OLF Coupeville for the population with average noise sensitivity and up to 18.0 dB at Ault Field and 12.0 dB at OLF Coupeville for the population highly sensitive to noise (the 10 percent of the population with the most sensitive hearing). As it is highly unlikely that any individuals would meet all the criteria of being outdoors at one's residence and exposed to all aircraft events over a 40-year period, the actual potential NIPTS for individuals would be far less than the values reported here.

4.2.5 Noise Impact Comparison, Alternatives 1 through 3

This summary provides a comparison of the three alternatives discussed in the preceding sections using the noise metrics provided within the discussion.

4.2.5.1 Noise Impact Comparison, Alternatives 1 through 3, Acreage and Population

The most appropriate means of differentiating between the impacts caused by the different alternatives and scenarios is by comparing the total estimated population within the DNL noise contours between the alternatives and scenarios. The alternative/scenario noise contour that covers the largest land area would also have the highest estimated population within that noise contour. For example, under Alternative 1, the most acreage within the noise contour at Ault Field is under Alternative 1, Scenario C, which also corresponds to the highest estimated population. However, when looking at the total NAS Whidbey Island complex, the alternative/scenario with the highest land area within its noise contour does not always correspond to the same alternative/scenario for the highest population. Therefore, the estimated population numbers presented below are discussed both in terms of the total NAS Whidbey Island complex and each individual airfield.

The DNL noise contour that covered the highest estimated population for the NAS Whidbey Island complex was Alternative 1, Scenario E, with a total of 13,050 (an increase of 1,879). However, the range of population potentially within the 65 dB DNL noise contour did not vary drastically between alternatives. The lowest estimated population was under Alternative 3, Scenario A, with a total of 12,483 (an addition of 1,312 people and an approximately 4.5-percent difference from the high range). Comparing the five scenarios under each alternative, Scenario A always resulted in the highest estimated population within the 65 dB DNL noise contour associated with OLF Coupeville, while the highest estimated population associated with Ault Field was always in Scenario C. This would be expected and is consistent with the proportion of FCLPs assigned to those airfields under the five scenarios.

In addition, the estimated population within the greater than 75 dB DNL noise contour increases under every scenario of each alternative at both Ault Field and OLF Coupeville. Around Ault Field, this ranges from a high of 598 more people under Alternative 1, Scenario C, to a low of 107 more people under Alternative 3, Scenario A. For OLF Coupeville, specific to the greater than 75 dB DNL noise contour, the largest increase in the number of people would be 1,374 under Alternative 1, Scenario A, to a low of 59 more people under Alternative 2, Scenario C. Table 4.2-26 shows a DNL noise comparison, by alternative and scenario, of the overall increase in the number of people within the 65 dB DNL noise contour.

Table 4.2-26 DNL Noise Contour Comparison - Overall Increase in the Number of People within the 65 dB DNL Noise Contour

	<i>Ault Field</i>	<i>OLF Coupeville</i>	<i>NAS Whidbey Island</i>
No Action Alternative	8,941 people	2,230 people	11,171 people
Alternative 1			
Alternative 1 – Scenario A	Additional 169 people (+1.9%)	Additional 1,236 people (+55.4%)	Additional 1,405 people (+12.6%)
Alternative 1 – Scenario B	Additional 914 people (+10.2%)	Additional 904 people (+40.5%)	Additional 1,818 people (+16.6%)
Alternative 1 – Scenario C	Additional 1,312 people (+14.7%)	Additional 538 people (+24.1%)	Additional 1,850 people (+16.5%)
Alternative 1 – Scenario D	Additional 621 people (+7.0%)	Additional 1,143 people (+51.3%)	Additional 1,764 people (+16.2%)
Alternative 1 – Scenario E	Additional 1,178 people (+13.2%)	Additional 701 people (+31.4%)	Additional 1,879 people (+17.3%)
Alternative 2			
Alternative 2 – Scenario A	Additional 133 people (+1.5%)	Additional 1,179 people (+52.9%)	Additional 1,316 people (+11.8%)
Alternative 2 – Scenario B	Additional 823 people (+9.2%)	Additional 865 people (+38.8%)	Additional 1,705 people (+15.3%)
Alternative 2 – Scenario C	Additional 1,128 people (+12.6%)	Additional 489 people (+21.9%)	Additional 1,643 people (+14.7%)
Alternative 2 – Scenario D	Additional 546 people (+6.1%)	Additional 1,089 people (+48.8%)	Additional 1,646 people (+14.7%)
Alternative 2 – Scenario E	Additional 1,016 people (+11.4%)	Additional 681 people (+30.5%)	Additional 1,718 people (+15.4%)
Alternative 3			
Alternative 3 – Scenario A	Additional 109 people (+1.2%)	Additional 1,203 people (+53.9%)	Additional 1,312 people (+11.7%)
Alternative 3 – Scenario B	Additional 821 people (+9.2%)	Additional 888 people (+39.8%)	Additional 1,709 people (+15.3%)
Alternative 3 – Scenario C	Additional 1,136 people (+12.7%)	Additional 517 people (+23.2%)	Additional 1,653 people (+14.8%)
Alternative 3 – Scenario D	Additional 533 people (+6.0%)	Additional 1,113 people (+49.9%)	Additional 1,646 people (+14.7%)
Alternative 3 – Scenario E	Additional 1,019 people (+11.4%)	Additional 694 people (+31.1%)	Additional 1,713 people (+15.3%)

Key:

NAS = Naval Air Station

OLF = Outlying Landing Field

4.2.5.2 Noise Impact Comparison, Alternatives 1 through 3, Supplemental Metrics

The supplemental metric analyses for the three alternatives are associated with the 48 POIs that were identified as part of this project (the 30 original POIs presented in the Draft EIS as well as the 18 additional POIs added for the Final EIS). Their individual locations cover a wide geographic area in many directions from the two airfields. Therefore, the results are more dependent on the location/distance of the POI with respect to Ault Field or OLF Coupeville than the specific alternative. However, as discussed within the context of each metric, the noise effects on those POIs that are closer to Ault Field are generally higher (i.e., more events) under Scenario C, while the noise effects on those POIs that are closer to OLF Coupeville are generally higher under Scenario A. Similar to the conclusions reached with respect to acreage and population, this would be expected and is consistent with the proportion of FCLPs assigned to those airfields under the five scenarios.

With respect to the evaluation of PHL, the 80 dB DNL contour around Ault Field would include a higher at-risk population under the Proposed Action than under the No Action Alternative, which may increase their vulnerability to experience a greater than or equal to 5 dB potential threshold shift in their hearing under all alternatives and scenarios. The largest increases in population potentially vulnerable around Ault Field would occur under Scenario C, which corresponds to 80 percent of the FCLPs being conducted at Ault Field.

At OLF Coupeville, the analysis also showed a higher population in the 80 dB DNL contour than under the No Action Alternative, which may increase their vulnerability to experience a greater than or equal to 5 dB potential threshold shift in their hearing under most alternatives and scenarios. The largest increases in population potentially vulnerable around OLF Coupeville would occur under Scenario A, which corresponds to 80 percent of the FCLPs being conducted at OLF Coupeville.

4.2.5.3 Noise Conclusion, Alternatives 1 through 3

The Proposed Action and alternatives would have a significant impact on the noise environment as it relates to aircraft operations at Ault Field and OLF Coupeville. The number of persons exposed to noise levels 65 dB and above would increase under all alternatives and scenarios. In addition, the population that may be vulnerable to PHL would increase under all alternatives and scenarios, with the largest population increases under Scenario C for each of the alternatives, as this scenario assigns 80 percent of the FCLP to Ault Field where there is a higher surrounding residential population density. However, the analysis used to assess the population that may be vulnerable to PHL is based upon an extremely conservative set of parameters, including being outdoors at one's residence and exposed to all aircraft events over a 40-year period. Therefore, since it is highly unlikely that an individual would meet those criteria, the actual potential NIPTS for individuals would be far less than the values reported, and hearing loss is not expected.

4.2.6 Noise Mitigation

The section below outlines several elements that the Navy either has implemented, is planning to implement, or is considering for future implementation as part of its expansive noise abatement and noise mitigation program. In addition, a technical appendix has been added to the EIS providing an expanded discussion of this topic; see Appendix H, Noise Mitigation.

4.2.6.1 Fifteen Action Alternatives

In addition to the force-structure alternatives, the Navy analyzed five sub-alternatives (Scenarios A through E) to provide a total of 15 action alternatives. The Secretary of the Navy will be able to select a final alternative/scenario combination from the range of 15 analyzed in this EIS. From a purely operational perspective, the Navy would prefer to use OLF Coupeville for all FCLPs because it more closely replicates the pattern and conditions at sea, and therefore provides superior training. In response to public comments regarding noise at OLF Coupeville, the Navy analyzed whether different operational scenarios would mitigate noise at OLF Coupeville. Therefore, in the Draft EIS as well as the Final EIS, the Navy considered conducting just 20 percent of FCLPs at the OLF and 80 percent at Ault Field; however, the Navy also recognizes this sub-alternative has the consequence of increasing operations, and therefore noise impacts, at Ault Field, which is more densely populated than Coupeville. Between the Draft EIS and the Final EIS, two additional scenarios were included in the noise model and overall analysis, including a scenario combination dividing the FCLPs between Ault Field and OLF Coupeville in a 30-percent/70-percent split in both directions (newly analyzed Scenarios D and E).

4.2.6.2 Noise-reduction Measures

The Navy is also considering other noise-reduction measures, such as construction and operation of a noise-suppression facility for engine maintenance (also known as a “hush house”) at NAS Whidbey Island and actively researching engine design solutions to reduce overall sound emissions from the engines of the FA-18E/F “Super Hornet” and Growler as well as other measures that may reduce the number of FCLPs required in the future. These measures include the following:

- **Chevrons.** Chevrons are specially designed shapes added to the end of a jet engine exhaust nozzle for sound reduction. Testing confirmed that chevron technology has some positive effect on noise output; however, it also demonstrated that redesign and additional testing are necessary to fully assess any noise-reduction benefits and potential drawbacks of chevrons. Therefore, while the Navy continues to pursue research and testing of chevrons, their potential as a noise-mitigation measure remains uncertain. The Navy is continuing to explore different technologies to reduce noise impacts from aircraft.
- **Precision Landing Mode.** Also known as MAGIC CARPET (for Maritime Augmented Guidance with Integrated Controls for Carrier Approach and Recovery Precision Enabling Technologies), Precision Landing Mode (PLM) is a flight control system that automates some controls to assist pilots with landing on aircraft carriers, making flight deck operations aboard the carrier safer and more efficient. In addition, the technology potentially reduces the workload and training required for pilots to develop and maintain proficiency for shipboard landings. This technology could eventually result in a decrease of future training requirements, resulting in fewer FCLPs at locations such as the NAS Whidbey Island complex. While this system's impact on future training has not been fully realized, it has the potential to significantly reduce training requirements for FCLP. Initial capabilities of PLM completed its first shore-based flight on the Super Hornet and the Growler on February 6, 2015. It has already been successfully demonstrated on the F-35C Joint Strike Fighter during operational testing. PLM introduction into the Fleet began in late 2017, and a more robust version offering full capabilities is expected to be complete in the 2020 timeframe.

The Navy is moving forward with an aggressive schedule to incorporate this technology into the Fleet, and the Navy expects that this will reduce FCLP training requirements in the next several years.

To that end, it is anticipated that by the time the Proposed Action is fully implemented at NAS Whidbey Island, the full capability PLM technology will be rolled out into the various operating squadrons. Therefore, as a change from the Draft EIS to the Final EIS, this assumption has been applied to the noise analysis for not only the No Action Alternative (CY 21) but also for all of the proposed alternative/scenario combinations. The introduction of PLM technology will reduce the number of required FCLPs by 20 percent, which leads to a reduction in the total number of FCLP operations. PLM technology is not specific to this Proposed Action and will be implemented regardless of which alternative/scenario is chosen for the Proposed Action at NAS Whidbey Island.

- **Hush House.** Specifically related to a potential noise suppression facility/hush house, the noise study analyzed the proposed hush house operations (656 annual events under the average year conditions) and demonstrated the effect the hush house would have on noise from high-power run-ups by the Growler, in terms of single events (L_{max}) and DNL (see Appendix A, Aircraft Noise Study [Section 9.0, Effect of Proposed Hush House]).

From a single-event perspective, the noise study compared the L_{max} contours of 60 to 90 A-weighted sound level (dBA), in 10-dB increments, for the Growler at minimum afterburner (AB) power at the current (unsuppressed) outdoor high-power location/orientation and at a potential hush house location/orientation (suppressed). The unsuppressed run-ups' 60 dB L_{max} contour extends as far as 3.3 miles from the NAS Whidbey Island boundary (primarily to the east), whereas the hush house's 60 dB L_{max} contour is wholly within the installation boundary. The L_{max} contour results from the noise generated while the aircraft engine is at AB power, typically 3 minutes per maintenance event. The average year analysis includes 665 annual events, meaning the average time spent at AB power during Growler maintenance run-ups would be approximately 5 minutes per day. For the average annual noise environment, using the DNL metric, the results showed that the hush house's effect would mostly be on station with the 85 dB DNL contour, and there would be between a 0.2 dB and 0.3 dB reduction estimated to occur off station south of West Sleeper Road. This small change is primarily due to the engine maintenance activities not being a major contributor to the overall noise environment.

Beyond those mentioned above, the Navy has other policies, programs, and procedures to assist in mitigating the potential existing and future noise impacts from aircraft activities.

4.2.6.3 Noise Abatement Policy

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

The Navy must follow governing FAA rules and regulations when flying. Arrival and departure corridors into and out of NAS Whidbey Island have been developed in conjunction with the FAA over decades with

an emphasis on flying over water and to avoid more densely populated areas. Additionally, these corridors are designed to deconflict military, commercial, and general aviation routes.

NAS Whidbey Island has noise-abatement procedures for assigned and transient aircraft to minimize aircraft noise. Airfield procedures used to minimize/abate noise for operations conducted at the NAS Whidbey Island airfields include restricting maintenance run-up hours, runway optimization, and other procedures as provided in NASWHIDBEYINST 3710.1AA as noted below. Additionally, aircrews are directed, to the maximum extent practicable, to employ prudent airmanship techniques to reduce aircraft noise impacts and to avoid sensitive areas except when operational safety dictates otherwise.

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

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

- Aircrews shall, to the maximum extent possible, employ prudent airmanship techniques to reduce aircraft noise impacts and to avoid noise-sensitive areas except when being vectored by radar ATC or specifically directed by the control tower.
- Sunday Operations: From 7:30 a.m. to noon local on Sundays, noise-abatement procedures require arrivals, except scheduled FCLP/CCA aircraft, VR-61 drilling reservists, and VP-69 drilling reservists, to make full-stop landings.
- High-power turn-ups should not be conducted prior to noon on Sundays or between the hours of 10:00 p.m. to 7:30 a.m. for jets and midnight to 7:30 a.m. for turboprops. For specific operational necessity requirements, defined as preparation for missions other than routine local training and functional check flights terminating at NAS Whidbey Island, high-power turn-ups may be authorized outside these established hours.
- Wind component and traffic permitting, morning departures prior to 8:00 a.m. shall use Runway 25, and evening arrivals after 10:00 p.m. shall use Runway 7 to maximize flight over open water.
- Make smooth power changes. Large, abrupt changes in power result in large, abrupt changes in sound level on the ground.
- The maximum number of aircraft in the FCLP flight pattern is five. This is so the FCLP pattern stays within the 5-mile radius of the class "Charlie" airspace, aircraft do not get extended creating additional noise impacts, and allowances may be made for non-FCLP aircraft to operate concurrently.
- Avoiding noise-sensitive areas by flying at altitudes of no less than 3,000 feet AGL except when in compliance with an approved traffic or approach pattern, military training route, or within Special Use Airspace.

NAS Whidbey Island has historically worked with elected officials from surrounding communities to best minimize impacts where practicable, including not flying at the OLF on weekends and minimizing flight

activity during major school testing dates and major community events. The Navy will continue to minimize impacts as much as practicable.

4.2.6.4 Noise Complaint Process

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

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

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

NAS Whidbey Island has an active public relations process to inform members of the public of upcoming FCLPs so that individuals have the ability to plan their personal activities. Information on FCLP schedules is shared every week with the media in the Puget Sound region and is posted on the command's Facebook and webpage sites every week. Members of the public also have the option to obtain these releases directly by signing up for them on the command's webpage news section. The command uses the same process to tell the public about other events that may increase noise, or have more impacts on specific areas for short periods of time.

4.2.6.5 Air Installations Compatible Use Zones Program

The Navy also has an active AICUZ program at NAS Whidbey Island that informs the public about its aircraft noise environment and recommends specific actions for the local jurisdictions with planning and zoning authority that can enhance the health, safety, and welfare of those living near Ault Field and OLF Coupeville (see Section 3.5.2.2). The current version of the AICUZ plan for NAS Whidbey Island was published in 2005. The Navy's official land use recommendations will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish land use controls and to adopt zoning restrictions taking into account a wide range of land-use factors, including the Navy's recommendations (see Sections 4.3.2.3 and 4.5.2.1 for more details on the AICUZ study and land use compatibility)

4.3 Public Health and Safety

This section addresses potential impacts to safety at Ault Field and OLF Coupeville as it relates to flight safety, Bird/Animal Aircraft Strike Hazard (BASH), Accident Potential Zones (APZs), and safety risks to children.

4.3.1 Public Health and Safety, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to safety related to flight safety, BASH, changes to APZs/Clear Zones at Ault Field or OLF Coupeville (see Figures 3.3-2 and 3.3-3), or environmental health and safety risks to children. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

4.3.2 Public Health and Safety Potential Impacts, Alternatives 1 through 3

4.3.2.1 Flight Safety

There is no generally recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce potential for a mishap through a number of measures. These include, but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace. When these measures are implemented, risks are minimized, even though they can never be eliminated. To complement airspace management measures, all Navy pilots use state-of-the-art simulators. Simulator training includes flight operations and comprehensive emergency procedures, which minimizes risk associated with pilot error. Additionally, highly trained maintenance crews perform inspections on each aircraft in accordance with Navy regulations, and maintenance activities are monitored to ensure that aircraft are equipped to withstand the rigors of operational and training events safely. Analysis of flight risks correlates Class A mishap rates and BASH with projected airfield utilization. The Proposed Action would add 35 or 36 Growler aircraft and increase overall airfield flight operations at the NAS Whidbey Island complex, thereby increasing the risk of a mishap. However, current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and airfield flight operations would adhere to established safety procedures. While it is generally difficult to project future safety/mishap rates for any aircraft, the Growler has a well-documented and established safety record as a reliable aircraft, as was outlined in Section 3.3.2.1.

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.

Potential aircraft mishaps are the primary safety concern with regard to military training flights. NAS Whidbey Island maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to mishaps, whether on or off the installation. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoD Instruction [DoDI] 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*) (DoD, 2011).

4.3.2.2 Bird/Animal Aircraft Strike Hazard

No aspect of the alternatives would create attractants with the potential to increase the concentration of birds in the vicinity of the airfields. While there is an increase in air operations proposed under each of the alternatives, there is no proposed change planned to existing flight procedures for Ault Field or OLF Coupeville. With an increase in operations, the potential for BASH increases slightly; however, the risk is managed through continued application of BASH measures, and the risk of BASH would be expected to remain similar to existing levels (see Sections 3.3.1.2, 3.3.2.1.1, and 3.3.2.2 for more details on BASH measures and risks under the affected environment, and see Section 4.8.2.1.3.2 for additional details on potential impacts to birds from aircraft operations).

4.3.2.3 Clear Zones and Accident Potential Zones

Much like civilian airports, Clear Zones are always established at the ends of active runways at military airfields and were generated at Ault Field and OLF Coupeville. APZs are created based on projected operations for approach, departure, and flight tracks. APZs are based on historical accident and operations data throughout the military and the specific areas (which have been determined to be potential impact areas) if an accident were to occur. Ault Field has had established APZs since 1986, and the APZs were re-confirmed during the 2005 AICUZ Update process. The runways associated with Ault Field have both Clear Zones and APZs that follow predominant flight tracks at the airfield. It is not expected that these APZs would change regardless of alternative selected under this Proposed Action; however, this would be confirmed through the Navy's subsequent AICUZ Update process (see Figure 3.3-2 for 2005 AICUZ Clear Zones and APZs at Ault Field).

OLF Coupeville also had APZs recommended as part of the 1986 AICUZ that reflected the FCLP patterns of the time; however, the recommended APZs were never adopted by the local municipality. During the 2005 AICUZ process, it was determined that additional APZ coverage was not warranted at that time because operational numbers were below the threshold (approximately 5,000 operations per approach or departure flight track) for the establishment of APZs at that location. Therefore, only Clear Zones are currently present at OLF Coupeville runways. Based on proposed airfield operations under the three alternatives, APZs could be warranted at OLF Coupeville (see Table 4.3-1) under some operational scenarios. APZ development would depend on the alternative selected, and the APZs could resemble the conceptual APZ depicted in Figure 4.3-1, based on operational numbers as described above. They would follow a standard FCLP pattern (typically, APZ-II is extended to connect along the entire FCLP pattern). The conceptual APZs depicted on the figure below (Figure 4.3-1) were developed to support the analysis in this document. New APZs specific to OLF Coupeville would be recommended through the AICUZ study process and would depend on the alternative selected.

Conceptual APZs are presented for the purpose of analyzing potential land use impacts of the Proposed Action. At this time, no decision has been made with regard to additional APZs. At the conclusion of this EIS, a Record of Decision (ROD) will be issued. At which time, the Navy will prepare an AICUZ Update and share official recommendations with the community.

As part of this analysis, the flight operations for each alternative were combined where they generally utilized the same arrival, departure, or pattern flight tracks to determine whether the 5,000 operations threshold was met, thereby identifying where potential new APZs would be needed. Table 4.3-1 shows the results of this evaluation and where the threshold for new APZs would be met at OLF Coupeville. The No Action Alternative is included and it would not meet the threshold for additional APZs. However, under most alternative scenarios (particularly Scenario A [80 percent of FCLPs at OLF Coupeville], Scenario B [50 percent of FCLPs at OLF Coupeville]), and Scenario D [70 percent of FCLPs at OLF Coupeville]), Runway 32 would meet the APZ threshold defined in the Office of the Chief of Naval Operations Instruction (OPNAVINST) 11010.36C. Using average year operations, Runway 14 does not meet the operational threshold requirement to warrant an APZ under any alternative or scenario. The Navy's official recommendation for APZs at OLF Coupeville will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish an APZ for OLF Coupeville and to adopt zoning to enhance public safety. It is the municipality's action that will influence future land use decisions. In fact, the municipality has a choice on the degree to which it implements the Navy's land use recommendations; for instance, it could decide to establish an APZ for Runway 14 even though the current or proposed number of operations does not warrant one under Navy policy. See Section 4.5.2 for an analysis of land use under conceptual APZs.

Table 4.3-1 Existing Clear Zones and Conceptual APZ Development based on Projected Operations at OLF Coupeville

<i>Alternatives</i>	<i>Existing Clear Zones and Conceptual APZs</i>		
	<i>Existing Clear Zone</i>	<i>Runway 32 Conceptual APZ</i>	<i>Runway 14 Conceptual APZ³</i>
Existing 2005 AICUZ	⊙ ¹	-	-
Alternative 1, Scenario A	⊙ ¹	⊙ ²	-
Alternative 1, Scenario B	⊙ ¹	⊙ ²	-
Alternative 1, Scenario C	⊙ ¹	-	-
Alternative 1, Scenario D	⊙ ¹	⊙ ²	-
Alternative 1, Scenario E	⊙ ¹	-	-
Alternative 2, Scenario A	⊙ ¹	⊙ ²	-
Alternative 2, Scenario B	⊙ ¹	⊙ ²	-
Alternative 2, Scenario C	⊙ ¹	-	-
Alternative 2, Scenario D	⊙ ¹	⊙ ²	-
Alternative 2, Scenario E	⊙ ¹	-	-
Alternative 3, Scenario A	⊙ ¹	⊙ ²	-
Alternative 3, Scenario B	⊙ ¹	⊙ ²	-
Alternative 3, Scenario C	⊙ ¹	-	-
Alternative 3, Scenario D	⊙ ¹	⊙ ²	-
Alternative 3, Scenario E	⊙ ¹	-	-
No Action Alternative	⊙ ¹	-	-

Source: Wyle, 2017

Notes:

- ¹ Presently, Clear Zones have existed since 1986 for Runway 32 and Runway 14, and no change is expected.
- ² Conceptual depiction of APZs for Runway 32; if this alternative is selected, it is likely the Navy would recommend establishing an APZ for this runway.
- ³ Under neither average year nor high-tempo FCLP year operations does Runway 14 meet the operational threshold requirement to warrant an APZ.

Key:

- ⊙ = Symbol indicates a continued Clear Zone or potential for new APZs based on alternative selected
- AICUZ = Air Installations Compatible Use Zone
- APZ = Accident Potential Zone

L:\Buffalo\Whidbey EIS\Maps\MXD\EIS\Figure 4.3-1 2005 AICUZ Clear Zones and Conceptual APZ for OLF Coupeville, Alternative 1.mxd

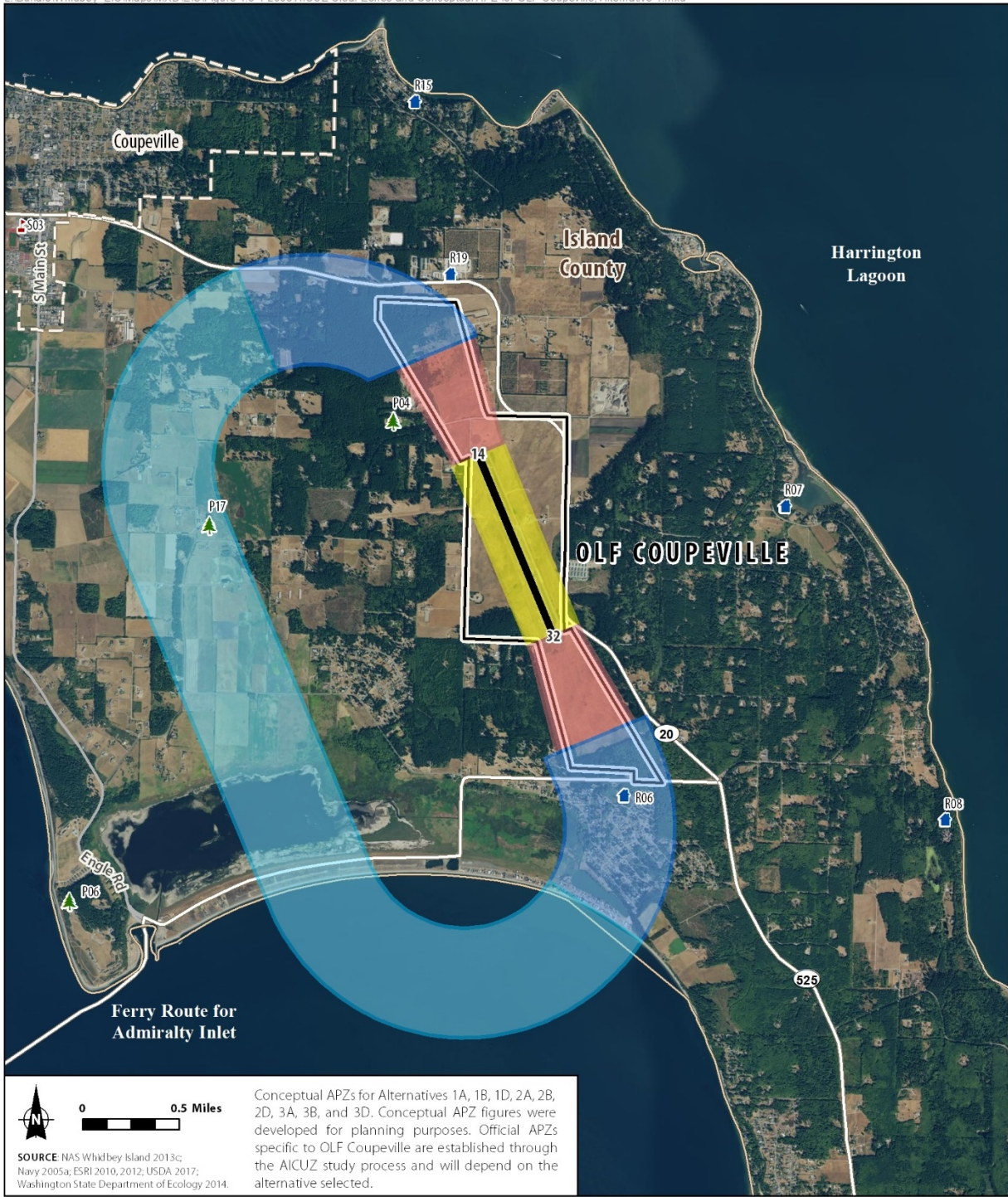


Figure 4.3-1
Existing 2005 AICUZ
Clear Zones and Conceptual
APZs for OLF Coupeville
 Whidbey Island, Island County, WA

- | | | |
|--------------------------|----------------------------|--|
| — County Boundary | 🌳 Points of Interest (POI) | 2005 AICUZ Clear Zones and Conceptual, Option 1 APZs |
| — U.S. and State Highway | 🏠 Residential | 🟡 Primary Surface |
| — Major Road | 🎓 School | 🔴 Clear Zone |
| 🏘️ City/Town Boundary | | 🟠 APZ I |
| ▭ Installation Area | | 🟡 APZ II |
| ▬ Runway | | |

4.3.2.4 Environmental Health Risks and Safety Risks to Children

In accordance with the requirements of Executive Order (EO) 13045, this section also evaluates the potential for disproportionate impacts on children near Ault Field and OLF Coupeville. Tables 4.3-2 through 4.3-4 present information on the number of children who are likely affected by the alternatives and scenarios during the average year, while Tables 4.3-5 through 4.3-7 present the same information for alternatives and scenarios during high-tempo FCLP years.

As shown on the tables, the total number of children likely to be affected would range from a low of 3,029 children under Alternative 3, Scenario A, to a high of 3,239 children under Alternative 1, Scenario C, under the average year. Under the high-tempo FCLP year, these figures would range from a low of 3,062 children under Alternative 3, Scenario A, to a high of 3,303 children under Alternative 1, Scenario C.

When compared to the No Action Alternative, this would equate to from 230 additional children being affected under Alternative 3, Scenario A, to 440 additional children being affected under Alternative 1, Scenario C, in the average year (see Tables 4.3-2 through 4.3-7). Under the high-tempo FCLP year, these figures would equate to from 89 additional children being affected under Alternative 3, Scenario A, to 330 additional children being affected under Alternative 1, Scenario C.

Under each of the alternatives and for each of the scenarios in the average year, additional children would be impacted by noise over the No Action Alternative. Total additional children affected by noise would range between 230 and 440 children (or a percent increase of between 8.2 percent and 15.7 percent, respectively) under all alternatives and scenarios under the average year compared to the No Action Alternative. An estimated 89 to 330 additional children (or a percent increase of between 3.0 percent and 14.8 percent, respectively) would be affected under all alternatives and scenarios under the high-tempo FCLP year compared to the No Action Alternative.

Table 4.3-9 identifies the schools and licensed daycare facilities that are likely to fall within the greater than 65 db DNL contours by the alternatives and scenarios for both the average year and high-tempo FCLP year. The table also shows total enrollment for each school and daycare center as well as the expected number of students who would be impacted under each alternative and scenario. As shown in the table, Crescent Harbor Elementary, Home Connection/Parent Partnership School, and Olympic View Elementary would be affected under all action alternatives and scenarios under the average and high-tempo FCLP years. Total impacted students would range from 1,469 to 2,027 children depending on the alternative and scenario considered. Under the No Action Alternative, 1,251 children attend schools or daycare centers that fall within the greater than 65 dB DNL noise contour (see Table 4.3-9).

Children within the greater than 65 db DNL contours have the potential to be impacted by aircraft noise and mishaps. Section 3.2, Section 4.2, and Appendix A provide a detailed discussion of the health and learning impacts on the community associated with aircraft noise. As stated in Section 3.2.3, a review of the scientific literature (see Appendix A, Aircraft Noise Study) indicated that there has been limited research in the area of aircraft noise effects on children and classroom/learning interference. Research suggests that environments with sustained high background noise can have a variety of effects on children, including effects on learning and cognitive abilities and various noise-related physiological changes. Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that aircraft noise can affect the academic performance of school children. Physiological effects in children exposed to aircraft noise and the potential for health effects have been the focus of limited investigation. Two

studies that have been conducted, both in Germany, examined potential physiological effects on children from noise. One examined the relationship between stress hormone levels and elevated blood pressure in children residing around the Munich airport. The other study was conducted in diverse geographic regions and evaluated potential physiological changes (e.g., change in heart rate and muscle tension) related to noise. The studies showed that there may be some relationship between noise and these health factors; however, the researchers noted that further study is needed in order to differentiate the specific cause and effect to understand the relationship (DNWG, 2013).

Based on the limited scientific literature available, there is no proven positive correlation between noise-related events and physiological changes in children. Additionally, the aircraft noise associated with the alternatives is intermittent; therefore, the Navy does not anticipate any significant disproportionate health impacts to children caused by aircraft noise.

As shown on Table 4.3-8, a total of 337 children would reside in the APZs for Ault Field and OLF Coupeville under Alternative 1, Scenario C; Alternative 1, Scenario E; Alternative 2, Scenario C; Alternative 2, Scenario E; Alternative 3, Scenario C; and Alternative 3, Scenario E. In all other alternatives and scenarios, a total of 478 children would reside in the Clear Zones/conceptual APZs for Ault Field and OLF Coupeville. However, as described in Section 3.3.2.4, unless there is a place where children congregate within an APZ, such as a school, there would not be a disproportionate safety risk to children. There are no schools or daycare centers within the existing Clear Zones, existing APZs or conceptual APZs at Ault Field and OLF Coupeville under any of the alternatives or scenarios. A small portion of Rhododendron Park falls within the Clear Zone and within the conceptual APZs at OLF Coupeville. However, this area of the park is used for passive recreation and is not expected to be an area where children congregate. Therefore, there are no disproportionate environmental health and safety risks to children as a result of possible aircraft mishaps under any alternative or scenario for both the average year and high-tempo FCLP year.

Table 4.3-2 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 1, All Scenarios, Average Year

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Population Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>
<i>No Action Alternative</i>					
65-70 DNL	4,140	1,044	25.2%	-	-
70-75 DNL	3,069	777	25.3%	-	-
75+ DNL	3,962	978	24.7%	-	-
Total Affected Population	11,171	2,799	25.1%	-	-
<i>Alternative 1, Scenario A</i>					
65-70 DNL	4,257	1,094	25.7%	50	-
70-75 DNL	2,844	686	24.1%	-91	-
75+ DNL	5,475	1,271	23.2%	293	-
Total Affected Population	12,576	3,051	24.3%	252	17.9%
<i>Alternative 1, Scenario B</i>					
65-70 DNL	4,161	1,066	25.6%	22	-
70-75 DNL	3,511	871	24.8%	94	-
75+ DNL	5,317	1,261	23.7%	283	-
Total Affected Population	12,989	3,198	24.6%	399	22.0%
<i>Alternative 1, Scenario C</i>					
65-70 DNL	4,802	1,205	25.1%	161	-
70-75 DNL	3,551	884	24.9%	107	-
75+ DNL	4,668	1,150	24.6%	172	-
Total Affected Population	13,021	3,239	24.9%	440	23.8%
<i>Alternative 1, Scenario D</i>					
65-70 DNL	4,243	1,092	25.7%	48	-
70-75 DNL	3,163	775	24.5%	-2	-
75+ DNL	5,529	1,293	23.4%	315	-
Total Affected Population	12,935	3,160	24.4%	361	20.5%
<i>Alternative 1, Scenario E</i>					
65-70 DNL	4,568	1,155	25.3%	111	-
70-75 DNL	3,545	878	24.8%	101	-
75+ DNL	4,937	1,199	24.3%	221	-
Total Affected Population	13,050	3,232	24.8%	433	23.0%

Table 4.3-2 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 1, All Scenarios, Average Year

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Population Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>

Sources: USCB, 2012d.

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:

DNL = day-night average sound level

Table 4.3-3 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 2, All Scenarios, Average Year

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Population Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>
<i>No Action Alternative</i>					
65-70 DNL	4,140	1,044	25.2%	-	-
70-75 DNL	3,069	777	25.3%	-	-
75+ DNL	3,962	978	24.7%	-	-
Total Affected Population	11,171	2,799	25.1%	-	-
<i>Alternative 2, Scenario A</i>					
65-70 DNL	4,238	1,092	25.8%	48	-
70-75 DNL	2,873	689	24.0%	-88	-
75+ DNL	5,376	1,251	23.3%	273	-
Total Affected Population	12,487	3,032	24.3%	233	17.7%
<i>Alternative 2, Scenario B</i>					
65-70 DNL	4,178	1,068	25.6%	24	-
70-75 DNL	3,488	864	24.8%	87	-
75+ DNL	5,210	1,239	23.8%	261	-
Total Affected Population	12,876	3,171	24.6%	372	21.8%
<i>Alternative 2, Scenario C</i>					
65-70 DNL	4,760	1,192	25.0%	148	-
70-75 DNL	3,490	869	24.9%	92	-
75+ DNL	4,564	1,126	24.7%	148	-
Total Affected Population	12,814	3,187	24.9%	388	23.6%
<i>Alternative 2, Scenario D</i>					
65-70 DNL	4,221	1,087	25.8%	43	-
70-75 DNL	3,216	786	24.4%	9	-
75+ DNL	5,380	1,259	23.4%	281	-
Total Affected Population	12,817	3,132	24.4%	333	20.2%
<i>Alternative 2, Scenario E</i>					
65-70 DNL	4,563	1,150	25.2%	106	-
70-75 DNL	3,482	862	24.8%	85	-
75+ DNL	4,844	1,178	24.3%	200	-
Total Affected Population	12,889	3,190	24.7%	391	22.8%

Table 4.3-3 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 2, All Scenarios, Average Year

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Population Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>

Sources: USCB, 2012d

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:

DNL = day-night average sound level

Table 4.3-4 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 3, All Scenarios, Average Year

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Population Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>
<i>No Action Alternative</i>					
65-70 DNL	4,140	1,044	25.2%	-	-
70-75 DNL	3,069	777	25.3%	-	-
75+ DNL	3,962	978	24.7%	-	-
Total Affected Population	11,171	2,799	25.1%	-	-
<i>Alternative 3, Scenario A</i>					
65-70 DNL	4,244	1,093	25.8%	49	-
70-75 DNL	2,839	681	24.0%	-96	-
75+ DNL	5,400	1,255	23.2%	277	-
Total Affected Population	12,483	3,029	24.3%	230	17.5%
<i>Alternative 3, Scenario B</i>					
65-70 DNL	4,150	1,062	25.6%	18	-
70-75 DNL	3,474	860	24.8%	84	-
75+ DNL	5,256	1,247	23.7%	269	-
Total Affected Population	12,880	3,169	24.6%	370	21.7%
<i>Alternative 3, Scenario C</i>					
65-70 DNL	4,743	1,188	25.0%	144	-
70-75 DNL	3,496	869	24.9%	92	-
75+ DNL	4,585	1,130	24.6%	152	-
Total Affected Population	12,824	3,187	24.9%	388	23.5%
<i>Alternative 3, Scenario D</i>					
65-70 DNL	4,210	1,085	25.8%	41	-
70-75 DNL	3,205	783	24.4%	6	-
75+ DNL	5,402	1,263	23.4%	285	-
Total Affected Population	12,817	3,131	24.4%	332	20.2%
<i>Alternative 3, Scenario E</i>					
65-70 DNL	4,532	1,143	25.2%	99	-
70-75 DNL	3,483	861	24.7%	84	-
75+ DNL	4,869	1,183	24.3%	205	-
Total Affected Population	12,884	3,187	24.7%	388	22.7%

Table 4.3-4 Total Populations Aged 19 Years or Younger at NAS Whidbey Island Complex under the No Action Alternative and Alternative 3, All Scenarios, Average Year

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Population Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>

Sources: USCB, 2012d

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:

DNL = day-night average sound level

Table 4.3-5 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 1, All Scenarios, High-Tempo FCLP

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Population Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>
<i>No Action Alternative</i>					
65-70 DNL	4,228	1,063	25.1%	-	-
70-75 DNL	3,463	892	25.8%	-	-
75+ DNL	4,113	1,018	24.8%	-	-
Total Affected Population	11,804	2,973	25.2%	-	-
<i>Alternative 1, Scenario A</i>					
65-70 DNL	4,303	1,102	25.6%	39	-
70-75 DNL	2,844	692	24.3%	-200	-
75+ DNL	5,602	1,297	23.2%	279	-
Total Affected Population	12,749	3,091	24.2%	118	12.5%
<i>Alternative 1, Scenario B</i>					
65-70 DNL	4,159	1,068	25.7%	5	-
70-75 DNL	3,587	891	24.8%	-1	-
75+ DNL	5,420	1,283	23.7%	265	-
Total Affected Population	13,166	3,242	24.6%	269	19.8%
<i>Alternative 1, Scenario C</i>					
65-70 DNL	4,893	1,229	25.1%	166	-
70-75 DNL	3,604	899	24.9%	7	-
75+ DNL	4,764	1,175	24.7%	157	-
Total Affected Population	13,261	3,303	24.9%	330	22.6%
<i>Alternative 1, Scenario D</i>					
65-70 DNL	4,291	1,102	25.7%	39	-
70-75 DNL	3,171	782	24.7%	-110	-
75+ DNL	5,660	1,320	23.3%	302	-
Total Affected Population	13,122	3,204	24.4%	231	17.5%
<i>Alternative 1, Scenario E</i>					
65-70 DNL	4,640	1,175	25.3%	112	-
70-75 DNL	3,593	893	24.9%	1	-
75+ DNL	5,029	1,221	24.3%	203	-
Total Affected Population	13,262	3,289	24.8%	316	21.7%

Table 4.3-5 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 1, All Scenarios, High-Tempo FCLP

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Population Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>

Sources: USCB, 2012d.

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:

DNL = day-night average sound level

Table 4.3-6 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 2, All Scenarios, High-Tempo FCLP

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 or Younger</i>	<i>Percent Population Aged 19 or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 or Younger</i>
<i>No Action Alternative</i>					
65-70 DNL	4,228	1,063	25.1%	-	-
70-75 DNL	3,463	892	25.8%	-	-
75+ DNL	4,113	1,018	24.8%	-	-
Total Affected Population	11,804	2,973	25.2%	-	-
<i>Alternative 2, Scenario A</i>					
65-70 DNL	4,300	1,105	25.7%	42	-
70-75 DNL	2,879	694	24.1%	-198	-
75+ DNL	5,454	1,267	23.2%	249	-
Total Affected Population	12,633	3,066	24.3%	93	11.2%
<i>Alternative 2, Scenario B</i>					
65-70 DNL	4,222	1,081	25.6%	18	-
70-75 DNL	3,551	882	24.8%	-10	-
75+ DNL	5,310	1,262	23.8%	244	-
Total Affected Population	13,083	3,225	24.7%	252	19.7%
<i>Alternative 2, Scenario C</i>					
65-70 DNL	4,793	1,202	25.1%	139	-
70-75 DNL	3,559	885	24.9%	-7	-
75+ DNL	4,698	1,155	24.6%	137	-
Total Affected Population	13,050	3,242	24.8%	269	21.6%
<i>Alternative 2, Scenario D</i>					
65-70 DNL	4,280	1,101	25.7%	38	-
70-75 DNL	3,231	792	24.5%	-100	-
75+ DNL	5,460	1,276	23.4%	258	-
Total Affected Population	12,971	3,169	24.4%	196	16.8%
<i>Alternative 2, Scenario E</i>					
65-70 DNL	4,546	1,150	25.3%	87	-
70-75 DNL	3,538	877	24.8%	-15	-
75+ DNL	4,982	1,206	24.2%	188	-
Total Affected Population	13,066	3,233	24.7%	260	20.6%

Table 4.3-6 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 2, All Scenarios, High-Tempo FCLP

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 or Younger</i>	<i>Percent Population Aged 19 or Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 or Younger</i>

Sources: USCB, 2012d.

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:

DNL = day-night average sound level

Table 4.3-7 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 3, All Scenarios, High-Tempo FCLP

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years and Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>
<i>No Action Alternative</i>					
65-70 DNL	4,228	1,063	25.1%	-	-
70-75 DNL	3,463	892	25.8%	-	-
75+ DNL	4,113	1,018	24.8%	-	-
Total Affected Population	11,804	2,973	25.2%	-	-
<i>Alternative 3, Scenario A</i>					
65-70 DNL	4,283	1,098	25.6%	35	-
70-75 DNL	2,816	682	24.2%	-210	-
75+ DNL	5,531	1,282	23.2%	264	-
Total Affected Population	12,630	3,062	24.2%	89	10.8%
<i>Alternative 3, Scenario B</i>					
65-70 DNL	4,125	1,059	25.7%	-4	-
70-75 DNL	3,541	879	24.8%	-13	-
75+ DNL	5,396	1,276	23.6%	258	-
Total Affected Population	13,062	3,214	24.6%	241	19.2%
<i>Alternative 3, Scenario C</i>					
65-70 DNL	4,767	1,196	25.1%	133	-
70-75 DNL	3,544	881	24.9%	-11	-
75+ DNL	4,671	1,149	24.6%	131	-
Total Affected Population	12,982	3,226	24.8%	253	21.5%
<i>Alternative 3, Scenario D</i>					
65-70 DNL	4,209	1,082	25.7%	19	-
70-75 DNL	3,184	784	24.6%	-108	-
75+ DNL	5,579	1,301	23.3%	283	-
Total Affected Population	12,972	3,167	24.4%	194	16.6%
<i>Alternative 3, Scenario E</i>					
65-70 DNL	4,536	1,149	25.3%	86	-
70-75 DNL	3,590	892	24.8%	0	-
75+ DNL	4,985	1,208	24.2%	190	-
Total Affected Population	13,111	3,249	24.8%	276	21.1%

Table 4.3-7 Total Populations Aged 19 Years or Younger at the NAS Whidbey Island Complex under Alternative 3, All Scenarios, High-Tempo FCLP

<i>DNL Contours</i>	<i>Total Affected Populations</i>			<i>Change from No Action Alternative</i>	
	<i>Total Affected Population</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years and Younger</i>	<i>Total Population Aged 19 Years or Younger</i>	<i>Percent Population Aged 19 Years or Younger</i>

Sources: USCB, 2012d.

Notes: DNL contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these DNL contours; therefore, these counties have been excluded from the analysis. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

Some totals may not sum due to rounding.

All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Key:

DNL = day-night average sound level

Table 4.3-8 Number of Children Residing within APZs for Ault Field and OLF Coupeville under Each Alternative/Scenario

<i>APZ</i>	<i>Total Affected Population*</i>	<i>Total Population 19 Years of Age or Younger</i>	<i>Percent of Total Population 19 Years of Age or Younger</i>
Alternatives 1C, 1E, 2C, 2E, 3C, and 3E¹			
Ault Field Existing Clear Zones and APZs	1,860	320	17.2%
OLF Coupeville Existing Clear Zones	96	17	17.7%
Total Population for Alternatives 1C, 1E, 2C, 2E, 3C, and 3E¹	2,284	337	17.2%
Alternatives 1A, 1B, 1D, 2A, 2B, 2D, 3A, 3B, and 3D²			
Ault Field Existing Clear Zones and APZs	1,860	320	17.2%
OLF Coupeville Existing Clear Zones	96	17	17.7%
OLF Coupeville Conceptual APZs – Option 1	677	141	20.8%
Total Population for Alternatives 1A, 1B, 1D, 2A, 2B, 2D, 3A, 3B, and 3D²	2,633	478	18.2%

Source: USCB, 2012d.

Notes:

¹ Under Alternative 1, Scenario C; Alternative 1, Scenario E; Alternative 2, Scenario C; Alternative 2, Scenario E; Alternative 3, Scenario C; and Alternative 3, Scenario E; no new APZs would be required at OLF Coupeville. There would be no change in the APZs at Ault Field compared to existing conditions.

² Under Alternative 1, Scenario A; Alternative 1, Scenario B; Alternative 1, Scenario D; Alternative 2, Scenario A; Alternative 2, Scenario B; Alternative 2, Scenario D; Alternative 3, Scenario A; Alternative 3, Scenario B; and Alternative 3, Scenario D; OLF Coupeville Conceptual APZs – Option 1 would be required. There would be no change in APZs at Ault Field compared to existing conditions.

* All population estimates for areas within the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period (Washington State Office of Financial Management, 2017).

Table 4.3-9 Schools and Licensed Daycare Centers within 65+ DNL under all Alternatives, All Scenarios, Average and High-Tempo FCLP

Alternatives	Schools				Licensed Daycares		Total Enrollment
	Coupeville High School/ Coupeville Middle School	Crescent Harbor Elementary	Home Connection /Parent Partnership School	Olympic View Elementary	Ebey Academy	Regatta CDC	
Enrollment	504	493	302	456	54	218	-
Alternative 1, Scenario A	⊙	⊙	⊙	⊙	⊙	-	1,809
Alternative 1, Scenario B	-	⊙	⊙	⊙	-	⊙	1,469
Alternative 1, Scenario C	-	⊙	⊙	⊙	-	⊙	1,469
Alternative 1, Scenario D	⊙	⊙	⊙	⊙	⊙ ¹	⊙	2,027
Alternative 1, Scenario E	-	⊙	⊙	⊙	-	⊙	1,469
Alternative 2, Scenario A	⊙	⊙	⊙	⊙	⊙	⊙ ¹	2,027
Alternative 2, Scenario B	-	⊙	⊙	⊙	-	⊙	1,469
Alternative 2, Scenario C	-	⊙	⊙	⊙	-	⊙	1,469
Alternative 2, Scenario D	⊙	⊙	⊙	⊙	-	⊙	1,973
Alternative 2, Scenario E	-	⊙	⊙	⊙	-	⊙	1,469
Alternative 3, Scenario A	⊙	⊙	⊙	⊙	⊙	-	1,809
Alternative 3, Scenario B	-	⊙	⊙	⊙	-	⊙	1,469
Alternative 3, Scenario C	-	⊙	⊙	⊙	-	⊙	1,469
Alternative 3, Scenario D	⊙	⊙	⊙	⊙	⊙ ¹	⊙	2,027
Alternative 3, Scenario E	-	⊙	⊙	⊙	-	⊙	1,469
No Action Alternative	-	⊙	⊙	⊙ ¹	-	-	1,251

Sources: Washington State Office of the Superintendent of Public Instruction, 2018; Child Care Center, 2018a, 2018b

Note:

¹ High-Tempo FCLP only

Key:

⊙ = Symbol indicates presence of a School or a Licensed Daycare Center

DNL = day-night average sound level

4.3.3 Public Health and Safety Conclusion, Alternatives 1 through 3

In summary, the Navy would continue to meet the primary goal of the AICUZ program, which is to protect the public's health, safety, and welfare through collaboration with the local community. Following completion of this EIS and the ROD, the Navy would review the need for changes to the APZs. If warranted, the APZs could be updated by completing an AICUZ Update and coordinating with local communities to provide appropriate new land use recommendations as necessary.

The Proposed Action would increase the volume of air operations; however, it would not change the installation's ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield. Therefore, no significant impact to safety related to flight safety or BASH is expected under any of the alternatives as part of the Proposed Action.

There would be an increase in the number of children within the noise contours under all alternatives and scenarios (8.5 percent to 15.8 percent). Noise impacts on children are discussed in Section 4.2.

4.4 Air Quality

Effects on air quality are based on the estimated changes in direct and indirect emissions associated with the alternatives and the impact of the projected changes in emissions on local and regional air quality. The Proposed Action is located within Island County and the Olympic-Northwest Washington Intrastate Air Quality Control Region. Air quality in Island, Whacom, and Skagit Counties is under the jurisdiction of the Northwest Clean Air Agency (NWCAA). Permit reporting requirements for greenhouse gas (GHG) emissions are addressed, and additional GHG information is included in Section 4.16, Climate Change and GHG Emissions. The General Conformity Rule does not apply to the Proposed Action because the region is in attainment for all National Ambient Air Quality Standards (NAAQS). Therefore, the analysis that follows is pursuant to NEPA. The analysis of a Navy action under NEPA must identify and evaluate any federal, state, or local air quality requirements that apply to the project.

As discussed in Section 1.13, four changes were applied to the noise analysis between release of the Draft EIS and the Final EIS: 1) rerunning the noise analysis using the updated, NOISEMAP Version 7.3 model; 2) applying refinements to certain flight profiles/aircraft operating assumptions; 3) incorporation of PLM, also known as MAGIC CARPET, into the noise analysis; and 4) updating the number of pilots per squadron.

4.4.1 Air Quality, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No new stationary sources would be installed, and no existing stationary sources would have an increase in emissions. There would be no significant change in aircraft operations and resulting aircraft emissions. Therefore, no significant impacts to air quality or air resources would occur with implementation of the No Action Alternative.

4.4.2 Air Quality, Alternative 1

Alternative 1 would expand carrier capabilities by adding three additional aircraft to each existing carrier squadron and augmenting the FRS with eight additional aircraft (a net increase of 35 aircraft). While no new squadrons would be created, this expansion would require new buildings and the renovation of space for maintenance hangars, armament storage and classroom space. The Navy would also construct additional paved areas for vehicle parking and aircraft runway improvements and parking areas. The expansion of Growler operations would require an increase of 335 personnel at the NAS Whidbey Island complex. Alternative 1 represents the largest increase in aircraft operations of the three alternatives. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 1.

4.4.2.1 Air Quality Potential Impacts, Alternative 1

Under Alternative 1, the Proposed Action would result in temporary, direct emissions of criteria air pollutants during construction. Changes in operations after implementation of the Proposed Action

Air Quality

Construction impacts would be temporary and minor, and would not result in significant impacts on air quality.

Operations would result in an increase in stationary and mobile sources. Increased stationary sources would not require revisions to the NAS Whidbey Island Air Permit and would have no significant impact. Increases in mobile emissions should not affect compliance with NAAQS.

would also result in an increase in direct and indirect stationary emissions from new building energy use and increased maintenance and fuel use. Mobile emissions from aircraft operations and the commuting of new personnel in personally owned vehicles (POVs) and other equipment would also increase. Refer to Appendix B for detailed assumptions, emission factors, and calculations used to provide emissions estimates.

4.4.2.1.1 Construction-related Emissions, Alternative 1

Construction would result in temporary and minor increases in air emissions from the combustion of fossil fuels in mobile source equipment and vehicles, volatile organic compound (VOC) emissions from paving and painting, and emissions of fugitive dust and dirt during site ground disturbance. Construction emissions would be temporary.

This analysis assumes the same construction activities under all alternatives and scenarios. The Navy will construct 130,000 square feet of hangar and storage space and 43,000 square feet of temporary hangar space, which will be removed after permanent hangar space is constructed. Expanded vehicle parking and taxiways will require 5.6 acres of paving. Construction activities are conservatively assumed to be conducted within 1 year, prior to the change in operations. Emission factors for vehicles and equipment were obtained from the USEPA's Motor Vehicle Emission Simulator (MOVES2014) (USEPA, 2015c). Appendix B provides the assumptions and calculations used to estimate the total emissions. Table 4.4-1 shows estimated criteria pollutant emissions from construction activities for Alternative 1.

Table 4.4-1 NAS Whidbey Island Complex Emissions from Construction, All Alternatives

Activity	Total Emissions (tons per year [TPY])						Metric tons per year
	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
Alternative 1							
Construction equipment	5.89	0.79	3.54	0.011	0.53	0.52	1,838
VOCs from paving and painting		4.55					
PM from grading and demolition					0.31	0.03	
Worker Commute and Deliveries	0.30	0.02	0.67	0.005	0.84	0.10	112
Total, All Alternatives	6.19	5.36	4.21	0.016	1.68	0.65	1,950

Key:

CO = carbon monoxide

CO₂ = carbon dioxide

NO_x = nitrogen oxides

PM = particulate matter

PM₁₀ = particulate matter less than 10 microns in diameter

PM_{2.5} = particulate matter less than 2.5 microns in diameter

SO₂ = sulfur dioxide

VOC = volatile organic compound

Based on the projected total construction emissions summarized in Table 4.4-1, the impact on air quality in the region would be minor and temporary and would not result in any significant impacts, and would occur before the completion of this action. Construction equipment emissions should not require revisions to NAS Whidbey Island's Air Operating Permit (AOP) (NWCAA, 2013) and therefore do not require Prevention of Significant Deterioration or New Source review. However, final selection of

construction equipment will include a review of permitting requirements, and changes to the AOP will be made if required.

Construction emissions would be reduced using Best Management Practices (BMPs). Exhaust emissions from construction vehicles can be reduced by using fuel-efficient vehicles with emission controls and ensuring that all equipment is properly maintained. Dust emissions from ground disturbance and road traffic should be controlled by spraying water on soil piles and graded areas and keeping roadways clean.

4.4.2.1.2 Stationary Operation-related Emissions, Alternative 1

This analysis assumed that changes to facilities and the maintenance of more aircraft would result in increases in stationary source emissions at NAS Whidbey Island, and these changes would be the same under all scenarios and alternatives. These emissions are subject to the AOP; however, because they are below permit revision requirement thresholds, they are not likely to result in changes to the AOP and therefore do not require Prevention of Significant Deterioration or New Source review. Final selection of building systems will include a review of permitting requirements, and changes to the AOP will be made if required.

New buildings would require additional direct (natural gas) and indirect (electricity) energy use that would result in an increase in direct and indirect emissions. Emissions from electricity use are estimated using the Energy Information Administration's average emission factors for the State of Washington (EIA, 2015). Direct emissions from natural gas combustion are estimated using emission factors provided in the NAS Whidbey Island AOP (NWCAA, 2013). Increased maintenance and operations of aircraft may also result in an increase in painting, solvent, and fueling operations and fuel storage, which could increase reported emissions (VOCs) from these permitted sources. The increased emissions have been estimated based on emissions from existing Growler maintenance operations and a ratio based on the increase in the number of aircraft associated with this action. Fuel storage increases are estimated based on the increase in personnel. New VOC emissions from the painting, solvent and fueling operations would not trigger a required change to the AOP. The Growler's F414-GE-400 engines would not be tested in the test cells, and, therefore, there would be no changes to this stationary source (NAS Whidbey Island Operations Command, 2016).

In order to mitigate noise from in-frame engine testing, The Navy is considering the construction of a "hush house," which would be equipped with ventilation equipment and would be therefore considered a new stationary source of emissions and may require New Source review and changes to the AOP. This is not considered as part of this action. For the purposes of this environmental review, all potential emissions from in-frame testing have been quantified and are included below in the discussion of mobile emissions. A hush house would not necessarily reduce potential emissions from in-frame testing; however, emissions generated within the hush house would be reporting and managed as a stationary source under the AOP.

Table 4.4-2 provides a summary of the estimated increase in direct and indirect emissions that would result from the Proposed Action. There are no plans to change any additional facilities that support these activities as a part of the Proposed Action. New Stationary emissions should not require revisions to NAS Whidbey Island's AOP (NWCAA, 2013) and therefore do not require Prevention of Significant Deterioration or New Source review. However, final selection of construction equipment will include a review of permitting requirements, and changes to the AOP will be made if required.

Table 4.4-2 Stationary Direct and Indirect Criteria Pollutant Emissions, All Alternatives

<i>Operations</i>	<i>NO_x</i> <i>(tpy)</i>	<i>VOC</i> <i>(tpy)</i>	<i>CO</i> <i>(tpy)</i>	<i>SO₂</i> <i>(tpy)</i>	<i>PM₁₀</i> <i>(tpy)</i>	<i>PM_{2.5}</i> <i>(tpy)</i>
New Building Electricity Use (Indirect)	0.25	N/A	N/A	0.165	N/A	N/A
New Building Natural Gas Use (Direct)	0.10	0.01	0.21	0.002	0.02	0.02
Painting, Solvent, and Gas Station Use (Direct)		3.57				
Total Change in Stationary Emissions	0.35	3.58	0.21	0.166	0.02	0.02

Key:

CO = carbon monoxide

NO_x = nitrogen oxides

PM = particulate matter

PM₁₀ = particulate matter less than 10 microns in diameter

PM_{2.5} = particulate matter less than 2.5 microns in diameter

SO₂ = sulfur dioxide

tpy = tons per year

VOC = volatile organic compound

4.4.2.1.3 Mobile Operation-related Emissions, Alternative 1

Under Alternative 1, changes to aircraft operations and personnel commuting would result in an increase in annual emissions. Mobile emissions are not covered by the NAS Whidbey Island AOP or stationary source reporting or permitting thresholds; however, these emissions contribute to regional emission totals and can affect compliance with NAAQS. Each of the five scenarios would have different numbers of different types of operations at OLF Coupeville and Ault Field, resulting in different levels of emissions from each scenario.

Emissions estimates were developed using the Navy's Aircraft Environmental Support Office (AESO) emission factors for aircraft emissions (AESO 2015, 2017a, 2017b) and the USEPA's Motor Vehicle Emission Simulator (MOVES2014) (USEPA, 2015c) emission factors for Island County for personnel commuting emissions. NAS Whidbey Island does not collect an inventory of ground support equipment operations; therefore, ground support equipment emissions at NAS Whidbey Island were estimated using a ratio of aircraft landing and takeoff operations to reported ground support equipment at NAS Lemoore in Appendix 1D of the Navy's F-35C West Coast Homebasing EIS (Navy, 2014d). Since air emissions calculations require specific operation counts by type, the operations data used for these calculations were consistent with the detailed operations count and type estimates used in the noise analysis (see Appendix A, Aircraft Noise Study). The AESO estimates a 30-second maximum setting (with AB) time-in-mode for Growler take off; however, emission factors have been adjusted to account for a more specific estimate at NAS Whidbey Island of 20 seconds at this setting (NAS Whidbey Island Operations Command, 2016).

Total emissions presented below have been estimated using projected average Growler flight and in-frame maintenance operations, and increases in personnel. As discussed in Chapter 3, the use of chaff and fuel dumping are rare occurrences and not part of training activities at Ault Field or OLF Coupeville; therefore, there would be no impacts to air quality from chaff or fuel dumping as a result of the Proposed Action. Hazardous Air Pollutant (HAP) emissions identified in Mobile Source Air Toxics (MSAT) regulations represent 24 percent of the reported aircraft VOC emissions (FAA, 2009) and also one-third of POV VOC emissions (AWMA, 2017). Criteria pollutant emissions from the mobile operations associated with the Proposed Action under Alternative 1, Scenario A, are provided in Table 4.4-3; Scenario B emissions are provided in Table 4.4-4; Scenario C emissions are provided in Table 4.4-5;

Scenario D emissions are provided in Table 4.4-6; and Scenario E emissions are provided in Table 4.4-7. Detailed assumptions, emission factors, and calculations, as well as additional emissions estimates based on high-tempo Growler operations, have been presented in Appendix B.

Table 4.4-3 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action, Alternative 1, Scenario A

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Mobile Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 1, Scenario A</i>						
<i>Alternative 1A Emissions</i>						
Ault Field Growler Aircraft	466.73	734.73	1958.05	41.10	212.35	212.35
OLF Growler Aircraft	184.26	4.28	93.04	12.08	51.14	51.14
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.39	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Mobile Operation Emissions	708.57	885.79	2,771.16	59.22	387.85	302.66
<i>Change in Emissions between No Action and Alternative 1A</i>						
Ault Field Growler Aircraft	74.95	140.05	372.87	6.91	36.50	36.50
OLF Growler Aircraft	138.74	3.14	67.78	9.08	38.49	38.49
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.07	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Mobile Operation Emissions	228.73	186.71	637.86	17.79	90.76	84.33

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = 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

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 1, Scenario B</i>						
<i>Alternative 1B Emissions</i>						
Ault Field Growler Aircraft	490.02	705.80	1881.75	42.15	215.39	215.39
OLF Growler Aircraft	115.23	2.68	58.30	7.55	31.99	31.99
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.37	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Operation Emissions	662.81	855.27	2,660.10	55.75	371.73	286.55
<i>Change in Emissions between No Action Alternative and Alternative 1B</i>						
Ault Field Growler Aircraft	98.24	111.13	296.56	7.96	39.54	39.54
OLF Growler Aircraft	69.72	1.54	33.03	4.56	19.33	19.33
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.06	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Operation Emissions	182.98	156.18	526.80	14.32	74.65	68.22

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = 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

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 1, Scenario C</i>						
<i>Alternative 1C Emissions</i>						
Ault Field Growler Aircraft	515.45	683.49	1823.06	43.45	219.81	219.81
OLF Growler Aircraft	46.16	1.08	23.39	3.03	12.81	12.81
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.36	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Operation Emissions	619.18	831.36	2,566.61	52.52	356.98	271.80
<i>Change in Emissions between No Action Alternative and Alternative 1C</i>						
Ault Field Growler Aircraft	123.67	88.82	237.87	9.26	43.96	43.96
OLF Growler Aircraft	0.67	-0.06	-1.77	0.04	0.16	0.16
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.05	0.00	0.03	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Operation Emissions	139.35	132.27	433.30	11.09	59.89	53.47

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = sulfur dioxide
- VOC = volatile organic compound

Table 4.4-6 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 1, Scenario D

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 1, Scenario D</i>						
<i>Alternative 1D Emissions</i>						
Ault Field Growler Aircraft	475.02	727.07	1937.89	41.52	213.74	213.74
OLF Growler Aircraft	161.24	3.75	81.46	10.57	44.76	44.76
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.38	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Operation Emissions	693.83	877.60	2,739.41	58.13	382.85	297.67
<i>Change in Emissions between No Action Alternative and Alternative 1D</i>						
Ault Field Growler Aircraft	83.24	132.39	352.70	7.33	37.89	37.89
OLF Growler Aircraft	115.73	2.61	56.19	7.58	32.10	32.10
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.07	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Operation Emissions	214.00	178.51	606.11	16.70	85.76	79.34

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = sulfur dioxide
- VOC = volatile organic compound

Table 4.4-7 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 1, Scenario E

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 1, Scenario E</i>						
<i>Alternative 1E Emissions</i>						
Ault Field Growler Aircraft	507.11	691.31	1843.64	43.03	218.42	218.42
OLF Growler Aircraft	65.70	1.60	35.07	4.31	18.25	18.25
In-frame Maintenance Operations	47.58	145.00	638.63	5.97	28.55	28.55
Ground Support Equipment	0.37	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	9.61	1.77	81.20	0.07	95.79	10.61
Total Operation Emissions	630.36	839.69	2,598.76	53.39	361.03	275.84
<i>Change in Emissions between No Action Alternative and Alternative 1E</i>						
Ault Field Growler Aircraft	115.33	96.64	258.45	8.84	42.57	42.57
OLF Growler Aircraft	20.18	0.46	9.81	1.32	5.60	5.60
In-frame Maintenance Operations	14.23	43.38	191.04	1.79	8.54	8.54
Ground Support Equipment	0.05	0.00	0.03	0.00	0.00	0.00
POV (Personnel Commuting)	0.73	0.13	6.13	0.01	7.23	0.80
Total Change in Operation Emissions	150.52	140.60	465.46	11.96	63.94	57.51

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = sulfur dioxide
- VOC = volatile organic compound

4.4.3 Air Quality, Alternative 2

Alternative 2 would expand expeditionary and carrier capabilities by establishing two new expeditionary squadrons, adding two additional aircraft to each existing carrier squadron, and augmenting the FRS with eight additional aircraft (a net increase of 36 aircraft). The expansion of Growler operations would require an increase of 628 personnel at the NAS Whidbey Island complex. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 2.

4.4.3.1 Air Quality Potential Impacts, Alternative 2

Under Alternative 2, the Proposed Action would result in temporary, direct emissions of criteria air pollutants during construction. Changes in operations after implementation of the Proposed Action would also result in an increase in direct and indirect stationary emissions from new building energy use and increased maintenance and fuel use. Mobile emissions from aircraft operations and the commuting of new personnel in POVs and other equipment would also increase. Refer to Appendix B for detailed assumptions, emission factors, and calculations used to provide emissions estimates.

4.4.3.1.1 Construction-related Emissions, Alternative 2

As described in Section 4.4.2, construction would result in temporary and minor increases in air emissions from the combustion of fossil fuels in equipment and vehicles, VOC emissions from paving and painting, and emissions of fugitive dust and dirt during site ground disturbance. Each of the five scenarios considered under Alternative 2 would result in the same construction activities as described for Alternative 1.

4.4.3.1.2 Stationary Operation-related Emissions, Alternative 2

Under Alternative 2, changes to facilities and the maintenance of more aircraft would result in increases in stationary source emissions at NAS Whidbey Island as described under Alternative 1.

4.4.3.1.3 Mobile Operation-related Emissions, Alternative 2

Under Alternative 2, changes to aircraft operations and personnel commuting would result in an increase in annual emissions. Mobile emissions are not covered by the AOP or stationary source reporting or permitting thresholds; however, these emissions contribute to regional emission totals and can affect compliance with NAAQS. Each of the five scenarios would have different numbers of different types of operations at OLF Coupeville and Ault Field, resulting in different levels of emissions from each scenario. Emissions estimation methods and assumptions are the same as described in Section 4.4.2.1.3. As discussed in Chapter 3, the use of chaff and fuel dumping are rare occurrences and not part of training activities at Ault Field or OLF Coupeville; therefore, there would be no impacts to air quality from chaff or fuel dumping as a result of the Proposed Action. HAP emissions identified in MSAT regulations represent 24 percent of the reported aircraft VOC emissions (FAA, 2009) and also one-third of POV VOC emissions (AWMA, 2017).

Criteria pollutant emissions from the operations associated with the Proposed Action under Alternative 2, Scenario A, are provided in Table 4.4-8; Scenario B emissions are provided in Table 4.4-9; Scenario C emissions are provided in Table 4.4-10; Scenario D emissions are provided in Table 4.4-11; and Scenario E emissions are provided in Table 4.4-12. Total emissions presented below have been estimated using projected average Growler flight operations and increases in personnel. Detailed assumptions, emission factors, and calculations, as well as additional emissions estimates based on high-tempo Growler operations, have been presented in Appendix B.

Table 4.4-8 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 2, Scenario A

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 2, Scenario A</i>						
<i>Alternative 2A Emissions</i>						
Ault Field Growler Aircraft	472.40	752.23	2004.61	41.74	215.95	215.95
OLF Growler Aircraft	175.92	4.09	88.84	11.53	48.83	48.83
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.40	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	706.95	904.45	2,824.34	59.37	395.70	304.90
<i>Change in Emissions between No Action Alternative and Alternative 2A</i>						
Ault Field Growler Aircraft	80.62	157.55	419.42	7.55	40.10	40.10
OLF Growler Aircraft	130.41	2.95	63.58	8.54	36.18	36.18
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.08	0.00	0.05	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	227.11	205.37	691.03	17.94	98.62	86.57

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = 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

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.32	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 2, Scenario B</i>						
<i>Alternative 2B Emissions</i>						
Ault Field Growler Aircraft	494.26	724.28	1930.88	42.71	218.72	218.72
OLF Growler Aircraft	110.01	2.56	55.61	7.21	30.54	30.54
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.38	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	662.88	874.98	2,717.36	56.03	380.18	289.37
<i>Change in Emissions between No Action Alternative and Alternative 2B</i>						
Ault Field Growler Aircraft	102.48	129.60	345.69	8.53	42.87	42.87
OLF Growler Aircraft	64.50	1.42	30.34	4.22	17.88	17.88
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.07	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	183.05	175.89	584.06	14.59	83.09	71.04

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = 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

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 2, Scenario C</i>						
<i>Alternative 2C Emissions</i>						
Ault Field Growler Aircraft	518.41	702.56	1873.72	43.93	222.86	222.86
OLF Growler Aircraft	44.06	1.02	22.26	2.89	12.23	12.23
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.37	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	621.08	851.72	2,626.84	52.92	366.01	275.21
<i>Change in Emissions between No Action Alternative and Alternative 2C</i>						
Ault Field Growler Aircraft	126.63	107.88	288.53	9.75	47.01	47.01
OLF Growler Aircraft	-1.45	-0.12	-3.01	-0.10	-0.42	-0.42
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.06	0.00	0.03	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	141.24	152.63	493.54	11.49	68.92	56.87

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = sulfur dioxide
- VOC = volatile organic compound

Table 4.4-11 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 2, Scenario D

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 2, Scenario D</i>						
<i>Alternative 2D Emissions</i>						
Ault Field Growler Aircraft	480.44	744.92	1985.38	42.14	217.32	217.32
OLF Growler Aircraft	153.96	3.58	77.80	10.09	42.74	42.74
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.39	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	693.02	896.64	2,794.07	58.33	390.97	300.17
<i>Change in Emissions between No Action Alternative and Alternative 2D</i>						
Ault Field Growler Aircraft	88.66	150.24	400.20	7.95	41.47	41.47
OLF Growler Aircraft	108.45	2.44	52.53	7.10	30.08	30.08
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.08	0.00	0.05	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	213.19	197.55	660.77	16.90	93.89	81.84

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = sulfur dioxide
- VOC = volatile organic compound

Table 4.4-12 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 2, Scenario E

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Mobile Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 2, Scenario E</i>						
<i>Alternative 2E Emissions</i>						
Ault Field Growler Aircraft	510.43	710.02	1893.37	43.54	221.53	221.53
OLF Growler Aircraft	66.18	1.55	33.64	4.34	18.37	18.37
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.37	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	10.24	1.88	86.56	0.08	102.12	11.31
Total Mobile Operation Emissions	635.22	859.70	2,657.88	53.98	370.82	280.02
<i>Change in Emissions between No Action Alternative and Alternative 2E</i>						
Ault Field Growler Aircraft	118.65	115.34	308.18	9.35	45.68	45.68
OLF Growler Aircraft	20.67	0.41	8.37	1.35	5.72	5.72
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.06	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	1.36	0.25	11.49	0.01	13.55	1.50
Total Change in Mobile Operation Emissions	155.39	160.62	524.57	12.54	73.74	61.69

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = sulfur dioxide
- VOC = volatile organic compound

4.4.4 Air Quality, Alternative 3

Alternative 3 would expand expeditionary and carrier capabilities by adding three additional aircraft to each existing expeditionary squadron, adding two additional aircraft to each existing carrier squadron, and augmenting the FRS with nine additional aircraft (a net increase of 36 aircraft). The expansion of the Growler community would require an increase of 341 personnel at the NAS Whidbey Island complex. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 3.

4.4.4.1 Air Quality Potential Impacts, Alternative 3

Under Alternative 3, the Proposed Action would result in temporary direct emissions of criteria air pollutants during construction. Changes in operations after implementation of the Proposed Action would also result in an increase in direct and indirect stationary emissions from new building energy use and increased maintenance and fuel use. Mobile emissions from aircraft operations and the commuting of new personnel in POVs and other equipment would also increase. Refer to Appendix B for detailed assumptions, emission factors, and calculations used to provide emissions estimates.

4.4.4.1.1 Construction-related Emissions, Alternative 3

As described in Section 4.4.2, construction would result in temporary and minor increases in air emissions from the combustion of fossil fuels in equipment and vehicles, VOC emissions from paving and painting, and emissions of fugitive dust and dirt during site ground disturbance. Each of the five scenarios considered under Alternative 2 would result in the same construction activities described under Alternative 1.

4.4.4.1.2 Stationary Operation-related Emissions, Alternative 3

Under Alternative 3, changes to facilities and the maintenance of more aircraft would result in increases in stationary source emissions at NAS Whidbey Island, as described under Alternative 1.

4.4.4.1.3 Mobile Operation-related Emissions, Alternative 3

Under Alternative 3, changes to aircraft operations and personnel commuting would result in an increase in annual emissions. Mobile emissions are not covered by the NAS Whidbey Island AOP or stationary source reporting or permitting thresholds; however, these emissions contribute to regional emission totals and can affect compliance with NAAQS. Each of the five scenarios would have different numbers of different types of operations at OLF Coupeville and Ault Field, resulting in different levels of emissions from each scenario. Emissions estimation methods and assumptions are the same as described in Section 4.4.2.1.3. As discussed in Chapter 3, the use of chaff and fuel dumping are rare occurrences and not part of training activities at Ault Field or OLF Coupeville; therefore, there would be no impacts to air quality from chaff or fuel dumping as a result of the Proposed Action. HAP emissions identified in MSAT regulations represent 24 percent of the reported aircraft VOC emissions (FAA, 2009) and also one-third of POV VOC emissions (AWMA, 2017).

Criteria pollutant emissions from the operations associated with the Proposed Action under Alternative 3, Scenario A, are provided in Table 4.4-13; Scenario B emissions are provided in Table 4.4-14; Scenario C emissions are provided in Table 4.4-15; Scenario D emissions are provided in Table 4.4-16; and Scenario E emissions are provided in Table 4.4-17. Total emissions presented below have been estimated using projected average Growler flight operations and increases in personnel. Detailed assumptions, emission factors, and calculations, as well as emissions estimates based on high-tempo Growler operations, have been presented in Appendix B.

**Table 4.4-13 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions
Comparison with No Action Alternative, Alternative 3, Scenario A**

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 3, Scenario A</i>						
<i>Alternative 3A Emissions</i>						
Ault Field Growler Aircraft	471.05	749.76	1998.04	41.62	215.30	215.30
OLF Growler Aircraft	175.52	4.08	88.72	11.50	48.72	48.72
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.40	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	704.58	901.87	2,812.39	59.21	388.74	303.45
<i>Change in Emissions between No Action Alternative and Alternative 3A</i>						
Ault Field Growler Aircraft	79.27	155.08	412.85	7.43	39.45	39.45
OLF Growler Aircraft	130.01	2.94	63.45	8.51	36.06	36.06
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.08	0.00	0.05	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	224.74	202.78	679.09	17.78	91.66	85.12

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = 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**

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 3, Scenario B</i>						
<i>Alternative 3B Emissions</i>						
Ault Field Growler Aircraft	495.30	728.58	1942.29	42.84	219.49	219.49
OLF Growler Aircraft	109.75	2.55	55.49	7.19	30.46	30.46
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.38	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	663.04	879.15	2,723.41	56.13	374.68	289.39
<i>Change in Emissions between No Action Alternative and Alternative 3B</i>						
Ault Field Growler Aircraft	103.52	133.90	357.11	8.66	43.65	43.65
OLF Growler Aircraft	64.24	1.41	30.22	4.20	17.81	17.81
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.07	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	183.21	180.07	590.11	14.70	77.60	71.06

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = 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**

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 3, Scenario C</i>						
<i>Alternative 3C Emissions</i>						
Ault Field Growler Aircraft	517.22	701.00	1869.57	43.83	222.36	222.36
OLF Growler Aircraft	43.93	1.02	22.20	2.88	12.19	12.19
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.37	0.01	0.22	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	619.13	850.04	2,617.39	52.81	359.28	273.98
<i>Change in Emissions between No Action Alternative and Alternative 3C</i>						
Ault Field Growler Aircraft	125.44	106.32	284.38	9.65	46.51	46.51
OLF Growler Aircraft	-1.58	-0.12	-3.07	-0.11	-0.46	-0.46
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.06	0.00	0.03	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	139.29	150.96	484.08	11.38	62.19	55.65

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = sulfur dioxide
- VOC = volatile organic compound

**Table 4.4-16 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions
Comparison with No Action Alternative, Alternative 3, Scenario D**

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.312	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 3, Scenario D</i>						
<i>Alternative 3D Emissions</i>						
Ault Field Growler Aircraft	479.10	742.54	1979.03	42.02	216.67	216.67
OLF Growler Aircraft	153.59	3.57	77.68	10.07	42.63	42.63
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.40	0.01	0.24	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	690.69	894.13	2,782.34	58.18	384.03	298.74
<i>Change in Emissions between No Action Alternative and Alternative 3D</i>						
Ault Field Growler Aircraft	87.32	147.86	393.84	7.83	40.83	40.83
OLF Growler Aircraft	108.08	2.43	52.41	7.08	29.98	29.98
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.08	0.00	0.05	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	210.86	195.05	649.04	16.75	86.95	80.40

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = sulfur dioxide
- VOC = volatile organic compound

Table 4.4-17 NAS Whidbey Island Complex Criteria Pollutant Mobile Air Emissions Comparison with No Action Alternative, Alternative 3, Scenario E

<i>Operations</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>
<i>No Action Alternative Emissions</i>						
Ault Field Growler Aircraft	391.78	594.68	1,585.19	34.19	175.85	175.85
OLF Growler Aircraft	45.51	1.14	25.27	2.99	12.65	12.65
In-frame Maintenance Operations	33.35	101.63	447.59	4.19	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total No Action Alternative Operation Emissions	479.84	699.09	2,133.30	41.43	297.09	218.33
<i>Alternative 3, Scenario E</i>						
<i>Alternative 3E Emissions</i>						
Ault Field Growler Aircraft	509.25	708.38	1889.01	43.44	221.02	221.02
OLF Growler Aircraft	65.93	1.53	33.35	4.32	18.30	18.30
In-frame Maintenance Operations	47.99	146.24	644.09	6.02	28.79	28.79
Ground Support Equipment	0.38	0.01	0.23	0.00	0.01	0.01
POV (Personnel Commuting)	9.62	1.77	81.31	0.07	95.92	10.63
Total Operation Emissions	633.17	857.94	2,647.98	53.85	364.05	278.75
<i>Change in Emissions between No Action Alternative and Alternative 3E</i>						
Ault Field Growler Aircraft	117.47	113.71	303.82	9.25	45.17	45.17
OLF Growler Aircraft	20.42	0.39	8.08	1.33	5.65	5.65
In-frame Maintenance Operations	14.64	44.62	196.50	1.84	8.78	8.78
Ground Support Equipment	0.06	0.00	0.04	0.00	0.00	0.00
POV (Personnel Commuting)	0.74	0.14	6.24	0.01	7.36	0.82
Total Change in Operation Emissions	153.33	158.85	514.67	12.42	66.96	60.42

Note: all measurements in tons per year

Key:

- CO = carbon monoxide
- NO_x = nitrogen oxides
- OLF = Outlying Landing Field Coupeville
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- POV = personally owned vehicle
- SO₂ = sulfur dioxide
- VOC = volatile organic compound

4.4.5 Air Quality Conclusions, Alternatives 1 through 3

4.4.5.1 Air Quality Conclusions, Average Operations

Total changes in ongoing annual emissions from changes to aircraft, POV, and stationary sources related to each of the alternatives have been summarized in Table 4.4-18. Construction emissions would occur before the Proposed Action is implemented and would be temporary; therefore, they are not included in these ongoing annual totals. Potential impacts to air quality from implementation of the Proposed Action when compared to the No Action Alternative would be similar between all three alternatives and scenarios but greatest under Alternative 2, Scenario A (see Table 4.4-10). For air emissions, the difference in aircraft emissions between the scenarios within each alternative is more distinctive than the differences between the alternatives (see Table 4.4-18).

Table 4.4-18 Total Change in Criteria Pollutant and GHG Emissions, All Alternatives

Alternative	Emissions (tpy) ²						MTCO _{2e}
	NO _x	VOC	CO	SO ₂	PM ₁₀	PM _{2.5}	CO ₂
Alternative 1							
Scenario A	229.1	190.3	638.1	18.0	90.8	84.4	39,405
Scenario B	183.3	159.8	527.0	14.5	74.7	68.2	31,923
Scenario C	139.7	135.9	433.5	11.3	59.9	53.5	24,941
Scenario D	214.3	182.1	606.3	16.9	85.8	79.4	37,044
Scenario E	150.9	144.2	465.7	12.1	64.0	57.5	26,807
Alternative 2							
Scenario A	227.5	209.0	691.2	18.1	98.6	86.6	40,284
Scenario B	183.4	179.5	584.3	14.8	83.1	71.1	33,078
Scenario C	141.6	156.2	493.8	11.7	68.9	56.9	26,380
Scenario D	213.5	201.1	661.0	17.1	93.9	81.9	38,051
Scenario E	155.7	164.2	524.8	12.7	73.8	61.7	28,652
Alternative 3							
Scenario A	225.1	206.4	679.3	17.9	91.7	85.1	39,329
Scenario B	183.6	183.7	590.3	14.9	77.6	71.1	32,675
Scenario C	139.6	154.5	484.3	11.5	62.2	55.7	25,513
Scenario D	211.2	198.6	649.2	16.9	87.0	80.4	37,102
Scenario E	153.7	162.4	514.9	12.6	67.0	60.4	27,766

Key:

- CO = carbon monoxide
- CO₂ = carbon dioxide
- CO_{2e} = carbon dioxide equivalent
- MT = metric tons
- NO_x = nitrogen oxides
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- SO₂ = sulfur dioxide
- tpy = tons per year
- VOC = volatile organic compound

For all three alternatives, Scenario A, the option to conduct 80 percent of FCLPs at OLF Coupeville and 20 percent of FCLPs at Ault Field, would result in the greater increase in emissions. Since air emissions calculations require specific operation counts by type, the data used for these calculations were obtained from the noise analysis (see Appendix A). Differences are less a result of the number of operations as they are due to the different type of operations (e.g., more Landing and Take-off Operations (LTOs) may be conducted at Ault Field if FCLPs are relocated to OLF Coupeville, and LTOs produce more emissions per operation than FCLPs. A smaller increase is a result of the transit back and forth from the OLF.

The majority of total emissions from all alternatives as well as the increase in emissions under Alternatives 1 and 2 would occur at Ault Field, occurring on or over the aircraft runways and taxiways. While the increased operations at OLF Coupeville would result in a three-fold increase in emissions at the OLF under Scenario A (See Table 4.4-3), operations at OLF Coupeville do not include many ground-level flight modes or have frequent AB use. Therefore, the total emissions at OLF Coupeville are low compared to the emissions at Ault Field. For example, the emissions of carbon monoxide and VOCs at

OLF Coupeville are 4 percent and 1 percent of total emissions of these pollutants and represent 10 percent and 2 percent of the total change in emissions, respectively.

Changes in construction and stationary source emissions would not be significant. Changes in mobile emissions are not subject to permit requirements or emission thresholds. These emissions contribute to regional emission totals and can affect compliance with NAAQS. The region is currently in attainment for all NAAQS, and the Northwest Clean Air Agency continues to monitor ambient air emission levels to confirm continued compliance. The Northwest Clean Air Agency has reviewed this air quality analysis and has not provided comments to the Navy (Buford, 2017). The annual emissions quantified for this analysis would be dispersed over a large area at two different sites, and most emissions would occur on Ault Field. Therefore, these emissions would not be likely to cause exceedances of the NAAQS and HAPs are not likely to be significant.

Air Quality within the NWCAA Jurisdiction is considered good. In 2016, Washington's DOE submitted recommended designation information for the 2015 eight-hour ozone NAAQS (70 ppb), noting that 2013-2015 ambient air data collected at Anacortes established a design value of 42 ppb, the lowest level in the state and significantly lower than the standard. (Bellon, 2016).

The DoD, Navy, and NAS Whidbey Island have implemented policies and programs to reduce energy and GHG emissions, which have also reduced criterial pollutant emissions. NAS Whidbey Island has implemented strategies and programs to reduce emissions from the NAS Whidbey Island complex. Improved energy efficiency through implementation of several building renovation projects has reduced overall facility energy usage by 40 percent between 2003 and 2015. NAS Whidbey Island will continue to work toward the achievement of DoD's GHG and energy reduction goals (NAS Whidbey Island, 2016).

Further discussion of the impacts of GHG emissions and climate change are provided in Section 4.16. Cumulative impacts to air quality are discussed in Chapter 5.

4.4.5.2 Air Quality Conclusions, High-Tempo Operations

Emissions would also be higher under the high-tempo FCLP year conditions across all three alternatives, although the difference varies depending on the type of emissions (see Table 4.4-19 and Appendix B for details). High-tempo FCLP year conditions would produce 2 to 9 percent more emissions under Alternative 2, compared to average conditions. Under Alternatives 1 and 3, high-tempo FCLP year conditions would produce 3 to 7 percent more emissions of nitrogen oxides, sulfur dioxide, particulate matter greater than 10 microns in diameter, and particulate matter greater than 2.5 microns in diameter, while VOC and carbon monoxide emissions would be the same or 1 to 3 percent less than average conditions. The variation in increases by type of emission is a result of not only changes in the number of operations but also in the type of operation. There would be no difference in stationary or construction emissions compared to average operations.

Table 4.4-19 Total Change in Criteria Pollutant and GHG Emissions, High-Tempo, All Alternatives

<i>Alternative/Scenario</i>	<i>Emissions (tpy)²</i>						<i>MTCO_{2e}</i>
	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO₂</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>	<i>CO₂</i>
Alternative 1							
Scenario A	239.7	187.6	639.0	18.6	93.4	87.0	40,858
Scenario B	190.0	156.6	523.4	14.9	76.1	69.7	32,795
Scenario C	142.8	132.2	425.8	11.4	60.3	53.9	25,273
Scenario D	223.7	178.6	604.1	17.4	87.9	81.5	38,283
Scenario E	159.0	141.3	461.1	12.6	65.8	59.4	27,875
Alternative 2							
Scenario A	241.6	218.1	723.3	19.2	103.6	91.5	42,575
Scenario B	193.4	185.4	604.9	15.5	86.5	74.5	34,683
Scenario C	148.0	161.4	509.5	12.1	71.3	59.2	27,432
Scenario D	226.0	209.5	690.0	18.0	98.3	86.2	40,082
Scenario E	163.5	170.1	543.3	13.3	76.5	64.5	29,916
Alternative 3							
Scenario A	235.4	204.7	682.9	18.6	94.2	87.7	40,734
Scenario B	191.0	182.8	593.2	15.3	79.6	73.0	33,720
Scenario C	143.3	153.2	482.9	11.8	63.1	56.5	26,005
Scenario D	219.8	196.0	649.3	17.4	89.0	82.4	38,239
Scenario E	158.8	161.9	516.5	12.9	68.3	61.8	28,488

Key:

- CO = carbon monoxide
- CO₂ = carbon dioxide
- CO_{2e} = carbon dioxide equivalent
- MT = metric tons
- NO_x = nitrogen oxides
- PM₁₀ = particulate matter less than 10 microns in diameter
- PM_{2.5} = particulate matter less than 2.5 microns in diameter
- SO₂ = sulfur dioxide
- tpy = tons per year
- VOC = volatile organic compound

4.5 Land Use

The location and extent of a Proposed Action needs to be evaluated for its potential effects on a project site and adjacent land uses. The foremost factor affecting a Proposed Action in terms of land use is its compatibility with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a Proposed Action, the duration of a proposed activity, and its permanence.

The study area for analysis of potential impacts to land use compatibility and recreation and wilderness is land within the DNL contours and conceptual APZs for the No Action Alternative and each action alternative. Areas of water within DNL contours were not included in the study area or analysis. Small gaps in the land use data used in this analysis exist (i.e., land use data did not cover wetlands), and these gaps are represented as "Other" in the analysis below. These gaps do not represent a significant gap in data and do not impact the analysis presented in this section.

4.5.1 Land Use, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to land use. Therefore, no impacts would occur with implementation of the No Action Alternative.

4.5.2 Land Use, Alternatives 1 through 3

The analysis was conducted to compare land use between the DNL contours and within conceptual APZs under each alternative with the No Action Alternative in terms of on-station land use, regional land use, land use controls, and land use compatibility in Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville. The assessment for potential impacts to recreation and wilderness areas under the Proposed Action considers the potential for aircraft noise resulting from the proposed changes in operations under the alternatives and scenarios to noticeably affect the recreational experiences of visitors to these areas. The impacts assessment also considers the potential for the Proposed Action to impact the implementation of park management plans. No activities are proposed that would occur directly within the property boundaries of parks or recreation areas.

Land Use

Land Use Compatibility

The Proposed Action would result in an increase in the land area within the projected greater than 65 dB DNL noise contours (range of 9 to 18 percent).

Under all action alternatives and scenarios, the Proposed Action would have no impact to on-station land use, on-station land use controls or regional land use.

For the purposes of this analysis, conceptual APZs for OLF Coupeville are proposed for some action alternatives. Land within the conceptual APZs associated with OLF Coupeville would increase under each action alternative. The Navy's official recommendation for APZs at OLF Coupeville will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish an APZ for OLF Coupeville and to adopt zoning restrictions taking into account a wide range of land-use factors, including the Navy's recommendations (see Sections 4.3.2.3 and 4.5.2.1 for more details on the AICUZ study and land use compatibility).

Recreation and Wilderness

All alternatives would have localized significant impacts to recreation at Ebey's Landing National Historical Reserve, various county and municipal parks, and private recreational facilities as a result of increased annual average noise levels. There would be no significant impacts to recreation as a result of increased demand and no significant impacts to wilderness areas.

As noted in Section 3.1, this analysis is concentrated on the average year; however, for purposes of comparison, the high-tempo FCLP year is included in Appendix E, Land Use Data, High-tempo FCLP Year.

4.5.2.1 Potential Impacts, Land Use Compatibility

4.5.2.1.1 On-station Land Use

Primary construction projects associated with all alternatives would occur at Ault Field. New construction under all alternatives to support new Growler aircraft and personnel would include additional armament storage, hangar facilities, mobile maintenance facility storage area, and expanded personnel parking areas. The three alternatives would require repairs to inactive taxiways for aircraft parking, in addition to expanded hangar space. Under Alternative 2, a two-squadron hangar would be constructed on the flight line either adjacent to Hangar 5 or at the site of existing Hangar 1. For the three alternatives, Hangar 12 would be expanded to accommodate additional training squadron aircraft. The locations of the proposed construction projects are shown in Figure 2.3-1.

Most of the new construction would occur at the north end of Ault Field, on or adjacent to areas currently developed to support airfield operations. Construction of new facilities in this area would be consistent with existing land uses, and no impacts to on-station land use at the NAS Whidbey Island complex would occur. No construction would be required at OLF Coupeville; therefore, no impacts to on-station land use would occur at the OLF.

4.5.2.1.1.1 On-station Land Use Controls

The NAS Whidbey Island Installation Development Plan provides a comprehensive framework for the orderly physical development of the installation and reflects the NAS Whidbey Island complex's official direction on facility and site development planning. The installation development plan establishes a vision for the installation's physical infrastructure and places intentional emphasis on mission requirements, developmental constraints and opportunities, and courses of action that will lead to the optimal use of lands, facilities, and resources that elevate the installation's long-range (25-year) performance. The Proposed Action would meet the needs of a changing mission, and, therefore, implementation of the Proposed Action under all alternatives would be consistent with the goals and objectives of the NAS Whidbey Island Installation Development Plan and therefore a beneficial impact.

The Proposed Action would have no effect on management practices currently implemented under the Integrated Natural Resources Management Plan or the Integrated Cultural Resources Management Plan. The Navy would coordinate construction occurring within any sites listed in the Land Use Controls Implementation Plan with the USEPA to ensure institutional controls would remain in place.

4.5.2.1.2 Regional Land Use

The impact analysis for regional land use focuses on the changes in personnel, DNL noise contours, and land area within conceptual APZs at OLF Coupeville, as well as growth-induced development related to the Proposed Action. A land use analysis comparing the proposed DNL noise contours and conceptual APZs to the No Action Alternative is included later in this section.

The Proposed Action would increase total population in Island County by less than 1.5 percent and total population in Skagit County by approximately 0.2 percent across all alternatives. See Section 4.10.2.1 for more details. The Proposed Action would not result in indirect growth-induced development in Island County or Skagit County. The slight increase in personnel that would occur under the alternatives would not be anticipated to result in any growth-induced impacts or change existing land use patterns. Consequently, regional land use would not be adversely impacted by the Proposed Action.

The Proposed Action may have a long-term impact on the character of communities. The Proposed Action would result in a larger area of land within the DNL noise contours and APZs, thereby affecting a larger portion of the population and the community character for those populations. While impacts are expected, the determination of whether impacts are positive or negative cannot be made. Change would occur in the affected communities, but how this change is viewed is subjective and would vary from individual to individual. This section, therefore, seeks to identify expected changes that could occur to the community character of the impacted communities within the 65 dB DNL noise contour. The analysis does not make a judgement as to whether such change is beneficial or harmful to the local community character.

Community character is constantly in a state of flux; a community's sense of place is changeable and adapts as social, demographic, and economic conditions change. When these changes are gradual, residents are given time to adapt and acclimate to new conditions. When these changes are abrupt and dramatic, residents are more likely to be affected negatively by the changes. The Navy has been operating at the NAS Whidbey Island complex for more than 75 years, and the complex has served as the home base location for the Navy's tactical Electronic Warfare community for more than 45 years. Since the 1960s, the Navy has continuously used OLF Coupeville for FCLP, with periods of lower and higher activity, depending on Navy mission requirements. For each alternative and scenario, total airfield operations would increase but levels would be similar to historical levels of operations between the late 1970s and the 1990s. Therefore, while the Proposed Action may have a long-term impact on the character of communities, this impact would not be significant.

4.5.2.1.2.1 Regional (Off-station) Land Use Controls

The Proposed Action would result in larger DNL noise contours and noise exposure, encompassing a larger land area. The Navy's AICUZ guidance recommends lower-density land uses within 65 dB DNL noise contours (see Table 3.5-1). With the changes in the DNL noise contours associated with the Proposed Action, land uses previously considered compatible may become incompatible per AICUZ recommendations; therefore, off-station land use controls may be impacted as a result.

The Navy has encouraged Island County to establish Accident Potential Zones (APZs) around OLF Coupeville and to establish land use controls and building standards appropriate for high noise areas. The Navy would continue to work with Island County, the City of Oak Harbor, and the Town of Coupeville as needed to plan for compatible use development within the projected DNL contours and conceptual APZs under all alternatives. As discussed in Section 3.5.2.2, Regional Land Use and Land Use Controls, the Navy has made positive changes through the Readiness and Environmental Protection Integration (REPI) Program, conservation easements, and navigation easements to ensure conservation and minimize the potential for incompatibility. In addition, the establishment of Ebey's Reserve (of which the Navy is one of the many land owners) as well as the Navy's REPI program have helped to ensure compatible land use and development around OLF Coupeville. The Navy would also refer to the

Washington Department of Commerce's December 2016 Civilian-Military Land Use Study to identify ways, if needed, to address potential land use conflicts with local jurisdictions.

Pursuant to the federal Coastal Zone Management Act and the state's Washington Coastal Zone Management Program, concurrence was received from Joe Burear, section manager of the Shorelands and Environmental Assistance Program of the State of Washington Department of Ecology, on September 20, 2017. Results of consultation with the State of Washington are included in Appendix C.

4.5.2.1.3 Land Use in the Noise Environment

4.5.2.1.3.1 DNL Noise Contours

Aircraft operations associated with home basing 35 or 36 additional Growler aircraft at the NAS Whidbey Island complex would result in an increase in the land area within the greater than 65 dB DNL noise contours when compared to the No Action Alternative. An analysis was conducted to compare projected DNL noise contours with the No Action Alternative in terms of compatibility with land uses in Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville. This was accomplished by comparing projected DNL contours and land use within Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville (see Figure 3.5-1).

Tables 4.5-1 through 4.5-15 show the changes in land use acreage around the NAS Whidbey Island complex under Alternatives 1 through 3 resulting from the addition of 35 or 36 Growler aircraft when compared to the No Action Alternative. Figures 4.5-1 through 4.5-6 show existing land use overlain with the noise contours associated with each alternative and scenario.

When compared with the No Action Alternative, the alternatives would result in an overall 9-percent to 18-percent increase in the acreage of land within the projected greater than 65 dB DNL noise contours.

- The largest increases in land use impacted by the greater than 65 dB DNL noise contours occur under Scenarios A and D across all alternatives.
- The smallest increases in land use impacted by the greater than 65 dB DNL noise contours occur under Scenario C (80 percent of operations at Ault Field and 20 percent at OLF Coupeville).
- Across all alternatives and scenarios surrounding Ault Field, agricultural land, parks, and other land categories experience the greatest increase in acreage within the greater than 65 dB DNL noise contours.
- Across all alternatives for Scenarios A and B surrounding OLF Coupeville, open space/forest and residential land categories experience the greatest increase in acreage within the greater than 65 dB DNL noise contours.
- Across all alternatives for Scenario C surrounding OLF Coupeville, the residential land category experiences the greatest increase, while park land decreases, in acreage within the greater than 65 dB DNL noise contours.
- Across all alternatives under Scenarios D and E surrounding OLF Coupeville, open space/forest, residential, rural, and transportation land categories experience the greatest increase, while agriculture and commercial land decrease, in acreage within the greater than 65 dB DNL noise contours.

Table 4.5-1 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario A, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario A (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	495 (+180)	234 (-76)	590 (+84)	1,319 (+17%)
Commercial	78	170	90	338	93 (+15)	155 (-15)	92 (+2)	340 (+1%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	64 (+8)	300 (-22)	197 (+13)	561 (0%)
Open Space/Forest	597	323	172	1,092	477 (-120)	414 (+91)	247 (+75)	1,138 (+4%)
Parks	471	185	245	901	617 (+146)	234 (+49)	250 (+5)	1,101 (+22%)
Residential ⁴	1,585	1,330	2,648	5,563	1,750 (+165)	1,313 (-17)	2,775 (+127)	5,838 (+5%)
Rural ⁵	361	517	1,350	2,228	369 (+8)	507 (-10)	1,415 (+65)	2,291 (+3%)
Transportation ⁶	121	112	342	575	133 (+12)	102 (-10)	356 (+14)	591 (+3%)
Other ⁷	11	0	0	11	34 (+23)	0 (0)	0 (0)	34 (+209%)
Subtotal	3,596	3,269	5,549	12,414	4,033 (+437)	3,259 (-10)	5,934 (+385)	13,226 (+7%)
OLF Coupeville								
Agriculture	837	705	30	1,572	326 (-511)	477 (-228)	1,081 (+1,051)	1,884 (+20%)
Commercial	1	0	0	1	2 (+1)	0 (0)	0 (0)	2 (+100%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	315 (-57)	420 (+114)	441 (+343)	1,176 (+52%)
Parks	47	7	0	54	59 (+12)	4 (-3)	0 (0)	63 (+17%)
Residential ⁴	1,388	1,019	229	2,636	442 (-946)	1,444 (+425)	2,100 (+1,871)	3,986 (+51%)
Rural ⁵	896	954	215	2,065	340 (-556)	816 (-138)	1,511 (+1,296)	2,667 (+29%)
Transportation ⁶	135	80	47	262	78 (-57)	87 (+7)	212 (+165)	377 (+44%)
Other ⁷	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-1 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario A, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario A (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	1,562 (-2,119)	3,248 (+160)	5,387 (+4,749)	10,197 (+38%)
TOTAL⁸	7,277	6,357	6,187	19,821	5,595 (-1,682)	6,507 (+150)	11,321 (+5,134)	23,423 (+18%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ “Federal” land use includes federally zoned land. “Federal” does not include the installation boundary.
- ⁴ “Residential” includes areas zoned as residential, as well as higher density areas zoned as “Rural” and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ “Rural” is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as “Rural,” parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in “Rural” zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ “Other” includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

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

Table 4.5-2 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario B, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario B (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Ault Field								
Agriculture	315	310	506	1,131	504 (+189)	227 (-83)	626 (+120)	1,357 (+20%)
Commercial	78	170	90	338	43 (-35)	202 (+32)	102 (+12)	347 (+3%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	316 (-6)	242 (+58)	562 (0%)
Open Space/Forest	597	323	172	1,092	447 (-150)	442 (+119)	262 (+90)	1,151 (+5%)
Parks	471	185	245	901	677 (+206)	228 (+43)	288 (+43)	1,193 (+32%)
Residential ⁴	1,585	1,330	2,648	5,563	1,711 (+126)	1,253 (-77)	3,044 (+396)	6,008 (+8%)
Rural ⁵	361	517	1,350	2,228	377 (+16)	501 (-16)	1,470 (+120)	2,348 (+5%)
Transportation ⁶	121	112	342	575	128 (+7)	102 (-10)	377 (+35)	607 (+6%)
Other ⁷	11	0	0	11	30 (+19)	0 (0)	0 (0)	30 (+173%)
Subtotal	3,596	3,269	5,549	12,414	3,922 (+326)	3,271 (+2)	6,423 (+874)	13,616 (+10%)
OLF Coupeville								
Agriculture	837	705	30	1,572	391 (-446)	514 (-191)	820 (+790)	1,725 (+10%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	315 (-57)	398 (+92)	326 (+228)	1,039 (+34%)
Parks	47	7	0	54	19 (-28)	0 (-7)	0 (0)	19 (-65%)
Residential ⁴	1,388	1,019	229	2,636	763 (-625)	1,581 (+562)	1,460 (+1,231)	3,804 (+44%)
Rural ⁵	896	954	215	2,065	461 (-435)	849 (-105)	1,212 (+997)	2,522 (+22%)
Transportation ⁶	135	80	47	262	65 (-70)	109 (+29)	165 (+118)	339 (+29%)
Other ⁷	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-2 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario B, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario B (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	2,015 (-1,666)	3,451 (+363)	4,025 (+3,387)	9,491 (+28%)
TOTAL⁸	7,277	6,357	6,187	19,821	5,937 (-1,340)	6,722 (+365)	10,448 (+4,261)	23,107 (+17%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

dB = decibel

DNL = day-night average sound level

Table 4.5-3 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario C, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario C (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	438 (+123)	186 (-124)	690 (+184)	1,314 (+16%)
Commercial	78	170	90	338	50 (-28)	194 (+24)	114 (+24)	358 (+6%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	1 (-55)	289 (-33)	270 (+86)	560 (0%)
Open Space/Forest	597	323	172	1,092	456 (-141)	423 (+100)	272 (+100)	1,151 (+5%)
Parks	471	185	245	901	719 (+248)	255 (+70)	332 (+87)	1,306 (+45%)
Residential ⁴	1,585	1,330	2,648	5,563	1,734 (+149)	1,197 (-133)	3,238 (+590)	6,169 (+11%)
Rural ⁵	361	517	1,350	2,228	383 (+22)	468 (-49)	1,542 (+192)	2,393 (+7%)
Transportation ⁶	121	112	342	575	125 (+4)	103 (-9)	390 (+48)	618 (+7%)
Other ⁷	11	0	0	11	40 (+29)	0 (0)	0 (0)	40 (+264%)
Subtotal	3,596	3,269	5,549	12,414	3,947 (+351)	3,115 (-154)	6,860 (+1,311)	13,922 (+12%)
OLF Coupeville								
Agriculture	837	705	30	1,572	496 (-341)	716 (+11)	226 (+196)	1,438 (-9%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal ³	0	2	7	9	0 (0)	1 (-1)	9 (+2)	10 (+11%)
Industrial	0	15	12	27	0 (0)	4 (-11)	23 (+11)	27 (0%)
Open Space/Forest	372	306	98	776	407 (+35)	245 (-61)	133 (+35)	785 (+1%)
Parks	47	7	0	54	1 (-46)	0 (-7)	0 (0)	1 (-98%)
Residential ⁴	1,388	1,019	229	2,636	1,577 (+189)	1,260 (+241)	484 (+255)	3,321 (+26%)
Rural ⁵	896	954	215	2,065	866 (-30)	829 (-125)	523 (+308)	2,218 (+7%)
Transportation ⁶	135	80	47	262	100 (-35)	120 (+40)	67 (+20)	287 (+10%)
Other ⁷	5	0	0	5	0 (-5)	5 (+5)	0 (0)	5 (0%)

Table 4.5-3 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario C, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario C (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	3,447 (-234)	3,180 (+92)	1,465 (+827)	8,092 (+9%)
TOTAL⁸	7,277	6,357	6,187	19,821	7,394 (+117)	6,295 (-62)	8,325 (+2,138)	22,014 (+11%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

dB = decibel

DNL = day-night average sound level

Table 4.5-4 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario D, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario D (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-69	70-74	>75	
Ault Field								
Agriculture	315	310	506	1,131	473 (+158)	210 (-100)	628 (+122)	1,311 (+16%)
Commercial	78	170	90	338	66 (-12)	180 (+10)	99 (+9)	345 (+2%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	29 (-27)	318 (-4)	215 (+31)	562 (0%)
Open Space/Forest	597	323	172	1,092	478 (-119)	406 (+83)	254 (+82)	1,138 (+4%)
Parks	471	185	245	901	640 (+169)	229 (+44)	280 (+35)	1,149 (+28%)
Residential ⁴	1,585	1,330	2,648	5,563	1,738 (+153)	1,261 (-69)	2,924 (+276)	5,923 (+6%)
Rural ⁵	361	517	1,350	2,228	376 (+15)	483 (-34)	1,453 (+103)	2,312 (+4%)
Transportation ⁶	121	112	342	575	135 (+14)	97 (-15)	370 (+28)	602 (+5%)
Other ⁷	11	0	0	11	40 (+29)	0 (0)	0 (0)	40 (+264%)
Subtotal	3,596	3,269	5,549	12,414	3,976 (+380)	3,184 (-85)	6,235 (+686)	13,395 (+8%)
OLF Coupeville								
Agriculture	837	705	30	1,572	327 (-510)	496 (-209)	1,013 (+983)	1,836 (+17%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	306 (-66)	425 (+119)	409 (+311)	1,140 (+47%)
Parks	47	7	0	54	49 (+2)	2 (-5)	0 (0)	51 (-6%)
Residential ⁴	1,388	1,019	229	2,636	490 (-898)	1,525 (+506)	1,933 (+1,704)	3,948 (+50%)
Rural ⁵	896	954	215	2,065	342 (-554)	845 (-109)	1,434 (+1,219)	2,621 (+27%)
Transportation ⁶	135	80	47	262	73 (-62)	94 (+14)	201 (+154)	368 (+40%)
Other ⁷	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-4 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario D, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario D (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-69	70-74	>75	
Subtotal	3,681	3,088	638	7,407	1,588 (-2,093)	3,387 (+299)	5,032 (+4,394)	10,007 (+35%)
TOTAL⁸	7,277	6,357	6,187	19,821	5,564 (-1,713)	6,571 (+214)	11,267 (+5,080)	23,402 (+18%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

dB = decibel

DNL = day-night average sound level

Table 4.5-5 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario E, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario E (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	443 (+128)	189 (-121)	682 (+176)	1,314 (+16%)
Commercial	78	170	90	338	48 (-30)	196 (+26)	110 (+20)	354 (+5%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	2 (-54)	298 (-24)	261 (+77)	561 (0%)
Open Space/Forest	597	323	172	1,092	457 (-140)	422 (+99)	268 (+96)	1,147 (+5%)
Parks	471	185	245	901	713 (+242)	245 (+60)	325 (+80)	1,283 (+42%)
Residential ⁴	1,585	1,330	2,648	5,563	1,720 (+135)	1,212 (-118)	3,188 (+540)	6,120 (+10%)
Rural ⁵	361	517	1,350	2,228	375 (+14)	474 (-43)	1,523 (+173)	2,372 (+6%)
Transportation ⁶	121	112	342	575	125 (+4)	103 (-9)	386 (+44)	614 (+7%)
Other ⁷	11	0	0	11	40 (+29)	0 (0)	0 (0)	40 (+264%)
Subtotal	3,596	3,269	5,549	12,414	3,924 (+328)	3,139 (-130)	6,755 (+1,206)	13,818 (+11%)
OLF Coupeville								
Agriculture	837	705	30	1,572	455 (-382)	598 (-107)	542 (+512)	1,595 (+1%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (+11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	413 (+41)	279 (-27)	200 (+102)	892 (+15%)
Parks	47	7	0	54	5 (-42)	0 (-7)	0 (0)	4 (-91%)
Residential ⁴	1,388	1,019	229	2,636	1,303 (-85)	1,464 (+445)	819 (+590)	3,586 (+36%)
Rural ⁵	896	954	215	2,065	759 (-137)	734 (-220)	874 (+659)	2,367 (+15%)
Transportation ⁶	135	80	47	262	79 (-56)	119 (+39)	107 (+60)	305 (+16%)
Other ⁷	5	0	0	5	0 (-5)	4 (+4)	1 (1)	5 (0%)

Table 4.5-5 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 1, Scenario E, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario E (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	3,014 (-667)	3,198 (+110)	2,580 (+1,942)	8,792 (+19%)
TOTAL⁸	7,277	6,357	6,187	19,821	6,938 (-339)	6,337 (-20)	9,335 (+3,148)	22,610 (+14%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

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

Table 4.5-6 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario A, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario A (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	490 (+175)	226 (-84)	595 (+89)	1,311 (+16%)
Commercial	78	170	90	338	97 (+19)	151 (-19)	91 (+1)	339 (0%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	68 (+12)	299 (-23)	194 (+10)	561 (0%)
Open Space/Forest	597	323	172	1,092	482 (-115)	413 (+90)	241 (+69)	1,136 (+4%)
Parks	471	185	245	901	593 (+122)	231 (+46)	246 (+1)	1,070 (+19%)
Residential ⁴	1,585	1,330	2,648	5,563	1,754 (+169)	1,330 (0)	2,747 (+99)	5,831 (+5%)
Rural ⁵	361	517	1,350	2,228	368 (+7)	510 (-7)	1,406 (+56)	2,284 (+3%)
Transportation ⁶	121	112	342	575	133 (+12)	103 (-9)	354 (+12)	590 (+3%)
Other ⁷	11	0	0	11	29 (+18)	0 (0)	0 (0)	29 (+164%)
Subtotal	3,596	3,269	5,549	12,414	4,015 (+419)	3,263 (-6)	5,886 (+337)	13,164 (+6%)
OLF Coupeville								
Agriculture	837	705	30	1,572	326 (-511)	490 (-215)	1,040 (+1,010)	1,856 (+18%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	308 (-64)	425 (+119)	420 (+322)	1,153 (+49%)
Parks	47	7	0	54	53 (+6)	3 (-4)	0 (0)	56 (+4%)
Residential ⁴	1,388	1,019	229	2,636	450 (-938)	1,531 (+512)	1,984 (+1,755)	3,965 (+50%)
Rural ⁵	896	954	215	2,065	340 (-556)	839 (-115)	1,459 (+1,244)	2,638 (+28%)
Transportation ⁶	135	80	47	262	75 (-60)	92 (+12)	204 (+157)	371 (+42%)
Other ⁷	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-6 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario A, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario A (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	1,553 (-2,128)	3,380 (+292)	5,149 (+4,511)	10,082 (+36%)
TOTAL⁸	7,277	6,357	6,187	19,821	5,568 (-1,709)	6,643 (+286)	11,035 (+4,848)	23,246 (+17%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

dB = decibel

DNL = day-night average sound level

Table 4.5-7 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario B, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario B (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	489 (+174)	224 (-86)	626 (+120)	1,339 (+18%)
Commercial	78	170	90	338	43 (-35)	203 (+33)	101 (+11)	347 (+3%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	321 (-1)	237 (+53)	562 (0%)
Open Space/Forest	597	323	172	1,092	462 (-135)	427 (+104)	257 (+85)	1,146 (+5%)
Parks	471	185	245	901	661 (+190)	225 (+40)	284 (+39)	1,170 (+30%)
Residential ⁴	1,585	1,330	2,648	5,563	1,706 (+121)	1,264 (-66)	3,016 (+368)	5,986 (+8%)
Rural ⁵	361	517	1,350	2,228	379 (+18)	500 (-17)	1,462 (+112)	2,341 (+5%)
Transportation ⁶	121	112	342	575	128 (+7)	102 (-10)	375 (+33)	605 (+5%)
Other ⁷	11	0	0	11	26 (+15)	0 (0)	0 (0)	26 (+136%)
Subtotal	3,596	3,269	5,549	12,414	3,899 (+303)	3,266 (-3)	6,370 (+821)	13,535 (+9%)
OLF Coupeville								
Agriculture	837	705	30	1,572	407 (-430)	526 (-179)	775 (+745)	1,708 (+9%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	316 (-56)	395 (+89)	308 (+210)	1,019 (+31%)
Parks	47	7	0	54	14 (-33)	0 (-7)	0 (0)	14 (-74%)
Residential ⁴	1,388	1,019	229	2,636	829 (-559)	1,589 (+570)	1,342 (+1,113)	3,760 (+43%)
Rural ⁵	896	954	215	2,065	492 (-404)	847 (-107)	1,162 (+947)	2,501 (+21%)
Transportation ⁶	135	80	47	262	65 (-70)	112 (+32)	155 (+108)	332 (+27%)
Other ⁷	5	0	0	5	0 (-5)	1 (+1)	5 (+5)	6 (20%)

Table 4.5-7 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario B, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario B (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	2,124 (-1,557)	3,470 (+382)	3,784 (+3,146)	9,378 (+27%)
TOTAL⁸	7,277	6,357	6,187	19,821	6,023 (-1,254)	6,736 (+379)	10,154 (+3,967)	22,913 (+16%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

dB = decibel

DNL = day-night average sound level

Table 4.5-8 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario C, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario C (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	436 (+121)	186 (-124)	685 (+179)	1,307 (+16%)
Commercial	78	170	90	338	48 (-30)	196 (+26)	110 (+20)	354 (+5%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	3 (-53)	298 (-24)	261 (+77)	562 (0%)
Open Space/Forest	597	323	172	1,092	463 (-134)	418 (+95)	265 (+93)	1,146 (+5%)
Parks	471	185	245	901	700 (+229)	243 (+58)	326 (+81)	1,269 (+41%)
Residential ⁴	1,585	1,330	2,648	5,563	1,716 (+131)	1,213 (-117)	3,187 (+539)	6,116 (+10%)
Rural ⁵	361	517	1,350	2,228	377 (+16)	473 (-44)	1,523 (+173)	2,373 (+7%)
Transportation ⁶	121	112	342	575	124 (+3)	103 (-9)	386 (+44)	613 (+7%)
Other ⁷	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,903 (+307)	3,130 (-139)	6,755 (+1,206)	13,788 (+11%)
OLF Coupeville								
Agriculture	837	705	30	1,572	499 (-338)	728 (+23)	175 (+145)	1,402 (-11%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal ³	0	2	7	9	0 (0)	1 (-1)	9 (+2)	10 (+11%)
Industrial	0	15	12	27	0 (0)	4 (-11)	23 (+11)	27 (0%)
Open Space/Forest	372	306	98	776	400 (+28)	236 (-70)	124 (+26)	760 (-2%)
Parks	47	7	0	54	0 (-47)	0 (-7)	0 (0)	0 (-100%)
Residential ⁴	1,388	1,019	229	2,636	1,576 (+188)	1,203 (+184)	441 (+212)	3,220 (+22%)
Rural ⁵	896	954	215	2,065	863 (-33)	851 (-103)	455 (+240)	2,169 (+5%)
Transportation ⁶	135	80	47	262	104 (-31)	120 (+40)	60 (+13)	284 (+8%)
Other ⁷	5	0	0	5	0 (-5)	5 (+5)	0 (0)	5 (0%)

Table 4.5-8 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario C, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario C (dB DNL)			Total (% change from NAA)
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	
Subtotal	3,681	3,088	638	7,407	3,442 (-239)	3,148 (+60)	1,287 (+649)	7,877 (+6%)
TOTAL⁸	7,277	6,357	6,187	19,821	7,345 (+68)	6,278 (-79)	8,042 (+1,855)	21,665 (+9%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

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

Table 4.5-9 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario D, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario D (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	468 (+153)	201 (-109)	633 (+127)	1,302 (+15%)
Commercial	78	170	90	338	71 (-7)	175 (+5)	98 (+8)	344 (+2%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	34 (-22)	316 (-6)	211 (+27)	561 (0%)
Open Space/Forest	597	323	172	1,092	485 (-112)	403 (+80)	249 (+77)	1,137 (+4%)
Parks	471	185	245	901	619 (+148)	225 (+40)	275 (+30)	1,119 (+24%)
Residential ⁴	1,585	1,330	2,648	5,563	1,744 (+159)	1,328 (-2)	2,842 (+194)	5,914 (+6%)
Rural ⁵	361	517	1,350	2,228	374 (+13)	486 (-31)	1,444 (+94)	2,304 (+3%)
Transportation ⁶	121	112	342	575	135 (+14)	100 (-12)	365 (+23)	600 (+4%)
Other ⁷	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,966 (+370)	3,234 (-35)	6,129 (+580)	13,329 (+7%)
OLF Coupeville								
Agriculture	837	705	30	1,572	337 (-500)	499 (-206)	970 (+940)	1,806 (+15%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (+11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	306 (-66)	419 (+113)	390 (+292)	1,115 (+58%)
Parks	47	7	0	54	42 (-5)	1 (-6)	0 (0)	43 (-20%)
Residential ⁴	1,388	1,019	229	2,636	542 (-846)	1,564 (+545)	1,815 (+1,586)	3,921 (+49%)
Rural ⁵	896	954	215	2,065	351 (-545)	862 (-92)	1,384 (+1,169)	2,597 (+26%)
Transportation ⁶	135	80	47	262	72 (-63)	98 (+18)	192 (+145)	362 (+38%)
Other ⁷	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-9 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario D, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario D (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	1,651 (-2,030)	3,443 (+355)	4,793 (+4,155)	9,887 (+33%)
TOTAL⁸	7,277	6,357	6,187	19,821	5,617 (-1,660)	6,677 (+320)	10,922 (+4,735)	23,216 (+17%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

dB = decibel

DNL = day-night average sound level

Table 4.5-10 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario E, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario E (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	442 (+127)	190 (-120)	676 (+170)	1,308 (+16%)
Commercial	78	170	90	338	46 (-32)	197 (+27)	107 (+17)	350 (+4%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	306 (-16)	252 (+68)	562 (0%)
Open Space/Forest	597	323	172	1,092	466 (-131)	418 (+95)	262 (+90)	1,146 (+5%)
Parks	471	185	245	901	693 (+222)	236 (+51)	318 (+73)	1,247 (+38%)
Residential ⁴	1,585	1,330	2,648	5,563	1,708 (+123)	1,226 (-104)	3,140 (+492)	6,074 (+9%)
Rural ⁵	361	517	1,350	2,228	378 (+17)	476 (-41)	1,507 (+157)	2,361 (+6%)
Transportation ⁶	121	112	342	575	125 (+4)	103 (-9)	383 (+41)	611 (+6%)
Other ⁷	11	0	0	11	35 (+24)	0 (0)	0 (+0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,898 (+302)	3,152 (-117)	6,657 (+1,108)	13,707 (+10%)
OLF Coupeville								
Agriculture	837	705	30	1,572	465 (-372)	609 (-96)	497 (+467)	1,571 (0%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (-11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	417 (+45)	273 (-33)	185 (+87)	875 (+13%)
Parks	47	7	0	54	5 (-42)	0 (-7)	0 (0)	5 (-91%)
Residential ⁴	1,388	1,019	229	2,636	1,375 (-13)	1,422 (+403)	769 (+540)	3,566 (+35%)
Rural ⁵	896	954	215	2,065	791 (-105)	731 (-223)	823 (+608)	2,345 (+14%)
Transportation ⁶	135	80	47	262	83 (-52)	117 (+37)	102 (+55)	302 (+15%)
Other ⁷	5	0	0	5	0 (-5)	5 (+5)	0 (0)	5 (0%)

Table 4.5-10 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 2, Scenario E, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario E (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	3,136 (-545)	3,157 (+69)	2,413 (+1,775)	8,706 (+18%)
TOTAL⁸	7,277	6,357	6,187	19,821	7,034 (-243)	6,309 (-48)	9,070 (+2,883)	22,413 (+13%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

dB = decibel

DNL = day-night average sound level

Table 4.5-11 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario A, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario A (dB DNL)			Total (% change from NAA)
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	483 (+168)	230 (-80)	590 (+84)	1,303 (+15%)
Commercial	78	170	90	338	98 (+20)	150 (-20)	91 (+1)	339 (0%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	69 (+13)	299 (-23)	193 (+9)	561 (0%)
Open Space/Forest	597	323	172	1,092	487 (-110)	409 (+86)	239 (+67)	1,135 (+4%)
Parks	471	185	245	901	587 (+116)	231 (+46)	245 (0)	1,063 (+18%)
Residential ⁴	1,585	1,330	2,648	5,563	1,751 (+166)	1,328 (-2)	2,740 (+92)	5,819 (+5%)
Rural ⁵	361	517	1,350	2,228	368 (+7)	512 (-5)	1,403 (+53)	2,283 (+2%)
Transportation ⁶	121	112	342	575	133 (+12)	103 (-9)	353 (+11)	589 (+2%)
Other ⁷	11	0	0	11	28 (+17)	0 (0)	0 (0)	28 (+155%)
Subtotal	3,596	3,269	5,549	12,414	4,005 (+409)	3,262 (-7)	5,866 (+317)	13,133 (+6%)
OLF Coupeville								
Agriculture	837	705	30	1,572	329 (-508)	483 (-222)	1,057 (+1,027)	1,869 (+19%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	312 (-60)	423 (+117)	428 (+330)	1,163 (+50%)
Parks	47	7	0	54	55 (+8)	4 (-3)	0 (0)	59 (+9%)
Residential ⁴	1,388	1,019	229	2,636	448 (-940)	1,494 (+475)	2,031 (+1,802)	3,973 (+51%)
Rural ⁵	896	954	215	2,065	341 (-555)	829 (-125)	1,480 (+1,265)	2,650 (+28%)
Transportation ⁶	135	80	47	262	77 (-58)	90 (+10)	208 (+161)	375 (+43%)
Other ⁷	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-11 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario A, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario A (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	1,563 (-2,118)	3,323 (+235)	5,246 (+4,608)	10,132 (+37%)
TOTAL⁸	7,277	6,357	6,187	19,821	5,568 (-1,709)	6,585 (+228)	11,112 (+4,925)	23,265 (+17%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

dB = decibel

DNL = day-night average sound level

Table 4.5-12 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario B, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario B (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	496 (+181)	223 (-87)	626 (+120)	1,345 (+19%)
Commercial	78	170	90	338	43 (-35)	203 (+33)	100 (+10)	346 (+2%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	322 (0)	235 (+51)	561 (0%)
Open Space/Forest	597	323	172	1,092	462 (-135)	429 (+106)	257 (+85)	1,148 (+5%)
Parks	471	185	245	901	661 (+190)	225 (+40)	282 (+37)	1,168 (+30%)
Residential ⁴	1,585	1,330	2,648	5,563	1,707 (+122)	1,267 (-63)	3,010 (+362)	5,984 (+8%)
Rural ⁵	361	517	1,350	2,228	379 (+18)	500 (-17)	1,460 (+110)	2,339 (+5%)
Transportation ⁶	121	112	342	575	128 (+7)	102 (-10)	375 (+33)	605 (+5%)
Other ⁷	11	0	0	11	26 (+15)	0 (0)	0 (0)	26 (+136%)
Subtotal	3,596	3,269	5,549	12,414	3,907 (+311)	3,271 (+2)	6,357 (+808)	13,535 (+9%)
OLF Coupeville								
Agriculture	837	705	30	1,572	397 (-440)	519 (-186)	802 (+772)	1,718 (90%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	316 (+56)	396 (+90)	319 (+221)	1,031 (+33%)
Parks	47	7	0	54	17 (-30)	0 (-7)	0 (0)	17 (-69%)
Residential ⁴	1,388	1,019	229	2,636	788 (-600)	1,585 (+566)	1,415 (+1,186)	3,788 (+44%)
Rural ⁵	896	954	215	2,065	474 (-422)	848 (-106)	1,192 (+977)	2,514 (+22%)
Transportation ⁶	135	80	47	262	65 (-70)	110 (+30)	161 (+114)	336 (+28%)
Other ⁷	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-12 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario B, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario B (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	2,058 (-1,623)	3,458 (+370)	3,931 (+3,293)	9,447 (+28%)
TOTAL⁸	7,277	6,357	6,187	19,821	5,965 (-1,312)	6,729 (+372)	10,288 (+4,101)	22,982 (+16%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

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

Table 4.5-13 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario C, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario C (dB DNL)			Total (% change from NAA)
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	431 (+116)	183 (-127)	687 (+181)	1,301 (+15%)
Commercial	78	170	90	338	48 (-30)	197 (+27)	109 (+19)	354 (+5%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	3 (-53)	299 (-23)	259 (+75)	561 (0%)
Open Space/Forest	597	323	172	1,092	467 (-130)	415 (+92)	264 (+92)	1,146 (+5%)
Parks	471	185	245	901	698 (+227)	241 (+56)	324 (+79)	1,263 (+40%)
Residential ⁴	1,585	1,330	2,648	5,563	1,713 (+128)	1,218 (-112)	3,181 (+533)	6,112 (+10%)
Rural ⁵	361	517	1,350	2,228	377 (+16)	473 (-44)	1,519 (+169)	2,369 (+6%)
Transportation ⁶	121	112	342	575	124 (+3)	103 (-9)	385 (+43)	612 (+6%)
Other ⁷	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,897 (+301)	3,129 (-140)	6,740 (+1,191)	13,766 (+11%)
OLF Coupeville								
Agriculture	837	705	30	1,572	497 (-340)	719 (+14)	208 (+178)	1,424 (-9%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal ³	0	2	7	9	0 (0)	1 (-1)	9 (+2)	10 (11%)
Industrial	0	15	12	27	0 (0)	4 (-11)	23 (+11)	27 (0%)
Open Space/Forest	372	306	98	776	404 (+32)	242 (-64)	129 (+31)	775 (0%)
Parks	47	7	0	54	0 (-47)	0 (-7)	0 (0)	0 (-100%)
Residential ⁴	1,388	1,019	229	2,636	1,570 (+182)	1,238 (+219)	468 (+239)	3,276 (+24%)
Rural ⁵	896	954	215	2,065	860 (-36)	838 (-116)	497 (+282)	2,195 (+6%)
Transportation ⁶	135	80	47	262	101 (-34)	121 (+41)	64 (+17)	286 (+9%)
Other ⁷	5	0	0	5	0 (-4)	5 (+4)	0 (0)	5 (0%)

Table 4.5-13 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario C, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario C (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	3,432 (-249)	3,168 (+80)	1,398 (+760)	7,998 (+8%)
TOTAL⁸	7,277	6,357	6,187	19,821	7,329 (+52)	6,297 (-60)	8,138 (+1,951)	21,764 (+10%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

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

Table 4.5-14 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario D, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario D (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	462 (+147)	205 (-105)	628 (+122)	1,295 (+15%)
Commercial	78	170	90	338	71 (-7)	175 (+5)	98 (+8)	344 (+2%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	36 (-20)	316 (-6)	210 (+26)	562 (0%)
Open Space/Forest	597	323	172	1,092	489 (-108)	399 (+76)	248 (+76)	1,136 (+4%)
Parks	471	185	245	901	616 (+145)	225 (+40)	273 (+28)	1,114 (+24%)
Residential ⁴	1,585	1,330	2,648	5,563	1,738 (+153)	1,326 (-4)	2,835 (+187)	5,899 (+6%)
Rural ⁵	361	517	1,350	2,228	375 (+14)	486 (-31)	1,441 (+91)	2,302 (+3%)
Transportation ⁶	121	112	342	575	135 (+14)	101 (-11)	364 (+22)	600 (+4%)
Other ⁷	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,958 (+362)	3,233 (-36)	6,109 (+560)	13,300 (+7%)
OLF Coupeville								
Agriculture	837	705	30	1,572	319 (-518)	511 (-194)	988 (+958)	1,818 (+16%)
Commercial	1	0	0	1	1 (0)	0 (0)	0 (0)	1 (0%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	302 (-70)	428 (+122)	398 (+300)	1,128 (+45)
Parks	47	7	0	54	45 (-2)	2 (-5)	0 (0)	47 (-13%)
Residential ⁴	1,388	1,019	229	2,636	499 (-889)	1,570 (+551)	1,862 (+1,633)	3,931 (+49%)
Rural ⁵	896	954	215	2,065	343 (-553)	859 (-95)	1,404 (+1,189)	2,606 (+26%)
Transportation ⁶	135	80	47	262	73 (-62)	97 (+17)	196 (+149)	366 (+40%)
Other ⁷	5	0	0	5	0 (-5)	0 (0)	5 (+5)	5 (0%)

Table 4.5-14 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario D, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario D (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	1,582 (-2,099)	3,467 (+379)	4,890 (+4,252)	9,939 (+34%)
TOTAL⁸	7,277	6,357	6,187	19,821	5,540 (-1,737)	6,700 (+343)	10,999 (+4,812)	23,239 (+17%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

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

Table 4.5-15 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario E, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario E (dB DNL)			Total (% change from NAA)
	65-<70	70- <75	>=75	Total	65-<70	70-<75	>=75	
Ault Field								
Agriculture	315	310	506	1,131	436 (+121)	187 (-123)	678 (+172)	1,301 (+15%)
Commercial	78	170	90	338	45 (-33)	198 (+28)	107 (+17)	350 (+4%)
Federal ³	1	0	12	13	1 (0)	0 (0)	12 (0)	13 (0%)
Industrial	56	322	184	562	4 (-52)	307 (-15)	251 (+67)	562 (0%)
Open Space/Forest	597	323	172	1,092	470 (-127)	415 (+92)	261 (+89)	1,146 (+5%)
Parks	471	185	245	901	676 (+205)	235 (+50)	317 (+72)	1,228 (+36%)
Residential ⁴	1,585	1,330	2,648	5,563	1,704 (+119)	1,230 (-100)	3,130 (+482)	6,064 (+9%)
Rural ⁵	361	517	1,350	2,228	379 (+18)	476 (-41)	1,505 (+155)	2,360 (+6%)
Transportation ⁶	121	112	342	575	125 (+4)	103 (-9)	382 (+40)	610 (+6%)
Other ⁷	11	0	0	11	35 (+24)	0 (0)	0 (0)	35 (+218%)
Subtotal	3,596	3,269	5,549	12,414	3,875 (+279)	3,151 (-118)	6,643 (+1,094)	13,669 (+10%)
OLF Coupeville								
Agriculture	837	705	30	1,572	459 (-378)	601 (-104)	526 (+496)	1,586 (+1%)
Commercial	1	0	0	1	0 (-1)	0 (0)	0 (0)	0 (-100%)
Federal ³	0	2	7	9	0 (0)	0 (-2)	10 (+3)	10 (11%)
Industrial	0	15	12	27	0 (0)	0 (-15)	27 (+15)	27 (0%)
Open Space/Forest	372	306	98	776	415 (+43)	276 (-30)	195 (+97)	886 (+14%)
Parks	47	7	0	54	5 (-42)	0 (-7)	0 (0)	5 (-91%)
Residential ⁴	1,388	1,019	229	2,636	1,332 (-56)	1,447 (+428)	799 (+570)	3,578 (+36%)
Rural ⁵	896	954	215	2,065	772 (-124)	732 (-222)	855 (+640)	2,359 (+14%)
Transportation ⁶	135	80	47	262	80 (-55)	118 (+38)	105 (+58)	303 (+16%)
Other ⁷	5	0	0	5	0 (-5)	4 (+4)	1 (+1)	5 (0%)

Table 4.5-15 NAS Whidbey Island Complex Land Use Acreage (+/-)¹ within the DNL Contours² for Alternative 3, Scenario E, during an Average Year

Land Use	No Action Alternative (NAA) (dB DNL)				Scenario E (dB DNL)			
	65-<70	70-<75	>=75	Total	65-<70	70-<75	>=75	Total (% change from NAA)
Subtotal	3,681	3,088	638	7,407	3,063 (-618)	3,178 (+90)	2,518 (+1,880)	8,759 (+18%)
TOTAL⁸	7,277	6,357	6,187	19,821	6,938 (-339)	6,329 (-28)	9,161 (+2,974)	22,428 (+13%)

Notes:

- ¹ The difference between No Action Alternative and Alternative 1 is noted in parentheses.
- ² Scenarios A, B, and C are outlined in Section 2.3.3, where the split represents the percent of FCLPs conducted at Ault Field and OLF Coupeville, respectively (i.e., 20/80 FCLP split = 20 percent of FCLPs at Ault Field and 80 percent of FCLPs at OLF Coupeville).
- ³ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ⁴ "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ⁵ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.
- ⁶ The transportation land use category includes gaps in land use data that appeared to be roads; however, this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁷ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.
- ⁸ Acreages have been rounded to ensure totals sum.

Key:

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

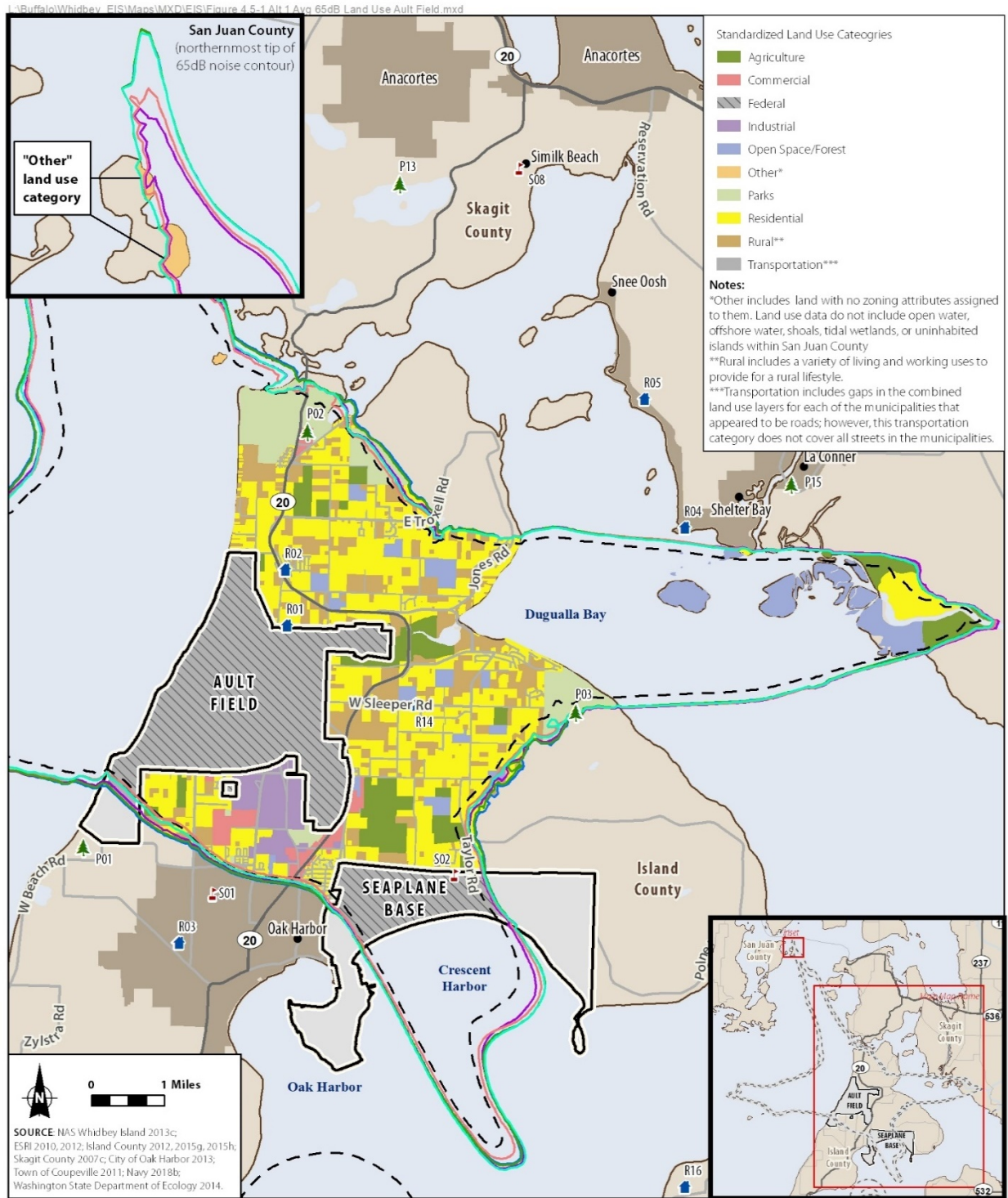


Figure 4.5-1
Alternative 1 Overview of the 65 dB DNL Noise Contours and Land Use for Ault Field
 Whidbey Island, Island County, WA

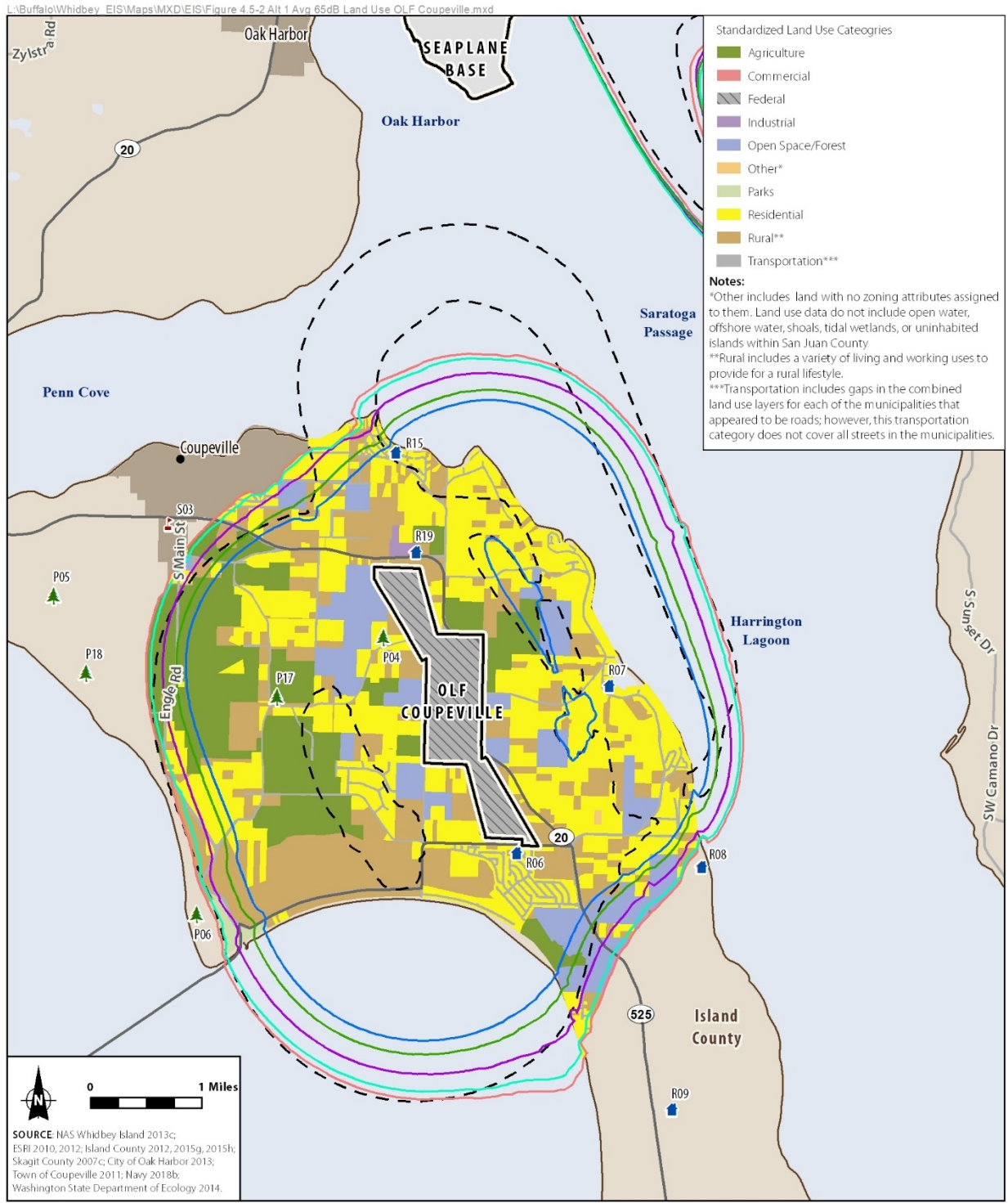


Figure 4.5-2
Alternative 1 Overview of the 65 dB DNL Noise Contours and Land Use for OLF Coupeville
 Whidbey Island, Island County, WA

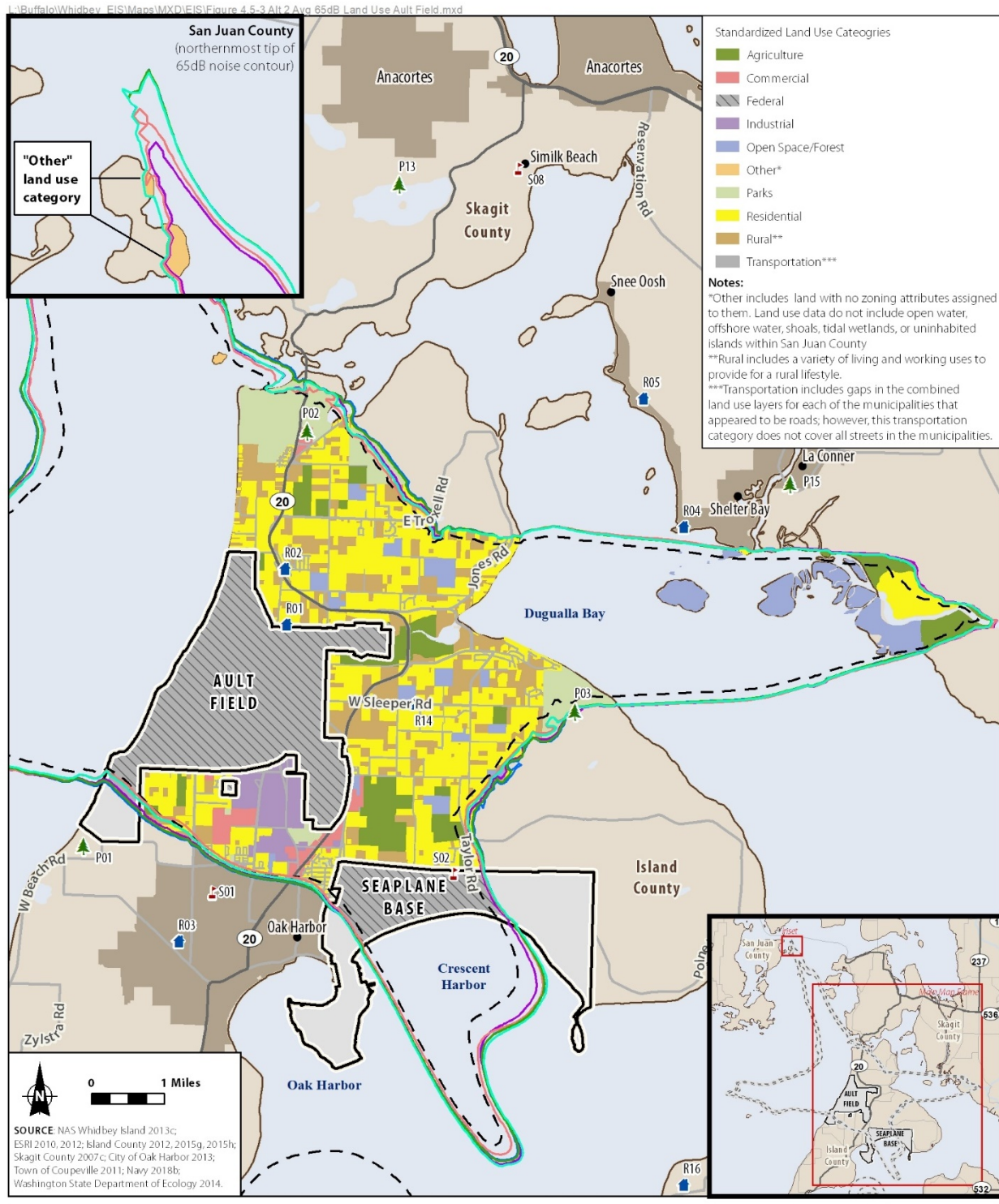


Figure 4.5-3
Alternative 2 Overview of the 65 dB DNL Noise Contours and Land Use for Ault Field
 Whidbey Island, Island County, WA

- City
- County Boundary
- U.S. and State Highway
- Major Road
- City/Town Boundary
- Installation Area
- ▲ Points of Interest (POI)
- ▲ Park
- Residential
- School
- Alternative 2A (Average Year) DNL Noise Contour (65 dB)
- Alternative 2B (Average Year) DNL Noise Contour (65 dB)
- Alternative 2C (Average Year) DNL Noise Contour (65 dB)
- Alternative 2D (Average Year) DNL Noise Contour (65 dB)
- Alternative 2E (Average Year) DNL Noise Contour (65 dB)
- No Action (Average Year) (≥65 dB)

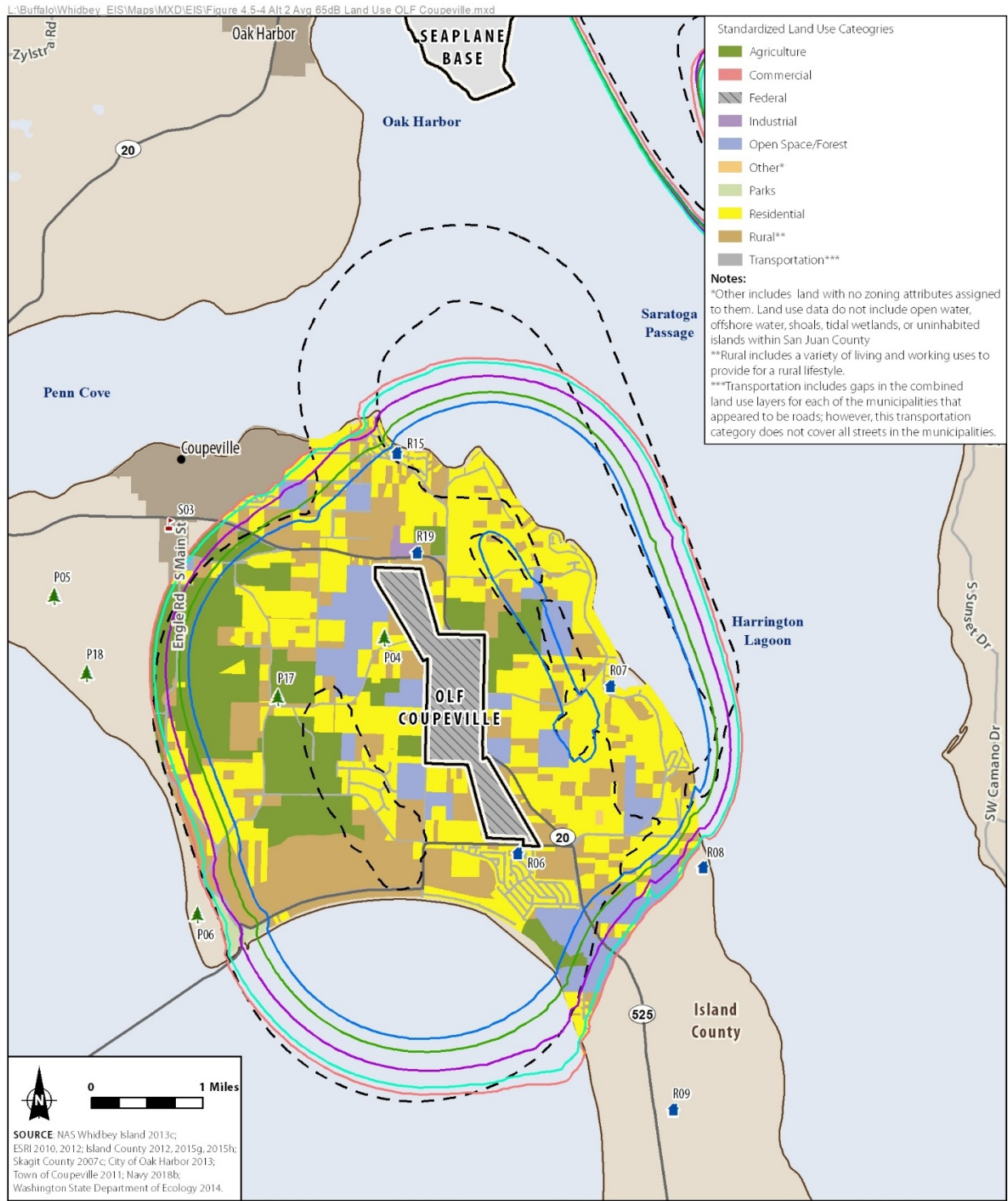
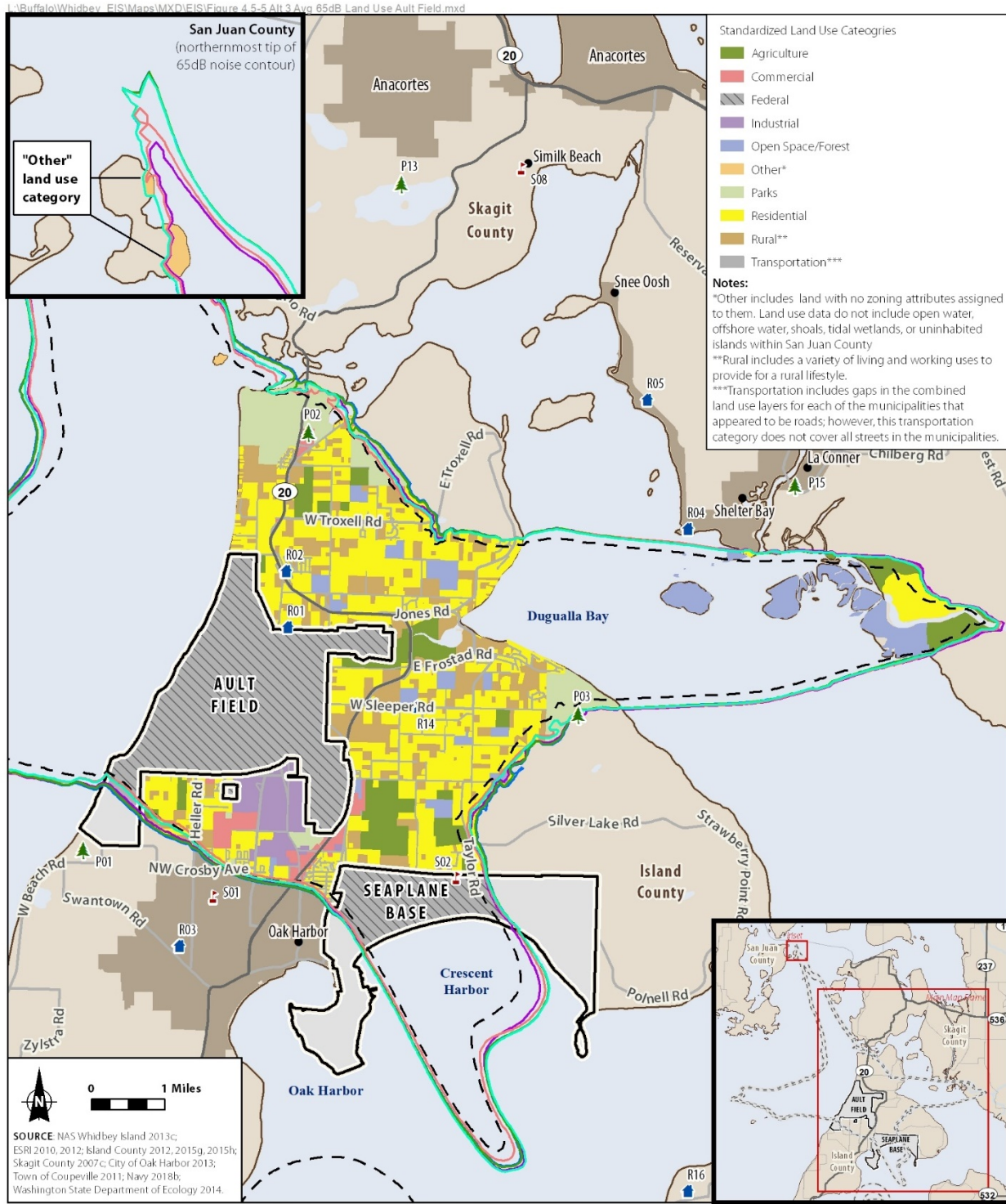


Figure 4.5-4
Alternative 2 Overview of the 65 dB DNL Noise Contours and Land Use for OLF Coupeville
 Whidbey Island, Island County, WA

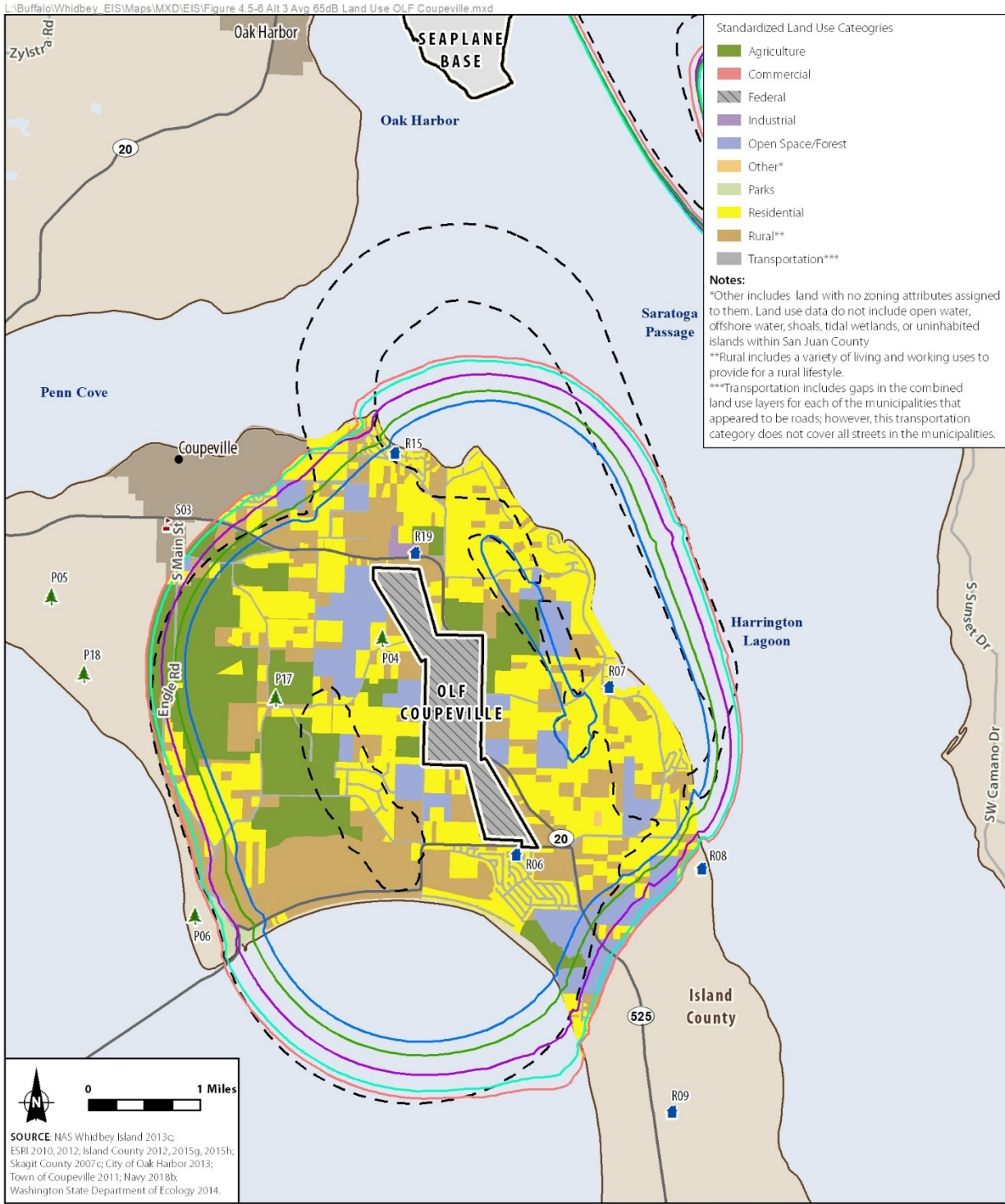
● City	Points of Interest (POI)	Alternative 2A (Average Year) DNL Noise Contour (65 dB)	Alternative 2D (Average Year) DNL Noise Contour (65 dB)
— County Boundary	🌳 Park	Alternative 2B (Average Year) DNL Noise Contour (65 dB)	Alternative 2E (Average Year) DNL Noise Contour (65 dB)
— U.S. and State Highway	🏠 Residential	Alternative 2C (Average Year) DNL Noise Contour (65 dB)	— No Action (Average Year) (≥65 dB)
— Major Road	🎓 School		
— City/Town Boundary			
▭ Installation Area			



SOURCE: NAS Whidbey Island 2013c; ESRI 2010, 2012; Island County 2012, 2015g, 2015lv; Skagit County 2007c; City of Oak Harbor 2013; Town of Coupeville 2011; Navy 2018b; Washington State Department of Ecology 2014.

- City
- County Boundary
- U.S. and State Highway
- Major Road
- City/Town Boundary
- ▭ Installation Area
- ▲ Park
- 🏠 Residential
- 🎓 School
- Alternative 3A (Average Year) DNL Noise Contour (65 dB)
- Alternative 3B (Average Year) DNL Noise Contour (65 dB)
- Alternative 3C (Average Year) DNL Noise Contour (65 dB)
- Alternative 3D (Average Year) DNL Noise Contour (65 dB)
- Alternative 3E (Average Year) DNL Noise Contour (65 dB)
- No Action (Average Year) (≥65 dB)

Figure 4.5-5
Alternative 3 Overview of the 65 dB DNL Noise Contours and Land Use for Ault Field
 Whidbey Island, Island County, WA



- City
- County Boundary
- U.S. and State Highway
- Major Road
- City/Town Boundary
- ▭ Installation Area
- ▲ Park
- Residential
- School
- Alternative 3A (Average Year) DNL Noise Contour (65 dB)
- Alternative 3B (Average Year) DNL Noise Contour (65 dB)
- Alternative 3C (Average Year) DNL Noise Contour (65 dB)
- Alternative 3D (Average Year) DNL Noise Contour (65 dB)
- Alternative 3E (Average Year) DNL Noise Contour (65 dB)
- No Action (Average Year) (≥65 dB)

Figure 4.5-6
Alternative 3 Overview of the 65 dB DNL Noise Contours and Land Use for OLF Coupeville
 Whidbey Island, Island County, WA

- Per OPNAVINST 11010.36C (AICUZ program), residential land use is not recommended within the greater than 65 dB DNL noise contour (see Table 3.5-1). Further, as described in Section 3.5.2.2.3, Island County has implemented an airport and aviation safety overlay district that applies additional standards to properties located within underlying zoning districts. These standards include noise-level reduction requirements ranging between 25 dB and 30 dB, depending on structure type, location within DNL contours, and disclosure. The Navy's official land use recommendations will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish land use controls and to adopt zoning restrictions taking into account a wide range of land-use factors, including the Navy's recommendations (see Sections 4.3.2.3 and 4.5.2.1 for more details on the AICUZ study and land use compatibility). Residential land use would exist within each DNL noise contour and under each alternative and scenario.
- Compared to the No Action Alternative, the largest increases in residential land use impacted by the greater than 65 dB DNL noise contours surrounding Ault Field occur under Alternative 1, Scenarios C and E; Alternative 2, Scenario C; and Alternative 3, Scenario C.
- Under Alternative 1, Scenario C, residential land use within the projected greater than 65 dB DNL noise contours surrounding Ault Field would experience the greatest increase.
- Compared to the No Action Alternative, the largest increases in residential land use impacted by the greater than 65 dB DNL contours surrounding OLF Coupeville occur under Scenarios A and D under all alternatives.

4.5.2.1.3.2 Accident Potential Zones

There would be no change in APZs at Ault Field under any of the alternatives. No impacts to land use would occur under the current APZs at Ault Field.

Regarding OLF Coupeville, Alternative 1, Scenarios A, B, and D; Alternative 2, Scenarios A, B, and D; and Alternative 3, Scenarios A, B, and D would have conceptual APZs for Runway 32 only (see Table 4.3-1 and Figure 4.3-1). The land use acreages within the conceptual APZs for Runway 32 are shown below in Table 4.5-16; these acreages represent the change from the No Action Alternative. Generally, the majority of impacted land within APZ-I is residential and rural land, and the majority of impacted land within APZ-II is agricultural and rural land.

Per OPNAVINST 11010.36C, single residential units at a maximum density of one to two dwelling units per acre and cluster housing development to achieve this density are compatible with APZ-II (see Table 3.5-1). Planned Unit Developments of single-family detached units where clustered housing may increase density, provided the amount of surface area covered by structures does not exceed 20 percent of the Planned Unit Development total area, thus resulting in large open areas, are compatible with APZ-II. All other residential land use is incompatible. Further details regarding land use impacts would be analyzed under a follow-on AICUZ study process and recommendations made to the municipality and/or county, as land use designations fall under their responsibility.

Because there would be no change in APZs at OLF Coupeville under Scenario C and E for all alternatives, no impacts to land use would occur due to the designation of new APZs.

There would be no change in Clear Zones at Ault Field or OLF Coupeville under any of the alternatives and, therefore, no impacts to land use would occur in the current Clear Zones.

Table 4.5-16 Land Use Acreage within Conceptual APZs for Runway 32 at OLF Coupeville

	<i>APZ- I</i>	<i>APZ- II</i>	<i>TOTAL</i>
Land Use			
Agriculture	8	555	563
Commercial	0	0	0
Federal ¹	4	0	4
Industrial	1	0	1
Open Space/Forest	90	0	90
Parks	0	0	0
Residential ²	267	236	503
Rural ³	147	376	523
Transportation ⁴	50	24	74
Other ⁵	2	650	652
Total	569	1,841	2,410

Notes:

- ¹ "Federal" land use includes federally zoned land. "Federal" does not include the installation boundary.
- ² "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).
- ³ "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres
- ⁴ The transportation land use category includes gaps in land use data that appeared to be roads; however this transportation category does not cover all streets within the counties/municipalities. This layer was created in order to minimize data gaps within the land use data.
- ⁵ "Other" includes lands with no zoning attributes assigned to them. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

Key:

APZ = Accident Potential Zone

4.5.2.2 Potential Impacts, Recreation and Wilderness

As noted in Section 3.2, Noise, annoyance is a primary human response to recurring high noise levels, and the level of annoyance experienced by a human noise receptor tends to vary based on activity. Noise may detract from the experience and enjoyment of visitors to parks and their perception of a landscape, particularly if the type of noise is not perceived to "fit" with the setting (i.e., a technological noise in a natural setting) (Krog, Engdahl, and Tambs, 2010a; Reid and Olson, 2013; Mace et al., 1999; Miller, 1999). Studies of the effects of aircraft noise on outdoor recreation are limited. However, recurring, intrusive aircraft noise has been found to be a primary environmental factor causing visitors to parks to become annoyed and may detract from their overall experience of a park or recreational activity (Krog, Engdahl, and Tambs, 2010a; Reid and Olson, 2013; Mace et al., 1999). Noticing an aircraft, visually or audibly, in a national park or wilderness area may disrupt the feeling that the area is

“pristine” or in its natural state and affect visitors’ perceptions of their experience and the naturalness of the area (Mace et al., 1999).

One study of aircraft noise effects on outdoor recreationists showed that reported annoyance by outdoor recreationists or changes in their use of parks and other outdoor recreation areas depend upon multiple factors such as their frequency of use of the recreation area, the recreation activities in which they are engaged, and the degree of change in noise exposure (Krog, Engdahl, and Tambs, 2010b). People who use a park less frequently are more likely to change their patterns of use in response to changes in noise exposure. The type of activity also plays a role in response to noise, with outdoor recreationists who value natural experiences more likely to change their patterns of use in response to aircraft operations (Krog, Engdahl, and Tambs, 2010b).

The effects discussed above may be experienced by people engaged in outdoor recreational activities in other areas outside of parks and designated recreational land, such as in urban centers or rural areas. While these areas may be exposed to other technological sound sources, such as automobiles or stationary equipment, and additional noise from human activity, recurring, intrusive aircraft noise may still affect the perceptions of people using these areas for recreation and affect experiences of soundscapes that may be typically associated with that type of environment.

Users of parks and recreational areas in northern and central Whidbey Island have reported the need to wear hearing protection while outdoors during sporting events or other activities (see Appendix M). Sections 4.2.2.1.2, 4.2.3.1.2, and 4.2.4.1.2 note that because of the intermittent nature of aircraft operations and the amount of time most people spend indoors, it is highly unlikely for individuals living or recreating around Ault Field or OLF Coupeville to experience noise exposure that would lead to hearing loss. In addition, as noted in Section 3.2.3 and Appendix A, no studies have shown a definitive causal and significant relationship between aircraft noise and health. While available data suggest that wearing hearing protection equipment while engaged in outdoor activities near Ault Field and OLF Coupeville would not be required to protect hearing or nonauditory health, individuals who are more sensitive to noise or individuals exposed to L_{max} above 110 dBA may find that wearing hearing protection allows them to participate in outdoor activities more comfortably.

NAS Whidbey Island has an active public relations process to inform members of the public of upcoming FCLPs so that individuals have the ability to plan outdoor activities. Information on FCLP schedules is shared with the media in the Puget Sound region and is posted on the command’s Facebook page and website every week. Members of the public also have the option to obtain these releases directly by signing up for them on the command’s webpage news section. The command uses the same process to tell the public about other events that may increase noise or have more impacts on specific areas for short periods of time.

Section 3.5 discusses the different types of outdoor recreational opportunities that exist within the study area. This section includes an analysis of the effects of the Proposed Action on outdoor recreation, primarily as a result of noise effects on the visitor experience and park management. Noise effects on outdoor recreation are discussed generally. Aircraft noise may result in more or less of an impact on outdoor recreation, depending on the activity. As noted above, when people are engaged in activities during which they expect or desire a more natural soundscape, such as hiking, beachcombing, or camping, they may be more annoyed by aircraft noise than when they are engaged in noisier activities or activities in more urban settings with other sources of transportation or technological noise. For the purposes of the analysis, a maximum sound level of 50 dB outdoors is used to capture occurrences of

outdoor speech interference, which is used as an indicator for potential annoyance for people engaged in all types of outdoor recreational activities.

Regardless of the alternative chosen, the additional Growler aircraft have the same noise signature and would generally use the same operating procedures, flight routes, and altitudes used by Growler aircraft currently home based at Ault Field. The types of aircraft operations at Ault Field and OLF Coupeville would not change. The discussion below focuses on potential changes resulting from differences in the number of average annual operations and the overall numbers of noise events per DNL daytime hour that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). For parks and recreation areas for which the annual average number of noise events greater than 50 dB outdoors has not been modeled, potential changes in annual average DNL at that location were assessed. Changes in the annual numbers of noise events with L_{max} over 100 dB are discussed for parks and recreational areas within the study area for which this supplemental analysis was conducted (see Section 4.2 for additional discussion). The alternatives are compared to conditions under the No Action Alternative, which do not vary to a significant degree from affected environment conditions. The data referenced below also are presented in Section 4.2.

4.5.2.2.1 Wilderness

Potential Impacts on Wilderness Recreation

An exposed bedrock formation within the San Juan Islands Wilderness, Williamson Rocks, would be within or partially within the 65 dB to 70 dB DNL contour range under all alternatives and scenarios. Williamson Rocks is closed to public entry to protect sensitive wildlife species and habitat, and recreational opportunities associated with this wilderness area are limited to wildlife and scenic viewing primarily from boats and kayaks offshore. Growler operations currently affect visitors' experience of the wilderness character of the rocks when aircraft are operating in the vicinity.

Implementation of the Proposed Action would increase average annual noise levels (DNL) at Williamson Rocks under all alternatives and would result in reduced opportunities for visitors to experience natural soundscapes associated with the rocks and surrounding waters. Based on the increase in average noise levels and the continued impact on visitor experience as a result of Growler operations, the Proposed Action would have moderate long-term impacts on recreation near wilderness designated at Williamson Rocks. These impacts would be intermittent and occur only when Growlers are operating in the area.

Potential Impacts on Wilderness Management

Growler operations currently affect and would continue to affect the U.S. Fish and Wildlife Service's (USFWS's) ability to preserve visitors' experience of predominantly natural sights and sounds in the Williamson Rocks wilderness area. This preservation of the visitor experience is an objective in the USFWS's Comprehensive Conservation Plan and Wilderness Stewardship Plan addressing the San Juan Islands Wilderness (USFWS, 2010c). The Proposed Action also would impact the USFWS's ability to manage Williamson Rocks to protect wilderness values. The Proposed Action's increase in Growler operations would increase annual average noise levels at and near this wilderness area. Aircraft operations would continue to affect visitors' experience of solitude and primitive recreation activities and would likely negatively affect visitors' perceptions of the area as retaining its primeval, natural character. Impacts to the visitor experience and wilderness character would be intermittent over the long term, occurring only when aircraft are transiting the area. When aircraft are operating in the area,

they would be momentarily overhead, and ambient noise levels would be restored as the aircraft continues to its destination.

Section 4.8.2.1 discusses potential impacts of the Proposed Action on birds, including waterfowl. In general, aircraft noise disturbances may cause startle and other behavioral responses that may last one to several hours after the event, depending on the species, but are not likely to disrupt major behavior patterns. The Proposed Action is not expected to have an adverse impact at the population level and would not result in significant impacts on the USFWS's ability to protect and manage wildlife populations. Williamson Rocks is located approximately 5.5 miles northwest of Ault Field. Growler aircraft transit at altitudes higher than 2,500 feet above MSL at this distance from the airfield, as directed by ATC procedures (FAA, 2016; OPNAVINST 3770.21, Airspace Procedures and Planning Manual), which would comply with the USFWS's recommended 2,000-foot aircraft ceiling over wilderness islands and 1,000-foot avoidance area around nesting seabird colonies (USFWS, 2010c).

The Proposed Action under all alternatives would result in moderate, long-term impacts on management of Williamson Rocks as wilderness. Potential impacts would not be significant because noise impacts would be intermittent over the long term and similar to affected environment conditions, and aircraft operations would comply with recommended USFWS avoidance areas around Williamson Rocks.

No Bureau of Land Management (BLM)-owned lands with wilderness characteristics are located in any of the areas beneath the 65 DNL contour in any alternative or scenario, including the No Action Alternative; therefore, no significant impacts would occur to these BLM-owned areas.

4.5.2.2.2 Parks and Recreation Areas Potential Noise Impacts

4.5.2.2.2.1 San Juan Islands National Monument

Potential Impacts on Recreation

None of the BLM-administered lands constituting the San Juan Islands National Monument would be located within the greater than 65 dB DNL average year noise contours under any of the proposed alternatives. Between 10,588 acres of water (under Alternative 2, Scenario B) and 11,399 acres of water (under Alternative 1, Scenario C) within the San Juan National Conservation Area Boundary that encompasses the national monument lands would be within the greater than 65 dB DNL noise contours, depending on the alternative selected. While no water areas are included in the national monument, visitors to national monument lands may access those lands by water—i.e., by kayak, boat, or ferry.

Table 4.5-17 provides the approximate water acreages within the San Juan National Conservation Area Boundary that would be in the noise contour ranges under each alternative and scenario, compared to conditions under the No Action Alternative. As shown in the table, each of the alternatives and scenarios would increase the water area within the greater than 65 dB DNL noise contours, compared to conditions under the No Action Alternative. This increase would range from a 26.9-percent increase in the acres of water area under Alternative 2, Scenario B, to a 36.6-percent increase under Alternative 1, Scenario C. Based on the increased water area within the San Juan National Conservation Area Boundary that would be intermittently exposed to intrusive noise levels, which would be over 2,000 acres regardless of alternative or scenario selected, the Proposed Action would have a long-term moderate impact on water-based recreation at the San Juan Islands National Monument when aircraft are

operating in the area. Because of the distance of the impacted area from the majority of lands within the national monument, this impact would not be significant.

Table 4.5-17 Estimated San Juan National Conservation Area Waters (Acres) within the Noise Contours under Each Alternative and Scenario (Average Year)¹

<i>dB DNL Noise Contour Range</i>	<i>Alternative 1 (Change from No Action Alternative) Acres²</i>	<i>Alternative 2 (Change from No Action Alternative)</i>	<i>Alternative 3 (Change from No Action Alternative)</i>
No Action Alternative Conditions			
65 – 70 dB DNL	4,236	4,236	4,236
70 – 75 dB DNL	2,690	2,690	2,690
> 75 dB DNL	1,442	1,442	1,442
Total	8,368	8,368	8,368
Scenario A			
65 – 70 dB DNL	5,321 (1,085 [25.6])	5,260 (1,024 [24.2])	5,227 (991 [23.4])
70 – 75 dB DNL	3,241 (551 [20.4])	3,223 (533 [19.8])	3,216 (526 [19.6])
> 75 dB DNL	2,307 (865 [60.0])	2,334 (892 [61.9])	2,220 (778 [54.0])
Total	10,869 (2,501 [29.9])	10,717 (2,349 [28.1])	10,662 (2,294 [27.4])
Scenario B			
65 – 70 dB DNL	5,309 (1,073 [25.3])	5,220 (984 [23.2])	5,221 (985 [23.3])
70 – 75 dB DNL	3,234 (544 [20.2])	3,208 (518 [19.2])	3,210 (520 [19.3])
> 75 dB DNL	2,269 (827 [57.4])	2,186 (744 [51.6])	2,190 (748 [51.9])
Total	10,814 (2,446 [29.2])	10,615 (2,247 [26.9])	10,521 (2,153 [25.7])
Scenario C			
65 – 70 dB DNL	5,562 (1,326 [31.3])	5,445 (1,209 [28.5])	5,442 (1,193 [28.2])
70 – 75 dB DNL	3,335 (645 [24.0])	3,306 (616 [22.9])	3,303 (612 [22.8])
> 75 dB DNL	2,535 (1,093 [75.8])	2,453 (1,011 [70.1])	2,441 (998 [69.2])
Total	11,432 (3,064 [36.6])	11,204 (2,836 [33.9])	11,186 (2,803 [33.5])
Scenario D			
65 – 70 dB DNL	5,432 (1,196 [28.2])	5,376 (1,132)	5,334 (1,206 [28.5])
70 – 75 dB DNL	3,299 (609 [22.6])	3,281 (591)	3,272 (582 [21.6])
> 75 dB DNL	2,452 (1,010 [70.0])	2,376 (934)	2,363 (921 [63.9])
Total	11,208 (2,840 [33.9])	11,033 (2,656 [31.7])	10,969 (2,601 [31.1])
Scenario E			
65 – 70 dB DNL	5,543 (1,307 [30.9])	5,402 (1,140 [26.9])	5,428 (1,192 [28.1])
70 – 75 dB DNL	3,328 (638 [23.7])	3,297 (607 [22.6])	3,297 (607 [22.6])
> 75 dB DNL	2,520 (1,078 [74.7])	2,438 (996 [69.0])	2,427 (985 [68.3])
Total	11,390 (3,022 [36.1])	11,137 (2,769 [33.1])	11,152 (2,784 [33.3])

Notes:

¹ Totals may not sum exactly due to rounding.

² The difference in acreage between the No Action Alternative and the alternatives is shown in parentheses.

Key:

dB = decibel

DNL = day-night average sound level

Potential Impacts on Recreation Management

BLM currently is preparing the San Juan Islands National Monument Resource Management Plan, which is expected to be completed and approved in the winter of 2019 (BLM, n.d.[b], BLM, 2018). The designation of the national monument does not restrict safe and efficient aircraft operations by the Armed Forces (White House Office of the Press Secretary, 2013). According to BLM policy for managing National Land Conservation System units, including national monuments, land use planning decisions and BLM activities pertaining to these lands must be consistent with the applicable designating legislation or proclamation (BLM, 2012a, 2012b). No national monument lands would be within the greater than 65 dB DNL noise contours under any of the alternatives (see Figure 4.5-7). (Note: Reservation Bay Rocks appear to be within the noise contours on this figure but are located east of and outside the noise contours.)

The 2013 presidential proclamation creating the national monument mentions the “historical and cultural significance” and “unique and varied natural and scientific resources” of the lands included in the national monument (White House Office of the Press Secretary, 2013). Aircraft operations at Ault Field under the Proposed Action, regardless of alternative or scenario selected, are not expected to directly impact management of the national monument by impacting the ability of the BLM to manage its cultural and natural resources, specifically as these resources are used or enjoyed by people visiting the national monument for recreation. Recreational values were not specifically noted in the 2013 presidential proclamation; however, BLM Manual 6220 – National Monuments, National Conservation Areas, and Similar Designations notes that “monuments...will be available for a variety of recreation purposes,” including “hunting and fishing, consistent with the designating authority” (BLM, 2012b). Regardless of alternative or scenario selected, Growler aircraft would continue to be intermittently visible and audible from national monument lands as they fly along flight tracks that pass over or near the national monument (see Figures 3.1-2, 3.1-3, and 3.1-4). In addition, from 10,588 acres (under Alternative 2, Scenario B) to 11,399 acres (under Alternative 1, Scenario C) of the waters southeast of Lopez Island and east of Decatur Island would be within the greater than 65 dB DNL noise contours. Aircraft overflights would not directly impact, or restrict, use of this area for fishing but may result in indirect impacts, primarily annoyance. Because the vast majority of the national monument and the surrounding waters is located outside of the greater than 65 dB DNL noise contours, the Proposed Action, regardless of alternative or scenario selected, would have long-term, minor, indirect impacts on management of the San Juan Islands National Monument for recreation.

Based on the above, no significant impacts on recreational use or recreation management of the national monument as a result of the Proposed Action are expected.

L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.5-7 Greater than 65 dB DNL Noise Contours in the Vicinity of the San Juan Islands National Monument.mxd

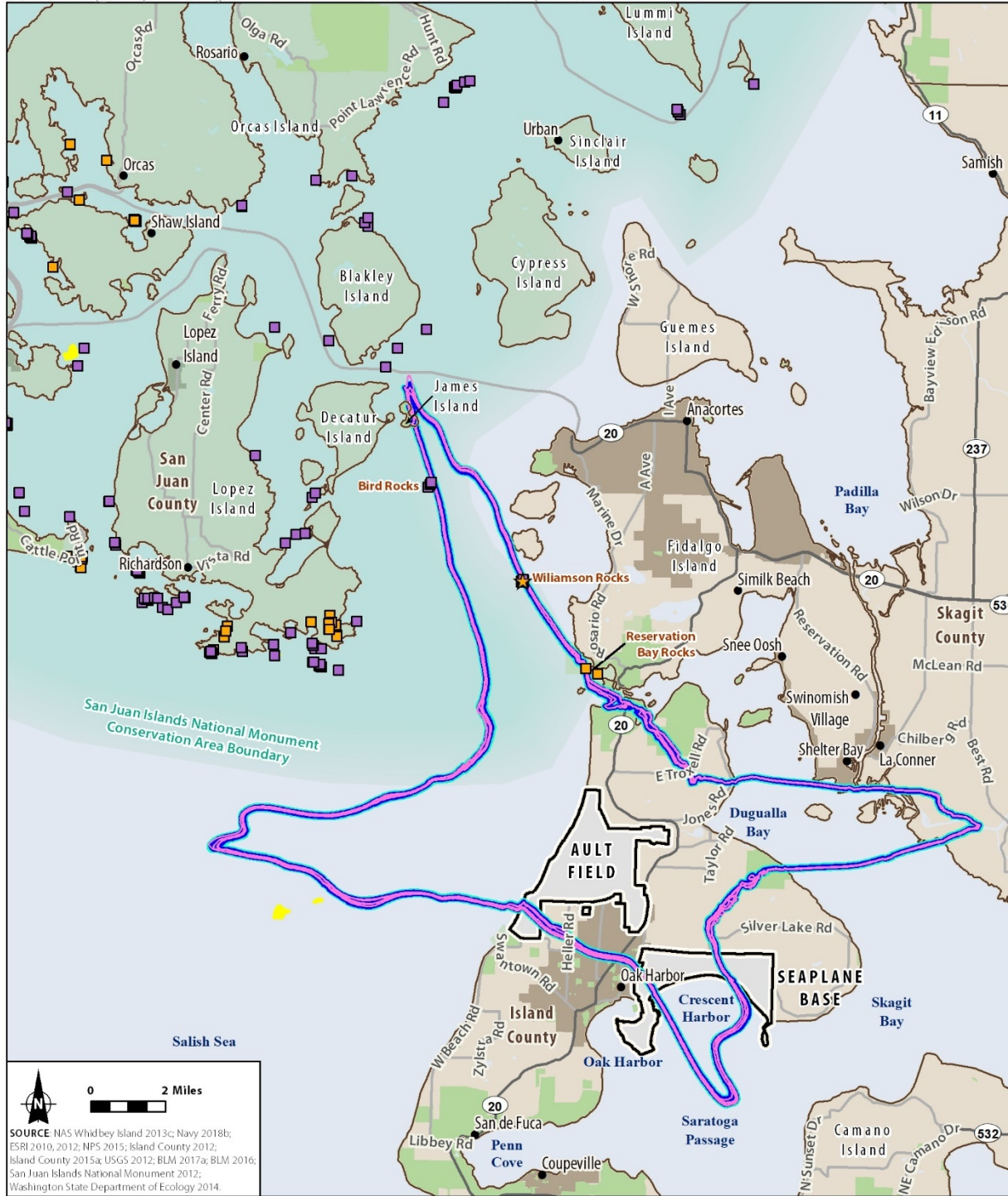


Figure 4.5-7
Greater than 65 dB DNL
Noise Contours in the
Vicinity of the San Juan Islands
 Whidbey Island, Island County, WA

4.5.2.2.2 San Juan Islands National Wildlife Refuge

Potential Impacts on Recreation

Williamson Rocks is the only area of the San Juan Islands National Wildlife Refuge (NWR) that would be within the greater than 65 dB DNL noise contours under the Proposed Action. This area is just outside of the 65 dB DNL noise contour line under affected environment conditions and would continue to be outside the contours under the No Action Alternative. Williamson Rocks would be within the 65 dB to 70 dB DNL contour range under all alternatives and scenarios.

Regardless of the alternative chosen, aircraft would continue to be visible and audible by recreational users in the waters surrounding the rocks. As noted in the discussion of wilderness at the beginning of this section, increased Growler operations under the Proposed Action would result in reduced opportunities for visitors to experience natural soundscapes associated with the rocks and surrounding waters, affect individual experience of the wilderness values associated with the rocks, and may temporarily affect wildlife behaviors during and for up to several hours after an intrusive noise event. Given the increase in annual average noise exposure at Williamson Rocks, the Proposed Action would have moderate impacts on the San Juan Islands NWR under all alternatives. No significant impacts on recreation at the NWR would result from the Proposed Action because of the small area of the NWR that would be affected, an area that is already exposed to aircraft noise under affected environment conditions.

Potential Impacts on Recreation Management

The USFWS manages Williamson Rocks to preserve wilderness values and allow recreational activities that are compatible with the wilderness character of the rocks. Impacts on the USFWS's ability to manage these areas for wilderness and recreational use are discussed at the beginning of this section. As noted, the Proposed Action would result in moderate, long-term impacts on management of Williamson Rocks as wilderness. These impacts would not be significant because noise impacts would be intermittent over the long term and similar to affected environment conditions, and aircraft operations would comply with recommended USFWS avoidance areas around Williamson Rocks.

4.5.2.2.3 Ebey's Landing National Historical Reserve

Potential Impacts on Recreation

With implementation of the Proposed Action, between approximately 30 percent and 41 percent of the 17,000-acre Ebey's Landing National Historical Reserve would be within the greater than 65 dB DNL contours, depending on the alternative selected. Noise contours under each alternative and scenario provide a means of assessing relative impacts on all types of outdoor recreation at Ebey's Landing National Historical Reserve.

As shown in Table 4.5-18, the scenario selected would affect the degree of intermittent noise exposure at Ebey's Landing National Historical Reserve more than the alternative. Under the No Action Alternative, approximately 6,000 acres would be within the noise contours. All three alternatives with either Scenario A, B, or D would result in an increase in land area within the noise contours of between approximately 4 percent (Alternative 2, Scenario B) and 16 percent (Alternative 1, Scenario A) and, therefore, a greater degree of noise impact on recreation than the No Action Alternative. These scenarios would increase the total area of Ebey's Landing National Historical Reserve exposed to annual average noise levels above 65 dB DNL, and this increase primarily would result from expansion of the greater than 75 dB DNL noise contour range. Scenarios C and E would result in a decrease in the area of Ebey's Landing National Historical Reserve exposed to annual average noise levels above 65 dB DNL (an approximately 4- to 13-percent decrease in land area compared to conditions under the No Action Alternative). Scenario C would result in a much smaller increase in the greater than 75 dB DNL noise contour range compared to the other scenarios. While Scenario C would result in less impact on Ebey's Landing National Historical Reserve, it is important to note that the projected annual number of aircraft operations at OLF Coupeville would still increase under all three alternatives with Scenario C, compared to projected annual aircraft operations under the No Action Alternative (see Table 4.1-5). Alternative 1, Scenario A, would result in the largest area encompassed by the greater than 65 dB DNL noise contours, while Alternative 2, Scenario C, would result in the smallest.

Depending on the alternative and scenario selected, annual aircraft operations would increase approximately 29 percent to 33 percent over No Action Alternative conditions. These operational conditions would be similar to historic operational levels in the 1970s, 1980s, and 1990s for the NAS Whidbey Island complex and, thus, similar to operational conditions that would have occurred at the time Ebey's Landing National Historical Reserve was created in 1978 and over most of the reserve's existence.

Five outdoor locations within Ebey's Landing National Historical Reserve were included as POIs in the supplemental noise analysis: Rhododendron Park northwest of OLF Coupeville, Ebey's Prairie west of the OLF, the Admiralty Head Lighthouse at Fort Casey State Park in the southwestern corner of Ebey's Landing National Historical Reserve, the Reuble Farm site, and the Ferry House (Wyle, 2017). The following section assesses the potential impacts of the Proposed Action on these POIs by alternative, compared to conditions under the No Action Alternative, as a result of increases in noise events.

Table 4.5-18 Area of Ebey's Landing National Historical Reserve Encompassed by the Greater than 65 dB DNL Noise Contours under the Proposed Action (Acres)¹

<i>dB DNL Noise Contour Range</i>	<i>Alternative 1 (Change from No Action Alternative [Percentage Change])</i>	<i>Alternative 2 (Change from No Action Alternative [Percentage Change])</i>	<i>Alternative 3 (Change from No Action Alternative [Percentage Change])</i>
	<i>Acres²</i>		
No Action Alternative Conditions			
65 – 70 dB DNL	3,001	3,001	3,001
70 – 75 dB DNL	2,623	2,623	2,623
> 75 dB DNL	377	377	377
Total	6,002	6,002	6,002
Scenario A			
65 – 70 dB DNL	1,328 (-1,646 [-54.8])	1,315 (-1,686 [-56.2])	1,326 (-1,675 [-55.8])
70 – 75 dB DNL	1,942 (-446 [-17.0])	1,999 (-624 [-23.8])	1,973 (-650 [-24.8])
> 75 dB DNL	3,665 (3,020 [801.1])	3,518 (3,141 [833.2])	3,577 (3,200 [848.8])
Total	6,935 (933 [15.5])	6,832 (830 [13.8])	6,877 (875 [14.6])
Scenario B			
65 – 70 dB DNL	1,317 (-1,684 [-56.1])	1,352 (-1,649 [-54.9])	1,331 (-1,670 [-55.6])
70 – 75 dB DNL	2,142 (-481 [-18.3])	2,135 (-488 [-18.6])	2,139 (-484 [-18.5])
> 75 dB DNL	2,870 (2,493 [661.3])	2,747 (2,370 [628.6])	2,822 (2,505 [664.5])
Total	6,328 (326 [5.4])	6,234 (232 [3.9])	6,292 (290 [4.8])
Scenario C			
65 – 70 dB DNL	2,112 (-889 [-29.6])	2,142 (-859 [-28.6])	2,123 (-878 [-29.3])
70 – 75 dB DNL	1,991 (-632 [-24.1])	2,087 (-536 [-20.4])	2,005 (-618 [-23.6])
> 75 dB DNL	1,223 (846 [224.4])	1,065 (688 [182.5])	1,164 (787 [208.8])
Total	5,325 (-677 [-11.3])	5,241 (-761 [-12.7])	5,292 (-710 [-11.8])
Scenario D			
65 – 70 dB DNL	1,303 (-1,671 [-55.7])	1,281 (-1,720 [-57.3])	1,286 (-1,715 [-57.1])
70 – 75 dB DNL	2,029 (-347 [-13.2])	2,087 (-536 [-20.4])	2,069 (-554 [-21.1])
> 75 dB DNL	3,436 (2,771 [735.0])	3,297 (2,920 [774.5])	3,353 (2,976 [789.4])
Total	6,768 (753 [12.5])	6,664 (662 [11.0])	6,708 (706 [11.8])
Scenario E			
65 – 70 dB DNL	1,839 (-1,162 [-38.7])	1,898 (-1,103 [-36.8])	1,863 (-1,138 [-37.9])
70 – 75 dB DNL	1,802 (-821 [-31.3])	1,793 (-830 [-31.6])	1,795 (-828 [-31.6])
> 75 dB DNL	2,099 (1,722 [456.8])	1,977 (1,600 [424.4])	2,054 (1,677 [444.8])
Total	5,740 (-262 [-4.4])	5,667 (-335 [-5.6])	5,712 (-290 [-4.8])

Notes:

¹ Totals may not sum exactly due to rounding.² The difference in acreage between the No Action Alternative and the alternatives is shown in parentheses.

Key:

dB = decibel

DNL = day-night average sound level

As shown in Table 4.5-19, each of the alternatives would result in the same increases in the annual average number of outdoor noise events over 50 dB at most POIs under most scenarios. Scenario A would result in the greatest impacts, with an increase of two noise events per hour at each POI under each alternative. Scenario D would result in similar impacts. Under Scenarios A and D, visitors to these areas of Ebey’s Landing National Historical Reserve would experience up to approximately five intrusive noise events per daytime hour, compared to three or fewer intrusive noise events per daytime hour under the No Action Alternative. Any of the alternatives with Scenarios B, C, or E would result in no change or an increase of one noise event per hour, depending on the location. As an example, depending on the alternative and scenario selected, visitors may experience an average of 10 intrusive noise events over a 2-hour visit to Rhododendron Park (Scenario A under all three alternatives) compared to six intrusive noise events over a 2-hour visit under the No Action Alternative, when Growlers are operating in the vicinity.

Recreational users of these areas already experience disruptions and annoyance that may affect recreational experiences as a result of current operations at OLF Coupeville. The Proposed Action, particularly under Scenarios A and D, would increase the rate of intrusive noise events at Ebey’s Landing National Historical Reserve but would not change the types of operations at OLF Coupeville or other factors that would affect the characteristics of individual noise events. Increases in the rate of intrusive noise events under the alternatives and scenarios noted above and in Table 4.5-19 would result in direct impacts on all types of outdoor recreation at Ebey’s Landing National Historical Reserve, including hiking, biking, nature-watching, and beachcombing, as well as interpretive programs and social events conducted by the NPS and other organizations. The primary impact, as noted throughout this section, would be annoyance that may adversely affect visitor experience and perceptions of the natural and cultural landscape of Ebey’s Landing National Historical Reserve. Interruptions in park programming and social events also would increase under most alternatives and scenarios at these locations, as discussed further below.

Table 4.5-19 Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest at Ebey’s Landing National Historical Reserve (Average Year Daytime)

<i>Point of Interest</i>	<i>No Action Alternative Conditions</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
		<i>(Change from No Action Alternative)</i>	<i>(Change from No Action Alternative)</i>	<i>(Change from No Action Alternative)</i>
<i>Annual Average Outdoor Daily DNL Daytime Events per Hour (NA50 L_{max})¹</i>				
Scenario A				
Ebey’s Landing National Historical Reserve (Rhododendron Park)	3	5 (+2)	5 (+2)	5 (+2)
Ebey’s Landing State Park (Ebey’s Prairie)	2	4 (+2)	4 (+2)	4 (+2)
Fort Casey State Park	1	3 (+2)	3 (+2)	3 (+2)
Reuble Farm	2	4 (+2)	4 (+2)	4 (+2)
Ferry House	2	4 (+2)	4 (+2)	4 (+2)

Table 4.5-19 Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest at Ebey’s Landing National Historical Reserve (Average Year Daytime)

<i>Point of Interest</i>	<i>No Action Alternative Conditions</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
		<i>(Change from No Action Alternative) Annual Average Outdoor Daily DNL Daytime Events per Hour (NA50 L_{max})¹</i>	<i>(Change from No Action Alternative)</i>	<i>(Change from No Action Alternative)</i>
Scenario B				
Ebey’s Landing National Historical Reserve (Rhododendron Park)	3	4 (+1)	4 (+1)	4 (+1)
Ebey’s Landing State Park (Ebey’s Prairie)	2	3 (+1)	3 (+1)	3 (+1)
Fort Casey State Park	1	2 (+1)	2 (+1)	2 (+1)
Reuble Farm	2	3 (+1)	3 (+1)	3 (+1)
Ferry House	2	3 (+1)	3 (+1)	3 (+1)
Scenario C				
Ebey’s Landing National Historical Reserve (Rhododendron Park)	3	3 (0)	3 (0)	3 (0)
Ebey’s Landing State Park (Ebey’s Prairie)	2	3 (+1)	3 (+1)	3 (+1)
Fort Casey State Park	1	1 (0)	1 (0)	1 (0)
Reuble Farm	2	2 (0)	2 (0)	2 (0)
Ferry House	2	2 (0)	2 (0)	2 (0)
Scenario D				
Ebey’s Landing National Historical Reserve (Rhododendron Park)	3	4 (+1)	4 (+1)	4 (+1)
Ebey’s Landing State Park (Ebey’s Prairie)	2	4 (+2)	4 (+2)	4 (+2)
Fort Casey State Park	1	3 (+2)	2 (+1)	2 (+1)
Reuble Farm	2	4 (+2)	4 (+2)	4 (+2)
Ferry House	2	4 (+2)	4 (+2)	4 (+2)
Scenario E				
Ebey’s Landing National Historical Reserve (Rhododendron Park)	3	3 (0)	3 (0)	3 (0)
Ebey’s Landing State Park (Ebey’s Prairie)	2	3 (+1)	3 (+1)	3 (+1)
Fort Casey State Park	1	2 (+1)	2 (+1)	2 (+1)
Reuble Farm	2	3 (+1)	3 (+1)	3 (+1)
Ferry House	2	3 (+1)	3 (+1)	3 (+1)

Notes:

¹ The difference between the No Action Alternative and the alternatives is shown in parentheses.

Key:

dB = decibel

DNL = day-night average sound level

Tables 4.5-20 through 4.5-22 show the maximum L_{max} and the number of annual aircraft noise events with an L_{max} of 100 dB at POIs within Ebey's Landing National Historical Reserve under each alternative and scenario (see Sections 3.2 and 4.2 for additional discussion). As shown in the table, L_{max} would decrease or remain the same at each of these POIs under the Proposed Action, compared to No Action Alternative conditions. L_{max} above 100 dB would approach levels that may cause physical discomfort at Rhododendron Park and the Reuble Farm site. The number of events with L_{max} above 100 dB at two POIs, Rhododendron Park and the Reuble Farm site, would increase under most alternatives and scenarios. The increase in these noise events at Rhododendron Park would range between 1,103 under Alternative 3, Scenario C, and 4,522 under Alternative 1, Scenario A. The increase in these noise events at the Reuble Farm site would range between 1,380 under Alternative 3, Scenario C, and 5,593 under Alternative 3, Scenario A.

Section 4.6.2.1, Noise and Vibration Associated with Operational Impacts, addresses the potential for noise and vibration during aircraft operations to affect historic architectural resources in Ebey's Landing National Historical Preserve. Based on existing studies, the analysis concludes that noise and vibrations from Growler aircraft operating in the vicinity of Ebey's Landing National Historical Reserve are below the threshold that may result in damage to structures. Visitors to Ebey's Landing National Historical Reserve may notice and be annoyed by vibration along with intrusive noise levels; however, vibration would not result in different or notably increased impacts on recreation compared with the potential impacts described earlier in this section.

Based on the above, impacts on Ebey's Landing National Historical Reserve would be greatest under all alternatives with Scenario A, which would result in long-term, intermittent, significant impacts on recreation because of the greater than 10 percent increase in the area within the greater than 65 dB DNL noise contours and the increase in the number of noise events with L_{max} approaching levels of physical discomfort (rarely) at the Rhododendron Park and Reuble Farm site POIs. All alternatives with Scenarios B, D, and E would result in less severe but still long-term, intermittent, significant impacts on recreation. Scenario D, like Scenario A, would result in a greater than 10-percent increase in the area of the reserve within the noise contours.

Any of the alternatives with Scenario C would have moderate impacts on recreation at Ebey's Landing National Historical Reserve because these alternatives would increase the area of the reserve within the greater than 75 dB DNL contour range. Scenario C would result in a smaller increase in the numbers of noise events over 50 dB (L_{max}) per daytime hour at one POI, Ebey's Prairie; would result in a smaller increase in the area within the greater than 75 dB DNL noise contour range; and would result in a decrease in the area of Ebey's Landing National Historical Reserve within the greater than 65 dB DNL noise contours compared to the other alternatives and scenarios. As noted previously in this section, operational conditions experienced at Ebey's Landing National Historical Reserve under the Proposed Action would be similar to conditions at the time of the reserve's creation and throughout much of the reserve's existence through the 1990s. Noise impacts on recreation also would be intermittent, occurring only when aircraft operate in the area.

Table 4.5-20 Number of Annual Aircraft Noise Events with Maximum Sound Level of 100 dB at Points of Interest in Ebey’s Landing National Historical Reserve, Alternative 1 (Average Year)

Location	<i>L_{max}</i> (dB)		Number of Annual Events with <i>L_{max}</i> (dB) of 100 dB or more	
	No Action Alternative	Alternative 1 (Change from No Action Alternative)	No Action Alternative	Alternative 1 (Change from No Action Alternative)
Scenario A				
Ebey’s Landing – Rhododendron Park	111	105 (-6)	462	4,522 (+1,802)
Ebey’s Landing – Ebey’s Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)
Scenario B				
Ebey’s Landing – Rhododendron Park	111	105 (-6)	462	2,953 (+233)
Ebey’s Landing – Ebey’s Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)
Scenario C				
Ebey’s Landing – Rhododendron Park	111	105 (-6)	462	1,160 (-1,560)
Ebey’s Landing – Ebey’s Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)
Scenario D				
Ebey’s Landing – Rhododendron Park	111	105 (-6)	462	4,046 (+1,326)
Ebey’s Landing – Ebey’s Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)
Scenario E				
Ebey’s Landing – Rhododendron Park	111	105 (-6)	462	1,742 (-978)
Ebey’s Landing – Ebey’s Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	0 (-693)
Ferry House	85	82 (-3)	0	0 (-)

Table 4.5-21 Number of Annual Aircraft Noise Events with the Maximum Sound Exposure Level or Maximum Sound Level at Points of Interest in Ebey's Landing National Historical Reserve, Alternative 2 (Average Year)

Location	L_{max} (dB)		Number of Annual Events	
	No Action Alternative	Alternative 2 (Change from No Action Alternative)	No Action Alternative	Alternative 2 (Change from No Action Alternative)
Scenario A				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	4,315 (+1,595)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	5,606 (+4,913)
Ferry House	85	82 (-3)	0	0 (-)
Scenario B				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	2,819 (+99)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	3,408 (+2,715)
Ferry House	85	82 (-3)	0	0 (-)
Scenario C				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	1,107 (-1,613)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	1,385 (+692)
Ferry House	85	82 (-3)	0	0 (-)
Scenario D				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	3,862 (+1,142)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	4,838 (+4,145)
Ferry House	85	82 (-3)	0	0 (-)
Scenario E				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	1,661 (-1,059)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	2,078 (+1,385)
Ferry House	85	82 (-3)	0	0 (-)

Table 4.5-22 Number of Annual Aircraft Noise Events with the Maximum Sound Exposure Level or Maximum Sound Level at Points of Interest in Ebey's Landing National Historical Reserve, Alternative 3 (Average Year)

Location	L_{max} (dB)		Number of Annual Events	
	No Action Alternative	Alternative 3 (Change from No Action Alternative)	No Action Alternative	Alternative 3 (Change from No Action Alternative)
Scenario A				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	4,305 (+1,585)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	5,593 (+4,900)
Ferry House	85	82 (-3)	0	0 (-)
Scenario B				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	2,812 (+92)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	3,400 (+2,707)
Ferry House	85	82 (-3)	0	0 (-)
Scenario C				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	1,103 (-1,617)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	1,380 (+687)
Ferry House	85	82 (-3)	0	0 (-)
Scenario D				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	3,854 (+1,134)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	4,826 (+4,133)
Ferry House	85	82 (-3)	0	0 (-)
Scenario E				
Ebey's Landing – Rhododendron Park	111	105 (-6)	2,720	1,656 (-1,064)
Ebey's Landing – Ebey's Prairie	78	76 (-2)	0	0 (-)
Fort Casey State Park	91	86 (-5)	0	0 (-)
Reuble Farm	110	110 (0)	693	2,071 (+1,378)
Ferry House	85	82 (-3)	0	0 (-)

Potential Impacts on Recreation Management

The *Final General Management Plan and EIS for Ebey's Landing National Historical Reserve* notes that the "natural soundscape" associated with the reserve consists of "sounds traditionally associated with rural agriculture and natural quiet" (NPS, 2005). Visitors to Ebey's Landing National Historical Reserve are likely to "come with expectations of seeing, hearing, and experiencing phenomena associated with a specific natural or cultural environment" (NPS, 2014). The document notes that the majority of impacts to the soundscape of Ebey's Landing National Historical Reserve are the result of outside activities and development, including increased residential development in and near the reserve, vehicle traffic, and aircraft operations at OLF Coupeville (NPS, 2005). The document notes the potential for "significant noise impacts...on a regular, but inconsistent basis" when OLF Coupeville is in use (NPS, 2005). No formal studies have been completed to assess the impact of aircraft noise on the visitor experience at Ebey's Landing National Historical Reserve. However, the NPS's 2015 acoustic monitoring study recorded intermittent noise levels above 60 dBA from transportation sources, including Growler and other military aircraft, that can be considered to impact recreational experiences at Ebey's Landing National Historical Reserve. The monitoring recorded long periods of time between noise events during which there was no military aircraft activity. Noise events above 60 dBA occurred less than 1 percent of the time at either of the recording locations included in the study. The results of the acoustic monitoring study are summarized in Section 1.12.

Neither the Final General Management Plan nor the Long-range Interpretive Plan for Ebey's Landing National Historical Reserve include management measures that specifically address or are in response to the effects of aircraft noise on visitor experience. The final general management plan and EIS (NPS, 2006a) for Ebey's Landing National Historical Reserve notes that, "The NPS [National Park Service] and Reserve staff have no influence over...[OLF Coupeville] practice [operations]."

Intrusive noise impacts the ability of the NPS to manage natural and cultural soundscapes associated with national parks, protect park resources, preserve visitor experience, and host interpretive programming. Any of the alternatives with Scenarios A, B, D, or E would impact the ability of the NPS to accomplish these activities as a result of the increase in the area of Ebey's Landing National Historical Reserve within the greater than 65 dB DNL noise contours and the increase in the numbers of NA50 dB (L_{max}) noise events and other noise events with L_{max} above 100 dB (discussed in the previous section). While any of the alternatives with Scenario C would result in a decrease in the total area within the greater than 65 dB DNL noise contours, this scenario would increase the area within the greater than 75 dB DNL noise contours and increase the number of NA50 dB (L_{max}) noise events at one POI (Ebey's Prairie) and therefore would have similar, though less severe, impacts. Increases in the number of intrusive noise events would decrease opportunities for visitors to experience the natural and cultural soundscapes associated with the rural farming community protected by Ebey's Landing National Historical Reserve and may interrupt or result in the need to change schedules for interpretive programs. As shown in Section 3.5.2.4, aircraft operations are not audible the majority of the time in Ebey's Landing National Historical Reserve, and the Proposed Action would not result in increases in operations to the point that NPS could not accomplish interpretive programming at the reserve.

Section 4.8.2 addresses potential impacts to biological resources. The analysis found that visual and noise disturbances from increased aircraft operations under the Proposed Action would not significantly impact terrestrial wildlife. Wildlife populations in Ebey's Landing National Historical Reserve are currently exposed to a high level of long-term aircraft operations and other human-made disturbances.

While these disturbances may impact the fitness of individual animals, these impacts are not expected to result in significant effects to populations. Therefore, implementation of the Proposed Action would not significantly impact the effectiveness of NPS activities to manage habitat and protect wildlife at Ebey's Landing National Historical Reserve.

Based on the above, impacts on Ebey's Landing National Historical Reserve would be greatest under all alternatives with Scenario A, which would result in long-term, significant direct impacts on management of the reserve because of the greater than 10-percent increase in the area within the greater than 65 dB DNL noise contours and the increase in the number of noise events with L_{max} approaching levels of physical discomfort at the Rhododendron Park and Reuble Farm site POIs. All alternatives with Scenarios B, D, and E would result in less severe but still long-term, intermittent, significant impacts on recreation as a result of the increase in the number of noise events with L_{max} approaching levels of physical discomfort at these POIs. It should be noted that individual noise events that may cause physical discomfort would be rare. Based on the NPS's noise monitoring study, less than 1 percent of audible aircraft noise recorded at the two monitoring sites in the reserve were above 60 dBA, which is typical for human conversation. Under the Proposed Action, noise levels from aircraft operations high enough to cause physical discomfort would be intermittent and of very short duration. Scenario D additionally would result in a greater than 10 percent increase in the area of the reserve within the noise contours.

Alternatives 1, 2, and 3 with Scenario C would have moderate impacts on management of Ebey's Landing National Historical Reserve because these alternatives would increase the area of the reserve within the greater than 75 dB DNL contour range. Scenario C would result in a smaller increase in the numbers of noise events over 50 dB (L_{max}) per daytime hour at one POI, Ebey's Prairie; would result in a smaller increase in the area within the greater than 75 dB DNL noise contour range; and would result in a decrease in the area of Ebey's Landing National Historical Reserve within the greater than 65 dB DNL noise contours compared to the other alternatives and scenarios. Under the Proposed Action, numbers of operations would increase up to a level of operation similar to historical levels experienced over the life of OLF Coupeville. These operations would be conducted in a manner similar to current Navy aircraft training missions at the NAS Whidbey Island complex. Navy aircraft have operated at OLF Coupeville continuously for more than 75 years, including periods of significantly higher levels of operations.

4.5.2.2.4 Pacific Northwest National Scenic Trail

Potential Impacts on Recreation

The recreational experience of hikers and other travelers on the Pacific Northwest National Scenic Trail on Whidbey Island would continue to be affected on an intermittent basis during aircraft operations at Ault Field or OLF Coupeville. Noise impacts on recreation as a result of Prowler, Growler, and other aircraft operations at Ault Field and OLF Coupeville currently occur along an estimated 10.7 miles of the trail. This impact would occur along a section of the trail that passes through developed urban areas that are subject to noise from traffic and other human activities and not in more remote sections of the trail characterized by a greater degree of natural scenery and ambient noise.

Table 4.5-23 shows the length of trail that would fall within the greater than 65 dB DNL noise contours under each alternative and scenario. The trail segment that would be impacted under all alternatives and scenarios is the segment that travels through the northern part of Whidbey Island, generally from Deception Pass State Park to the shoreline just north of Joseph Whidbey State Park. Near OLF Coupeville, a segment of the trail along Whidbey Island's western shoreline near the Keystone Ferry

Terminal also would be within the noise contours under all three alternatives with Scenarios A or D. Under any of the alternatives with Scenario B, only the ferry terminal itself would be within the greater than 65 dB DNL noise contours. Both segments of the trail would be within the greater than 65 dB DNL noise contours under the No Action Alternative. Under Scenarios C and E, under which 80 and 70 percent of FCLPs would be conducted at Ault Field, respectively, no segments of the trail would be within the greater than 65 dB DNL noise contours for OLF Coupeville. Therefore, any of the three alternatives with Scenarios C or E would result in a slight benefit on recreation on this segment of the trail, compared to conditions under the No Action Alternative.

Table 4.5-23 Length of the Pacific Northwest National Scenic Trail Encompassed by the Greater than 65 dB DNL Noise Contours under the Proposed Action (Miles [Percentage Change])

<i>Alternative</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
Scenario A	11.8 (<1)	11.8 (<1)	11.8 (<1)
Scenario B	11.9 (1.7)	11.9 (1.7)	11.9 (1.7)
Scenario C	12.6 (7.7)	12.5 (6.8)	12.5 (6.8)
Scenario D	11.8 (<1)	11.8 (<1)	11.8 (<1)
Scenario E	12.5 (6.8)	12.4 (6.0)	12.0 (2.6)

Note: The length of the trail that would be impacted under No Action Alternative conditions would be 11.7 miles.

As shown in the table, each alternative with Scenarios A or D would impact a slightly longer segment of the trail than the segment impacted under the No Action Alternative (11.7 miles). Impacts under any of the alternatives with Scenario B, C, or E would result in impacts greater than those under the No Action Alternative. However, regardless of the alternative selected, the difference in the length of the trail exposed to average annual noise levels above 65 dB DNL under the Proposed Action compared to the No Action Alternative would be 0.9 mile or less.

The Proposed Action would impact hiking along approximately 1 percent of the 1,200-mile Pacific Northwest National Scenic Trail and would not significantly increase the length of trail impacted, compared to the No Action Alternative. As noted, this segment of the trail travels through urban areas, and hikers in this area are exposed to multiple sources of technological noise. Weekly FCLP notices may help inform hikers' decisions regarding when to use portions of the trail. Therefore, the Proposed Action would have a long-term, intermittent, minor or negligible impact on recreational use of the trail, depending on the alternative or scenario selected.

Potential Impacts on Recreation Management

As noted in Section 3.5, the U.S. Forest Service is preparing a comprehensive plan to guide management of the Pacific Northwest National Scenic Trail corridor. The comprehensive plan will establish a corridor route and define standards and guidelines for management of the corridor (USDA Forest Service, n.d.[a], n.d.[b]). These standards and guidelines will address the need to protect the trail experience, among other planning considerations (USDA Forest Service, 2015).

While technological noise from outside sources is intrinsically part of the trail experience in urban areas of Whidbey Island, the change in noise exposure along the trail as a result of the Proposed Action would affect the trail experience. The potential impacts of the Proposed Action cannot be assessed against the comprehensive plan for the Pacific Northwest National Scenic Trail at this time, but based on the

discussion above, the Proposed Action would have long-term, minor, or negligible direct impacts on the trail when aircraft are operating in the area, depending on the alternative and scenario selected, as a result of the changes in the length of trail exposed to average annual noise levels above 65 dB DNL compared to the No Action Alternative. The Proposed Action would have no direct physical impacts on the trail corridor or public access to the trail.

4.5.2.2.2.5 State Parks and Recreation Areas

Potential Impacts on Recreation

Table 4.5-24 shows the average NA50 dB noise events, by alternative and scenario at representative POIs at state parks, compared to conditions under the No Action Alternative. Hourly noise events would increase at most parks under each alternative and scenario (with the exception of Fort Casey State Park under all alternatives with Scenario C), and this increase would range between one and three events per hour.

Table 4.5-24 Number of Events per Hour of Outdoor Speech Interference for Representative Points of Interest at State Parks (Average Year)

Point of Interest	No Action Alternative Conditions	Alternative 1	Alternative 2	Alternative 3
		(Change from No Action Alternative)	(Change from No Action Alternative)	(Change from No Action Alternative)
Annual Average Outdoor Daily DNL Daytime Events per Hour (NA50 L_{max}) ¹				
Scenario A				
Deception Pass State Park	8	9 (+1)	9 (+1)	9 (+1)
Dugualla State Park	7	8 (+1)	9 (+2)	9 (+2)
Fort Casey State Park	1	3 (+2)	3 (+2)	3 (+2)
Scenario B				
Deception Pass State Park	8	9 (+1)	9 (+1)	9 (+1)
Dugualla State Park	7	9 (+2)	9 (+2)	9 (+2)
Fort Casey State Park	1	2 (+1)	2 (+1)	2 (+1)
Scenario C				
Deception Pass State Park	8	10 (+2)	10 (+2)	10 (+2)
Dugualla State Park	7	9 (+2)	10 (+3)	9 (+2)
Fort Casey State Park	1	1 (0)	1 (0)	1 (0)
Scenario D				
Deception Pass State Park	8	9 (+1)	9 (+1)	9 (+1)
Dugualla State Park	7	9 (+2)	9 (+2)	9 (+2)
Fort Casey State Park	1	3 (+2)	2 (+1)	2 (+1)
Scenario E				
Deception Pass State Park	8	10 (+2)	10 (+2)	10 (+2)
Dugualla State Park	7	9 (+2)	9 (+2)	9 (+2)
Fort Casey State Park	1	2 (+1)	2 (+1)	2 (+1)

Notes:

¹ The difference between the No Action Alternative and the alternatives is shown in parentheses.

Key:

DNL = day-night average sound level

L_{max} = maximum A-weighted sound level

NA50 = number of events above an L_{max} of 50 dB

The Proposed Action would continue to impact field games at Fort Casey State Park. Any of the alternatives with Scenarios A, B, D, or E would increase the rate of noise events over 50 dB (L_{max}) by one or two events per daytime hour. Alternatives with Scenario C would not increase the rate of noise events per daytime hour. Therefore, all alternatives with Scenarios A, B, D, or E would result in intermittent, moderate, long-term impacts on sports at Fort Casey State Park, and all alternatives with Scenario C would result in no impacts.

Potential impacts on recreation at James Island Marine State Park, which was not included as a POI in the noise study, were assessed based on overall changes in the extent of the greater than 65 dB DNL noise contours under each alternative and scenario. Regardless of the alternative or scenario selected, a portion of the eastern shoreline of James Island Marine State Park—which would be outside the greater than 65 dB DNL noise contours under the No Action Alternative—would be encompassed by the 65 to less than 70 dB DNL contour range. As shown on Figures 4.2-1, 4.2-12, and 4.2-23, the contours in the vicinity of James Island Marine State Park are narrow, occurring primarily along the departure and arrival tracks from and to the northeast of Ault Field. Therefore, under each alternative and scenario, the 65 to less than 70 dB DNL contour range primarily would encompass the eastern shoreline of James Island, and overall differences in noise exposure under each alternative and scenario would be imperceptible to most recreational users. Each of the alternatives and scenarios would result in long-term, intermittent, moderate impacts on recreation at James Island Marine State Park when aircraft are operating in the area, as a result of the additional areas that would be exposed to average noise levels between 65 and 70 dB DNL compared to the No Action Alternative.

Section 4.2, Noise, and Section 4.10, Socioeconomics, discuss potential impacts on camping. Table 4.5-25 shows the estimated number of disruptive noise events per nighttime hour with maximum sound levels above 50 dB (L_{max}) that would potentially disturb people camping in tents at Deception Pass State Park, Rhododendron Park, and Fort Casey State Park. Most alternatives and scenarios, with the exception of Alternative 1 with Scenarios C and E, would result in no change in the average number of disruptive noise events per nighttime hour at Deception Pass State Park. Most of the alternatives and scenarios would result in an increase of one event per nighttime hour on average at Rhododendron Park and Fort Casey State Park, with the exception of Scenarios C and E under all alternatives, which would result in no change at Fort Casey State Park. With an average of one event per nighttime hour, campers at Fort Casey State Park or Rhododendron Park could experience nine NA50 dB noise events during the 9-hour period between 10 p.m. and 7 a.m. when aircraft are operating at Ault Field. It is important to note that these figures are averages, and training tempos and times may vary depending on training requirements and time of year. Section 4.10 discusses the potential economic impacts of the Proposed Action on Deception Pass State Park as a result of lost camping revenue.

Table 4.5-25 Number of Events of Outdoor Speech Interference per Nighttime Hour at Deception Pass State Park and Fort Casey State Park¹

<i>Point of Interest</i>	<i>No Action Alternative Conditions</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
		<i>(Change from No Action Alternative)</i>	<i>(Change from No Action Alternative)</i>	<i>(Change from No Action Alternative)</i>
<i>Annual Average Outdoor Daily DNL Daytime Events per Hour (NA50 L_{max})¹</i>				
Scenario A				
Deception Pass State Park	2	2 (0)	2 (0)	2 (0)
Ebey’s Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	1 (+1)	1 (+1)	1 (+1)
Scenario B				
Deception Pass State Park	2	2 (0)	2 (0)	2 (0)
Ebey’s Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	1 (+1)	1 (+1)	1 (+1)
Scenario C				
Deception Pass State Park	2	3 (+1)	2 (0)	2 (0)
Ebey’s Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	- (0)	- (0)	- (0)
Scenario D				
Deception Pass State Park	2	2 (0)	2 (0)	2 (0)
Ebey’s Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	1 (+1)	1 (+1)	1 (+1)
Scenario E				
Deception Pass State Park	2	3 (+1)	2 (0)	2 (0)
Ebey’s Landing – Rhododendron Park	-	1 (+1)	1 (+1)	1 (+1)
Fort Casey State Park	-	- (0)	- (0)	- (0)

Note:

¹ The supplemental metric for outdoor speech interference was used as a proxy to assess potential impacts on overnight camping. Details on the analysis of outdoor speech interference are provided in Section 3.2 and in Appendix A.

Key:

DNL = day-night average sound level

L_{max} = maximum A-weighted sound level

Tables 4.5-26 through 4.5-28 show the number of annual aircraft noise events with L_{max} above 100 dB at state park POIs in the study area under each alternative and scenario (see Sections 3.2 and 4.2 for additional discussion). As shown in the table, L_{max} would remain the same or decrease at each of these POIs under the Proposed Action, compared to No Action Alternative conditions. L_{max} would continue to approach levels that may rarely cause physical discomfort (above 110 dB) at Deception Pass State Park, and the number of events with an L_{max} above 100 dB would increase at this park under each alternative and scenario, with the annual increase ranging from 43 events under Alternative 1, Scenario A, and 3,534 events under Alternative 1, Scenario C. All alternatives and scenarios intermittently may result in the need to reschedule or cancel outdoor activities at Deception Pass State Park when aircraft are operating in the area. The public has the opportunity to make informed choices on outdoor activities based on the likelihood of more concentrated aircraft operations by referring to the weekly FCLP schedules published by NAS Whidbey Island.

Table 4.5-26 Number of Annual Aircraft Noise Events with Maximum Sound Level above 100 dB at Selected Park Points of Interest in the Study Area, Alternative 1 (Average Year)

Location	L_{max} (dB)		Number of Annual Events	
	No Action Alternative	Alternative 1 (Change from No Action Alternative)	No Action Alternative	Alternative 1 (Change from No Action Alternative)
Scenario A				
Deception Pass State Park	104	104 (0)	5,449	5,492 (+43)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario B				
Deception Pass State Park	104	104 (0)	5,449	6,583 (+1,134)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario C				
Deception Pass State Park	104	104 (0)	5,449	8,983 (+3,534)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario D				
Deception Pass State Park	104	104 (0)	5,449	6,402 (+953)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario E				
Deception Pass State Park	104	104 (0)	5,449	8,471 (+3,022)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)

Table 4.5-27 Number of Annual Aircraft Noise Events with Maximum Sound Level above 100 dB at Seleted Park Points of Interest in the Study Area, Alternative 2 (Average Year)

<i>Location</i>	<i>L_{max} (dB)</i>		<i>Number of Annual Events</i>	
	<i>No Action Alternative</i>	<i>Alternative 2 (Change from No Action Alternative)</i>	<i>No Action Alternative</i>	<i>Alternative 2 (Change from No Action Alternative)</i>
Scenario A				
Deception Pass State Park	104	104 (0)	5,449	5,558 (+109)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario B				
Deception Pass State Park	104	104 (0)	5,449	6,587 (+1,138)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario C				
Deception Pass State Park	104	104 (0)	5,449	8,895 (+3,446)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario D				
Deception Pass State Park	104	104 (0)	5,449	6,455 (+1,006)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario E				
Deception Pass State Park	104	104 (0)	5,449	8,406 (+2,957)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)

Table 4.5-28 Number of Annual Aircraft Noise Events with Maximum Sound Level above 100 dB at Selected Park Points of Interest in the Study Area, Alternative 3 (Average Year)

<i>Location</i>	<i>L_{max} (dB)</i>		<i>Number of Annual Events</i>	
	<i>No Action Alternative</i>	<i>Alternative 3 (Change from No Action Alternative)</i>	<i>No Action Alternative</i>	<i>Alternative 3 (Change from No Action Alternative)</i>
Scenario A				
Deception Pass State Park	104	104 (0)	5,449	5,539 (+90)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario B				
Deception Pass State Park	104	104 (0)	5,449	6,560 (+1,111)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario C				
Deception Pass State Park	104	104 (0)	5,449	8,845 (+3,396)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario D				
Deception Pass State Park	104	104 (0)	5,449	6,434 (+985)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)
Scenario E				
Deception Pass State Park	104	104 (0)	5,449	8,357 (+2,908)
Dugualla State Park	88	88 (0)	0	0 (0)
Fort Casey State Park	91	86 (-5)	0	0 (0)

As described in this section, noise effects on state parks under the Proposed Action would generally depend on the location of the park and the scenario. All alternatives and scenarios would result in long-term, intermittent, moderate impacts on Deception Pass State Park, Dugualla State Park, and James Island Marine State Park as a result of noise exposure when aircraft are operating in the area. Impacts on Fort Casey State Park would be moderate under Scenarios A, B, D, or E and minor under Scenario C.

Potential Impacts on Recreation Management

The Proposed Action would not physically affect any parklands. Therefore, the ability of the Washington State Parks and Recreation Commission to implement the Centennial 2013 Plan would not be impacted. However, aircraft noise may impact visitor experience, particularly for those day visitors and campers who come to the parks with the expectation of seeing, hearing, and experiencing phenomena associated with a specific natural or cultural environment as described above.

Increased Growler operations under the Proposed Action would also impact the ability of Washington State Parks to provide educational and interpretive programming at Deception Pass and Fort Casey state parks. When Growler aircraft are operating in the vicinity, outdoor programming may be interrupted by intrusive noise events ranging from nine to 10 events per hour (or an increase of one to two events per hour above No Action Alternative conditions) at Deception Pass State Park and two to three events per hour (or an increase of one to two events per hour above No Action Alternative conditions) at Fort

Casey State Park (see Table 4.5-24). Impacts on outdoor programming would occur only when aircraft are operating in the vicinity. The No Action Alternative would result in a relatively high number of intrusive noise events per hour at Deception Pass State Park, and alternatives under the Proposed Action would result in an additional one to two events per hour. This frequency of noise events may affect the ability of Washington State Parks to provide effective outdoor programming when Growler aircraft are operating in the vicinity and result in the need for schedule or programming changes. Impacts on programming at Fort Casey State Park would be greatest under any alternative with Scenario A and Alternative 1 with Scenario D; the remaining alternatives would result in either no change or increase the number of intrusive noise events per hour by one event. The Proposed Action is not expected to result in the need to modify programming at Fort Casey State Park.

Based on the above and discussion in the previous section, all alternatives and scenarios would result in long-term, intermittent, moderate direct impacts on management of Deception Pass State Park, Dugualla State Park, and James Island Marine State Park as a result of noise exposure when aircraft are operating in the area. Direct impacts on management of Fort Casey State Park would be moderate under Scenarios A, B, D, or E and minor under Scenario C.

4.5.2.2.6 County and Municipal Parks and Recreation Areas

Potential Impacts on Recreation

Impacts on visitor experience at county and municipal parks and recreation areas would be similar to those impacts described above and would vary based on personal factors as well as factors such as the proximity of a park to Ault Field or OLF Coupeville, the setting of a particular park, and the recreational activities in which visitors are engaged. Visitor experience at parks in urban settings may be less affected because of the variety of existing sights and noises associated with urban environments.

Potential impacts on county and municipal parks and recreation areas in the study area are assessed based on the noise contour range encompassing the largest area of the park, for all parks wholly or partially included in the greater than 65 dB DNL noise contours. Tables 4.5-29 and 4.5-30 show the noise contour range that encompasses the largest area of each park/recreation area entirely or partially within the greater than 65 dB DNL contours under each alternative and scenario. The tables compare each alternative and scenario to projected conditions under the No Action Alternative at each park. Under each scenario and alternative, the difference in the amount of land at each park included in a particular DNL contour range compared to the No Action Alternative is indicated by a plus (+) or minus (-) sign in parentheses (i.e., more or less land would be included in the DNL contour range than the land included under the No Action Alternative). A hyphen indicates that a park or recreation area would not be encompassed by the greater than 65 dB DNL contours under a particular alternative and scenario.

As noted at the beginning of this section, recreational users' experience of, and reaction to, noise varies depending on a number of factors. The general comparison below provides a method of comparing the alternatives and scenarios and their relative noise effects on recreation while acknowledging the subjective nature of potential impacts to the user experience.

As shown in Table 4.5-29, the county parks that would be most affected by increased noise exposure under the Proposed Action include the Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, and Ika Island. Noise exposure at each of these areas under various alternatives and scenarios would increase by at least one DNL contour range (e.g., the contour range encompassing the majority of the park/recreation area would increase from the 65 to 69 dB DNL contour range to the 70 to 74 dB DNL contour range). Impacts on the following parks would be long term, intermittent, and significant due to the increase in noise exposure:

- Clover Valley Ball Park and Off-Leash Dog Park under all alternatives and scenarios, with the exception of Alternatives 1 and 3 with Scenario A
- Rocky Point Public Beach Access under all alternatives and scenarios
- Driftwood Park under all alternatives and scenarios
- Rhododendron Park under all alternatives with Scenarios A, B, D, or E
- Patmore Pit under all alternatives with Scenarios A, B, D, or E
- Ika Island under all alternatives and scenarios

Impacts on most of the other parks listed above under most alternatives and scenarios would be long term and moderate as a result of the increase in noise exposure when aircraft operate in the area, compared to the No Action Alternative. As a result of a long-term reduction in noise exposure, the Proposed Action would have no impact or a long-term beneficial impact compared to No Action Alternative conditions on the following parks and recreational areas:

- Long Point Public Beach Access under all alternatives and scenarios
- low-tide trails between Ebey's Landing Road and Keystone Jetty under all alternatives with Scenarios B, C, or E and Alternative 2 with Scenario D
- Crockett Blockhouse under all alternatives with Scenario C

Table 4.5-29 dB DNL Contour Range at County Parks and Recreation Areas under Each Alternative and Scenario

<i>County Park or Recreation Area</i>	<i>No Action Alternative</i>			
	<i>Conditions</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
<i>dB DNL Contour Range</i>				
Scenario A				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	75 – 79 (negl.)	80 – 84 (+)	75 – 79 (+)
Moran Beach (Island)	80 – 84	80 – 84 (negl.)	80 – 84 (negl.)	80 – 84 (negl.)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Low-Tide Trails (between Ebey’s Landing Road and Keystone Jetty)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Driftwood Park (Island)	65 – 69	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crockett Blockhouse (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Rhododendron Park (Island)	70 – 74	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Patmore Pit (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Scenario B				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Moran Beach (Island)	80 – 84	80 – 84 (negl.)	80 – 84 (negl.)	80 – 84 (negl.)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Low-Tide Trails (between Ebey’s Landing Road and Keystone Jetty)	65 – 69	65 – 69 (-)	- (-)	65 – 69 (-)
Driftwood Park (Island)	65 – 69	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Crockett Blockhouse (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Rhododendron Park (Island)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Patmore Pit (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)

Table 4.5-29 dB DNL Contour Range at County Parks and Recreation Areas under Each Alternative and Scenario

<i>County Park or Recreation Area</i>	<i>No Action Alternative</i>			
	<i>Conditions</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
<i>dB DNL Contour Range</i>				
Scenario C				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Moran Beach (Island)	80 – 84	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	- (-)	- (-)	- (-)
Low-Tide Trails (between Ebey’s Landing Road and Keystone Jetty)	65 – 69	65 – 69 (-)	- (-)	- (-)
Driftwood Park (Island)	65 – 69	70 – 74 (+)	65 – 69 (+)	65 – 69 (+)
Crockett Blockhouse (Island)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Rhododendron Park (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Patmore Pit (Island)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Scenario D				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	80 – 84 (+)	75 – 79 (+)	75 – 79 (+)
Moran Beach (Island)	80 – 84	80 – 84 (negl.)	80 – 84 (negl.)	80 – 84 (negl.)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	65 – 69 (negl.)	65 – 69 (negl.)	65 – 69 (negl.)
Low-Tide Trails (between Ebey’s Landing Road and Keystone Jetty)	65 – 69	65 – 69 (+)	65 – 69 (-)	65 – 69 (negl.)
Driftwood Park (Island)	65 – 69	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crockett Blockhouse (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Rhododendron Park (Island)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Patmore Pit (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)

Table 4.5-29 dB DNL Contour Range at County Parks and Recreation Areas under Each Alternative and Scenario

County Park or Recreation Area	No Action Alternative Conditions	Alternative 1	Alternative 2	Alternative 3
	dB DNL Contour Range			
Scenario E				
Clover Valley Ball Park and Off-Leash Dog Park (Island)	75 – 79	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Moran Beach (Island)	80 – 84	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Rocky Point Public Beach Access (Island)	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Long Point Public Beach Access (Island)	65 – 69	- (-)	- (-)	- (-)
Low-Tide Trails (between Ebey’s Landing Road and Keystone Jetty)	65 – 69	- (-)	- (-)	- (-)
Driftwood Park (Island)	65 – 69	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Crockett Blockhouse (Island)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Rhododendron Park (Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Patmore Pit (Island)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ika Island (Skagit)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Skagit Wildlife Area (Goat Island)	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Skagit Wildlife Area (Skagit Bay Estuary)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)

Key:

DNL = day-night average sound level

L_{max} = maximum A-weighted sound level

Contour ranges:

- 65 – 69 dB DNL
- 70 – 74 dB DNL
- 75 – 79 dB DNL
- 80 – 84 dB DNL
- 85 – 89 dB DNL

- (+) – The area included in the DNL contour range would increase compared to the No Action Alternative, or the DNL contour range encompassing the majority of the park or recreational area would increase.
- (-) – The area included in the DNL contour range would decrease compared to the No Action Alternative, or the DNL contour range encompassing the majority of the park or recreational area would decrease.
- (negl.) – Negligible change in the area included in the DNL contour range compared to the No Action Alternative.
- Hyphen [-] – Area is outside of the greater than 65 dB DNL contours.

The Proposed Action would continue to impact use of ball fields at Rhododendron Park as a result of the need for some individuals to wear hearing protection during outdoor sporting events. Aircraft operations would result in L_{max} of 106 dBA and a maximum SEL of 111 dBA at Rhododendron Park under all alternatives (see Sections 3.2 and 4.2 for an explanation of these metrics). The SEL estimated to occur at this POI would be slightly less than estimated under the No Action Alternative, while the L_{max} would not change from No Action Alternative conditions (see Tables 4.2-3, 4.2-11, and 4.2-19). The numbers of aircraft operations, and therefore the frequency of intrusive noise events, would vary based on alternative, as shown in Tables 4.5-20 through 4.5-22 (under Section B., Ebey's Landing National Historical Reserve, above). As shown in the tables, all alternatives with Scenario A and Alternative 2 with Scenario E may increase the amount of time hearing protection is needed for individuals using Rhododendron Park, resulting in moderate impacts. Under these alternatives, the increase in the number of noise events with the maximum SEL or L_{max} would range between six and 31 events annually and therefore would not differ significantly from No Action Alternative conditions. All alternatives with Scenarios B, C, or D and Alternatives 1 and 3 with Scenario E would result in a decrease in the number of projected operations with the maximum SEL or L_{max} compared to No Action Alternative conditions. This decrease would range from 37 events annually under Alternative 1 with Scenario D to 346 events annually under Alternatives 2 and 3 with Scenario C. Therefore, these alternatives would have a slight long-term beneficial impact on Rhododendron Park; however, people using the park would still be exposed to high noise levels on an intermittent basis.

Table 4.5-30 shows potential impacts on municipal parks and recreational facilities, including schools with outdoor recreational facilities or playgrounds, in the greater than 65 dB DNL noise contours. The Proposed Action would result in a change in noise exposure that would increase the DNL contour range at the following recreational areas listed in the table (e.g., the contour range encompassing the majority of the park/recreation area would increase from the 65 to less than 69 dB DNL contour range to the 70 to less than 74 dB DNL contour range) and result in long-term, intermittent significant impacts:

- Hand-in-Hand Early Learning under all alternatives with Scenarios B, C, D, and E
- Coupeville Middle School under all alternatives with Scenarios A or D
- Coupeville High School under all alternatives with Scenarios A or D and Alternative 1, Scenario B

Table 4.5-30 dB DNL Contour Range at Municipal Parks and Recreation Areas under Each Alternative and Scenario

<i>Municipal Park or Recreation Area</i>	<i>No Action Alternative Conditions</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
	<i>dB DNL Contour Range</i>			
Scenario A				
Technical Drive Off-leash Dog Park (Oak Harbor)	75 – 79	70 – 74 (-)	70 – 74 (-)	70 – 74 (-)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (negl.)	65 – 69 (negl.)	65 – 69 (negl.)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	70 – 74 (negl.)	70 – 74 (negl.)	70 – 74 (negl.)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Coupeville Middle School	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Coupeville High School	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Scenario B				
Technical Drive Off-Leash Dog Park (Oak Harbor)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Coupeville Middle School	-	-	-	-
Coupeville High School	-	65 – 69 (+)	-	-
Scenario C				
Technical Drive Off-leash Dog Park (Oak Harbor)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (negl.)	65 – 69 (negl.)	65 – 69 (negl.)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	-	-	-
Coupeville Middle School	-	-	-	-
Coupeville High School	-	-	-	-

Table 4.5-30 dB DNL Contour Range at Municipal Parks and Recreation Areas under Each Alternative and Scenario

<i>Municipal Park or Recreation Area</i>	<i>No Action Alternative</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
	<i>Conditions</i>			
<i>dB DNL Contour Range</i>				
Scenario D				
Technical Drive Off-leash Dog Park (Oak Harbor)	75 – 79	70 – 75 (-)	70 – 75 (-)	70 – 75 (-)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Coupeville Middle School	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Coupeville High School	-	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Scenario E				
Technical Drive Off-leash Dog Park (Oak Harbor)	75 – 79	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Ridgewood Park (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Hand-in-Hand Early Learning (Oak Harbor)	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Crescent Harbor Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Olympic View Elementary School (Oak Harbor)	65 – 69	65 – 69 (+)	65 – 69 (+)	65 – 69 (+)
Parker Road Trail (Coupeville)	70 – 74	65 – 69 (-)	65 – 69 (-)	65 – 69 (-)
Coupeville Middle School	-	-	-	-
Coupeville High School	-	-	-	-

Key:

DNL = day-night average sound level

L_{max} = maximum A-weighted sound level

Contour ranges:

- 65 – 69 dB DNL
- 70 – 74 dB DNL
- 75 – 79 dB DNL
- 80 – 84 dB DNL
- 85 – 89 dB DNL

(+) – The area included in the DNL contour range would increase compared to the No Action Alternative, or the DNL contour range encompassing the majority of the park or recreational area would increase.

(-) – The area included in the DNL contour range would decrease compared to the No Action Alternative, or the DNL contour range encompassing the majority of the park or recreational area would decrease.

(negl.) – Negligible change in the area included in the DNL contour range compared to the No Action Alternative.

Hyphen [-] – Area is outside of the greater than 65 dB DNL contours.

One recreational area in Oak Harbor, the Technical Drive Off-leash Dog Park, is within the greater than 75 to 79 dB DNL contour range and would remain within this contour range under most alternatives and scenarios, with the exception of all alternatives with Scenarios A or D. The Proposed Action would result in noise exposure that would not be significantly different from the level of noise exposure currently experienced at this park; therefore, the Proposed Action would result in long-term, intermittent, minor impacts to this park, which is already exposed to high average annual noise levels. Impacts not described above would be long-term, intermittent, and negligible or minor.

Potential impacts to local festivals in the study area resulting from increased Growler operations would be similar to the impacts described throughout this section. Intrusive noise events during festivals may result in annoyance, depending on the perceptions of people hearing the noise and activities in which these people are engaged. Impacts on festivals located near OLF Coupeville (for example, the Whidbey Island Kite Festival at Fort Casey State Park) would potentially be greater under each alternative with Scenarios A or D. Impacts on festivals located near Ault Field (for example, the Whidbey Island Marathon) would potentially be greater under each alternative with Scenarios C or E. Under each alternative, the waterfronts and downtowns of Oak Harbor and Coupeville and most of Penn Cove would be outside the greater than 65 dB DNL noise contours. Therefore, noise from Growler operations is not likely to significantly disrupt festivals at these locations. Impacts on festival locations within the greater than 65 dB DNL noise contours would be minor to moderate depending on the location; intermittent impacts would occur only when aircraft are operating in the vicinity.

Potential Impact on Recreation Management

Aircraft noise may impact the visitor experience, particularly for those visitors who come to the recreation areas with the expectation of seeing, hearing, and experiencing phenomena associated with a specific natural or cultural environment as described above. Because of the large area included in the NAS Whidbey Island complex AICUZ footprint and the shifts in noise exposure under each of the operational scenarios, the degree of impact under each alternative and scenario is highly location dependent. Therefore, long-term direct impacts on recreation management at county and municipal parks as a result of noise exposure when aircraft are operating in the area mirror the impacts discussed above and shown in Tables 4.5-29 and 4.5-30.

The Proposed Action may also result in increased demand for local parks and recreation areas near the places personnel transferring to NAS Whidbey Island would be expected to live. The Proposed Action would result in minor increases in the populations of Island and Skagit Counties (see Section 4.10). The Proposed Action is not expected to impact population in San Juan County. The potential population impacts of the Proposed Action were determined at the county level; therefore, the following discussion of demand for parks and recreation areas also is focused at the county level. Regardless of alternative selected, the Proposed Action would result in population increases of 1.5 percent or less in Island County and 0.2 percent or less in Skagit County compared to No Action conditions (see Table 4.10-2). Personnel and their families residing off station would likely rent or buy homes in different neighborhoods and communities; therefore, individual municipalities are not expected to experience substantial increased demand for recreational facilities in specific locations. In addition, some of the increased demand for recreation would be met by parks and recreational facilities on NAS Whidbey Island.

The *Island County Comprehensive Plan* assesses recreational needs through geographic analysis, information provided by county residents, and observations by county recreational staff (MIG, Inc.,

2011). A geographic analysis was used to determine areas underserved by recreational trails and water-access points. Needs for other types of recreational facilities, including boat launches, dog parks, camp sites, specialty trails, and designated hunting lands, were identified through a county-led public involvement process and through observations of recreational facility use. Therefore, a quantitative analysis of the potential increase in demand for Island County recreational facilities resulting from the Proposed Action is not possible. However, the projected increase in county population under each alternative would be small: 0.81 percent of Island County's 2013 population (117,641 people) under Alternative 1, 1.41 percent under Alternative 2, and 0.82 percent under Alternative 3. Regardless of the alternative selected, this increase would result in minor impacts from use of recreation areas in Island County as a result of increased demand.

Table 4.5-31 compares the estimated existing (2013) demand for parks and recreation areas in Skagit County to the estimated demand under each alternative. As shown in the table, the Proposed Action, regardless of alternative selected, would not add significantly to existing demand or deficits in the county's parks and recreation areas. The Proposed Action would create demand for an additional 2 acres (under Alternatives 1 and 3) to 3 acres (under Alternative 2) of regional parkland, which would add to the existing county deficit for regional parks. The Proposed Action would not create additional deficits in any other parks or recreation areas as a result of increased demand. While the Proposed Action would result in additional demand for open space, the county has an estimated surplus of open space, which would not change under the Proposed Action. Therefore, the Proposed Action, regardless of alternative selected, would not result in significant impacts on recreation in Skagit County as a result of increased demand.

Table 4.5-31 Potential Changes to Recreational Levels of Service in Skagit County as a Result of the Proposed Action

<i>Skagit County Levels of Service (LOS) Standard for Recreation Facilities (2010)¹</i>		<i>Skagit County Estimated 2013 Demand and Deficit² (Acres)</i>	<i>Estimated Skagit County Demand (Acres) under the Proposed Action, by Alternative³</i>		
<i>Park Type</i>	<i>LOS Standard (acres/1,000 people)</i>		<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
Regional Park	11.93/1,000	1,403 (861)	1,405	1,406	1,405
Community Park	1.12/1,000	132 (83)	132	132	132
Neighborhood Park	0.19/1,000	22 (20)	22	22	22
Open Space / Undeveloped	10.41/1,000	1,225 (-345)	1,226	1,227	1,227

Source: Skagit County Parks and Recreation, 2013

Notes:

- ¹ LOS standards for Skagit County are based on an aggregate LOS including LOS measures for Snohomish, Spokane, and Whatcom Counties.
- ² Estimated deficit based on the county's 2013 population of 117,641 people, compared to the 2010 park inventory acreages provided in Skagit County Parks and Recreation, 2013. Park deficits in acres are shown in parentheses.
- ³ Based on Skagit County's 2013 population of 117,641 people and the estimated net population increase under each alternative (see Section 4.10).

4.5.2.2.7 Privately Owned and Other Recreation Areas

Community gathering places, including the Whidbey Island Nordic Lodge Hall and Camp Casey Conference Center, would be located within the greater than 65 dB DNL noise contours under the

Proposed Action. Table 4.5-32 shows changes in the DNL contour ranges at these locations under each alternative. The scenario selected would have a greater impact on noise exposure at these community gathering places than the alternative.

Table 4.5-32 dB DNL Contour Range at Community Gathering Places under Each Alternative and Scenario

County Park or Recreation Area	No Action Alternative Conditions			
	Alternative 1	Alternative 2	Alternative 3	
dB DNL Contour Range				
Scenario A				
Camp Casey Conference Center	65 – 69	65 – 69 (+)	65 – 69 (negl.)	65 – 69 (+)
Whidbey Island Nordic Lodge Hall	70 – 74	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Scenario B				
Camp Casey Conference Center	65 – 69	- (-)	- (-)	- (-)
Whidbey Island Nordic Lodge Hall	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)
Scenario C				
Camp Casey Conference Center	65 – 69	- (-)	- (-)	- (-)
Whidbey Island Nordic Lodge Hall	70 – 74	70 – 74 (+)	70 – 74 (+)	70 – 74 (+)
Scenario D				
Camp Casey Conference Center	65 – 69	65 – 69 (negl.)	65 – 69 (negl.)	65 – 69 (negl.)
Whidbey Island Nordic Lodge Hall	70 – 74	80 – 84 (+)	80 – 84 (+)	80 – 84 (+)
Scenario E				
Camp Casey Conference Center	65 – 69	- (-)	- (-)	- (-)
Whidbey Island Nordic Lodge Hall	70 – 74	75 – 79 (+)	75 – 79 (+)	75 – 79 (+)

Tables 4.5-20 through 4.5-22 (above) show L_{max} and the number of annual events with L_{max} above 100 dB projected to occur at representative parks near the locations of the Camp Casey Conference Center (Fort Casey State Park) and Whidbey Island Nordic Lodge Hall (Rhododendron Park). In general, events with the maximum L_{max} at Camp Casey Conference Center (Fort Casey State Park) would not exceed 100 dB and would not approach levels that can cause physical discomfort. At Whidbey Island Nordic Lodge Hall (Rhododendron Park), all alternatives with Scenario A would result in the greatest impact, and all alternatives with Scenario C would result in the least impact. L_{max} at the two representative locations would be intrusive for outdoor activities, and L_{max} at Rhododendron Park near the Whidbey Island Nordic Lodge Hall would approach dB levels that can cause physical discomfort (rarely). On an intermittent basis, implementation of the Proposed Action may result in the need for Camp Casey Conference Center and the Whidbey Island Nordic Lodge Hall to reschedule or cancel outdoor events, particularly if Scenarios A or D are implemented and during periods of increased training tempos prior to deployment. Implementation of Scenarios B and E may result in similar impacts on a less frequent basis, and implementation of Scenario C would result in a decrease in the number of events with L_{max} above 100 dB at Rhododendron Park near the Whidbey Island Nordic Lodge Hall.

Based on the above, all alternatives with Scenario A would have long-term, intermittent, significant impacts on the Camp Casey Conference Center, and all alternatives with Scenarios B or D would have long-term, intermittent moderate to significant impacts on the center as a result of the increase in events with the maximum L_{max} . All alternatives with Scenario E would have long-term, intermittent, moderate impacts on the center as a result of a smaller increase. All alternatives with Scenario C would decrease annual average noise levels and the number of events with the maximum SEL or L_{max} at this

location and therefore would have no impact on the Camp Casey Conference Center. All alternatives with Scenarios A, B, D, or E would have long-term, intermittent, significant impacts on the Whidbey Island Nordic Lodge Hall as a result of an increase in annual average noise levels. Scenarios A, B, and D also would result in an increase in the number of events with L_{max} over 100 dB. Scenario C would result in long-term, intermittent, moderate impacts on this location because of an increase in annual average noise levels.

The Island County Historical Society Museum is not located within the study area but holds regular outdoor historical interpretive activities and walking tours in and around Coupeville that may occur in parts of the study area. The Proposed Action would have impacts similar to those described above on outdoor programs offered by the museum. Growler operations at OLF Coupeville may result in the need to reschedule or cancel outdoor activities or may result in annoyance (most likely) or physical discomfort (rarely) for people participating in these activities, depending on their location. Impacts would be moderate under Scenarios A and D, minor under Scenario B, and minor or negligible under Scenarios C and E.

Private property and public areas such as bike paths and lanes, rural roads, and wildlife viewing and hunting areas throughout the study area also are used for recreation. Because these places are not designated parks or recreation areas and are dispersed throughout the study area, the evaluation of impacts focuses on total acreages that would be within the DNL noise contours under each alternative, as shown in Table 4.5-33. The table shows that impacts would be greater around OLF Coupeville under all alternatives with Scenarios A and D and slightly greater around Ault Field under all alternatives with Scenarios C or E, as noted throughout this section. Impacts across the entire study area would be greatest under Alternative 1, Scenario A, which would result in an approximately 18-percent increase in the land area within the contours, and would be higher under all alternatives with Scenarios A and D generally.

Impacts resulting from implementation of the Proposed Action would include intrusive noise resulting in annoyance during aircraft operations. The increase in Growler operations may also induce people to change their use of private property and other public areas for recreation--i.e., by spending less time outside during Growler operations, planning outdoor activities around Growler operational schedules, or wearing hearing protection during operations.

Overall, Alternative 2 with Scenario C would result in intermittent, long-term, moderate impacts on other recreational areas as a result of the increases in acreage included within the greater than 65 dB DNL noise contours. The other alternatives, which would increase the acreage included within the greater than 65 dB DNL noise contours by more than 10 percent, would result in long-term, intermittent, significant impacts. All alternatives would result in an increase in the overall area used for recreation that would be exposed to high annual average noise levels.

**Table 4.5-33 Total Acreage within the Greater than 65 dB DNL Noise Contours
(Average Year [Percentage Change])**

<i>Area</i>	<i>No Action Alternative</i>	<i>Alternative 1 (Difference in Acres Compared to No Action Alternative)</i>	<i>Alternative 2 (Difference in Acres Compared to No Action Alternative)</i>	<i>Alternative 3 (Difference in Acres Compared to No Action Alternative)</i>
Scenario A				
Ault Field	12,414	13,226 (+812 [7%])	13,164 (+750 [6%])	13,133 (+719 [6%])
OLF Coupeville	7,407	10,197 (+2,790 [38%])	10,082 (+2,675 [36%])	10,132 (+2,725 [37%])
NAS Whidbey Island Complex	19,821	23,423 (+3,602 [18%])	23,246 (+3,425 [17%])	23,265 (+3,444 [17%])
Scenario B				
Ault Field	12,411	13,616 (+1,202 [10%])	13,535 (+1,121 [9%])	13,535 (+1,121 [9%])
OLF Coupeville	7,406	9,491 (+2,084 [28%])	9,378 (+1,971 [27%])	9,447 (+2,040 [28%])
NAS Whidbey Island Complex	19,817	23,107 (+3,286 [17%])	22,913 (+3,092 [16%])	22,982 (+3,161 [16%])
Scenario C				
Ault Field	12,411	13,922 (+1,508 [12%])	13,788 (+1,374 [11%])	13,766 (+1,352 [11%])
OLF Coupeville	7,406	8,092 (+685 [9%])	7,877 (+470 [6%])	7,998 (+591 [8%])
NAS Whidbey Island Complex	19,817	22,014 (+2,193 [11%])	21,665 (+1,844 [9%])	21,764 (+1,943 [10%])
Scenario D				
Ault Field	12,411	13,395 (+981 [8%])	13,329 (+915 [7%])	13,300 (+886 [7%])
OLF Coupeville	7,406	10,007(+2,600 [35%])	9,887 (+2,480 [33%])	9,939 (+2,532 [34%])
NAS Whidbey Island Complex	19,817	23,402 (+3,581 [18%])	23,216 (+3,395 [17%])	23,239 (+3,418 [17%])
Scenario E				
Ault Field	12,411	13,818 (+1,404 [11%])	13,707 (+1,293 [10%])	13,669 (+1,255 [10%])
OLF Coupeville	7,406	8,792 (+1,385 [19%])	8,706 (+1,299 [18%])	8,759 (+1,352 [18%])
NAS Whidbey Island Complex	19,817	22,610 (+2,789 [14%])	22,413 (+2,592 [13%])	22,428 (+2,607 [13%])

Note: Numbers may not sum exactly due to rounding.

4.5.3 Land Use Conclusion, Alternatives 1 through 3

Table 4.5-34 provides a summary of potential impacts on land use and recreation under each alternative.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	Summary of Impacts
1A	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 18 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <hr/> <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Coupeville Middle School, and Coupeville High School. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Long-term, intermittent significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; moderate impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
1B	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <hr/> <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	Summary of Impacts
	<ul style="list-style-type: none"> • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Long-term, intermittent, moderate to significant impacts to the Camp Casey Conference Center; significant impacts to the Whidbey Island Nordic Lodge Hall; minor impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
1C	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 11 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, moderate impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, and James Island Marine State Park. Long-term, intermittent, minor impacts to Fort Casey State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impact to the Camp Casey Conference Center; long-term, intermittent, moderate impacts to the Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
1D	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 18 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	Summary of Impacts
	<ul style="list-style-type: none"> • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville Middle School, and Coupeville High School. • Long-term, intermittent, moderate to significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; moderate impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
1E	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 14 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • Long-term, intermittent, moderate impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	Summary of Impacts
	<p>Society Museum; and significant impacts to private property and other areas used for recreation.</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2A	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Coupeville Middle School, and Coupeville High School. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Moderate to significant impacts on community gathering places, and moderate impacts on private property and other areas used for recreation. • Long-term, intermittent, significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; moderate impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2B	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 16 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts on management of the national monument for recreation.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	Summary of Impacts
	<ul style="list-style-type: none"> • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Long-term, intermittent, moderate to significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor impacts to Island County Historical Society Museum; and significant impacts on private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2C	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 9 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, moderate impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impact to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, and James Island Marine State Park. Long-term, intermittent, minor impacts to Fort Casey State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball park and Off-Leash Dog Park, Driftwood Park, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impact to the Camp Casey Conference Center; long-term, intermittent moderate impacts to the Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and moderate impacts to private property and other areas used for recreation.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	Summary of Impacts
	<ul style="list-style-type: none"> • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2D	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville Middle School, and Coupeville High School. • Long-term, intermittent moderate to significant impacts to the Camp Casey Conference Center, Whidbey Island Nordic Lodge Hall, and Island County Historical Society Museum; significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
2E	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 13 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

<i>Alternative</i>	<i>Summary of Impacts</i>
	<ul style="list-style-type: none"> • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • Long-term, intermittent moderate impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
3A	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts on management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Coupeville Middle School, and Coupeville High School. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Moderate to significant impacts to community gathering places, and moderate impacts on private property and other areas used for recreation. • Long-term, intermittent significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; moderate impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	Summary of Impacts
3B	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 16 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <hr/> <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts on management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • Long-term, intermittent, moderate to significant impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
3C	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 10 percent of land, and consequently an increase in people, within the greater-than-65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <hr/> <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, moderate impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	Summary of Impacts
	<ul style="list-style-type: none"> • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, and James Island Marine State Park. Long-term, intermittent, minor impacts to Fort Casey State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • No significant impacts from use of recreation areas in Island or Skagit Counties as a result of increased demand. • No impact to the Camp Casey Conference Center; long-term, intermittent moderate impacts to the Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
3D	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 17 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls. • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville Middle School, and Coupeville High School. • Long-term, intermittent moderate to significant impacts to the Camp Casey Conference Center, Whidbey Island Nordic Lodge Hall, and Island County Historical Society Museum; significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.
3E	<p>Land Use:</p> <ul style="list-style-type: none"> • No impact to on-station land use. • No impact to regional land use. • Proposed Action is consistent with on-station land use controls. • An increase of 13 percent of land, and consequently an increase in people, within the greater than 65 dB DNL contours. This change may impact off-station land use controls.

Table 4.5-34 Summary of Impacts on Land Use and Recreation, All Action Alternatives

Alternative	Summary of Impacts
	<ul style="list-style-type: none"> • An increase in residential land within greater than 65 dB DNL contours and therefore an increase in potentially incompatible land uses per the AICUZ recommendations. <p>Recreation and Wilderness:</p> <ul style="list-style-type: none"> • Long-term, intermittent, moderate impact to water-based recreation at the San Juan Islands National Monument. Long-term, minor indirect impacts to management of the national monument for recreation. • Long-term, intermittent, significant impacts to recreation and recreation management at Ebey’s Landing National Historical Reserve. • Long-term, intermittent, moderate impacts to recreation and recreation management at San Juan Islands NWR. • Long-term, intermittent, minor impacts to the Pacific Northwest National Scenic Trail. • Long-term, intermittent, moderate impacts to Deception Pass State Park, Dugualla State Park, Fort Casey State Park, and James Island Marine State Park. • Long-term, intermittent significant impacts to the following county and municipal parks and recreational facilities: Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Moran Beach, and Hand-in-Hand Early Learning. • Long-term, intermittent moderate impacts to the Camp Casey Conference Center and Whidbey Island Nordic Lodge Hall; minor or negligible impacts to the Island County Historical Society Museum; and significant impacts to private property and other areas used for recreation. • Long-term, intermittent, moderate impacts to the Williamson Rocks wilderness area in the San Juan Islands NWR. No impacts to BLM-owned lands with wilderness characteristics.

Key:

- BLM = Bureau of Land Management
- DNL = day-night average sound level
- L_{max} = maximum A-weighted sound level
- NWR = National Wildlife Refuge

In summary, implementation of the alternatives, average and high-tempo FCLP years, at the NAS Whidbey Island complex would not result in any impact to on-station land use. Construction proposed under the alternatives would not result in direct or indirect impacts to regional land uses because all construction would be located entirely within the NAS Whidbey Island complex. The minor increase in personnel associated with the Proposed Action would result in no significant impact to regional land use.

The Proposed Action is consistent with on-station land use controls. Regarding off-station land use controls, the increase in size of the DNL noise contours associated with the Proposed Action during an average operating year would result in an increase in land area and people within the greater than 65 DNL noise contours. Off-station land use controls may be insufficient and may require update in light of new DNL contours and new APZs (at OLF Coupeville, only).

Land use compatibility surrounding the NAS Whidbey Island complex would be impacted under each alternative. The acreage of land within the projected greater than 65 dB DNL noise contours would increase by 9 percent to 18 percent during an average operating year. Incompatible land use (i.e., residential land) within the DNL noise contours would increase under all alternatives and scenarios, during average operating years.

During a high-tempo FCLP year, the Proposed Action would result in a similar increase in land, and therefore people, within the DNL noise contours relative to an average year. The acreage of land within the projected greater than 65 dB DNL noise contours would increase by 10 percent to 18 percent during a high-tempo FCLP year, relative to the No Action year. Incompatible land use (i.e., residential land) within the DNL noise contours would increase under all alternatives and scenarios during high-tempo FCLP years. Furthermore, off-station land use controls should consider the temporary impacts of the high-tempo FCLP year or designate as an area to monitor.

Land within the conceptual APZs at OLF Coupeville would increase under each alternative. If warranted, the APZs could be updated by completing an AICUZ Update and coordinating with local communities to provide appropriate new land use recommendations as necessary. The Navy would continue to work with Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville as necessary to plan for compatible land use development within current and proposed APZs under any alternative selected for implementation.

Implementation of the Proposed Action would result in moderate impacts on wilderness recreation and management at Williamson Rocks, which are included in the San Juan Island Wilderness, part of the San Juan Islands NWR. Implementation of the Proposed Action would increase average annual noise levels at Williamson Rocks under all alternatives and would result in reduced opportunities for visitors to experience natural soundscapes associated with the rocks and surrounding waters. The Proposed Action also would impact the USFWS's ability to manage Williamson Rocks to protect wilderness values. Although visitors are currently exposed to noise from existing aircraft operations, the proposed increase in Growler operations would increase the occurrence of intrusive noise at and near this area, which would result in fewer or limited opportunities for visitors to experience solitude and primitive recreation activities and would likely negatively affect visitors' perceptions of these areas as retaining their primeval, natural character. Impacts to visitor experience and wilderness character would be intermittent over the long term, occurring only when aircraft are operating in the area.

Overall, under some alternatives and scenarios, implementation of the Proposed Action at NAS Whidbey Island would result in localized significant impacts to recreation at Ebey's Landing National Historical Reserve, various county and municipal parks and recreational areas, and private recreational facilities as a result of increased noise exposure (see Table 4.5-34, above). Impacts on other parks and recreational areas would predominantly be long term and minor or moderate at individual locations as a result of increases in the area within the greater than 65 dB DNL noise contours, in the average number of NA50 dB BNL daytime noise events per hour, or in the number of annual operations with the maximum SEL or L_{max} . Noise impacts would be intermittent over the long term, occurring only when aircraft are operating in the area. It is important to note, however, that the different scenarios may result in no impacts on individual parks and recreation areas by shifting the majority of Growler operations to either Ault Field or OLF Coupeville. The Proposed Action may result in increased demand for parks and recreation areas as a result of personnel transfers; however, impacts resulting from this demand would be minor.

The Proposed Action would directly affect recreation management in the study area as a result of long-term changes in noise exposure that would affect the recreational experiences of visitors when aircraft are operating in the area.

4.6 Cultural Resources

This section evaluates the potential impacts of the Proposed Action on cultural resources, including archaeological resources, architectural or built resources, cemeteries, and traditional cultural properties (TCPs) within the area of potential effects (APE), in accordance with NEPA guidance. Measures developed by the Navy to avoid, minimize, or mitigate impacts on cultural resources were identified as part of evaluating environmental consequences.

In coordination with its NEPA analysis, the Navy also has evaluated the potential to affect cultural resources in compliance with Section 106 of the National Historic Preservation Act (NHPA), including its implementing regulations codified in 36 CFR Part 800 (Table 4.6-1). As the Proposed Action is an undertaking with the potential to affect historic properties, the Navy is required to identify historic properties within the APE, as defined in Section 3.6, and to consider the effects of a Proposed Action on these properties. The effects of the Proposed Action on historic properties within the APE were evaluated pursuant to guidance on determining effects under 36 CFR 800.4(d) and 800.5(1). The Navy is consulting with the Washington State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), American Indian tribes and nations (herein after referred to as “tribes”), and consulting parties regarding the potential to affect historic properties.

The analysis in this EIS regarding historic properties applies criteria delineated in ACHP regulations found in 36 CFR Part 800 to assess impacts within the APE (see Section 3.6 for a further discussion of the APE).²⁹ A project affects a historic property when it alters the characteristics (and integrity) of a historic property that qualify it for inclusion in or eligibility for the National Register of Historic Places (NRHP) (36 CFR Section 800.16[i]). Examples of adverse effects are included in Table 4.6-1. Effects to TCPs that are attributed to American Indian tribes and nations only can be determined through consultation with the affected tribes. However, ground disturbance to prehistoric archaeological sites and graves has often been cited as an adverse impact.

Cultural Resources

NEPA Evaluation

Archaeological Resources

Minimal to no impacts will occur to known or intact archaeological sites.

Architectural Resources

Moderate to no impacts will occur to architectural resources.

Cemeteries

Minimal to no impacts will occur to known cemeteries or human burial grounds.

Traditional Cultural Properties

No impacts will occur to known traditional cultural properties.

Section 106 Evaluation

Overall, the Navy has determined that the proposed undertaking will adversely affect historic properties and is consulting on a Memorandum of Agreement (MoA) to mitigate adverse effects as part of its NHPA Section 106 consultation.

²⁹ While cultural resources, including historic properties, may be located outside the APE, only those located within it are evaluated as part of this analysis. For consistency, the Navy used the APE defined in accordance with Section 106 of the NHPA for the NEPA analysis (See Section 3.6.1.2).

Table 4.6-1 Definitions of Effects on Historic Properties

<i>Finding of No Historic Properties Affected (No Effect on Historic Properties)</i>
<ul style="list-style-type: none"> • 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.
<i>Finding of No Adverse Effect</i>
<ul style="list-style-type: none"> • 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).
<i>Finding of Adverse Effect</i>
<ul style="list-style-type: none"> • 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.
<i>Examples of Adverse Effect</i>
<ul style="list-style-type: none"> • 36 CFR 800.5(a)(2) – Examples of Adverse Effects Adverse effects on historic properties include but are not limited to: <ul style="list-style-type: none"> ○ physical destruction of or damage to all or part of the property ○ 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 ○ removal of the property from its historic location ○ change of the character of the property’s use or of physical features within the property’s setting that contribute to its historic significance ○ introduction of visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic features ○ 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 ○ transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property’s historic significance.

Source: Protection of Historic Properties, 36 CFR Part 800

Key:

- CFR = Code of Federal Regulations
- SHPO = State Historic Preservation Office
- THPO = Tribal Historic Preservation Office

Analysis of potential impacts to historic properties (i.e., a cultural resource that is listed on or eligible for listing on the NRHP) considers both direct and indirect effects. Direct effects may be the result of physically altering, damaging, or destroying all or part of a resource, or neglecting the property to the extent that it deteriorates or is destroyed. Indirect impacts are those that may occur as a result of the completed project altering characteristics of the surrounding environment through the introduction of visual or audible elements that are out of character for the period the property represents. An example of an indirect effect is increased vehicular or pedestrian traffic in the vicinity of the property.

The Navy has consulted with the Washington SHPO, the ACHP, eight federally recognized tribes, and 12 consulting parties to identify the APE for the Proposed Action, to determine the NRHP eligibility of cultural resources within the APE, to determine the effects of the alternatives for future development on historic properties, and to develop measures as necessary to mitigate any adverse effects of future development on historic properties. Figure 3.6-1 shows the APE for the NAS Whidbey Island complex. As noted in Section 3.6.2.6, consultation was initiated in October 2014 with the SHPO and the following organizations:

- ACHP
- Town of Coupeville
- Citizens of Ebey's Reserve (COER)
- Trust Board of Ebey's Landing National Historical Reserve
- Island County Commissioners
- Island County Historical Society
- NPS
- City of Oak Harbor
- PBY-Naval Air Museum
- Seattle Pacific University (Camp Casey)
- Washington State Parks Northwest Region Office.

The Navy sent a second letter to the SHPO and consulting parties on June 30, 2016. The letter provided information on the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours. The SHPO acknowledged receipt of the second letter in a response dated July 6, 2016 (please note in Appendix C, the letter shows a date of July 7, 2016. The letter, however, was transmitted to the Navy via email on July 6, 2016).

Letters also were sent to the Mayor of Port Townsend, the Island County Commissioner for District 3, and the Jefferson County Historical Society on July 12, 2016. These parties are additions to the original mailing list for which letters were sent in October 2014. The letters requested comments on the proposed definition of the APE and included information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours.

In response to the request for comments on the proposed definition of the APE, letters and emails were received from the following parties:

- ACHP – The ACHP responded on August 10, 2016, indicating its comments regarding the proposed definition of the APE and its recommendations to provide information on the APE to consulting parties for review.
- City of Port Townsend – Between July 5, 2016, and August 6, 2016, the City of Port Townsend provided correspondence via email regarding the proposed definition of the APE and the noise study. The City of Port Townsend also provided a letter to the Navy on August 16, 2016, indicating its comments on the proposed definition of the APE and the use of the noise data.
- COER – In a letter dated July 22, 2016, COER requested information regarding the comment deadline, an explanation of expanded operations at Ault Field and OLF Coupeville, and additional input on the noise modeling study and files from the 2005 EA.
- Town of Coupeville – In a letter dated August 25, 2016, the Town of Coupeville provided comments on the use of particular noise data and the potential to impact historic resources, agriculture, and businesses.

The Navy sent a third letter to the consulting parties on August 31, 2016. This letter was intended to provide clarification of the Section 106 process. It included three enclosures, consisting of information on the process and strategy for the 106 process for the continuation and increase of Growler operations, a flow chart, and a copy of the implementing regulations for Section 106 codified at 36 CFR 800.

Responses were received on September 1, 2016, from COER concerning the noise data and the initial findings; on September 28, 2016, from the Trust Board of Ebey's Landing National Historical Reserve, indicating their comments on the proposed definition of the APE and the use of noise data; and on September 30, 2016, from the Washington SHPO regarding the Section 106 process, the proposed definition of the APE, the development of a public involvement plan, tribal consultation, the distinction of NEPA and the NHPA, the determination of effect, and the potential for drafting resolution documentation.

A fourth letter was sent by the Navy on November 10, 2016, indicating the use of the Draft EIS public meetings to fulfill the Section 106 requirements for public notification and consultation. The letter provided information on the dates and times of the meetings. The NPS responded to this letter on January 3, 2017, noting its concern for the use of the 65 dB DNL contour to delineate the APE, as well as its concern for evaluating impacts to the cultural landscape. The SHPO responded to information presented in the Draft EIS on January 25, 2017, noting its concern with the APE and the potential for adverse effects, especially as it pertains to long-term and cumulative effects of increased flight operations on the character and qualities of historic places and communities.

The Navy sent a fifth letter to the consulting parties on May 1, 2017. This letter provided information regarding the Navy's rationale for the use of the 65 dB DNL noise contour for the APE. The Navy also provided background information on historical flight operations. The letter contained five enclosures, including the location of NAS Whidbey Island and OLF Coupeville, a map of flight tracks to depict airfield operations, a depiction of the aggregate noise contour, a map showing the portions of the APE evaluated for potential direct effects, and a map showing the portions of the APE evaluated for potential indirect effects.

The Navy and the SHPO continued discussions regarding the APE. The Navy met with the SHPO on May 10, 2017, and received a letter of the same date. The letter noted the SHPO's disagreement with the

definition of the APE and provides recommendations for the submittal of forms for when a survey is completed. The Navy provided a response on July 14, 2017, showing additional information on the use of the 65 dB DNL contour and its intention to incorporate the whole of Ebey's Landing National Historical Reserve. The SHPO response on July 14, 2017, provided concurrence with the methodology for identifying historic properties and offered recommendations to completing the task.

An additional letter was sent by the Navy to all consulting parties on July 19, 2017. It provided an update on the Navy's effort to identify historic properties and to offer another opportunity to provide comments. Five enclosures were provided. The first four included information noting known historic properties within the 65 dB DNL contour line, the historic buildings identified in the Ebey's Landing National Historical Reserve 2016 Inventory Update, known historic properties within the 2016 Inventory Update, and all listed historic properties in the NRHP. A bibliography also was included to help provide information on the historic context.

The Navy notified the ACHP, SHPO, and consulting parties on October 2, 2017, that it was updating the noise analysis to incorporate changes to the Navy's training requirements and would consult on changes to the APE and inventory once the update was complete. The letter notified the various parties of the change in the scale and scope of the undertaking due to the inclusion of two new scenarios (Scenarios D and E), a decrease in number of pilots required in each squadron, and the updated noise analysis.

A letter continuing the Section 106 consultation was provided to the ACHP, SHPO, and consulting parties on June 25, 2018. The letter noted the Navy's adverse effect finding for the Central Whidbey Island Historic District as a result of more frequent aircraft operations affecting certain landscape components of the district. Specifically, the Navy found that the increased frequentness of noise exposure would have an adverse indirect effect on five representative locations within the district. The Navy further requested comments on this finding. An attachment documenting the finding of effects determination was included as part of the correspondence.

The SHPO responded to the Navy's letter on June 27, 2018. The SHPO acknowledged the receipt of the materials and concurred with the Navy's determination of adverse effect. The SHPO noted its anticipation of further consultation and the development of a Memorandum of Agreement (MoA) to address the adverse effect. The SHPO also requested correspondence or comments received from concerned tribes or other consulting parties.

The Navy is consulting with the Washington SHPO, the ACHP, tribes, and consulting parties regarding the MoA to mitigate adverse effects as part of its NHPA Section 106 consultation.

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

Consultation is being conducted with these organizations because they have demonstrated interests in the effects of the undertaking on historic properties. Consultation also is being conducted with individuals interested in this undertaking. As noted in Section 3.6.1.2, the APE was refined in consideration of comments received by the consulting parties; it now includes all of Ebey's Landing National Historical Reserve. Information received through the consultation also was considered by the Navy in evaluating potential effects to historic properties, particularly with regard to noise and vibration effects to off-station resources.

As mentioned previously, the Navy also has initiated Section 106 consultation with the eight federally recognized tribes regarding the Proposed Action and its effects on historic properties at NAS Whidbey Island.

The following tribes were contacted on October 10, 2014:

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

The Samish Indian Nation responded on October 28, 2014, indicating that the Samish Indian Nation was not interested in consulting for cultural resources at this time.

The Navy sent a second letter to the tribes on June 30, 2016. The letter provided information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours.

The Jamestown S’Klallam Tribe responded on August 1, 2016, indicating that with respect to cultural resources, the tribe has no comments regarding the EA-18G flight operations. They requested future consultation on projects regarding renovation, demolition, and construction of facilities at NAS Whidbey Island.

The Navy sent a third letter to the tribes on August 31, 2016. This letter was intended to provide clarification of the Section 106 process. It included three enclosures, consisting of information on the process and strategy for the 106 process for the continuation and increase of Growler operations, a flow chart, and a copy of the implementing regulations for Section 106 codified at 36 CFR 800.

A fourth letter was sent by the Navy on November 10, 2016, indicating the use of the Draft EIS public meetings to fulfill the Section 106 requirements for public notification and consultation. The letter provided information on the dates and times of the meetings.

The Navy sent a fifth letter to the tribes on May 1, 2017. This letter provided information regarding the Navy’s rationale for the use of the 65 dB DNL noise contour for the APE. The Navy also provided background information on historical flight operations. The letter contained five enclosures, including the location of NAS Whidbey Island and OLF Coupeville, a map of flight tracks to depict airfield operations, a depiction of the aggregate noise contour, a map showing the portions of the APE evaluated for potential direct effects, and a map showing the portions of the APE evaluated for potential indirect effects.

An additional letter was sent by the Navy to all tribes on July 19, 2017. It provided an update on the Navy’s effort to identify historic properties and to offer another opportunity to provide comments. Five enclosures were provided. The first four included information noting known historic properties within the 65 dB DNL contour line, the historic buildings identified in the Ebey’s Landing National Historical Reserve 2016 Inventory Update, known historic properties within the 2016 Inventory Update, and all

listed historic properties in the NRHP. A bibliography also was included to help provide information on the historic context.

The Navy notified the tribes on October 2, 2017, that it was updating the noise analysis to incorporate changes to the Navy's training requirements and would consult on changes to the APE and inventory once the update was complete. The letter notified the tribes of the change in the scale and scope of the undertaking due to the inclusion of two new scenarios (Scenarios D and E), a decrease in number of pilots required in each squadron, and the updated noise analysis.

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No other responses have been received to date from the tribes.

4.6.1 Documentation of the correspondence with the tribes is provided in Appendix C. Cultural Resources, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no potential impacts to cultural resources. No additional Growler aircraft would be in operation, and no associated facilities would be constructed. Therefore, no new ground disturbance within the APE would occur, and no new sources of noise, vibration, or visual change would be introduced. Therefore, no new significant or adverse effects to cultural resources would occur with implementation of the No Action Alternative.

4.6.2 Cultural Resources, Alternatives 1 through 3

4.6.2.1 Cultural Resources, Potential Impacts

New construction would occur to support additional Growler aircraft and personnel, including expansion of hangar space, new armament storage, separate mobile maintenance facility storage, and expanded parking areas. As part of the planned construction activities, Building 115 also would be demolished. Construction would be limited to Ault Field (i.e., within the on-installation direct effect areas of the APE).

Operations would consist of actions at both Ault Field and OLF Coupeville. For this analysis, potential direct and indirect impacts are considered to cultural resources as a result of the construction of the new facilities and the flight operations of 35 or 36 additional Growler aircraft homebased at NAS Whidbey Island.

4.6.2.1.1 Direct Effects

Potential direct effects of the Proposed Action are evaluated under NEPA and under Section 106 of the NHPA. Consideration of potential direct effects includes whether the Proposed Action's alternatives involve direct physical damage to a resource, such as construction, renovation, or demolition activities. Therefore, this section only considers construction and demolition activities at Ault Field and thereby only within the on-installation direct effect areas of the APE (see Figure 3.6-2) (see Section 4.6.2.1.2 for a discussion of indirect and off-installation effects).

4.6.2.1.1.1 Archaeological Resources

As part of the Proposed Action, ground disturbance would occur within the north end of the flight line at Ault Field (i.e., that portion of the APE being evaluated for direct effects), which is within a previously disturbed area at NAS Whidbey Island and an area that is not considered sensitive for archaeological resources. The area was historically used as farmland and was heavily tilled and disturbed prior to the arrival of the Navy in Clover Valley.

Although proximate to the north end of the flight line, another potential location of ground disturbance includes the area along Taxiway Juliet. As it also is located within Ault Field, this taxiway is within an area not considered sensitive for archaeological resources. As discussed in Section 3.6.2.1.1.1, Ault Field was filled with gravel to allow for the stabilization of the airfield during construction of the current runways in 1957. The potential for intact archaeological resources, therefore, would be low.

Construction of armament storage, hangar facilities, storage areas, and expanded parking areas would include 10.1 acres for all alternatives. Upon completion of construction, each of the three alternatives would have a total of 2.3 acres of impervious surfaces. Some ground disturbance may occur in areas in which new impervious surfaces would be constructed either for temporary or permanent use; however, since construction is limited to areas within Ault Field, such ground disturbance would be in areas considered to have low sensitivity for archaeological resources. Additional details regarding the facility and infrastructure requirements are included in Section 2.3.3.3. The amount of acreage needed for each of the three alternatives does not vary between scenarios.

No ground disturbance is anticipated to occur in other locations of the APE during construction (i.e., off station), so no impacts would be anticipated to occur to archaeological resources located outside the on-installation direct effect area of the APE. No ground disturbance that would have the potential to impact archaeological resources would occur during operation.

Therefore, under NEPA, the Navy anticipates minimal to no impact to known or intact archaeological sites within Ault Field during the construction and operation of the Proposed Action; per its Section 106 responsibilities, the Navy has determined that no historic properties located within the on-installation direct effect areas of the APE and that are known archaeological resources would be affected.

4.6.2.1.1.2 Architectural Resources

With regard to historic architectural resources located within the on-installation direct effect areas of the APE, the Proposed Action under each of the three alternatives would require the expansion of Building 2737 (Hangar 12), and repairs to inactive taxiways for aircraft parking also would be needed. A two-squadron hangar also would be constructed on the flight line adjacent to Building 386 (Hangar 5); Building 115 also would be demolished (see Section 2.3.3.3, Facility and Infrastructure Requirements, for additional details). During the construction of armament storage, hangar facilities, storage areas, and expanded parking areas, ground disturbance would occur. Once constructed, facilities and parking would add up to 2.3 acres of new impervious surface at the installation for all alternatives. This amount of additional impervious surface would not vary between scenarios within each of the three alternatives.

Building 112 (Hangar 1) currently is positioned within an area of Ault Field where construction would occur. As noted in Section 3.6.2.2, while Building 112 (Hangar 1) is eligible for the NRHP, it is planned for demolition; the SHPO has been consulted for this action. The demolition is scheduled prior to the initiation of the Proposed Action. For this reason, no impacts (either direct or indirect) are anticipated to

occur during construction (or operation) to Building 112 (Hangar 1). Buildings 457 and 458 (Ready Lockers), which are eligible for the NRHP due to their association with Building 112 (Hangar 1), also will be demolished; the SHPO has been consulted for this action.

Building 115 was built in 1942 and is located on Midway Street, just west of Langley Boulevard. It was determined ineligible for listing in the NRHP (SHPO Log Nos. 012610-05-USN). The building was originally built as an ordnance shop and continues its function as an aviation armament shop. A new ordnance shop would be required in proximity to the flight line and would replace Building 115. Geotechnical borings within one-eighth mile of Building 115 encountered five soil types: fill, glacial marine drift, glacial till, glacial outwash, and undifferentiated glacially consolidated soils. The fill varied from 2.5 feet to 6 feet deep, and no Holocene deposits were encountered between it and the Pleistocene sediments. It is unlikely that any intact Holocene sediments exist beneath the building. The Navy has determined that archaeological monitoring of the building's demolition is not warranted.

Building 2737 (Hangar 12) would be expanded as part of each alternative to accommodate additional training squadron aircraft. This building was originally built in August 1989 in order to accommodate the EA-6B Prowler squadron (Thursby, Bryant, and Ross et al., 2013; Thursby, Bryant, and Meiser et al., 2013). Building 2737 (Hangar 12) is not associated with a significant event in the Cold War era. It was used for maintaining tactical bomber and electronic warfare aircraft while they were off of aircraft carrier rotation (Hampton and Burkett, 2010). While this resource is important to the operations at Ault Field, it is not considered historically significant due to its date of construction and lack of significance for the Cold War, and has been determined not eligible for listing in the NRHP. The Washington SHPO has concurred with this finding.

Other changes to architectural resources during construction include repairs to inactive taxiways, located to the south of Runway 7-25 (Facility 201247), that were built in the early 1950s. Similar to Building 2737 (Hangar 12), while the taxiways are important to the operations at NAS Whidbey Island, they are also not considered historically significant. While the taxiways (in conjunction with the runway) represent the post-World War II conversion of Ault Field to a Master Jet Station, the Navy has determined the taxiways to be not eligible for the NRHP and has received concurrence from the SHPO (Hampton and Burkett, 2010).

Under NEPA, moderate to no direct impacts would occur to architectural resources located within the on-installation direct effect areas of the APE. Per its Section 106 responsibilities and in consideration of direct effects, the Navy has determined that no effect would occur within the on-installation direct effect area of the APE because no historic properties are present and Buildings 112, 457, and 458 would no longer be present.

4.6.2.1.1.3 Cemeteries

As noted in Section 3.6.2.4, 27 cemeteries have been identified within the APE. However, no known cemeteries or human burial grounds are located in the on-installation direct effect areas of the APE; therefore, no known cemeteries or human burial grounds would be subject to direct effects.

As evaluated under NEPA, no direct impacts to known cemeteries would occur. As evaluated under Section 106, no effect would occur because no known historic properties are present within the on-installation direct effect areas of the APE.

4.6.2.1.1.4 Traditional Cultural Properties

In consultation with affected tribes, no known TCPs have been identified within the APE. Therefore, as evaluated under NEPA, no direct impacts would occur. Per Section 106, no effects would occur to historic properties because no known TCPs have been identified.

4.6.2.1.2 Indirect Effects

The Navy also is evaluating the potential indirect effects of the Proposed Action to archaeological resources, historic architectural resources, cemeteries, and TCPs under NEPA and under Section 106 of the NHPA.

Indirect effects associated with construction activities and equipment will occur due to the presence of increased dust, personnel, and machinery within the on-installation direct effect areas of the APE. The impacts for each of the alternatives would be anticipated to be similar in nature. These impacts generally would lessen as the distance between the construction areas and the resource would increase.

After construction is complete, indirect impacts associated with the presence of new facilities and the operation of the aircraft would occur. These types of impacts would be associated with changes to the visual, atmospheric, and auditory (noise) setting, primarily of historic architectural resources, including the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve.

4.6.2.1.2.1 Archaeological Resources

As noted in Section 3.6.2.2, 151 archaeological sites are located within the APE. Among these, seven archaeological sites have been determined eligible for the NRHP, and 15 have been determined potentially eligible. An additional 127 archaeological sites are unevaluated for their NRHP status and thereby are considered eligible for listing in the NRHP for this evaluation.

As a majority of the archaeological sites contain subsurface components, minimal to no indirect effects would occur during construction and operation because the visual, atmospheric, and auditory setting would not be altered. In addition, if impacts were to occur, they generally would be temporary and intermittent due to the nature of the activities.

Therefore, under NEPA, minimal to no indirect impacts would occur as a result of construction and operation. Per its Section 106 responsibilities, the Navy has determined that no adverse effect would occur to archaeological resources as a result of indirect effects associated with construction and operation.

4.6.2.1.2.2 Architectural Resources

For the evaluation of architectural resources, the aspect of setting is particularly important when considering potential impacts associated with visual, atmospheric, and auditory changes. Setting refers to the physical environment and the character of the place in which a resource played its historic role. Physical features of the setting may include both natural and man-made aspects, such as topography, vegetation, and the relationships between buildings or open space (Andrus, 2002).

The discussion of impacts is divided into the following sub-sections to account for the differences between on-installation and off-installation areas of the APE and the type of indirect effects. The discussion covers visual effects, atmospheric effects, and auditory (noise and vibration) effects.

4.6.2.1.2.2.1 Visual Effects

4.6.2.1.2.2.1.1 On-Installation Indirect Effect Areas

Construction activities at Ault Field have the potential to cause indirect impacts to buildings and structures located within the on-installation indirect effect areas. Building 386 (Hangar 5), which is eligible for the NRHP, is proximate to the planned location of the construction activities and would be adjacent to the two-squadron hangar. This building is eligible for the NRHP due to its unique architectural qualities (i.e., Criterion C). The physical structure of the building would not be altered during construction; however, increased dust and the presence of personnel and machinery may temporarily impact its visual setting.

Limited visual changes also would occur as a result of the changes from the construction associated with each alternative to Building 2737 (Hangar 12), new armament storage, separate maintenance facilities, and expanded parking areas, as well as from the demolition of Building 115, within Ault Field. These changes would be consistent with the operational mission of NAS Whidbey Island, in which activities associated with flight operations and maintenance would occur on a daily basis. Because physical changes to the existing buildings and facilities resulting from construction under all of the alternatives would be limited to Ault Field, no impacts are anticipated to occur at OLF Coupeville, the Seaplane Base, or other on-installation areas within the APE. Within Ault Field, the resulting facilities (and removal of facilities) would be consistent with the airfield operations and would not be anticipated to alter the overall feel of the setting. This would include impacts to NRHP-eligible facilities, such as Building 386 (Hangar 6), as well as other architectural resources within Ault Field. Building 112 (Hangar 1) and Buildings 457 and 458 (Ready Lockers) would no longer be present. Visual impacts, however, would be anticipated to occur due to the increased flight operations at Ault Field, OLF Coupeville, and the Seaplane Base. As noted in Section 2.3.3.2, annual airfield operations would increase approximately 29 percent to 33 percent (depending on the alternative and scenario selected) over the No Action Alternative, and an additional 35 or 36 Growler aircraft would be included in the community at Ault Field. Aircraft would be visible in views both to and from historic resources during take-off and landing and while in flight, and would be most noticeable for those resources located proximate to the airfields; the aircraft would be less visible as the distance from the airfields increases.

Lighting associated with the aircraft and operations at NAS Whidbey Island facilities would be visible proximate to the airfield. In general, the lighting would be similar to that already present and thereby would create a minimal change in the visual setting for resources located within the APE. Lighting within the airfields generally consists of runway, carrier deck, landing system, arrest gear, wave-off, taxiway, and obstruction lighting. A rotating beacon also is present; when the airfield is open, the beacon is operated continuously from sunset to sunrise and during daylight hours when the airfield is operating in Instrument Flight Rules (Navy, 2005a). As noted in Section 2.2, lighting for FCLPs often is low and is described as ambient in order to simulate aircraft carrier landings. Some additional lighting may be needed for the expansion of Building 2737 (Hangar 12), the parking facilities, and the armament storage under all alternatives and the two-squadron hangar.

Under NEPA, for those resources within Ault Field, OLF Coupeville, and the Seaplane Base (on-installation indirect effect areas of the APE), minimal impacts would be anticipated to occur because the existing visual setting in part accommodates aircraft and military operations. The visual presence of aircraft during take-off and landing and lighting associated with the Proposed Action generally would

cause minimal impacts because the changes would be consistent with the visual setting of historic resources located within Ault Field, OLF Coupeville, and the Seaplane Base.

As evaluated under Section 106, the Navy has determined that no adverse effect to historic properties located at Ault Field would occur, and no viewshed effects to Building 386 (Hangar 5) would occur. No historic properties are present within the APE at OLF Coupeville and the Seaplane Base.

4.6.2.1.2.2.1.2 Off-Installation Indirect Effect Areas, Central Whidbey Island Historic District, and the Ebey's Landing National Historical Reserve

For these areas of the APE, no indirect effects are anticipated to occur as a result of the construction because the construction activities and changes to the facilities would be limited to Ault Field.

During take-off and landing, however, the aircraft would be within the viewshed of historic resources outside of Ault Field and OLF Coupeville, including those within the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve. Therefore, for this analysis, these off-installation areas of the APE, those outside the installation and those within the historic district/reserve, are considered together. The presence of the additional 35 or 36 aircraft would create a temporary change in the visual setting, during the ascent and descent of the aircraft, when captured within the viewshed of a historic architectural resource. As indicated in Sections 1.4 and 2.3.3.2, the total number of flight operations within Ault Field and OLF Coupeville would increase by approximately 29 to 33 percent (depending on the alternative and scenario selected) over the No Action Alternative. For each alternative and scenario, the total airfield operations, and therefore the opportunity for a visual presence of aircraft, would be similar to historic operations between the late 1970s and the 1990s.

While the types of impacts under each of the alternatives would be similar, the difference between the five scenarios may influence the frequency of visual impacts resulting from takeoff and landing. Under Scenario C of each alternative, approximately 80 percent of the FCLPs would be conducted at Ault Field. As compared to the other scenarios, visual impacts may be experienced with greater frequency under this scenario to those resources in proximity to Ault Field. Likewise, under Scenario A of each alternative, approximately 80 percent of the FCLPs would be conducted at OLF Coupeville. As compared to the other scenarios, impacts may be experienced with greater frequency under this scenario to those resources in proximity to OLF Coupeville. During a high-tempo FCLP year in which pre-deployment training for multiple units may overlap, FCLP activity would be expected to increase over average conditions, and thus the frequency of aircraft also may increase over the course of the year.

In addition to the frequency of aircraft takeoffs and landings, distance also may influence the extent to which a visual impact is experienced. For instance, Crockett Prairie and Smith Prairie are adjacent to OLF Coupeville. Views of the ascent and descent of aircraft may be apparent from historic architectural resources within these locations to a greater extent than from those located further from the airfield. Existing vegetation may provide a slight buffer for those resources located within Crockett Prairie, which largely is characterized as woodlands. Aircraft also would be in view of historic architectural resources while in flight. Unlike take-off and landing procedures, the vertical distance to the ground surface is greater, and the duration is longer. As part of the Proposed Action, FCLPs would occur at Ault Field, as well as at OLF Coupeville. As noted in Section 1.4, a typical FCLP evolution lasts approximately 45 minutes, with three to five aircraft participating in the training. While each of the five scenarios generally would include the same total number of FCLPs, impacts occurring as a result of in-flight aircraft may be experienced more frequently under Scenario C of each alternative within proximity to Ault Field

and under Scenario A of each alternative within proximity to OLF Coupeville. During a high-tempo FCLP year, which may occur under all of the alternatives, the frequency of aircraft in flight also may increase.

Lighting associated with the aircraft and operations at NAS Whidbey Island facilities also may be visible to and from historic resources located proximate to the airfield. In general, the lighting would be similar to that already present and therefore would create a minimal change in the visual setting to resources located within the off-installation indirect effect areas of the APE and the historic district/reserve.

Considered together under NEPA, due to the temporary nature of the activities, the frequency of operations, the variable distance of historic architectural resources from the airfields, and the consistent military presence within the reserve, minimal to moderate impacts would be anticipated to occur to the visual setting of architectural resources within off-installation areas of the APE and the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve.

Under Section 106, no adverse effect would be anticipated to occur to historic properties located within the APE as a result of visual changes. While the setting may be temporarily interrupted by the visual presence of aircraft (during takeoffs, landings, and in flight) and additional lighting, these occurrences do not detract from the overall integrity of historic properties within the APE and therefore their individual significance.

When considering the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve under Section 106, the Navy accounted for the relative number, size, scale, design, and locations of components that both do and do not contribute to its significance. The operation of the aircraft would not affect the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve designation or the NRHP eligibility. The land use patterns, relationships between the individual buildings, and appearance of buildings or landscape features would be maintained. No direct or permanent on-the-ground visual intrusions would be introduced into the physical landscape. While the setting may be temporarily interrupted by the visual presence of aircraft (during takeoffs, landings, and in flight), these occurrences do not detract from the relationships of components within the district and do not interfere with the overall integrity of the district. Therefore, these effects would not detract from those characteristics that convey the significance of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve. The Navy has determined that no adverse effect would occur to this historic property, as well as the individual properties within it, as a result of visual intrusions.

4.6.2.1.2.2.2 Atmospheric Effects

As part of their operation, some aircraft may leave contrails (i.e., condensation trails), which readily evaporate but do mark their previous presence. The contrails are a visual representation of atmospheric changes. As the in-flight time would be limited to a specific range, the atmospheric changes would not create a permanent effect on the visual setting of historic resources both on and off installation.

Therefore, as considered under NEPA, only minimal impacts would occur as a result of atmospheric changes. As evaluated under Section 106, the Navy has determined that no adverse effect to historic properties would occur.

4.6.2.1.2.2.3 Noise and Vibration

Architectural resources within the APE that may be impacted by noise and vibration from the operation of the additional Growler aircraft were considered by the Navy under both NEPA and Section 106 of the NHPA.

A review of existing literature indicates that buildings may be impacted by noise and vibration, noting that some may be more impacted due to their individual ages, conditions, and location. In 1977, the National Research Council developed guidelines for evaluating potential impacts from noise in the context of Proposed Actions. These guidelines are often cited in subsequent studies as the basis for evaluating impacts even today. Per the guidelines, sounds lasting more than 1 second with a peak unweighted sound level greater than or equal to 130 dB (in the 1 to 1,000 hertz frequency range) are considered potentially damaging to structural components (NRC and NAS, 1977). This is a conservative standard for assessing all sound (NRC and NAS, 1977).

According to Hubbard (1982), a person inside a structure can sense noise through vibration of the primary components of a building, such as the floors, walls, and windows; by the rattling of objects; or by damage to secondary structures, such as plaster and tiles and/or furnishings. For these types of impacts, a structural vibration velocity of 2 inches per second (in/sec)³⁰ (50 millimeters per second) has commonly been used as the safe limit, such that vibrations above this value would have an adverse environmental impact (NRC and NAS, 1977). Other scholars suggest that limits between 0.006 and 0.08 in/sec for continuous vibration would not be expected to cause damage; however, when continuous vibrations exceed 0.4 or 0.6 in/sec, architectural and structural damages may occur (Nam et al., 2013). While standards are used to determine acceptable levels of noise and vibration, Konan and Schuring (1983) also note that the individual condition of the building/structure must be accounted for when determining potential impacts, as historic buildings may be in varying states of deterioration. For example, older structures may have previous settlement, and movements within the structure may have redistributed the loads and stresses into unknown patterns. If this occurs, damage from new vibration would be difficult to discern from previous or existing damage (Konan and Schuring, 1983).

With respect to the potential for aircraft noise and vibration effects on the structural components of historic structures, a number of studies have been conducted. Hershey, Kevala, and Burns (1975), for instance, examined the potential for breakage at five historic sites within the Concorde flightpath. They evaluated the impact on structural features, including windows, brick chimneys, stone bridge, and plaster ceilings. They determined that the potential for breakage was generally less than 0.001 for a year of overflights. The aircraft noise study (Appendix A, Section A1.3.11), citing this study, relays that no damage was found to a 1795 plantation house from routine departures of the Concorde aircraft 1,500 feet from the runway centerline of a major airport; the Concorde study concluded that noise exposure levels for compatible land use also should be protective of conventional historic and archaeological sites (Wyle, 2016).

As shown by these studies, recommended noise/vibration limits tend to vary within the published literature. "At one end of the range is a conservative limit of 0.10 inches/sec except in the case of ancient ruins where 0.08 inches/sec is considered appropriate by some. At the other end of the range, some would consider 0.50 inches/sec or even 2.0 inches/sec to be appropriate" (Wilson, Ihrig & Associates, Inc., ICF International, and Simpson, Gumpertz & Heger, Inc., 2012). Within the U.S., no established standard is present for determining a precise threshold for historic buildings due to the individual characteristics of buildings and the types of vibration that may occur. Therefore, research indicates a need to evaluate potential vibration impacts on a case-by-case basis or to, at minimum,

³⁰ Velocity of vibration is measured in peak units, such as inches per second or millimeters per second. The structural vibration velocity measurement refers to the velocity with which a measured point moves about from a rest position.

account for the particular existing conditions. An analysis was performed for NAS Whidbey Island in 2012; the standards used for this analysis, therefore, are used for the assessment of noise/vibration for the three alternatives.

The 2012 study at NAS Whidbey Island suggested that sounds lasting more than 1 second above a sound level of 130 C-weighted sound level (dBC) are potentially damaging to structural components (Kester and Czech, 2012). The study evaluated Prowlers and Growlers at NAS Whidbey Island and noted that none of the conditions evaluated for the study caused C-weighted³¹ sound levels to exceed 130 dBC (i.e., the stated threshold) and that structural damage would not be expected. The authors, however, did note that takeoff conditions had C-weighted sound levels greater than 110 dBC for both types of aircraft, creating an environment conducive to noise-induced vibration (Kester and Czech, 2012).

In order to reach these conclusions, the authors of the 2012 study included a brief examination of low-frequency noise associated with Growler overflights at 1,000 feet AGL in takeoff, cruise, and approach configuration/power conditions (Kester and Czech, 2012). The study found that takeoff condition has the highest potential for damage, with unweighted sound levels of approximately 105 dB and an overall C-weighted sound level of 115 dBC. The Growler would exhibit C-weighted sound levels up to 101 dBC when cruising and 109 dBC (gear down) at approach. As these levels are much less than the 130 dB criterion, damage would not be expected for typical residential structures in the vicinity of NAS Whidbey Island. The authors further concluded that additional analysis would be needed to more accurately determine the potential for building rattle/vibration (Kester and Czech, 2012).

The NPS has accounted for the potential disruption to visitor experiences caused by overflights at its units other than Ebey's Landing National Historical Reserve (Bell et. al., 2010). In a 2010 study, the authors noted that by the time most aircraft are noted, they are high enough that they yield less noise than those that are used to specifically tour NPS units. However, the authors also noted that this may result in more noise when the unit is located either near a commercial airport or a military airfield (Bell et al., 2010).

In 2016, the NPS conducted an acoustical study utilizing two acoustic monitoring systems for 31 days on NPS property in the Ebey's Landing National Historical Reserve. The locations consisted of the Reuble Farmstead and the Ferry House. At the Reuble Farmstead, the highest recorded sound pressure level was 113 dBA during FCLP by Growlers. At the Ferry House, 85 dBA was the loudest recorded military aircraft (NPS, 2016). While these studies concerned two locations known for their historic qualities, the study did not evaluate for the potential damage to these structures caused by noise or vibration. However, when comparing the highest recorded sound pressures of 113 dBA and 85 dBA at the two POIs and conservatively converting these A-weighted measurements to C-weighted measurements (i.e. the addition of 6 dB), it is unlikely that sound pressures of 119 dBC and 91 dBC would approach a peak unweighted sound level greater than or equal to 130 dBC, which is the level that would be considered potentially damaging to structures at those locations. The study provided information on the impacts to the visitor experience and to wildlife (see Sections 4.2, Noise, and 4.5, Land Use).

³¹ The C-weighting scale was originally designed to be the best predictor of the ear's sensitivity to tones at high noise levels. The C-weighting scale is quite flat, and it therefore includes much more of the low-frequency range of sounds than the A and B scales (Witt 2013). C-weighting is often used to assess the potential for structural vibration, rattle, or damage (Kester and Czech 2012).

For this analysis, potential indirect effects from a change in noise exposure were measured in two ways: 1) a change in exposure to the 65 dB DNL contour, and 2) a substantive change in dB DNL (i.e., changes in noise exposure of 5 dB DNL or greater in areas with an existing DNL of greater than or equal to 65 dB DNL, and 5 dB DNL or more in areas within Ebey's Landing National Historical Reserve, regardless of existing noise contour range). Change in exposure to the 65 dB DNL contour is represented as change in the area of the 65 dB DNL contour between the No Action Alternative and the proposed aggregate 65 dB DNL contour. This includes any resources that are located within the proposed aggregate 65 dB DNL contour but not located within the No Action Alternative's 65 dB DNL contour. Primarily, these resources are located at the edge of the APE, where the proposed 65 dB DNL contour expands beyond the No Action Alternative 65 dB DNL contour.

Substantive change in dB DNL is measured as the difference between the dB DNL for the Proposed Action, represented as an aggregate of all proposed alternatives, and the dB DNL modeled under the No Action Alternative. This difference, also called delta DNL, was modeled across the entire APE, and areas where there is a substantive increase in dB DNL were outlined. Additional information regarding this methodology is provided in Appendix C as part of the June 25, 2018, letter to consulting parties.

Due to the large number of architectural resources within the APE, only those resources that were eligible for listing or listed in the NRHP and that would experience a substantive increase in noise exposure were considered by the Navy for both the NEPA and Section 106 evaluations of potential auditory impacts.

4.6.2.1.2.2.3.1 On-Installation Indirect Effect Areas

No on-installation historic properties meet the conditions for the noise evaluation. However, no historical data are present for facilities at NAS Whidbey Island to suggest the presence of noise and vibration-related effects on historic architectural resources.

As considered under NEPA, due to the continuous operation of aircraft for more than 75 years, including periods of significantly higher levels of operation and a history of little or no damage at this location, minimal to no impacts related to noise and vibration would occur either with the operation of the additional Growler aircraft or with the results of the new construction and expansion of facilities associated with the alternatives.

While no historic properties are noted as meeting the conditions of the noise analysis for the Section 106 evaluation conducted by the Navy, and as noted in the Section 106 documentation (see Appendix C), historic properties are present. Therefore, the Navy has determined that no adverse effect will occur to historic properties located on the installation due to noise and vibration.

4.6.2.1.2.2.3.2 Off-Installation Indirect Effect Areas and the Central Whidbey Island Historic District and Ebey's Landing National Historical Reserve

Within off-installation indirect effects areas, including the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve, two historic buildings and structures, six buildings listed in the Washington Heritage Barn Register, one historic district, and 44 individual resources within the historic district³² are eligible for listing in the NRHP and will experience a substantive increase in noise exposure.

³² As resources may be recorded in different inventories and listings, overlap is not accounted for; therefore, some double-counting may occur.

Noise and vibration within the off-installation areas of the APE would likely vary due to the location of specific historic architectural resources in relation to the airfields. Therefore, while the types of impacts under each of the alternatives would be similar, the difference between the five scenarios may influence the frequency and intensity of noise and vibration impacts resulting from takeoff and landing. Under Scenario C of each alternative, approximately 80 percent of the FCLPs would be conducted at Ault Field. As compared to the other scenarios, noise and vibration impacts may be experienced with greater frequency and intensity under this scenario by those resources in proximity to Ault Field. Likewise, under Scenario A of each alternative, approximately 80 percent of the FCLPs would be conducted at OLF Coupeville. As compared to the other scenarios, impacts may be experienced with greater frequency and intensity under this scenario by those resources in proximity to OLF Coupeville. During a high-tempo FCLP year in which pre-deployment training for multiple units may overlap, FCLP activity would be expected to increase over average conditions, and thus the frequency of aircraft also may increase over the course of the year. No significant physical damage as a result of aircraft operations has been reported to these resources as a result of continuous operation of aircraft for over 75 years. For this reason, the Navy does not anticipate that the operation of the aircraft would cause impacts to the structural integrity of historic resources within the APE.

While indirect physical damage (i.e., to structural integrity) would not likely occur, potential impacts to perceptual qualities due to the experience of the noise and vibration were considered by the Navy for this evaluation. These qualities are relevant to the landscape character areas and their representative views located particularly within the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve. The Navy identified a substantive change in noise exposure in nine landscape areas where perceptual qualities contribute to the significance of the overall district. Potentially affected landscapes include all of the identified contributing landscape areas, except for the Fort Casey Uplands. The substantive change in noise exposure has the potential to indirectly alter the perceptual experience of the contributing cultural landscape character areas at five of the representative locations because these character areas are identified as tangible resources and character-defining features of the historic property. These locations include the following:

1. entry to Coupeville (from Ebey's Prairie into Prairie Center, and along Main Street) and Front Street in Coupeville
2. view to Crockett Prairie and Camp Casey from Wanamaker Road
3. view to Crockett Prairie and uplands from the top of Patmore Road
4. view to Crockett Prairie and uplands from Keystone Spit
5. view of Smith Prairie from Highway 20, entering the Reserve

Further detail, including a listing of all of the properties considered for the noise evaluation, is provided in Appendix C as part of the June 25, 2018, letter to consulting parties and determination document.

Therefore, under NEPA, minor to moderate, temporary impacts would be anticipated to occur; under Section 106, the Navy has determined that an adverse effect would occur as a result of the changes to the perceptual qualities of five landscape features that contribute to the significance of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve; no other adverse effects would occur as a result of noise and vibration. To address adverse effects, the Navy is consulting with the Washington SHPO, the ACHP, tribes, and consulting parties regarding a MoA to mitigate adverse effects as part of its NHPA Section 106 consultation.

4.6.2.1.2.3 Cemeteries

While no known cemeteries or human burial grounds would be subject to areas of potential ground disturbance, indirect impacts associated with visual, atmospheric, or auditory changes may occur to the setting of cemeteries or may be experienced by those visiting cemeteries located within the APE.

Therefore, as evaluated under NEPA, minimal to no impacts would occur; in accordance with Section 106, the Navy has determined that no adverse effect would occur to historic properties that are cemeteries and human burial grounds.

4.6.2.1.2.4 Traditional Cultural Properties

No known TCPs have been identified in the APE. Consultations with tribes, the SHPO, and consulting parties have resulted in no new TCPs identified within the APE.

Therefore, as evaluated under NEPA, no impacts would occur; in accordance with Section 106, the Navy has determined that no effect would occur to TCPs because no known TCPs have been identified within the APE.

Traditional resources associated with tribes and government-to-government consultation are discussed in Section 4.7.

4.6.3 Cultural Resources Conclusion, Alternatives 1 through 3

As considered under NEPA, implementation of Alternatives 1 through 3 would result in no significant impacts, direct or indirect, to archaeological or architectural resources, cemeteries, and TCPs. While adverse effects to historic properties have been identified, the intensity and context of those effects do not rise to the level of significance under NEPA. NEPA accounts for impacts to both cultural resources that are not historic properties and those that are. As part of its Section 106 responsibilities, the Navy is consulting on a MoA to resolve adverse effects to historic properties.

Minimal to no direct impacts would result to known or intact archaeological sites within Ault Field (the on-installation direct effect areas of the APE) during the construction and operation of the Proposed Action. No ground disturbance is anticipated to occur at the Seaplane Base and OLF Coupeville or other areas of the APE; therefore, no direct impacts would occur. The Navy would follow procedures in its Integrated Cultural Resources Management Plan should any inadvertent discoveries be made during construction activities. There would be no difference in impacts to archaeological resources between scenarios or between average year and high-tempo FCLP year conditions under the alternatives. Minimal to no indirect impacts would occur to on- and off-station archaeological resources as a result of the construction and subsequent operation of the Proposed Action.

Moderate to no direct impacts would result to on-installation architectural resources during construction of the Proposed Action. Building 115 would be demolished as part of the three action alternatives. On-installation resources, such as Building 2737 (Hangar 12) and the taxiways, also may be directly impacted as a result of the expansion of facilities and new structures; because these are not historically significant and are considered within their context, the impacts to these resources are anticipated to be minor. No off-station direct impacts to architectural resources are anticipated during construction because ground disturbance is limited to Ault Field.

Minor indirect impacts to on-installation architectural resources, including visual, atmospheric, and auditory changes to the setting, may result from the construction of the Proposed Action. These types of

impacts may occur in areas proximate to Ault Field, which includes NRHP-eligible Building 386 (Hangar 5). During operation, minimal to moderate visual, atmospheric, and auditory impacts would occur to architectural resources. Within NAS Whidbey Island, these impacts are anticipated to be minimal, as the presence of new and/or expanded facilities and operations would be consistent with the airfield setting. Off-station impacts would be minimal to moderate. The level of impact for off-station resources would largely be dependent upon the distance of the resource from the operations and the frequency of them. Those resources in proximity to Ault Field and OLF Coupeville would experience visual impacts to a greater extent than those that are either screened or are located further from the airfields. Under Scenario C of each alternative, approximately 80 percent of the FCLPs would be conducted at Ault Field. As compared to the other scenarios, impacts may be experienced with greater frequency and intensity under this scenario to those resources in proximity to Ault Field. Under Scenario A of each alternative, approximately 80 percent of the FCLPs would be conducted at OLF Coupeville. As compared to the other scenarios, impacts may be experienced with greater frequency and intensity under this scenario to those resources in proximity to OLF Coupeville. During a high-tempo FCLP year, training activity would be expected to increase over average conditions, and therefore, the frequency of aircraft and the potential for its associated impacts also may increase.

While no known cemeteries or human burial grounds would be within areas of potential ground disturbance, indirect impacts associated with visual, atmospheric, or auditory changes would occur to the setting of cemeteries or would be experienced by those visiting cemeteries located within the APE. Because no known TCPs have been identified within the APE, no impacts are anticipated to occur.

Under Section 106, the Navy has determined the following with regard to historic properties that are archaeological resources:

- The proposed undertaking in the on-installation direct effect areas of the APE will result in no effect to historic properties that are archaeological resources because no known archaeological sites are present; and
- No adverse effect would occur to other archaeological sites within the on- and off-installation indirect effect areas of the APE, which includes the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve.

Little likelihood exists for intact archaeological deposits to be present in the on-installation direct effect areas of the APE. Given the results of geotechnical borings and documented disturbance from airfield and flight line construction and maintenance since 1942, the Navy does not find archaeological monitoring of construction or demolition necessary.

Although it is unlikely that intact archaeological resources would be found in these areas, as noted for the NEPA evaluation, the potential for post-review discoveries of archaeological resources. In case of an inadvertent discovery of Native American human remains and/or archaeological resources during construction, the Navy would follow the current Inadvertent Discovery Plan and would notify the appropriate tribal governments and the SHPO as to the treatment of the remains and/or archaeological resources per applicable laws.

With regard to historic properties that are architectural resources, the Navy has determined that no individual NRHP-eligible buildings and structures within the on-installation direct and indirect effect areas of the APE would be adversely affected by the proposed undertaking (including a no adverse

effect finding to the viewshed of Building 386 [Hangar 5]) as a result of direct, visual, or atmospheric effects.

However, the Navy has determined “Historic Properties Adversely Affected” as a result of the potential auditory effects to representative landscape features within the Central Whidbey Island Historic District/Ebey’s Landing National Historical Reserve. The increased frequency of noise exposure would indirectly damage the characteristics of the Central Whidbey Island Historic District/Ebey’s Landing National Historical Reserve that currently make it eligible for the NRHP. Although the indirect effects are intermittent, the proposed undertaking would result in an increased occurrence of noise exposure affecting certain cultural landscape components in the historic district/reserve—specifically, the perceptual qualities of five locations that contribute to the significance of the landscapes.

The Navy finds no effect to cemeteries within the direct effect areas of the APE because no known cemeteries or human burial grounds are present, and no adverse effects would occur to cemeteries and human burial grounds that are historic properties within all other portions of the APE from the proposed undertaking. Because no known TCPs have been identified within the APE, no effect would occur.

Per its Section 106 responsibilities, the Navy determined an adverse effect to the Central Whidbey Island Historic District/Ebey’s Landing National Historical Reserve and therefore an overall finding of adverse effect to historic properties. The Navy is consulting with the Washington SHPO, the ACHP, tribes, and consulting parties regarding a MoA to mitigate adverse effects as part of its NHPA Section 106 consultation.

4.7 American Indian Traditional Resources

This section evaluates how and to what degree the Proposed Action (described in Chapter 2) could impact traditional resources within the study area as defined in Section 3.7.

As established in Section 3.7, traditional resources are “those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by or reserved by or for Indian tribes through treaties, statutes, judicial decisions, or EOs, including tribal trust resources.” The term “traditional resources” will be used to encompass protected tribal resources.

Potential impacts to American Indian traditional cultural and religious properties, including traditional cultural properties (i.e., historic properties eligible for listing in the NRHP under the NHPA and other tribal resources are evaluated in Section 4.6 (Cultural Resources).

4.7.1 Approach to Analyses

The evaluation of impacts on traditional resources considers whether: 1) the traditional resource itself is significantly affected (such as significant impacts to fish species or to supporting habitats), or 2) there is a significant change in access to federally secured off-reservation usual and accustomed fishing grounds and stations, or access for hunting and gathering on open and unclaimed lands. Impacts may be clearly identified, as when a known traditional resource is directly and significantly affected or access is significantly changed.

4.7.2 No Action Alternative

Under the No Action Alternative, the project would not be constructed, and overall operations would not change from current levels. NAS Whidbey Island, Ault Field, the Seaplane Base, and OLF Coupeville are restricted to authorized personnel, and the Navy would continue to accommodate access by American Indians on a case-by-case basis. The Navy would continue coordination with the Suquamish Tribe for access to the Surface Danger Zone (SDZ) in waters northwest of Ault Field for fishing activities in accordance with the 2013 memorandum of agreement. There would be no change to the Suquamish Tribe’s ability to safely access the SDZ. Federally secured off-reservation hunting and gathering rights are not affected because there are no changes to current Navy access requirements to Navy property at Ault Field, the Seaplane Base, and OLF Coupeville for these activities. No Indian lands (reservations) are located within the 65 dB DNL noise contour areas.

American Indian Traditional Resources

Implementation of any of the action alternatives would not result in significant impacts to American Indian traditional resources.

The Navy invited government-to-government consultation with potentially affected American Indian tribes and nations to solicit any concerns they may have so that the Navy can more fully consider the extent of any potentially significant impacts to traditional resources. Government-to-government consultation on this Proposed Action was requested by the Swinomish Indian Tribal Community on December 13, 2016; however, the tribe subsequently withdrew its request on September 27, 2017. No other tribes have requested or initiated government-to-government consultation.

Therefore, under the No Action Alternative, there is no potential to significantly affect American Indian traditional resources because there would be no change to current tribal access and no additional potential to impact traditional resources in the study area.

4.7.3 Alternatives 1, 2, and 3

Under each of the three alternatives and five scenarios, construction and operational activities are similar. Therefore, the potential impacts to traditional resources would largely be the same. For the purposes of this discussion, no differentiation between alternatives/scenarios is made.

NAS Whidbey Island, Ault Field, the Seaplane Base, and OLF Coupeville are restricted to authorized personnel, and the Navy would continue to accommodate access by American Indians on a case-by-case basis. The Navy would continue coordination with the Suquamish Tribe to access to the SDZ in waters northwest of Ault Field for fishing activities in accordance with the 2013 memorandum of agreement. There would be no change to the Suquamish Tribe's ability to safely access the SDZ. Federally secured off-reservation hunting and gathering rights are not affected because there are no changes to current Navy access requirements to Navy property at Ault Field, the Seaplane Base, and OLF Coupeville for these activities. No Indian lands (reservations) are located within the 65 dB DNL noise contour areas.

Terrestrial and Marine Wildlife

Under each of the three alternatives and five scenarios, minor impacts are anticipated to occur to terrestrial wildlife during construction or operation. Impacts to specific wildlife species from habitat loss, sensory disturbance, and aircraft operations are discussed in Section 4.8.2.1 for terrestrial wildlife.

Under each of the three alternatives and five scenarios, minor impacts are anticipated to occur to marine wildlife (fish and marine mammals) during construction or operation. Impacts to specific marine wildlife from habitat loss, sensory disturbance, and aircraft operations are discussed in Section 4.8.2.2 for marine wildlife.

Water Resources

Under each of the three alternatives and five scenarios, implementation of the Proposed Action at NAS Whidbey Island would not result in significant impacts to water resources. The Proposed Action would result in up to 2.3 acres of new impervious surface, but impacts to surface waters and marine waters and sediment would be minimized and avoided through implementation of BMPs, low-impact development (LID), and green infrastructure and therefore would not be significant. See Section 4.9 for the discussion of impacts anticipated to occur to water resources.

Climate Change and Greenhouse Gases

Under each of the three alternatives and five scenarios, potential changes in GHG emissions from implementation of the Proposed Action would be similar but greatest under Alternative 2, Scenario A (see Table 4.16-2, NAS Whidbey Island Complex Annual GHG Emissions, Alternative 2). See Section 4.16 for the discussion of climate change and GHG emissions.

Therefore, under Alternatives 1, 2, and 3 and the five scenarios, there is no potential to significantly affect American Indian traditional resources because there would be no change to current access and no significant impact to traditional resources in the study area.

4.7.4 American Indian Traditional Resources Conclusion, Alternatives 1 through 3

The implementation of the three alternatives at NAS Whidbey Island would not result in significant impacts to American Indian traditional resources. Construction and operational activities are similar under the three alternatives, and, therefore, the potential impacts to traditional resources would largely be the same.

The Navy has invited government-to-government consultation with potentially affected tribes to solicit any concerns they may have so that the Navy can more fully consider the extent of any potentially significant impacts to traditional resources. Government-to-government consultation on this Proposed Action was requested by the Swinomish Indian Tribal Community on December 13, 2016. The Navy responded to the Swinomish Indian Tribal Community via email on December 20, 2016, and via letter on December 21, 2016. Additional correspondence occurred in June of 2017. The tribe subsequently withdrew its request on September 27, 2017 (Appendix C includes a copy of this correspondence). The Navy will continue to consult with the Swinomish regarding their concerns for tribal resources. No other tribes have requested or initiated government-to-government consultation.

4.8 Biological Resources

This section evaluates effects of the Proposed Action that are reasonably likely to occur on the terrestrial and marine wildlife discussed in Section 3.8, Affected Environment, Biological Resources. The analysis focuses on wildlife or vegetation types that are important to the function of the ecosystem or are protected under federal or state law or statute. The impacts discussed in this section may occur during construction for the Proposed Action and/or during the proposed aircraft operations. The potential impacts on biological resources consist of three general types: habitat loss, sensory (i.e., noise and visual) disturbance, and physical impact to individuals (i.e., wildlife-aircraft collisions [NAS Whidbey Island BASH plan (NAS Whidbey Island, 2013a)]).

4.8.1 Biological Resources, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change to biological resources and therefore no significant impacts to biological resources would occur through implementation of the No Action Alternative.

4.8.2 Biological Resources Potential Impacts, Alternatives 1 through 3

In light of the similarities between Alternatives 1 through 3, they are discussed collectively. Differences in the potential severity of an impact across scenarios are noted where necessary. Under Alternative 1, carrier capabilities would be expanded, resulting in a net increase of 35 aircraft. Under Alternative 2, expeditionary and carrier capabilities would be expanded, resulting in a net increase of 36 aircraft. Under Alternative 3, expeditionary and carrier capabilities would be expanded, resulting in a net increase of 36 aircraft similar to Alternative 2, but would have slightly fewer aircraft operations than Alternative 2.

Biological Resources

Minimal habitat loss from construction activities would not significantly impact terrestrial wildlife and would not impact marine habitat.

Animals in the study area are currently exposed to high levels of aircraft operations and other human disturbances, and the Proposed Action would result in some additional sensory disturbance impacts, particularly from noise.

Because large numbers of wildlife inhabit the study area throughout the year, risk of a strike is a possibility. However, with the continued implementation of a BASH plan, the Proposed Action would not significantly impact local wildlife populations.

Non ESA-listed Species:

The Proposed Action would result in some additional sensory disturbance impacts, particularly from noise. Only minor behavioral disturbances are anticipated for marine species, including fish and mammals.

Bald and Golden Eagle Protection Act:

The impacts from stressors introduced by the Proposed Action would not result in an adverse effect on bald or golden eagles.

Migratory Bird Treaty Act:

The impacts from stressors introduced by the Proposed Action would not result in a significant adverse effect on migratory bird populations.

Endangered Species Act:

The Proposed Action may affect, but is not likely to adversely affect, the bull trout, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, yelloweye rockfish, humpback whale, and Southern Resident killer whale and their critical habitat.

The Proposed Action may adversely affect the marbled murrelet.

The Proposed Action would have no effect on other ESA-listed species or critical habitat.

New construction under Alternatives 1 through 3 would include expanded hangar space and/or new hangars, armament storage, maintenance facilities, and expanded personnel parking areas. Each alternative would result in up to 2.3 acres of new impervious surface at NAS Whidbey Island. Impacts to biological resources would be similar under all three alternatives.

The biological resources (i.e., habitat and species) present on and around Ault Field and OLF Coupeville are generally similar. Species at or near Ault Field and OLF Coupeville would be impacted to greater or lesser extents depending on which scenario is selected within a given alternative.

Under the Proposed Action, the greatest potential for impacts on biological resources would occur during aircraft operations, when noise and collision impacts could occur. Research shows that some animals begin to respond to aircraft noise at as little as 60 dB (Black et al., 1984). Dolbeer et al. (2014) found that most wildlife-aircraft collisions (hereafter referred to as “strikes”) occur below an altitude of 3,500 feet. Based on these findings, the Navy defined the study area as all areas where modeled average noise levels under the Proposed Action would be equal to or greater than 60 dB at ground/surface level and all areas where aircraft operations would occur at or below an altitude of 3,500 feet (Figure 3.8-1). Potential noise and wildlife-aircraft impacts are discussed in more detail below.

The biological resources that could be impacted under the Proposed Action are divided into two general categories, terrestrial wildlife and marine wildlife. Potential impacts on terrestrial wildlife (i.e., general birds, mammals, and reptiles and amphibians) include habitat loss, sensory disturbance, and wildlife-aircraft strikes. Potential impacts on marine wildlife (i.e., fish and marine mammals) include sensory disturbance and indirect effects from construction (e.g., increased stormwater runoff). Species protected under the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), and Marine Mammal Protection Act (MMPA) are discussed separately.

4.8.2.1 Effects on Terrestrial Wildlife

As a result of the Proposed Action, three effect categories are applicable to terrestrial wildlife: habitat loss, sensory disturbance, and wildlife strikes. Each effect is discussed below, along with impacts specific to species groups, including separate conclusions for special status species (i.e., those protected under the ESA, MBTA, and BGEPA).

4.8.2.1.1 Habitat Loss

Habitat loss would be limited to the construction of proposed facilities under each of the three action alternatives and would occur in developed or previously disturbed areas of Ault Field. No construction is proposed for OLF Coupeville. Under each alternative, proposed construction activities would result in the permanent loss of up to 2.3 acres of non-native grassland and landscaped vegetation. No loss of any unique or regionally significant vegetation communities would occur. The vegetation that would be cleared has been previously disturbed and occurs in areas with high levels of human activity. Therefore, the previously disturbed areas likely provide only marginal, temporary habitat for species that are adapted to human-modified environments (e.g., raccoons). Wildlife that could occur in these areas are likely common within the study area.

The construction site provides marginal habitat for MBTA-protected species, and species occurring in construction areas would likely be adapted to human-modified environments. Ground-nesting birds generally avoid the area of the proposed construction. However, the area would be surveyed at the start of the nesting season to ensure nests are not built in the area. If found, the inactive nests would be

removed prior to completion so that a new nest could be built outside the construction area. Temporary and minor changes may occur to the abundance and frequency of migratory birds occurring in the construction area, but use of the area is anticipated to return to prior levels after construction is complete.

Vegetation removal under each of the three action alternatives would have negligible impacts on terrestrial wildlife and their habitat. Impacts from construction activities on terrestrial wildlife would not be significant.

As described in Section 4.9, there would be no significant impacts on surface water, wetlands, or marine waters and sediments. Therefore, there would be no significant impact on terrestrial wildlife related to water quality.

4.8.2.1.1.1 Endangered Species Act

Pursuant to the ESA, no effect to ESA-listed vegetation or terrestrial wildlife species would occur because no ESA-listed vegetation is located within the construction area, and ESA-listed terrestrial wildlife are extremely unlikely to occur within the construction area. Vegetation removal would have negligible impacts on habitat and therefore would have no effect on availability of habitat for ESA-listed species. Consultation under the ESA regarding habitat loss is not required.

4.8.2.1.1.2 Migratory Bird Treaty Act

MBTA-protected species may occur within the construction area of Ault Field, and construction activities are not exempt from “take” under the military readiness rule. Given the small footprint of the construction area, that the area has been previously disturbed and is highly used, and that vegetation removal would have negligible impact on the habitat, no changes to a bird’s ability to feed, shelter, or reproduce are anticipated. Pursuant to the MBTA, no take of migratory birds is anticipated.

4.8.2.1.1.3 Bald and Golden Eagle Protection Act

Although bald eagles use various habitats around Ault Field for breeding, foraging, roosting, and perching, the location of the construction is not in an area that is used highly by bald eagles. Golden eagles are rare visitors to Whidbey Island during migration, and the construction site does not provide an important rest area for this species. Pursuant to the BGEPA, the loss of 2.3 acres of non-native grassland would neither disturb bald and golden eagles to a degree that would substantially interfere with their normal breeding, feeding, or sheltering behavior nor result in nest abandonment because the construction footprint is small and does not represent a biologically important or unique location for any of these behaviors. As such, coordination with the USFWS is not required.

4.8.2.1.2 Sensory Disturbances

The Proposed Action may cause sensory disturbances of wildlife during the construction and operations phases. Construction and operation of proposed new facilities would result in an increase in human activity, noise, and vibrations associated with equipment use that could disturb wildlife. Likewise, increases in aircraft operations would result in increases in potential noise and visual disturbances of wildlife in the study area. Refer to Section 4.2 for a complete description of changes in noise impacts of the Proposed Action compared to the No Action Alternative. In general, wildlife in the study area are currently exposed to high levels of aircraft operations and other human disturbances, and the Proposed Action may result in some additional sensory disturbance impacts, particularly from noise. As previously

stated, the impacts would be similar under each action alternative; however, the levels of impacts would vary between the five scenarios within the alternatives.

Anthropogenic noise can cause temporary or permanent hearing damage as well as mask sounds or distract wildlife. Animals in loud environments face damage to hair cell receptors of their auditory system caused by overstimulation. The amount and type of damage differs among species (Beason, 2004). Noise can also affect hearing by inhibiting the perception of sound, a phenomenon called “masking,” which may disrupt communications and cause some animals to alter their vocalization to reduce its effects. Masking only occurs in the presence of the masking noise and does not persist after the noise ceases. As such, constantly noisy environments have a greater potential for long-term impact because masking conditions are more prevalent (Patricelli and Blickley, 2006). Masking can affect mate choice by limiting the number of individuals heard, and it can affect social groups that use alarm calls to warn of predators or use contact calls to maintain group cohesion. In addition, masking of one species’ vocalizations can affect other species’ abilities to assess predation risks, find prey, or make habitat decisions (Barber et al., 2010).

Wildlife behavioral responses to anthropogenic disturbances may include displacement or avoidance of affected areas, increased vigilance, and changes in foraging behavior, habitat selection, mate attraction, and parental investment (Frid and Dill, 2002; Shannon et al., 2015). While difficult to measure in the field, all behavioral responses are accompanied by some form of physiological response (Frid and Dill, 2002). Deleterious physiological responses to noise may include hearing loss, increased stress, hypertension, and startle responses (Barber et al., 2010). A startle response is a rapid, primitive reflex characterized by rapid increase in heart rate, shutdown of nonessential functions, and mobilization of glucose reserves. Energy lost by behavioral responses to sensory disturbances, should they occur, must be replaced, or the health of the individual exhibiting those behavioral responses may decline. Replenishing energy requires more time spent feeding and resting than the individual might have otherwise budgeted. If the affected individual is caring for an egg or chick, then the energy expenditures or altered activity budget may also negatively affect the young’s health. The disturbances could also keep birds away from more productive feeding habitats. This could also negatively affect the impacted individuals because they may be forced to forage in areas with smaller or inferior prey resources. Noise and other disturbances can also distract wildlife, taking their attention away from other key functions and behaviors, such as predator awareness (Chan and Blumstein, 2011; Francis and Barber, 2013). Animals can learn to control the behavioral reactions associated with a startle response and often become habituated to noise (NPS, 1994; Bowles, 1995; Larkin et al., 1996). Habituation is a reduction in response to repetitious or continuous stimuli over time as individuals learn there are neither adverse nor beneficial effects associated with the stimulus (Bejder et al., 2009). Habituation keeps animals from expending energy and attention on harmless stimuli, but the physiological component might not habituate completely (Bowles, 1995).

Animals exhibiting observable responses to anthropogenic disturbances are not necessarily the only animals affected by the disturbance. Observable responses (e.g., fleeing) may be determined by a variety of factors, such as individual tolerance, experience, species, age, sex, reproductive condition, resource availability, and habitat conditions (Gill et al., 2001; Beale and Monaghan, 2004; Yasue, 2006; Stillman et al., 2007; Bejder et al., 2009; Francis and Barber, 2013). Wildlife make similar ecological considerations when responding to anthropogenic disturbances as they do with considering predation risks. That is, they will consider costs and benefits of responding versus continuing with other fitness-enhancing activities (Frid and Dill, 2002; Beale and Monaghan, 2004; Bejder et al., 2009; Francis and

Barber, 2013). Wildlife most adversely affected by disturbances may be those constrained to a particular site, potentially suffering reduced survival or reproductive success (Gill et al., 2001). Wildlife readily responding to disturbances may not necessarily be the most impacted because their response may come at low fitness costs (Gill et al., 2001; Beale and Monaghan, 2004; Yasue, 2006; Ware et al., 2015). In addition, acclimation or tolerance to disturbances might not release individuals from costs to their fitness (Kight et al., 2012; Francis and Barber, 2013).

Gill et al. (2001) suggested that the impacts of anthropogenic disturbances are best determined by evaluating resulting fitness costs and effects on populations and community demographics. Ample research has demonstrated that anthropogenic disturbances contribute to ecological effects on wildlife, such as reduced species richness, time budgets, space use and habitat selection, reproductive success, and predator-prey interactions, and greater nest abandonment in birds (Barber et al., 2010; Barber et al., 2011). These ecological effects, in turn, may affect species' populations and community composition (Frid and Dill, 2002; Francis et al., 2009; Francis et al., 2012). At the community level, anthropogenic disturbances, particularly noise, can impact interspecific relationships, in some cases negatively impacting some species while benefiting others (Francis et al., 2009; Francis et al., 2011; Francis et al., 2012). For example, human-made noise may negatively impact the ability of predators to use audible cues to track prey while indirectly improving the survival and reproductive success of prey species (Francis et al., 2009; Francis et al., 2011).

Noise associated with construction and aircraft operations has the potential to impact terrestrial wildlife. Construction and aircraft noise are discussed below, with regulatory conclusions provided where appropriate.

4.8.2.1.2.1 Construction

Terrestrial wildlife that live at or near the proposed Ault Field construction site would be expected to be those species adapted to living in urban or human-modified environments because this site is subject to high levels of noise associated with Ault Field activities and aircraft operations under existing conditions.

The increase in noise during construction would be temporary and minor when compared to the existing noise generated by airfield operations (see Section 2.3.3.3 for details on construction under the alternatives and Section 3.2 for existing aircraft noise). Therefore, each of the three action alternatives would have minimal, short-term impacts on terrestrial wildlife from sensory disturbances associated with construction of the proposed facilities. These impacts would not be significant.

4.8.2.1.2.1.1 Endangered Species Act

Pursuant to the ESA, no effect to ESA-listed vegetation or terrestrial wildlife species would occur because no ESA-listed vegetation is located within the construction area (and would not be affected by noise). ESA-listed terrestrial wildlife are extremely unlikely to occur within the small footprint of the construction site and therefore would not be exposed to construction noise. Consultation under the ESA regarding sensory disturbance from construction is not required.

4.8.2.1.2.1.2 Migratory Bird Treaty Act

MBTA-protected species occurring in construction areas would likely be adapted to human-modified environments. As discussed in Section 4.8.2.1.1 (Habitat Loss), ground-nesting birds generally avoid the area of the proposed construction. However, the area would be surveyed at the start of the nesting season to ensure nests are not built in the area. If found, the inactive nests would be removed prior to

completion so that a new nest could be built outside the construction area. Temporary behavioral disturbance of non-nesting birds may result from noise, vibrations, or human presence, but these minor changes are not expected to differ appreciably from existing high levels of disturbance near the construction site. Temporary and minor changes in abundance and frequency of migratory birds occurring in the construction area may occur, but use of the area is anticipated to return to prior levels after construction is complete. No changes to a bird's ability to feed, shelter, or reproduce are anticipated. Pursuant to the MBTA, no take of migratory birds is anticipated.

4.8.2.1.2.1.3 Bald and Golden Eagle Protection Act

Although bald eagles use various habitats around Ault Field for breeding, foraging, roosting, and perching, the location of the construction is not in an area used highly by bald eagles, and the nearest nesting location for bald eagles is 0.75 mile from the construction area. Golden eagles are rare visitors to Whidbey Island during migration, and the construction site and surrounding area do not provide an important habitat for this species. Although noise from construction would extend beyond the footprint of the construction site, the increase in noise during construction would be temporary and minor when compared to the existing noise generated by airfield operations. Because of the small footprint and temporary nature of the construction and associated increase in noise, sensory disturbance associated with the construction activities would not disturb bald and golden eagles to a degree that would substantially interfere with their normal breeding, feeding, or sheltering behavior, pursuant to the BGEPA. As such, coordination with the USFWS is not required.

4.8.2.1.2.2 Aircraft Operations

Aircraft operations under each of the three action alternatives would produce potential noise and visual disturbances to terrestrial wildlife. Wildlife may respond to both seeing and hearing the aircraft. Similar to construction discussed above, aircraft operations could result in behavioral and physiological responses that lead to impacts on fitness of wildlife from the affected area; however, potential disturbance from aircraft operations would occur over a much larger area than that affected by construction. Aircraft operations may disturb wildlife within the study area.

The following sections focus on potential aircraft disturbances on vertebrate wildlife (i.e., birds, mammals, and reptiles and amphibians) in the study area, including separate discussions of special status species (i.e., those protected under the ESA, MBTA, and BGEPA).

4.8.2.1.2.2.1 Birds

Bird responses to anthropogenic disturbances, including aircraft noise, vary by species and may vary by situation (Grubb and Bowerman, 1997; Goudie, 2006). Birds rely heavily on acoustic signals not only for avoiding predators but also for territorial defense and attracting mates (Slabbekoorn and Ripmeester, 2008). Noise can mask birds' songs and alter their use of habitats. Nesting birds or those caring for eggs or young would presumably be more sensitive to disturbances than birds that are not caring for eggs or young. Although minor variations in reactions are likely between species, aircraft overflights associated with the Proposed Action would cause similar types of reactions (e.g., alerting, flushing) to the stimuli. As such, the information regarding all categories of birds (e.g., shorebirds, wading birds) is synthesized in the analysis below, except where specifically noted.

Studies of hearing loss (called "threshold shift") in birds within their frequencies of best hearing (between 2 and 4 kHz) due to long-duration (30 minutes to 72 hours), continuous, non-impulsive, high-

level sound exposures in air have shown that susceptibility to hearing loss varies substantially by species, even in species with similar auditory sensitivities, hearing ranges, and body size (Niemic et al., 1994; Ryals et al., 1999; Saunders and Dooling, 1974). However, data on threshold shift in birds due to shorter duration sound exposures that could be used to estimate the onset of threshold shift are limited. Saunders and Dooling (1974) provide the only threshold shift growth data measured for birds. Saunders and Dooling (1974) exposed young budgerigars (*Melopsittacus undulatus*) to four levels of continuous 1/3-octave band noise (76, 86, 96, and 106 dB re 20 μ Pa) centered at 2.0 kHz and measured the threshold shift at various time intervals during the 72-hour exposure. The earliest measurement found 7 dB of threshold shift after approximately 20 minutes of exposure to the 96 dB re 20 μ Pa sound pressure level noise (127 dB re 20 μ Pa²-s sound exposure level [SEL]). Because of the observed variability of threshold shift susceptibility among bird species and the relatively long duration of sound exposure in Saunders and Dooling (1974), the observed onset level cannot be assumed to represent the SEL that would cause onset of temporary threshold shift for other bird species or for shorter duration exposures (i.e., a higher SEL may be required to induce threshold shift for shorter duration exposures). Although birds are more resistant to hearing loss than other animals, continually loud environments may damage their auditory system (Beason, 2004). However, unlike many other animals, birds have the ability to regenerate hair cells in the ear, usually resulting in considerable anatomical, physiological, and behavioral recovery within several weeks (Rubel et al., 2013; Ryals et al., 1999). Data are not available regarding the potential for hearing loss associated with intermittent aircraft operations (e.g., takeoffs, landings, and overflights) or similar short-duration sound exposure. However, given the short period of exposure, hearing loss is not anticipated to occur to bird species in the study area.

Behavioral responses to aircraft overflights are likely the result of both the noise stimulus and the visual stimulus. Behavioral reactions by birds include lifting the head up, adopting alert postures, agitation, flushing, and panic diving. Behavioral reactions to aircraft overflights are dependent upon species and activity at the time of the stimulus. Generally, birds tend to begin to react (by lifting the head or alerting to the stimulus) to aircraft overflights at 60 dBA to 65 dBA (Black et al., 1984), with more intense alert responses (e.g., flushing) occurring when noise levels exceed 75 dBA (Wright et al., 2010; Goudie and Jones, 2004). However, other birds have been observed to show no reaction or significant effect from overflights with noise levels ranging from 52 to 101 dBA (Grubb, 1979; Burger, 1981; Trimper and Thomas, 2001).

In addition to the noise emitted during the overflight, the altitude of the aircraft and its distance from the bird is a factor in determining the potential for a behavioral reaction. Airplane overflights less than 1,000 feet AGL (or mean sea level, for seabirds) more frequently elicit behavioral responses (Komenda-Zehnder et al., 2003; Black et al., 1984; Rojek et al., 2007; Smit and Visser, 1985), although geese responded more significantly when aircraft flew between 1,000 feet AGL and 2,500 feet AGL (Ward et al., 1999). However, not all birds react to overflights, as black-crowned night herons (*Nycticorax nycticorax*) and great blue herons (*Ardea herodias*) in nesting colonies had “no apparent reaction” from aircraft at altitudes between 150 and 800 feet AGL (Grubb, 1979), and sandhill cranes (*Grus canadensis*) remained on their nests when exposed to helicopter flights as low as 130 feet (Dwyer and Tanner, 1992).

Behavioral reactions to either the noise or the visual stimulus produced are likely to be temporary, with the birds returning to their normal behaviors shortly after exposure. Most observations report a return to normal behaviors within 5 minutes of exposure (Goudie and Jones, 2004; Komenda-Zehnder et al., 2003; Black et al., 1984; Smit and Visser, 1985, as cited by Smit and Visser, 1993). Some responses such

as decreased courtship persisted up to 2 hours after the overflight occurred, although the responses were unlikely to affect critical behaviors of breeding pairs, such as resting, foraging, and courtship (Goudie and Jones, 2004). Habituation to repeated exposure to aircraft noise and visual disturbance has been noted in numerous species (Grubb, 1979; Smit and Visser, 1993; Trimper and Thomas, 2001; Delaney et al., 1999), but not all species exhibit the same pattern of habituation, and residual effects are possible (Koolhaas et al., 1993; Goudie, 2006). For example, 25 percent to 30 percent of captive American black ducks (*Anas rubripes*) initially responded to aircraft noise and visual disturbances, but they habituated to the disturbances with repeated exposure, whereas wood ducks (*Aix sponsa*) did not exhibit habituation to the same stimuli (Conomy et al., 1998).

The potential for population-level effects from aircraft overflights has been noted in few studies, whereas other types of anthropogenic disturbance has been more frequently identified for potential population-level impacts. Aircraft overflights generally have not been shown to impact breeding, nest attendance, feeding of young, nest success, chick survival, nestling mortality, or nesting chronology of wading birds (Black et al., 1984). However, Rojek et al. (2007) identified that flushing of nesting seabirds can result in eggs breaking or chicks and/or eggs being exposed to predation or the elements, and a weak correlation between aircraft noise and reduced reproductive success in the coastal California gnatcatcher (*Polioptila californica californica*) and the least Bells's vireo (*Vireo pusillus belli*) has been suggested (Hunsaker, 2001). Other types of anthropogenic disturbances have been noted to potentially result in reduced species distribution (Forman et al., 2002; Tarr et al., 2010), densities (Bayne et al., 2008), clutch size (Halfwerk et al., 2011), and survival (Goss-Custard et al., 2006) and increased population decline (Pfister et al., 1992) and energy expenditure (Lilleyman et al., 2016). However, uncoupling the impacts from noise with other environmental variables, such as changes in vegetation, makes direct causation from noise difficult.

The introduction of noise may also affect ecological patterns. For example, some species of passerines had higher nest success in noisy habitats, which was attributed to reduced rates of nest predation by western scrub-jays (*Aphelocoma californica*³³) (Francis et al., 2009; Francis et al., 2011). Complex pollination and seed dispersal interactions were observed by Francis et al. (2012); in noisy habitats, black-chinned hummingbirds (*Archilochus alexandri*) pollinated more flowers, and the assemblage of species dispersing seeds of pinon pines (*Pinus edulis*) was altered.

Pigeon guillemots are one of the more common seabirds in the study area, present year-round (eBird, 2015a; Seattle Audubon Society, 2015). Twenty-seven documented breeding colonies of the species occur on Whidbey Island (Bishop et al., 2016). Bishop et al. (2016) found that breeding pigeon guillemot populations on Whidbey Island were stable (i.e., no significant change) during a 6-year study period from 2009 through 2014 and that the number of colonies increased from 23 to 27 during that span. They recorded counts of pigeon guillemots on Whidbey Island nearly 10 times higher than for counts conducted in the early 1980s on Whidbey Island; however, it is unclear whether populations have increased since then or if the 1980s surveys underestimated the population of the species. No published research examining the impacts of aircraft or other anthropogenic noise on pigeon guillemots is available, but Gill (2007) posited that the impacts of anthropogenic disturbances on wildlife may be best highlighted by population-level effects. Considering that the population of pigeon guillemots has remained stable in recent years and may have increased since the 1980s, it is probable that existing high

³³ The interior population of the western scrub-jay is now known as the Woodhouse's scrub-jay (*Aphelocoma woodhouseii*).

levels of human disturbance, including decades of aircraft operations at the NAS Whidbey Island complex, have not significantly impacted this species. Pigeon guillemot nesting population trends are considered one indicator of ecosystem health in the Puget Sound marine environments (Pearson and Hamel, 2013; Bishop et al., 2016). As such, the health of seabird populations, particularly colony-nesting species, may be reflected, to some degree, in the pigeon guillemot's stable to increasing populations on Whidbey Island (Bishop et al., 2016) despite many years of exposure to high levels of aircraft and other human disturbances.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to birds in the study area. Aircraft operations are not seasonally dependent, and therefore annual totals are used for comparison. To determine the amount of increased noise disturbance, the amount of exposure time to Growler events greater than or equal to 92 dBA SEL was calculated. Although 60 dBA DNL was used as the basis for determining the overall area potentially impacted by aircraft noise, the 92 dBA SEL threshold is a better indicator of potential disturbance because it relates to more severe responses to a disturbance, such as flushing. The 92 dBA SEL threshold is derived from research on Mexican spotted owls exposed to helicopter noise (owls did not flush from their roosts until the noise exceeded 92 dBA SEL [Delaney et al., 1999]) and is used by the USFWS (USFWS, 2010b) as the threshold to determine potential effects on the marbled murrelet (details on the marbled murrelet are provided below under Endangered Species Act).

Table 4.8-1 provides the amount and percentage of time during a year that noise levels from Growler aircraft are estimated to be greater than 92 dBA for the No Action Alternative and Alternative 1, Scenarios A through C. Alternative 1 was used to represent the potentially greatest impacts, as the greatest number of proposed flights would occur under this alternative. Additionally, Scenario A provides the greatest potential for impacts at OLF Coupeville, Scenario C provides the greatest potential for impacts at Ault Field, and Scenario B provides a 50-percent split of FCLPs between the two locations.

The greatest increase in noise is calculated at Ault Field under Scenario C. Pattern operations would result in increased noise for an estimated additional 2 percent of a year (from 3.27 percent to 5.23 percent). However, under this scenario, the amount of noise greater than 92 dBA at OLF Coupeville would decrease for arrival operations. The data in Table 4.8-1 indicate that, although an increase in aircraft operations would occur under the Proposed Action, the increased percentage of time birds would hear noise above 92 dBA over the course of a year would be minimal.

Potential impacts to IBAs would be similar under Alternatives 1 through 3, but the level of impact would vary by scenario. Potential impacts at Skagit Bay and Deception Pass IBAs would be greatest under Scenario C and least under Scenario A because the largest number of air operations would occur at Ault Field, and these IBAs are located closer to Ault Field than OLF Coupeville. Likewise, potential impacts to Crockett Lake and Penn Cove IBAs would be greatest under Scenario A and least under Scenario C because the largest number of air operations would occur at OLF Coupeville, and these IBAs are located closer to this airfield than Ault Field. As Crescent Harbor is located between the two airfields, the potential impacts on this IBA would be dependent on total number of operations rather than the number of operations at each location. The greatest potential for impact at Crescent Harbor Marshes IBA would occur under Scenario A, and the least potential for impact would occur under Scenario C.

Table 4.8-1 Annual Time of Exposure to Growler Events Greater than or Equal to 92 dBA in the Study Area

<i>Location</i>	<i>Operation Type¹</i>	<i>Annual Hours within the 92 dBA SEL Contour²</i>	<i>Annual Percentage Of Time within the 92 dBA SEL Contour³</i>	<i>Change in Percentage From No Action to Proposed Action</i>
<i>No Action Alternative</i>				
Ault Field	Departures	83.06	0.95	N/A
	Arrivals	249.00	2.84	N/A
	Pattern	286.68	3.27	N/A
OLF Coupeville	Departures	2.36	0.03	N/A
	Arrivals	7.03	0.08	N/A
	Pattern	43.95	0.50	N/A
<i>Alternative 1 Scenario A</i>				
Ault Field	Departures	102.50	1.17	0.22
	Arrivals	307.62	3.51	0.67
	Pattern	302.21	3.45	0.18
OLF Coupeville	Departures	8.62	0.10	0.07
	Arrivals	25.92	0.30	0.22
	Pattern	181.24	2.07	1.57
<i>Alternative 1 Scenario B</i>				
Ault Field	Departures	98.48	1.12	0.18
	Arrivals	295.42	3.37	0.53
	Pattern	380.49	4.34	1.07
OLF Coupeville	Departures	5.40	0.06	0.03
	Arrivals	16.20	0.18	0.10
	Pattern	113.31	1.29	0.79
<i>Alternative 1 Scenario C</i>				
Ault Field	Departures	95.32	1.09	0.14
	Arrivals	286.00	3.26	0.42
	Pattern	458.09	5.23	1.96
OLF Coupeville	Departures	2.17	0.02	0.00
	Arrivals	6.53	0.07	-0.01
	Pattern	45.38	0.52	0.02
<i>Alternative 1 Scenario D</i>				
Ault Field	Departures	101.43	1.16	0.21
	Arrivals	101.46	1.16	-1.68
	Pattern	109.28	1.25	-2.03
OLF Coupeville	Departures	7.54	0.09	0.06
	Arrivals	7.56	0.09	0.01
	Pattern	52.81	0.60	0.10
<i>Alternative 1 Scenario E</i>				
Ault Field	Departures	96.41	1.10	0.15
	Arrivals	96.43	1.10	-1.74
	Pattern	144.07	1.64	-1.63
OLF Coupeville	Departures	3.26	0.04	0.01
	Arrivals	3.28	0.04	-0.04
	Pattern	22.69	0.26	-0.24

Table 4.8-1 Annual Time of Exposure to Growler Events Greater than or Equal to 92 dBA in the Study Area

<i>Location</i>	<i>Operation Type¹</i>	<i>Annual Hours within the 92 dBA SEL Contour²</i>	<i>Annual Percentage Of Time within the 92 dBA SEL Contour³</i>	<i>Change in Percentage From No Action to Proposed Action</i>
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Sources: Data for number of operations obtained from *Aircraft Noise Study for Naval Air Station Whidbey Island Complex, Washington* (see Appendix A). No Action Alternative data were obtained from Table 5-2, Alternative 1A data from Table 6-2, Alternative 1B data from Table 6-4, Alternative 1C data from Table 6-6, Alternative 1D data from Table 6-8, and Alternative 1E data from Table 6-10 of the study.

Key:

dBA = A-weighted decibels

OLF = Outlying landing field

SEL = Sound Exposure Level

Notes:

- ¹ Ault Field Departures include “Departures” and “Interfacility – Departure to OLF.” Ault Field Arrivals include “Arrivals” (VFR SI/Non-Break, Overhead Break, and IFR) and “Interfacility – Break Arrival from OLF.” Ault Field Pattern Operations include half the number of “Closed Pattern” events because a pattern includes an arrival and departure; only half the number of events is necessary because the entire pattern is above 92 dBA and needs to be only counted once. OLF Coupeville Departures include “Interfacility – Departure to Ault.” OLF Coupeville Arrivals include “Interfacility – Break Arrival from Ault.” OLF Coupeville Pattern Operations include half the number of “Close Pattern” events, similar to Ault Field.
- ² Within the 92 dBA SEL contour, elevated sound levels may be experienced for up to 20 seconds per departure and 60 seconds upon arrival. The annual number of operations was multiplied by either 20 or 60 seconds, depending on operation type, and then converted to hours.
- ³ Percentage of time is calculated by dividing the annual hours by the total hours in a year (8,760 hours).

Birds in the study area that have not habituated to the current level of aircraft operations, or those that are new to the area, may respond to aircraft operations under the Proposed Action by exhibiting alert postures, flushing, or diving, but they would be expected to resume normal activities within a short period after overflights (Goudie and Jones, 2004); therefore, these disturbances are not expected to affect critical behaviors. Individuals breeding in the area of potential aircraft disturbance are currently exposed to a high level of long-term operations activity as well as other human-made disturbances. Each of the three action alternatives would have minimal, short-term impacts on birds from sensory disturbances associated with aircraft noise. These impacts would not be significant.

4.8.2.1.2.2.1.1 Endangered Species Act

With the exception of the marbled murrelet, the Proposed Action would have no effect on ESA-listed terrestrial wildlife species discussed in Chapter 3 because no other species are anticipated to occur in the area. As such, this section provides an analysis only for the marbled murrelet.

In general, impacts on the marbled murrelet would be similar to those described above for birds in general. Behavioral responses of marbled murrelets to noise and visual disturbances could be as minor as alert postures, mild startling, or a brief disruption of activities. More severe responses could include individuals attempting to move away from the disturbance by flying, diving, or swimming. If behavioral responses were to occur, they could result in energy expenditure and disruption or loss of feeding, resting, sheltering, and/or social opportunities. Energy expenditures, opportunity costs, and habitat loss could have indirect, negative effects on the health and reproduction of individuals. The severity of

sensory disturbance effects on marbled murrelets may vary widely and would be dependent on the individuals' sensitivity as well as the intensity, duration, and frequency of the disturbances.

Research into the effects of aircraft disturbances on marbled murrelets is extremely limited. Kuletz (1996) found that marbled murrelet counts in marine waters decreased in response to increasing numbers of both boats and low-flying planes. This appears to be the only study noting the effects of aircraft on marbled murrelets in marine waters, although evaluating aircraft impacts was not a primary objective. In the absence of information regarding aircraft disturbances on marbled murrelets in marine waters, boat-related studies provide some insight into how marbled murrelets respond to human disturbances. Due to the lack of studies regarding aircraft disturbances on at-sea marbled murrelets, the following serves as the best available information.

At two sites near Juneau, Alaska, marbled murrelets appeared to habituate to boat traffic (Speckman et al., 2004). Very few individuals reacted to approaching boats by flying away. The majority of individuals either paddled away or dived briefly and then paddled away. Fish-holding individuals, or those signaling that the bird is about to deliver food to its young, were often threatened by approaching boats (within about 15 to 130 feet) and typically responded by swallowing the fish. This, the authors suggested, may lead to substantial energetic costs to the adults that have to continue foraging to feed their chicks and an even greater cost to the chick if the adult is not able to catch another fish to feed it (Speckman et al., 2004).

In another study, approximately 60 percent of marbled murrelets showed no reaction to boat encounters off Vancouver Island, British Columbia (Hentze, 2006). Approximately 31 percent of individuals dove and 9 percent flushed (flew away) in response to approaching boats. Marbled murrelets did not dive or flush in response to boats at least 295 feet or 330 feet away, respectively. The reactions to approaching boats also depended on a combination of environmental variables (e.g., sea state), boat speed and distance, and other factors. In addition, birds observed flushing did not fly far and typically resumed foraging relatively quickly (Hentze, 2006).

In a second study off Vancouver Island, British Columbia, 58.1 percent of individuals did not respond to moving boats, while about 30.8 percent dove and 11.7 percent flew (Bellefleur et al., 2009)³⁴. The majority of marbled murrelets reacted within 130 feet of the boats. Bird age, boat speed, and boat density were significant predictors of flushing response. Faster boats caused more birds to fly or dive and at greater distances, and birds were more likely to fly completely out of feeding areas when approached by boats at high speeds. Juveniles were also more likely to fly or dive than were adults. Individuals that responded by flying left the feeding area completely (Bellefleur et al., 2009).

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to marbled murrelets in the study area. Total area exposed to 92 dBA SEL or greater would decrease by 4,827 acres from the No Action Alternative to the Proposed Action. While total acreage exposed would decrease, the total number of hours aircraft spend at 92 dBA SEL or greater would increase slightly, as discussed in the analysis for birds above (Table 4.8-1).

Marbled murrelets may occur in all marine waters in the study area and have been documented at a number of locations, and they would be susceptible to disturbances from aircraft operations. However,

³⁴ The percentages are reported as published in Bellefleur et al. (2009). The Navy is aware that the reported numbers exceed 100 percent when summed (100.6 percent).

marbled murrelets in the study area would be exposed to an annual average of 84,700 aircraft operations and associated noise on the NAS Whidbey Island complex under the No Action Alternative (Table 3.1-3), which suggests they are habituated to the existing high levels of aircraft activity as well as other human-made disturbances (e.g., boat traffic). Existing research indicates that most individuals would not respond to aircraft overflights, and those that do may return to normal foraging and loafing activities relatively soon after the disturbances end (Speckman et al., 2004; Hentze, 2006; Bellefleur et al., 2009).

Pursuant to the ESA, sensory disturbance from aircraft overflights may affect marbled murrelets because some individuals may react to the aircraft overflights. The Navy has consulted with the USFWS as required by section 7(a)(2) of the ESA. The USFWS concluded in its June 14, 2018, Biological Opinion that the Proposed Action is not likely to jeopardize the continued existence of the marbled murrelet. As required by the terms and conditions associated with the Incidental Take Statement, the Navy will submit an annual monitoring report to the USFWS describing Growler flight operations from the previous year to ensure the amount of activity does not exceed that which was evaluated in the Biological Opinion.

4.8.2.1.2.2.1.2 Migratory Bird Treaty Act

As described in Section 3.8.2.1, nearly all bird species that occur in the study area are protected under the MBTA. For military readiness activities, the Armed Forces may take migratory birds provided that they confer with the USFWS for activities that may result “in a significant adverse effect on a population of migratory bird species” (50 CFR Part 21.15). Analysis under the MBTA is focused on population-level impacts rather than the potential for individual reactions to aircraft overflights.

As discussed for birds in general, population-level effects have generally not been recorded as a result of aircraft overflights. During aircraft operations, birds in the immediate vicinity of the flight pattern may alert to the stimulus or temporarily flush from the area. However, these temporary responses are not expected to result in abandonment of the area, as documented by the stable, if not increasing, population of pigeon guillemots. If nesting birds were to flush from nests during aircraft operations, the possibility exists that there could be impacts to the egg(s) or chick(s). However, aircraft operations are currently underway at NAS Whidbey Island, so the minor increase in aircraft noise (Table 4.8-1) is not likely to result in a significant change to nesting behavior. Birds nesting in the immediate vicinity of the airfield are likely habituated to the noise from aircraft overflights, and therefore population-level impacts are not expected.

Pursuant to the MBTA, sensory disturbance associated with the Proposed Action would not result in significant adverse effects on populations of migratory bird species. As such, conferring with the USFWS is not required.

4.8.2.1.2.2.1.3 Bald and Golden Eagle Protection Act

Bald eagles (*Haliaeetus leucocephalus*) are state listed as Sensitive and protected under the BGEPA may breed in the study area. Bald eagle responses to military aircraft overflights have been studied. Of bald eagles studied in Arizona and Michigan, the median distance from eagles to military jet aircraft at which there was no response was approximately 2,000 feet (Grubb and Bowerman, 1997). Thirty-one percent of bald eagles responded to military jets when they were at a median distance of 1,300 feet from the birds. Bald eagles also responded more frequently as the breeding season progressed.

The population of bald eagles has been steadily increasing throughout Washington (Kalasz and Buchanan, 2016). Breeding bald eagles have been documented at Ault Field (NAS Whidbey Island, 2013a), and increased aircraft operations would increase the potential for impacts on nesting eagles. No eagles have been documented breeding at OLF Coupeville.

Skagit Bay and Penn Cove were designated as IBAs, in part, because of their importance to breeding bald eagles. Assuming these IBAs support higher concentrations of breeding bald eagles than other areas in the study, there would be a greater potential for aircraft disturbance impacts at these locations. The potential for impacts on breeding bald eagles at Skagit Bay IBA would increase most under Scenario C because aircraft operations at Ault Field would be greatest under this scenario. Potential impacts on breeding bald eagles at Penn Cove IBA would be greatest under Scenario A, which calls for the greatest increase in operations at OLF Coupeville.

During the non-breeding season, both bald eagles and golden eagles may occur. No research is available that examines aircraft disturbances on eagles, or any other raptor species, during the non-breeding season. Skagit Bay is a migration stopover spot for raptors, including eagles, and, similar to other birds, migrating and wintering raptors may be disturbed by aircraft. The potential for impacts to raptors on Skagit Bay IBA would increase with increased aircraft operations at Ault Field, with Scenario C having the highest potential for impacts.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to bald and gold eagles in the study area. Breeding or non-breeding eagles near Ault Field (e.g., near Skagit Bay IBA) may be exposed to an additional 220 hours (or 2.5 percent of a year) of aircraft noise above 92 dBA (maximum under Alternative 1, Scenario C) when compared to the No Action Alternative (Table 4.8-1). Similarly, breeding eagles near OLF Coupeville (e.g., near Penn Cove IBA) may be exposed to an additional 162 hours (or 1.85 percent of a year) of aircraft noise greater than 92 dBA (maximum under Alternative 1, Scenario A) when compared to the No Action Alternative (Table 4.8-1). Given the current airfield operations conducted at NAS Whidbey Island, breeding bald eagles are likely familiar with aircraft noise, and the small increase in hours of aircraft noise (over the course of a year) would not likely result in decreases in productivity.

Pursuant to the BGEPA, sensory disturbance associated with the Proposed Action would not disturb bald and golden eagles to a degree that would substantially interfere with the eagles' normal breeding, feeding, or sheltering behavior. As such, coordination with the USFWS is not required.

4.8.2.1.2.2.2 Mammals

Few published studies have examined aircraft disturbances on terrestrial large mammals. Of those available, most focus on ungulates (e.g., deer). Ungulates often move when disturbed, which results in increased energy expenditure that can affect the individual's health and production (Efroymsen et al., 2000). Weisenberger et al. (1996) found that captive mule deer³⁵ and bighorn sheep (*Ovis canadensis*) in Arizona changed behavior and exhibited increased heart rates during simulated aircraft overflight noise, but the species returned to pre-disturbance conditions within a few minutes after the disturbance ended. Similarly, Goldstein et al. (2005) found that mountain goats (*Oreamnos americanus*) returned to pre-disturbance behaviors an average of 30 seconds after helicopter overflights in Alaska. Maier et al.

³⁵ Columbian black-tailed deer, which occur in the study area, are a subspecies of mule deer.

(1998) observed caribou being more active, traveling longer distances, or interrupting resting bouts in response to low-altitude military jet overflights in Alaska. They concluded that females with young are the most sensitive to aircraft disturbance.

Efroymsen 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. Efroymsen et al. (2000) noted that several species of ungulates have exhibited habituation to aircraft overflights with repeated exposure, including mule deer.

Studies of the effects of aircraft noise on small mammals are limited. Bowles et al. (1995) observed decreases in survival and life spans of rodents in Arizona exposed to low-altitude military aircraft overflights, where an average of 30 operations per day exceeded 80 dB, compared to control sites. However, rodents compensated for lower survivorship with increased recruitment at exposure sites. Furthermore, rodents were indistinguishable between control and exposure sites in terms of population density, diversity, proportions that were reproductively active, mean body weight, and biomass. This study also found that a top rodent predator, the kit fox (*Vulpes macrotis*), exhibited higher mortality rates at exposure sites but showed no differences in home range size or population numbers between the exposure and control sites.

Noise impacts from other anthropogenic sources also are limited. Rabin et al. (2006) found that California ground squirrels (*Spermophilus beecheyi*) increased alertness and moved closer to their burrows in response to alarm call playback at wind turbine sites that were approximately 30 dB louder than control sites. Ground squirrels appeared to be exhibiting the behaviors to compensate for masking by the turbine noise. Similarly, Kern and Radford (2016) discovered that dwarf mongooses (*Helogale parvula*) exhibited different behaviors in response to anti-predator surveillance calls in the presence of traffic noise compared to ambient noise. Mongooses interrupted foraging activities to scan for predators more often and for longer periods. In fact, dwarf mongooses scanned for predators more often in road traffic noise without playback of antipredator calls as well.

Shannon et al. (2014) showed that black-tailed prairie dogs (*Cynomys ludovicianus*) spent more time in burrows, spent less time foraging and resting, and were more vigilant when exposed to traffic noise perceived at 48 to 58 dBA at the center of the colony. However, the study colonies were located a minimum of 1.5 km from road traffic, and the prairie dogs were responding to pre-recorded traffic audio played for 1 hour in 10 tests over a 3-month period. Therefore, the disturbance was novel, and the colonies did not habituate to it over the course of the study. In another study of black-tailed prairie dogs, Shannon et al. (2016) found that animals became alert and took flight sooner during periods of experimental noise exposure compared to the control. Both prairie dog studies indicate that these small mammals exhibit increased vigilance and predator detection in the presence of anthropogenic noise (Shannon et al., 2014, 2016), just as the Rabin et al. (2006) and Kern and Radford (2016) studies found.

Morris-Drake et al. (2017) provided evidence that anthropogenic noise can affect interspecific interactions between mammals, specifically eavesdropping of vocalizations. Dwarf mongooses in South Africa flee in response to alarm calls from tree squirrels (*Paraxerus cepapi*), which share a similar suite of predators. Morris-Drake et al. found that the mongooses' responses differed in the presence of road traffic noise compared to ambient noise. While all individuals responded to the alarm calls, dwarf

mongooses were less likely to flee and more likely to look up and scan (i.e., exhibit increased vigilance) with traffic noise.

Overall, existing research shows that anthropogenic noise may often result in behavioral and/or physiological responses. These responses, in turn, may result in effects on individual fitness of mammals and, ultimately, have potential population-level effects if enough individuals in the population are affected. Still, others may not exhibit population-level effects despite apparent impacts on individual fitness (Bowles et al., 1995). While most mammals may respond to anthropogenic noise, habituation and impacts on populations are likely to vary between species and local environments.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to mammals in the study area. As discussed above for birds, the amount of additional time that loud noises (e.g., when aircraft are at the closest approach to the animal) would be present because of the Proposed Action is minimal when compared to the No Action Alternative (Table 4.8-1).

Mammals in the study area that have not habituated to the current level of aircraft operations may respond to aircraft operations under the Proposed Action by exhibiting alert postures, fleeing, and increasing vocal calls. Mammals that have habituated to the noise may change their vocal behavior during the short duration of the overflight. The length of time each overflight may disrupt a mammal is short, and mammals would likely return to their normal behavior immediately after the noise has subsided. Each of the three action alternatives would have minimal, short-term impacts on mammals from sensory disturbances associated with aircraft noise. These impacts would not be significant.

4.8.2.1.2.2.3 Reptiles and Amphibians

Studies addressing reptile responses to noise, especially aircraft noise, are extremely limited. Therefore, the following studies are presented as the best available information even though they may not be directly applicable to Whidbey Island or the Pacific Northwest. In general, reptiles have narrower hearing ranges than mammals and birds but are highly sensitive to vibrations (Bowles, 1995).

Desert tortoises (*Gopherus agassizii*) are the only reptiles for which aircraft disturbance effects have been studied (Bowles et al., 1999; Efrogmson 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; Efrogmson et al., 2000).

Numerous studies have evaluated the impacts of anthropogenic noise on amphibians. Most research has examined the effects of traffic noise on frogs; however, two studies evaluated the effect of aircraft noise on frogs. Sun and Narins (2005) found that three frog species in a Thailand pond decreased their calling rate in response to aircraft overflights, while a fourth species increased its calling rate, seemingly in response to the other species' decreased rate. Kruger and Du Preez (2016) found that a frog species in South Africa significantly increased its call rates and called at higher frequencies during flyovers to overcome masking of auditory signals. Several studies have shown that traffic noise also affects frog vocalization behavior (Bee and Swanson, 2007; Lengagne, 2008; Narins, 2013; Lukanov et al., 2014). Conversely, Nelson et al. (2017) discovered that the Pacific chorus frog (*Pseudacris regilla*), a species native to the Proposed Action's study area, did not change vocalizations in the presence of traffic noise, which strongly impacted its communication at noisier sites.

Effects on vocal communication may not be the only impacts on amphibians (i.e., frogs) attributable to anthropogenic noise. Brattstrom and Bondello (1983) found that Couch's spadefoot toads (*Scaphiopus couchii*) aroused from dormancy during hot, dry periods and prematurely emerged from burrows in response to motorcycle noise at 95 dBA and higher. Two studies revealed that anthropogenic noise can also decrease locomotion activities (Lukanov et al., 2014; Tennessen et al., 2014) and result in loss of coloration used in visual communication (Troianowski et al., 2017), both of which affect reproductive success by impairing mate attraction. Reproductive success may also be directly impacted through physiological changes, as Kaiser et al. (2015) found that traffic noise significantly decreased sperm counts and sperm viability in White's treefrogs (*Litoria caerulea*). Several studies observed increases in corticosterone, a physiological sign of stress, in frogs exposed to traffic noise (Tennessen et al., 2014; Kaiser et al., 2015; Troianowski et al., 2017). Prolonged increases in corticosterone levels can suppress the immune system and affect survival and reproduction.

Impacts on the health, reproduction, and survival of amphibians from anthropogenic noise could lead to negative impacts on their populations and communities. However, Herrera-Montes and Aide (2011) found that traffic noise did not affect species richness, occurrence, and composition of frog communities in Puerto Rico. They posited that frogs mainly call at night, when traffic activity is low, whereas traffic noise affected bird communities because birds largely communicate vocally during the day, when traffic activity is higher. Frogs in the study area call primarily at night (WDFW, 2005), and aircraft operations under the Proposed Action would mostly occur during daylight hours (refer to Section 3.1.2); therefore, the Navy does not expect the Proposed Action to have significant effects on vocal communication in amphibians.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to reptiles and amphibians in the study area. As discussed above for birds, the amount of additional time that loud noises would be present because of the Proposed Action is minimal when compared to the No Action Alternative (Table 4.8-1).

Reptiles and amphibians in the study area that have not habituated to the current level of aircraft operations may respond to aircraft operations under the Proposed Action by exhibiting alert postures and increasing vocal calls. The length of time each overflight may disrupt an individual is short, and reptiles and amphibians would likely return to their normal behavior immediately after the noise has subsided. Each of the three action alternatives would have minimal, short-term impacts on reptiles and amphibians from sensory disturbances associated with aircraft noise. These impacts would not be significant.

4.8.2.1.3 Bird/Animal Aircraft Strike Hazard

4.8.2.1.3.1 Construction

During construction, wildlife may be directly harmed or killed by equipment and vehicles. Terrestrial wildlife that live at or near the proposed Ault Field construction site would be expected to be those species adapted to living in an urban or human-modified environment because this site is subject to high levels of activity (e.g., vehicle traffic). The heavy equipment used during construction has the potential to directly strike terrestrial animals. However, many of these species are highly mobile and may avoid construction equipment and vehicles. In the event of a strike of terrestrial wildlife by construction equipment or vehicles, an individual may be harmed or killed. However, the construction area's small footprint and the fact that it is in a previously disturbed area of Ault Field minimize any potential

population-level effects. Although individuals may be impacted, the overall effects from construction activities would be minimal and temporary. These impacts would not be significant.

4.8.2.1.3.1.1 Endangered Species Act

Pursuant to the ESA, no vegetation or terrestrial wildlife species are anticipated to use the construction area as habitat, and therefore construction activities would have no effect on these species. Consultation under the ESA regarding strike hazards is not required.

4.8.2.1.3.1.2 Migratory Bird Treaty Act

MBTA-protected birds, particularly those that are nesting, are susceptible to being harmed or killed by construction equipment and vehicles. Pre-construction and construction avoidance and minimization measures will be taken in order to avoid impacts to MBTA-protected species. For military readiness activities, the Armed Forces may take migratory birds provided that they confer with the USFWS for activities that may result “in a significant adverse effect on a population of migratory bird species” (50 CFR Part 21.15). Even in the event of a strike to a migratory bird, impacts to the population are not anticipated. Pursuant to the MBTA, strike hazards associated with construction would not result in significant adverse effects on populations of migratory birds. As such, conferring with the USFWS is not required.

4.8.2.1.3.1.3 Bald and Golden Eagle Protection Act

The likelihood of construction equipment directly striking a bald or golden eagle is extremely remote because these birds would be easily seen and would readily avoid any equipment. Nesting would also not be expected in the grassland area of the construction site.

Pursuant to the BGEPA, a strike of a bald or golden eagle by construction equipment and vehicles is not anticipated. As such, coordination with the USFWS is not required.

4.8.2.1.3.2 Aircraft Operations

During operations, birds and animals are susceptible to strikes with aircraft. The Air Force and Navy/Marine Corps report at least 3,000 bird strikes at their installations each year (DoD and Partners in Flight, 2010). However, the actual number of bird strikes is likely higher because only an estimated 20 to 47 percent are reported for civilian and military aviation as collisions with small birds (i.e., passerines) may go unnoticed or carcasses may disappear in aquatic or dense terrestrial environments (DoD and Partners in Flight, 2010; Dolbeer, 2015).

NAS Whidbey Island reported approximately 350 aircraft-wildlife strikes between 2005 and 2017 (Naval Safety Center, 2015a, 2015b, 2018). Of these, approximately 70 of the strikes were confirmed from Growler aircraft (Naval Safety Center, 2015a, 2015b, 2018). Assuming that an estimated 20 percent to 47 percent of strikes were reported (DoD and Partners in Flight, 2010; Dolbeer, 2015), the NAS Whidbey Island complex would have averaged between 70 and 164 aircraft-wildlife strikes annually during that period, most of which would have been birds. The estimated numbers of strikes (and actual number of reported strikes) are minimal relative to the 84,700 aircraft operations flown at the NAS Whidbey Island complex under the No Action Alternative (refer to Table 3.1-3) and the high numbers of wildlife inhabiting the study area throughout the year. The NAS Whidbey Island BASH plan (NAS Whidbey Island, 2013a) is, in large part, responsible for minimizing the numbers of strikes at the complex through the implementation of a series of land management (e.g., maintaining grass height), wildlife dispersal (e.g.,

chase, pyrotechnics, bioacoustics, and other forms of non-lethal harassment and depredation), and warning system measures (e.g., setting bird-watch conditions and alerts when conditions make an influx of birds onto the airfield likely).

The following sections focus on potential aircraft-wildlife strikes by species groups (i.e., birds, mammals, and reptiles and amphibians) and include separate discussions of special status species (i.e., those protected under the ESA, MBTA, and BGEPA).

4.8.2.1.3.2.1 Birds

At the NAS Whidbey Island complex, birds comprised approximately 99 percent of the reported strikes from 2005 through 2017 (Naval Safety Center, 2015a, 2015b, 2018). Songbirds, raptors, and shorebirds comprised 90 percent of all bird strikes identified to species group at the NAS Whidbey Island complex from 2005 through 2017 (Naval Safety Center, 2015a, 2015b, 2018).

At the NAS Whidbey Island complex, 55 percent of reported bird strikes occurred between July and October (Naval Safety Center, 2015a, 2015b, 2018). Relatively few bird strikes—8 percent of total reports—were reported in winter (November through February). Fall migration occurs between July and October, and bird populations are at their highest point of the year then because the breeding season has just ended. Under each of the action alternatives, the number of operations would not vary by season, but based on the trends described above, the risk of wildlife, particularly bird, strikes would be greatest from July through October.

Strikes could occur at nearly any altitude; however, most strikes are reported at lower altitudes. Strike altitude data were not available for military aircraft, so civilian aircraft strike data were analyzed as a surrogate. The majority of reported civilian aircraft bird strikes (92 percent of commercial strikes and 97 percent of general aviation strikes) occurred at or below 3,500 feet (Dolbeer et al., 2014). Furthermore, about 71 percent of commercial strikes and 74 percent of general aviation strikes of birds occurred at or below 500 feet AGL. Bird strikes at ground level also are common, comprising 41 percent and 37 percent of reported commercial and general aviation strikes, respectively.

Most reported bird strikes by civilian aircraft occur during the day (Dolbeer et al., 2014). Under all alternatives, most of the operations would be conducted from 7:00 a.m. to 10:00 p.m. at both Ault Field (88 percent under the No Action Alternative) and OLF Coupeville (84 percent under the No Action Alternative) (refer to Section 3.1.2). Thus, most flight operations would be conducted during daylight hours, the time at which birds are more susceptible to strike (Dolbeer et al., 2014).

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for strikes to birds in the study area. Alternative 1 would increase operations at the NAS Whidbey Island complex between 30 percent and 33 percent, and Alternatives 2 and 3 would increase operations between 29 percent and 32 percent (refer to Section 4.1). The increase in operations would result in an increase in the potential for aircraft-wildlife strikes, and the potential increase would be similar under all three alternatives because the increase in air operations is similar. However, impacts would vary by scenario.

To determine the potential for an increased risk of strike, the amount of time that Growler aircraft would spend below 500 feet in altitude was calculated. An altitude of 500 feet was used for the metric because the majority (more than 70 percent) of civilian aircraft strikes have been recorded at altitudes less than 500 feet (Dolbeer, 2006). Additionally, the USFWS requested data based on the 500-foot AGL

metric in support of the analysis for the marbled murrelet (details on the marbled murrelet are provided below under Endangered Species Act).

Table 4.8-2 provides the amount of time, and percentage over a year, that Growler aircraft would be flying at altitudes less than 500 feet for the No Action Alternative and Alternative 1, Scenarios A through C. Alternative 1 was used to represent the greatest potential impacts because the greatest number of proposed flights would occur under this alternative. Additionally, Scenario A provides the greatest potential for impacts at OLF Coupeville, Scenario C provides the greatest potential for impacts at Ault Field, and Scenario B provides a 50-percent split of FCLPs between the two locations. At OLF Coupeville, aircraft flying at altitudes less than 500 feet occurs entirely over land.

The greatest increase in time spent below 500 feet AGL at Ault Field occurs under Scenario C. Arrivals would result in an additional approximately 180 hours (or 2 percent of a year) of time below 500 feet AGL over the course of a year when compared to the No Action Alternative (Table 4.8-2). The data in Table 4.8-2 indicate that, although an increase in aircraft operations would occur under the Proposed Action, the increased percentage of time birds would be exposed to aircraft flying at altitudes below 500 feet AGL over the course of a year would be a minimal.

NAS Whidbey Island would continue to implement the measures outlined in the installation’s BASH plan to minimize the risk of a strike occurring. Therefore, it is expected that the number of bird-aircraft strikes at the NAS Whidbey Island complex would remain relatively low compared to the high number of operations. In general, bird populations consist of hundreds or thousands of individuals, ranging across a large geographical area. In this context, the loss of several or even dozens of birds due to physical strikes would not be expected to have population-level impacts. Aircraft strikes would not have significant impacts on local bird populations.

Table 4.8-2 Annual Time EA-18G Growler Aircraft Altitude is less than 500 feet in the Study Area

<i>Location</i>	<i>Operation Type¹</i>	<i>Annual Hours Spent below 500 Feet above Ground Level¹</i>	<i>Annual Percentage Of Time below 500 feet above Ground Level²</i>	<i>Change in Percentage from No Action to Proposed Action</i>
<i>No Action Alternative</i>				
Ault Field	Departures	94.15	1.07	N/A
	Arrivals	564.70	6.45	N/A
OLF Coupeville	Departures	9.71	0.11	N/A
	Arrivals	9.71	0.11	N/A
<i>Alternative 1 Scenario A</i>				
Ault Field	Departures	101.62	1.16	0.09
	Arrivals	609.83	6.96	0.52
OLF Coupeville	Departures	34.52	0.39	0.28
	Arrivals	207.16	2.36	2.25

Table 4.8-2 Annual Time EA-18G Growler Aircraft Altitude is less than 500 feet in the Study Area

<i>Location</i>	<i>Operation Type¹</i>	<i>Annual Hours Spent below 500 Feet above Ground Level¹</i>	<i>Annual Percentage Of Time below 500 feet above Ground Level³</i>	<i>Change in Percentage from No Action to Proposed Action</i>
Alternative 1 Scenario B				
Ault Field	Departures	112.65	1.29	0.21
	Arrivals	675.91	7.72	1.27
OLF Coupeville	Departures	21.58	0.25	0.14
	Arrivals	129.51	1.48	1.37
Alternative 1 Scenario C				
Ault Field	Departures	124.01	1.42	0.34
	Arrivals	744.09	8.49	2.05
OLF Coupeville	Departures	8.65	0.10	-0.01
	Arrivals	51.91	0.59	0.48
Alternative 1 Scenario D				
Ault Field	Departures	105.35	1.20	0.13
	Arrivals	632.21	7.22	0.77
OLF Coupeville	Departures	30.18	0.34	0.23
	Arrivals	181.11	2.07	1.96
Alternative 1 Scenario E				
Ault Field	Departures	120.24	1.37	0.30
	Arrivals	721.52	8.24	1.79
OLF Coupeville	Departures	12.98	0.15	0.04
	Arrivals	77.92	0.89	0.78

Sources: Data for number of operations obtained from *Aircraft Noise Study for Naval Air Station Whidbey Island Complex, Washington* (see Appendix A). No Action Alternative data were obtained from Table 5-2, Alternative 1A data from Table 6-2, Alternative 1B data from Table 6-4, Alternative 1C data from Table 6-6, Alternative 1D data from Table 6-8, and Alternative 1E data from Table 6-10 of the study.

Notes:

- ¹ Ault Field Departures include "Departures," "Interfacility – Departure to OLF," and half of the "Closed Pattern" events. Ault Field Arrivals include "Arrivals," "Interfacility – Break Arrival from OLF," and half of the "Closed Pattern" events. OLF Coupeville Departures include "Interfacility – Departure to Ault" and half of the "Closed Pattern" events. OLF Coupeville Arrivals include "Interfacility – Break Arrival from Ault" and half of the "Closed Pattern" events. Closed Pattern events are included for each of the arrivals and departures because the entire pattern does not occur under 500 feet in altitude, and therefore the separate arrival and departure segments need to be considered.
- ² Aircraft are below 500 feet in altitude for up to 10 seconds for departures and up to 60 seconds for arrivals. The annual number of operations was multiplied by either 10 or 60 seconds, depending on operation type, and then converted to hours.
- ³ Percentage of time is calculated by dividing the annual hours at altitudes less than 500 feet by the total hours in a year (8,760 hours).

4.8.2.1.3.2.1.1 Endangered Species Act

With the exception of the marbled murrelet, the Proposed Action would have no effect on ESA-listed terrestrial wildlife species discussed in Chapter 3 because no other species are anticipated to occur in the area. As such, this section provides an analysis only for the marbled murrelet.

The height at which marbled murrelets fly and the speed of the aircraft are considered risk factors when assessing the likelihood of aircraft collision with marbled murrelets. Alcid flight patterns in the marine environment are often closely associated with the surface of the water and the flight heights detailed in Section 3.8.2.2, Special Status Terrestrial Species. Marbled murrelet flight altitudes have been measured using radar surveys at several sites in the Pacific Northwest. Mean marbled murrelet flight altitudes ranged from 300 feet (Sanzenbacher et al., 2014) to 1,010 feet (Hamer Environmental, 2009) above ground level. Flight altitudes vary greatly between coastal and inland areas (Sanzenbacher et al., 2014).

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for strikes of marbled murrelets in the study area. As discussed above for birds generally, the potential for an increased risk of strike (over that of the No Action Alternative) was calculated by determining the amount of time that Growler aircraft would spend below 500 feet in altitude. An altitude of 500 feet was used for the metric because the majority (greater than 70 percent) of civilian aircraft strikes with birds have been recorded at altitudes lower than 500 feet (Dolbeer, 2006). Additionally, the USFWS requested data based on the 500-foot AGL metric in support of the consultation on the marbled murrelet.

Table 4.8-2 provides the amount of time, and percentage over a year, that Growler aircraft would be flying at altitudes lower than 500 feet for the No Action Alternative and Alternative 1, Scenarios A through C. Alternative 1 was used to represent the potentially greatest impacts because the greatest number of proposed flights would occur under this alternative. Additionally, Scenario A provides the greatest potential for impacts at OLF Coupeville, Scenario C provides the greatest potential for impacts at Ault Field, and Scenario B provides a 50-percent split of FCLPs between the two locations. At OLF Coupeville, aircraft flying at altitudes lower than 500 feet do so entirely over land.

Approaching aircraft spend more time below 500 feet AGL than departing aircraft because descending aircraft maintain lower flight altitudes and a more horizontal trajectory, resulting in a longer duration (up to 60 seconds) below 500 feet AGL. Departures result in the aircraft climbing in altitude more quickly, spending approximately 10 seconds at altitudes lower than 500 feet AGL. No aircraft at OLF Coupeville spend time below 500 feet AGL over marine environments.

The greatest increase in time spent below 500 feet AGL at Ault Field occurs under Scenario C. Arrivals would result in an additional approximately 180 hours (or 2 percent of a year) of time for aircraft at altitudes below 500 feet AGL over the course of a year when compared to the No Action Alternative (Table 4.8-2). The data in Table 4.8-2 indicate that, although an increase in aircraft operations would occur under the Proposed Action, the increased percentage of time marbled murrelets would be exposed to aircraft flying at altitudes below 500 feet AGL over the course of a year would be minimal.

The management of marbled murrelet strikes is also included in the installation's BASH plan (see Sections 3.3.1.2 and 3.3.2.2), and, to date, there have been no reported strikes of marbled murrelets or any alcids recorded at NAS Whidbey Island (Naval Safety Center, 2015a, 2015b).

Pursuant to the ESA, the potential for strikes of marbled murrelets during aircraft operations may affect marbled murrelets. The Navy has consulted with the USFWS as required by section 7(a)(2) of the ESA.

The USFWS concluded in its June 14, 2018, Biological Opinion that the Proposed Action is not likely to jeopardize the continued existence of the marbled murrelet. As required by the terms and conditions associated with the Incidental Take Statement, the Navy will submit an annual monitoring report to the USFWS describing Growler flight operations from the previous year to ensure the amount of activity does not exceed that which was evaluated in the Biological Opinion.

4.8.2.1.3.2.1.2 Migratory Bird Treaty Act

As described in Section 3.8.2.1, nearly all bird species that occur in the study area are protected under the MBTA. For military readiness activities, the Armed Forces may take migratory birds provided that they confer with the USFWS for activities that may result “in a significant adverse effect on a population of migratory bird species” (50 CFR Part 21.15). Analysis under the MBTA is focused on population-level impacts rather than the potential for individual impacts.

NAS Whidbey Island would continue to implement the measures outlined in the installation’s BASH plan to minimize the risk of a strike occurring. Additionally, NAS Whidbey Island has a USFWS depredation permit that allows the Navy to lethally remove problem birds (protected under the MBTA) from around the airfield and a special use permit that allows the Navy to collect the remains of birds for use in bird identification (NAS Whidbey Island, 2013a). The permits carry conditions that are adhered to by the Navy, and all birds collected are reported to USFWS annually.

It is expected that the number of bird-aircraft strikes at the NAS Whidbey Island complex would remain relatively low compared to the high number of operations conducted there. In general, bird populations consist of hundreds or thousands of individuals, ranging across a large geographical area. In this context, the loss of several or even dozens of birds due to physical strikes would not be expected to have population-level impacts. Aircraft strikes would not have significant impacts on local bird populations.

Pursuant to the MBTA, aircraft strikes associated with the Proposed Action would not result in significant adverse effects on populations of migratory bird species. As such, conferring with the USFWS is not required.

4.8.2.1.3.2.1.3 Bald and Golden Eagle Protection Act

The NAS Whidbey Island complex reported three strikes of bald eagles, all at Ault Field, between 2005 and 2015 (Naval Safety Center, 2015a, 2015b). No strikes of bald eagles were reported between 2016 and 2017 (Naval Safety Center, 2017a, 2017b). Three reported strikes is relatively low when considering the number of operations annually occurring at the NAS Whidbey Island complex from 2005 to 2015 (refer to Section 1.4), the species’ being most abundant near marine shorelines in Washington (WDFW, 2013; Rodewald, 2015), and bald eagles being one of the most commonly reported bird species in Island County (eBird, 2015a). Although airfield operations would increase under the Proposed Action (from 84,700 under the No Action Alternative to as many as 112,600 under Alternative 1, Scenario A; see Section 2.3), the number of potential strikes to bald or golden eagles would not increase significantly. This 33-percent increase would result in the potential for one additional strike over a 10-year-period (e.g., from the three that were reported to potentially four strikes). The loss of several bald eagles due to aircraft strikes under the Proposed Action would not be expected to have population-level impacts for this relatively abundant species. NAS Whidbey Island would continue to implement the measures outlined in the installation’s BASH plan to minimize the risk of a strike occurring. Thus, aircraft strikes would not have significant impacts on local bald eagle populations.

NAS Whidbey Island did not report any strikes of golden eagles between 2005 and 2017 (Naval Safety Center, 2015a, 2015b, 2017a, and 2017b), and the species is a transient visitor to the study area (NAS Whidbey Island, 2013a; eBird, 2015a). Therefore, aircraft strikes of golden eagles as a result of the Proposed Action would be unlikely, and potential impacts would not be significant.

NAS Whidbey Island has a bald eagle permit from the USFWS that allows the species to be trapped, banded, and removed from the airfield (NAS Whidbey Island, 2013a). Bald eagle trapping and relocating focuses on juvenile birds that congregate near the runways, but it avoids trapping adults during nesting season to prevent nesting failure caused by removing the adults of nearby nesting pairs.

Pursuant to the BGEPA, the Proposed Action would cause minor increases in aircraft operations below 500 feet AGL. Additionally, the Navy would continue to adhere to all requirements identified in its bald eagle permit. As such, additional coordination with USFWS is not required for the Proposed Action.

4.8.2.1.3.2.2 Mammals

Although the majority of aircraft strikes at the NAS Whidbey Island complex have been with birds, strikes of mammals (three strikes to bat species between 2005 and 2017) have also been reported (Naval Safety Center, 2015a, 2015b, 2018). Most mammal strikes occur at night and bat strikes would not be expected in winter because the species of bats occurring in the study area hibernate (Dolbeer et al., 2014). Strike altitude data were not available for military aircraft, so civilian aircraft strike data were analyzed as a surrogate. Most civilian aircraft strikes of mammals occur at ground level; however, 9 percent of mammal (excluding bats) strikes occurred immediately after take-off or before landing when, for example, deer were struck by landing gear (Dolbeer et al., 2014). As such, mammal strikes would largely be limited to Ault Field and OLF Coupeville runways.

Under all alternatives, most of the operations would be conducted from 7:00 a.m. to 10:00 p.m. at both Ault Field (88 percent under the No Action Alternative) and OLF Coupeville (84 percent under the No Action Alternative) (refer to Section 3.1.2). Aircraft operations during daylight hours minimize the potential for strikes with bats, and the total number of strikes of mammals regardless of time of day is low despite a high level of operations (Naval Safety Center, 2015a, 2015b).

The Proposed Action would increase aircraft operations at the NAS Whidbey Island complex by between 30 percent and 33 percent under Alternative 1 or by between 29 percent and 32 percent under Alternatives 2 and 3 compared to the No Action Alternative (Refer to Section 4.1). The increase in operations would result in an increase in the potential for aircraft-mammal strikes, and the potential increase would be similar under all three alternatives because the increase in air operations is similar. The potential impacts would not affect mammals in the study area differently between scenarios, as the both Ault Field and OLF Coupeville support the same general mammal species compositions and abundances.

The NAS Whidbey Island complex would continue to implement the measures outlined in the installation's BASH plan to minimize the risk of a strike occurring. Additionally, NAS Whidbey Island has a deer depredation permit from the Washington Department of Fish and Wildlife that allows for the lethal removal of deer from the airfield. Deer removal is limited to a few deer that try to inhabit the areas near the runways each year.

The number of mammal-aircraft strikes at the NAS Whidbey Island complex would remain low, especially when compared to the high number of operations. Although additional aircraft operations

would increase the potential for a strike with a mammal, impacts to an individual animal would not have impacts on local mammal populations. Impacts associated with the potential for mammal-aircraft strikes would not be significant.

4.8.2.1.3.2.3 Reptiles and Amphibians

Reptile and amphibian strikes with aircraft are known to occur; however, none were reported at the NAS Whidbey Island complex between 2005 and 2015 (Naval Safety Center, 2015a, 2015b). Although additional aircraft operations would increase the potential for a strike with a reptile or amphibian, impacts to an individual animal would not have impacts on local populations. Impacts associated with the potential for reptile or amphibian-aircraft strikes would not be significant.

4.8.2.2 Effects on Marine Species

As a result of the Proposed Action, sensory disturbance is the only type of impact that is applicable to marine species. In-air construction noise was considered for hauled-out pinnipeds, and noise generated from aircraft operations was analyzed for impacts to all marine species. Each part of the Proposed Action is discussed below, with separate conclusions for special status species (i.e., those protected under the ESA).

4.8.2.2.1 Construction

Construction would not result in direct impacts to marine species. Because the construction would occur on land, no marine habitat would be disturbed, and noise generated by construction would not propagate through the water. Therefore, underwater noise impacts to fish and cetaceans (whales, dolphins, and porpoises) would not occur. While hauled-out seals and sea lions could be exposed to in-air noise from construction, the closest known haul-out sites are located on Whidbey Island and Kalamut Island (approximately 6 miles away from Ault Field), in Skagit Bay (approximately 7 miles away from Ault Field), and on Smith and Minor Island (approximately 7 miles away from Ault Field) (Jeffries et al., 2000). Due to the distance from the construction site, sound from construction would attenuate below levels that might impact pinnipeds.

4.8.2.2.1.1 Endangered Species Act

The Navy initiated consultation with the NMFS for the potential effects of aircraft disturbance on the Mexico Distinct Population Segment (DPS) and Central America DPS of the humpback whale. Although the Navy concluded that the construction activities would have no effect on this species, the NMFS's response indicated that the potential for increased stormwater runoff, and by extension increased pollutant discharge, would have insignificant effects. As such, the NMFS determined that construction activities may affect, but are not likely to adversely affect, the Mexico and Central America DPSs of the humpback whale.

Similarly to humpback whales, the Navy initiated consultation with the NMFS for the potential effects of aircraft disturbance on Southern Resident killer whales. During consultation, the NMFS additionally determined that the construction activities associated with the Proposed Action may affect, but are not likely to adversely affect, Southern Resident killer whales and their critical habitat. The NMFS identified that the addition of 2 acres of impervious surface under the Proposed Action would result in increased stormwater runoff from Ault Field. However, impacts to water quality from the increased infrastructure and associated stormwater discharge on the growth and development of the Southern Resident killer

whale are expected to be insignificant. Additionally, NMFS does not anticipate any effects on the quantity and quality of prey as a result of stormwater discharge. Therefore, the NMFS determined that the potential effects associated with construction activities on Southern Resident killer whales and their critical habitat is insignificant.

4.8.2.2.1.2 Marine Mammal Protection Act

Pursuant to the MMPA, the construction activities associated with the Proposed Action would not result in reasonably foreseeable takes of marine mammals. Therefore, permitting under the MMPA is not required.

4.8.2.2.2 Aircraft Operations

Marine species could be exposed to aircraft noise wherever aircraft overflights occur in the project area; however, sound is primarily transferred into the water from the air in a narrow cone under the aircraft. A sound wave propagating from an aircraft must enter the water at an angle of incidence of 13 degrees or less from the vertical for the wave to continue propagating under the water's surface (Richardson et al., 1995). At greater angles of incidence, the water surface acts as a reflector of the sound wave and allows very little penetration of the wave below the water (Urlick, 1983). Water depth and bottom conditions also strongly influence propagation and levels of underwater noise from passing aircraft. For low-altitude flights, sound levels reaching the water surface would be higher, but the transmission area would be smaller. As an aircraft gains altitude, sound reaching the water surface diminishes, but the possible transmission area increases.

The operations portion of the Proposed Action would not directly impact marine habitats (see Section 4.9, Water Resources). Direct injury or loss of hearing are unlikely because aircraft overflights lack the intensity and duration to cause injury or hearing loss and because the sound does not have a rapid rise from ambient to extremely high peak pressure, as occurs with many impulsive sounds (U.S. Air Force, 2000). Aircraft overflights have the potential to affect surface waters and, therefore, to expose fish and marine mammals occupying those upper portions of the water column to sound and general disturbance, which could potentially result in short-term behavioral or physiological responses. Additionally, marine mammals that haul out on land also have the potential to be disturbed by aircraft overflights. These behavioral and physiological responses are discussed in the sections below.

Masking refers to the presence of a noise that interferes with an animal's ability to hear biologically important sounds, including those produced by prey, predators, or conspecifics. Masking occurs in all vertebrate groups and can effectively limit the distance over which an animal can communicate and detect biologically relevant sounds. Masking is more likely to occur in the presence of broadband, relatively continuous noise sources, such as vessel noise. Researchers have studied masking in fishes using continuous masking noise, but masking due to intermittent, short duty-cycle sounds has not been studied.

Underwater sound from aircraft overflights has been derived for some airframes. Underwater sound has not been derived for the EA-18G Growler; data for the airframe most similar to the Growler, the FA-18 Hornet, is provided. For an FA-18 Hornet at the lowest altitude (984.2 feet), the sound level at 6.6 feet below the water surface peaked at 152 dB re 1 μ Pa, and the sound level at 164.0 feet below the surface peaked at 148 dB re 1 micropascal (μ Pa) (Eller and Cavanagh, 2000). When FA-18 Hornet flight sound was derived at 9,842.4 feet altitude, peak sound level at a depth of 6.6 feet dropped to 128 dB re 1 μ Pa. It must be noted that these mathematically derived values cover a very small footprint based on the

altitude of the aircraft, and, due to the flight speed, these sound levels would only be present for, at most, tens of seconds (Eller and Cavanagh, 2000).

4.8.2.2.2.1 Fish

The inner ears of fish are sensitive to acoustic particle motion rather than acoustic pressure. Although a propagating sound wave contains pressure and particle motion components, particle motion is most significant at low frequencies (less than a few hundred Hz) and closer to the sound source. However, a fish's gas-filled swim bladder (an organ present in many fishes that controls their buoyancy) can enhance sound detection by converting acoustic pressure into localized particle motion, which may then be detected by the inner ear. Behavioral effects to fish could include disruption or changes in natural activities, such as swimming, schooling, feeding, breeding, and migrating. Sudden changes in sound level can cause fish to dive, rise, or change swimming direction (Popper et al., 2014). There is a lack of studies that have investigated the behavioral reactions of unrestrained fish to man-made sound, especially in the natural environment. Studies of caged fish have identified three basic behavioral reactions to sound: startle, alarm, and avoidance (McCauley et al., 2000; Pearson et al., 1992; Scripps Institution of Oceanography and Foundation, 2008). Changes in sound intensity may be more important to a fish's behavior than the maximum sound level. Sounds that fluctuate in level tend to elicit stronger responses from fish than even stronger sounds with a continuous level (Schwartz, 1985). In addition, sound can induce generalized stress responses in fish, particularly a startle response during initial activity, which can in turn induce behavioral changes, such as site avoidance of the Project area throughout the remainder of pile-driving activities (Wysocki, Dittami, and Ladich, 2006).

Masking refers to the presence of a noise that interferes with a fish's ability to hear biologically relevant sounds. Fish use sounds to detect predators and prey, and for schooling, mating, and navigating, among other uses (Myrberg, 1980; Popper et al., 2003). Masking of sounds associated with these behaviors could have impacts to fish by reducing their ability to perform these biological functions. Masking may take place whenever the noise level heard by a fish exceeds ambient noise levels, the animal's hearing threshold, and the level of a biologically relevant sound. Masking is found among all vertebrate groups, and the auditory system in all vertebrates, including fish, is capable of limiting the effects of masking noise, especially when the frequency range of the noise and biologically relevant signal differ (Fay, 1988; Fay and Megela-Simmons, 1999).

The majority of fish species exposed to non-impulsive noise sources would likely have no reaction or mild behavioral reactions. Overall, there would be no long-term impacts for individual fish because acoustic exposures are of short duration (tens of seconds), intermittent, and unlikely to repeat over short periods. Impacts from aircraft overflights on fish would not be significant.

4.8.2.2.2.1.1 Endangered Species Act

Eight species of fish listed under the ESA could potentially occur in the study area. In order for a fish to be affected by aircraft overflights, it would need to be at or near the water's surface at the moment the aircraft is taking off or landing, and be able to perceive the sound entering the water. Some species, such as the green sturgeon and rockfish, are deepwater species and are not likely to be at the water's surface during an overflight. Although the likelihood of a fish being affected by an aircraft overflight is exceedingly remote given the small area and short amount of time of the overflight, there is a potential for the overflights to affect ESA-listed fish species.

Pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, the Southern DPS green sturgeon, Southern DPS eulachon, Puget Sound ESU Chinook salmon, Hood Canal summer-run chum, Puget Sound DPS steelhead, Puget Sound/Georgia Basin DPS bocaccio rockfish, Puget Sound/Georgia Basin DPS yelloweye rockfish, and bull trout. The Navy has consulted with the NMFS and USFWS as required by Section 7(a)(2) of the ESA. The NMFS and USFWS have concurred with the Navy's finding in letters dated July 20, 2018 (marine mammals), April 23, 2018 (NMFS fish), and June 14, 2018 (USFWS fish).

Critical habitat has been designated in the study area for Southern DPS green sturgeon, Puget Sound ESU Chinook salmon, Hood Canal summer-run chum, Puget Sound DPS steelhead, Puget Sound/Georgia Basin DPS bocaccio rockfish, Puget Sound/Georgia Basin DPS yelloweye rockfish, and bull trout. Aircraft overflights would introduce temporary sound into the water column. However, temporary increases in sound would have no effect on the features for which the critical habitats were designated. As such, the Proposed Action would have no effect on these designated critical habitats.

4.8.2.2.2 Marine Mammals

Aircraft overflights produce sound with energy at low frequencies (e.g., less than 1 kilohertz). Direct measurements of hearing sensitivity exist for approximately 25 of the nearly 130 species of marine mammals. Aircraft overflight sounds may be audible to all species of marine mammals in the study area, although sensitivities vary greatly between species (Richardson et al., 1995; Southall et al., 2007). Exposure to intense sound may result in noise-induced hearing loss that persists after cessation of the noise exposure. However, noise from aircraft overflights would not result in hearing loss to marine mammals because it lacks the intensity and duration to cause these types of effects. Kastak and Reichmuth (2006) documented a temporary threshold shift in harbor seals from in-air noise sources, although details regarding experiment design were unavailable to determine similarity in the sources used and overflight noise. However, threshold shift was documented only after 22 minutes of exposure; given that aircraft overflights would be much shorter in duration, threshold shift is not anticipated. As such, only behavioral reactions to aircraft overflights are analyzed below.

Thorough reviews of the behavioral reactions of marine mammal species to overhead flights are presented in Richardson et al. (1995) and elsewhere (e.g., Efrogmson et al., 2000; Patenaude et al., 2002; Holst et al., 2011; Luksenburg and Parsons, 2009; Smith et al., 2016). Richardson et al. (1995) noted that marine mammal reactions to aircraft overflights largely consisted of opportunistic and anecdotal observations lacking clear distinction between reactions potentially caused by the noise of the aircraft and the visual cue an aircraft presents. In addition, it was suggested that variations in the responses noted were due generally to other undocumented factors associated with overflights (Richardson et al., 1995). These factors could include aircraft type (single engine, multi-engine, jet turbine), flight path (altitude, centered on the animal, off to one side, circling, level and slow), environmental factors (e.g., wind speed, sea state, cloud cover), animal activity state, acoustic habitat, and locations where native subsistence hunting continues and animals are more sensitive to anthropogenic impacts, including the noise from aircraft. Ellison et al. (2012) outlined an approach to assessing the effects of sound on marine mammals that incorporates these contextually based factors. They recommend considering not just the received level of sound but also the activity in which the animal is engaged, the nature and novelty of the sound (i.e., is this a new sound from the animal's perspective?), and the distance between the sound source and the animal.

The impact of aircraft overflights is one of the lesser understood sources of potential behavioral response by any species or taxonomic group, and so many generalities must be made based on the little data available. Some data for each taxonomic group are available; taken together, it appears that in general, marine mammals have varying levels of sensitivity to overflights depending on the species and context. Information specific to pinnipeds (seals and sea lions) and cetaceans (whales, dolphins, and porpoises) is provided below, followed by information specific to federally protected threatened and endangered species.

4.8.2.2.2.1 Pinnipeds

Richardson et al. (1995) noted that responsiveness of pinnipeds to aircraft overflights generally was dependent on the altitude of the aircraft, the abruptness of the associated aircraft sound, and the life cycle stage (breeding, molting, etc.) of the individual. In general, pinnipeds are unresponsive to overflights and may startle, orient toward the sound source or increase vigilance, or briefly re-enter the water but typically remain hauled out or immediately return to their haul-out location (Blackwell et al., 2004; Gjertz and Børset, 1992). Adult females, calves, and juveniles are more likely to enter the water than males, and stampedes resulting in mortality to pups (by separation or crushing) can occur when disturbance is severe, although these are rare (Holst et al., 2011). Responses may also be dependent on the distance of the aircraft. For example, reactions of walruses on land varied in severity and included minor head raising at a distance of 2.5 km, orienting toward or entering the water at less than 150 m and 1.3 km in altitude, to full flight reactions at horizontal ranges of less than 1 km at altitudes as high as 1,000 to 1,500 m (Richardson et al., 1995).

Harbor seals are the primary marine mammal known to haul out on the southeastern shores of Whidbey Island, primarily in Crescent Harbor (NAS Whidbey Island, 2013a; Jeffries et al., 2000). In addition to harbor seals, elephant seals also haul out on Smith and Minor Islands, which are located on the western edge of the study area (USFWS, 2014b; Jeffries et al., 2000). Harbor seals and elephant seals may also be present on islands in Skagit Bay, approximately 7 miles east of Ault Field. Harbor seals and elephant seals also breed on these islands. Efrogmson et al. (2000) reviewed documented altitudes at which harbor seals respond to aircraft, and the most conservative observed threshold was about 1,000 feet.

The Kalamut Island haul-out site is located near the approach path for the Ault Field landing strip, where planes will reach lower altitudes around 50 feet, resulting in greater aircraft noise and risk of potential impacts. The MMPA defines “harassment” for military readiness activities as any activity that disturbs or is likely to disturb a marine mammal or mammal stock in the wild by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point that they are abandoned or significantly altered (16 U.S.C. 1362[18][B]). Currently, the same Growler aircraft that would operate under the Proposed Action use the approach route, and the seals have continued to use the haul-out site (i.e., they have not abandoned the site).

The number of operations at the NAS Whidbey Island complex would increase by between 30 percent and 33 percent under Alternative 1 and by between 29 percent and 32 percent under Alternatives 2 and 3 annually compared to the No Action Alternative (refer to Section 4.1). The increase in operations would result in an increase in the potential for aircraft disturbance on pinnipeds, and the potential disturbance would be similar under all three alternatives because the in-air operations are similar. The potential impacts would not affect pinnipeds in the area of potential aircraft disturbance differently between scenarios, as they may occur in marine waters and shorelines in the flight paths for operations at both Ault Field and OLF Coupeville.

Harbor seals in the area of potential aircraft disturbance are currently exposed to high levels of aircraft, vessel, and other human-made disturbances. Harbor seals are presumably habituated to the activity because they are common in the area of potential aircraft disturbance (NAS Whidbey Island, 2013a) despite the existing long-term high level of disturbances. Repeated exposures of an individual to multiple sound-producing activities over a season, year, or life stage cause some animals to habituate to, or become tolerant of, repeated exposures over time, learning to ignore a stimulus that in the past has not accompanied any overt threat. Several studies have documented marine mammal habituation to repeated exposure to human-caused noise (Stockin et al., 2008; Bejder et al., 2006; Blackwell et al., 2004). Marine mammals that are more tolerant may stay in a disturbed area. In addition, no breeding areas would be impacted.

Alternatives 1 through 3 are not expected to have significant impacts on pinnipeds, either through behavioral disturbance or injury resulting from military readiness activities.

4.8.2.2.2.2 Cetaceans

There are a number of studies on cetaceans but few on the effects of aircraft noise on species within the study area. The most common responses of cetaceans to overflights are short surfacing durations, abrupt dives, swimming away from the flight path, and percussive behavior (breaching and tail slapping) (Richardson et al., 1995; Patenaude et al., 2002; Nowacek et al., 2007). Other behavioral responses such as flushing and fleeing the area of the source of the noise have also been observed (Holst et al., 2011; Manci et al., 1988).

Mysticetes either ignore or occasionally dive in response to aircraft overflights (Koski et al., 1998; Patenaude et al., 2002). Richardson et al. (1985; 1995) found no evidence that single or occasional aircraft flying above mysticetes causes long-term displacement of these mammals. Variable responses to aircraft have been observed in odontocetes (toothed whales), although overall little change in behavior has been observed during flyovers. Some toothed whales dove, slapped the water with their flukes or flippers, or swam away from the direction of the aircraft during overflights; others did not visibly react (Richardson et al., 1995).

Bowhead whales in the Beaufort Sea exhibited a transient behavioral response to fixed-wing aircraft and vessels. Reactions were frequently observed when aircraft were less than 1,000 feet MSL, infrequently observed at 1,500 feet, and not observed at all at 2,000 feet (Richardson et al., 1985). Patenaude et al. (2002) found that bowhead whales (*Balaena mysticetus*) and beluga whales (*Delphinapterus leucas*) responded to aircraft through abbreviated surfacing, immediate dives or turns, changes in behavior state, vigorous swimming, and breaching during spring migration in Alaska. Bowheads responded to 2.2 percent and belugas responded to 3.2 percent of fixed-winged aircraft overflights. Bowheads and belugas responded to helicopters 14 percent and 38 percent of the time, respectively. Responses by these species most often occurred when fixed-winged aircraft were at altitudes below about 600 feet or at lateral distances of less than 820 feet. Both species responded significantly more often when helicopters were less than 820 feet away in lateral distance. It should be noted that bowhead whales in this study may have had more acute responses to anthropogenic activity than many other marine mammals because these animals were presented with restricted egress due to limited open water between ice floes. Additionally, these animals are hunted by Alaska Natives, which could lead to animals developing additional sensitivity to human noise and presence.

During standard marine mammal surveys, conducted from an altitude of 750 feet, some sperm whales remained on or near the surface the entire time the aircraft was in the vicinity, while others dove immediately or a few minutes after being sighted (Green et al., 1992; Richter et al., 2003; Richter et al., 2006; Smultea et al., 2008a; Würsig et al., 1998). In one study, sperm whales showed no reaction to a helicopter until they encountered the downdrafts from the rotors (Richardson et al., 1995). A group of sperm whales responded to a circling aircraft (at an altitude of 800 to 1,100 feet) by moving closer together and forming a defensive fan-shaped semicircle, with their heads facing outward. Several individuals in the group turned on their sides, apparently to look up toward the aircraft (Smultea et al., 2008b). Whale-watching aircraft (fixed-wing airplanes and helicopters) apparently caused sperm whales to turn more sharply but did not affect blow interval, surface time, time to first click, or the frequency of aerial behavior (Richter et al., 2003).

Smaller delphinids generally react to overflights either neutrally or with a startle response (Würsig et al., 1998). Beluga whales reacted to helicopter overflights by diving, breaching, changing direction or behavior, and altering breathing patterns to a greater extent than mysticetes in the same area (Patenaude et al., 2002). These reactions increased in frequency as the altitude of the helicopter dropped below 150 m. A change in travel direction was noted in a group of pilot whales as the aircraft circled while conducting monitoring (HDR, 2011).

It is important to note that bowhead whales, beluga whales, and sperm whales do not occur in the study area. However, these species are similar to those that do occur in the study area (i.e., gray whales and minke whales), and therefore studies concerning these species are relevant.

The Proposed Action would increase the number of aircraft and aircraft operations (see Table 4.1-5), resulting in an increased potential for noise disturbance to marine mammals in the study area. The number of operations at the NAS Whidbey Island complex would increase by between 30 percent and 33 percent under Alternative 1 and by between 29 percent and 32 percent under Alternatives 2 and 3 annually compared to the No Action Alternative (refer to Section 4.1). The increase in operations would result in an increase in the potential for aircraft disturbance on cetaceans, and the potential disturbance would be similar under all three alternatives because the in-air operations are similar. The potential impacts would not affect cetaceans in the area of potential aircraft disturbance differently between scenarios, as they may occur in marine waters in the flight paths for operations at both Ault Field and OLF Coupeville.

As described above, studies have shown that the majority of individual cetaceans did not respond to overflights (Patenaude et al., 2002; Smultea et al., 2008b). Whales in Alaska (Patenaude et al., 2002) and Hawaii (Smultea et al., 2008b) were likely not exposed to the long-term high levels of aircraft operations, vessels, and other human-made disturbances that occur in the area of potential aircraft disturbance. Cetaceans in the area of potential aircraft disturbance are presumably habituated to high levels of long-term disturbances and would be even less likely to respond to aircraft than those individuals in the above-mentioned studies. Therefore, the Proposed Action is not expected to have significant impacts on cetaceans, either through behavioral disturbance or injury resulting from military readiness activities.

4.8.2.2.2.2.1 Endangered Species Act

No aircraft disturbance data or studies exist specifically for the Mexico and Central America DPSs of humpback whales. However, as described, marine mammals exposed to low-altitude fixed-wing aircraft

overflights could exhibit a short-term behavioral response. Fixed-wing aircraft overflights are not expected to result in chronic stress because it is extremely unlikely that individual animals would be repeatedly exposed to low altitude overflights.

Pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, the Mexico and Central America DPSs of humpback whales. The Navy has consulted with the NMFS as required by Section 7(a)(2) of the ESA, and the NMFS has provided concurrence with the Navy's determination.

No aircraft disturbance data or studies exist specifically for Southern Resident killer whales. However, as described, marine mammals exposed to low-altitude fixed-wing aircraft overflights could exhibit a short-term behavioral response. Fixed-wing aircraft overflights are not expected to result in chronic stress because it is extremely unlikely that individual animals would be repeatedly exposed to low-altitude overflights.

Pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, Southern Resident killer whales. The Navy has consulted with the NMFS as required by Section 7(a)(2) of the ESA, and the NMFS has provided concurrence with the Navy's determination.

During consultation, the NMFS additionally determined that there is a low likelihood of exposure of the critical habitat to aircraft operations, and, if exposed, the operations are not likely to significantly alter passage conditions (i.e., any disturbance due to noise will be short term and localized, with no lasting effects or displacement). As passage conditions are identified as one of the primary constituent elements of the critical habitat, the NMFS determined that the Proposed Action may affect, but is not likely to adversely affect, Southern Resident killer whale critical habitat.

4.8.2.2.2.2.2 Marine Mammal Protection Act

All marine mammal species are protected under the MMPA. Harassment for military readiness activities only arises when an animal's behavioral patterns are disturbed to the point that they are "abandoned or significantly altered," and not just "disturbed" (16 U.S.C. 1362[18][B]). Short-term behavioral responses would not necessarily rise to the level of harassment. As is evident by the use of Kalamut Island as a continued haul-out site for harbor seals, abandonment or significant alteration of normal behavioral patterns are not expected.

Pursuant to the MMPA, sensory disturbance from aircraft overflights as proposed in Alternatives 1 through 3 would not result in reasonably foreseeable takes of marine mammals. Therefore, permitting under the MMPA is not required.

4.8.3 Biological Resources Conclusion

Potential effects on terrestrial and marine wildlife from implementation of the Proposed Action would be similar between all three action alternatives but greater under Alternative 1 because that alternative would result in the largest increase in aircraft operations. Negligible differences to impacts on biological resources would occur between scenarios across all three action alternatives. These minor differences would be attributable to the location and frequency of operations (e.g., more FCLPs proposed under Scenario C). The Navy has consulted with the appropriate regulatory agencies, as required. The overall conclusions regarding the Proposed Action's potential impacts on various wildlife species groups are highlighted below.

- Construction of the new facilities would occur in previously disturbed areas of high-volume human activity and is not expected to result in significant impacts on terrestrial wildlife. Construction noise would not have any impacts on marine species.
- Wildlife in the study area are currently exposed to high levels of aircraft operations and other human disturbances, and the Proposed Action would result in some additional sensory disturbance impacts, particularly from noise. The impacts would be similar under each action alternative; however, the levels of impacts would vary between the five scenarios within the alternatives. Scenario A would result in greater impacts at OLF Coupeville, whereas Scenario C would result in greater impacts at Ault Field, based on the division of aircraft operations at each. However, these differences would be minor and insignificant.
- The NAS Whidbey Island complex reports a proportionally small number of bird/animal aircraft strikes annually (approximately 30 strikes annually) relative to the high number of aircraft operations flown (84,700 annually) at the complex and the large numbers of wildlife inhabiting the study area throughout the year. With the continued implementation of the NAS Whidbey Island complex's BASH plan, the Proposed Action would not significantly impact local wildlife populations.
- For MBTA-protected species, the impacts from stressors from the Proposed Action would not result in a significant adverse effect on migratory bird populations. As such, conferring with USFWS is not warranted. Pursuant to the BGEPA, stressors from the Proposed Action would not disturb bald and golden eagles to a degree that would substantially interfere with their normal breeding, feeding, or sheltering behavior.
- The Proposed Action may have aircraft-strike or sensory disturbance impacts on the marbled murrelet. The Navy determined that aircraft-strike impacts would be discountable, to which the USFWS concurred in its Biological Opinion dated June 14, 2018. Sensory disturbance by aircraft overflights was determined by USFWS to have a potential adverse effect on marbled murrelets. The USFWS concluded in its June 14, 2018, Biological Opinion that the Proposed Action is not likely to jeopardize the continued existence of the marbled murrelet.
- The Proposed Action may have behavioral or masking impacts on ESA-listed fish species (i.e., bull trout, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, and yelloweye rockfish). However, those potential impacts would be insignificant. Therefore, the Proposed Action may affect, but is not likely to adversely affect, ESA-listed fish species. The NMFS and USFWS have concurred with the Navy's finding in letters dated April 23, 2018, and June 14, 2018, respectively.
- The Proposed Action's increase in aircraft operations would not have significant noise and/or visual impacts on the Southern Resident killer whale and Mexico and Central America DPSs of the humpback whale. Because of the potential for reactions due to auditory and/or visual disturbance, the Proposed Action may affect, but is not likely to adversely affect, the Southern Resident killer whale and Mexico and Central America DPSs of the humpback whale. Additionally, the NMFS determined that the construction activities may affect, but not adversely affect, the Southern Resident killer whale and its critical habitat. The NMFS's determination under the ESA was issued on July 20, 2017.
- Marine mammals, including non-ESA species, exposed to fixed-wing aircraft overflights could exhibit a short-term behavioral response, but these responses would not lead to abandonment

or significant alteration of normal behavioral patterns. Pursuant to the MMPA, the Proposed Action would not result in the unintentional taking (e.g., harassment) of marine mammals incidental to the activity.

4.9 Water Resources

This assessment examines how the Proposed Action would affect groundwater, surface water, wetlands, floodplains, marine waters, and marine sediments. The analysis of groundwater focuses on the potential for impacts to the quality, quantity, and accessibility of water. The analysis of surface water considers whether any new construction would impact the quality of water. BMPs are identified to minimize soil impacts and prevent or control pollutant discharge into stormwater. The analysis of marine waters focuses on whether any new construction would impact the quality of marine waters. The analysis of wetlands considers the potential for impacts that may change the local hydrology, soils, or vegetation that support a wetland. The analysis of marine sediments focuses on whether any new construction would impact the quality of the marine sediments.

Water Resources

Impacts on surface water from construction activities, but would be minimized and avoided through implementation of BMPs and therefore would not be significant.

Potential indirect impacts from construction activities, but would be minimized and avoided through implementation of BMPs and therefore would not be significant.

4.9.1 Water Resources, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to affected environment water resources. Therefore, no significant impacts to water resources would occur with implementation of the No Action Alternative.

4.9.2 Water Resources, Alternatives 1 through 3

New construction under Alternatives 1 through 3 would include expanded hangar space and/or new hangars, armament storage, maintenance facilities, and expanded personnel parking areas. All planned construction activities would occur in proximity to the flight line at Ault Field. No construction would occur at OLF Coupeville. While each alternative would result in up to 2.3 acres of new impervious surface at NAS Whidbey Island, development associated with Alternative 1 would result in different, new impervious surface located at the hangar space, and development associated with Alternative 3 would result in slightly more impervious surface at the Armaments Storage area. Overall, the impacts to water resources would be minimal, and the differences between alternatives in regard to their impacts would only result in slight local variations in groundwater and surface water quality.

4.9.2.1 Water Resources Potential Impacts

4.9.2.1.1 Groundwater

New construction under each of the alternatives would not impact Whidbey Island's three groundwater aquifers or any private wells in the vicinity of NAS Whidbey Island because none of the proposed construction would extend below the ground surface to a depth that would impact the underlying water tables. Although fuel or other chemicals could be spilled during construction, implementation of BMPs (as detailed in section 3.9.2.2 and 4.9.2.1.2), such as immediate cleanup of these spills, would prevent any infiltration into the underlying groundwater. Although the number of personnel employed or stationed at NAS Whidbey would increase, resulting in a corresponding increase in the demand for

groundwater, this is anticipated to be minimal because NAS Whidbey Island does not use groundwater as a source of drinking water.

4.9.2.1.1.1 Per- and Polyfluoroalkyl Substances

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

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

4.9.2.1.2 Surface Water

The Proposed Action would result in up to 2 acres of new impervious surface created by the new armament storage, mobile maintenance facility storage area, vehicle parking, and hangar space. The increase in impervious surface would be less than 1 percent compared to the existing approximately 600 acres of impervious surface at NAS Whidbey Island.

The new impervious surfaces under each alternative would increase the quantity and velocity of stormwater runoff, which would in turn increase the susceptibility of surface water to runoff impacts like increased turbidity and pollutants, resulting in diminished water quality. Stormwater runoff could impact surface water and waters around NAS Whidbey Island; however, as stated above, the percent increase in impervious surface from existing impervious surface is minimal and would not impact overall water quality. This includes surface water bodies such as the Salish Sea and Puget Sound.

Examples of BMPs for controlling non-point source pollution include, but are not limited to, the following:

- Activities such as vehicle maintenance, chemical or waste oil storage, or transferring potential contaminants would be conducted in covered areas so stormwater would not wash contaminants into storm drains or surface waters.
- Areas that cannot be covered should have their stormwater runoff retained and diverted to the sanitary sewer system.

- The storm drain system should not be used to dump or discharge any materials or chemicals. All departments should notify the Environmental Division before conducting any operations that may discharge materials or washes into the system. This includes water from vehicle washing. All storm drains should be labeled with “no dumping” signs.

The installation’s Spill Prevention, Control, and Countermeasures (SPCC) Plan provides guidance that would be used in a spill response, such as a response procedures, notification, and communication; roles and responsibilities; and response equipment inventories. Developing stormwater and erosion-control measures, implementing standard stormwater BMPs, and educating station personnel are proactive measures to limit the exposure of stormwater to contaminants.

Because more than 1 acre would be disturbed during construction under all alternatives, a construction National Pollutant Discharge Elimination System (NPDES) stormwater permit would be obtained from the USEPA through its water quality permit program. Under the permit, the Navy (NAS Whidbey Island) would develop a site-specific Stormwater Pollution Prevention Plan for new discharges that would include a site plan for managing stormwater runoff and describe the BMPs to be implemented to eliminate or reduce erosion, sedimentation, and stormwater pollution. With proper implementation of the Stormwater Pollution Prevention Plan, impacts on water quality from erosion and off-site sedimentation during construction would not be significant.

Additional mitigation might be required to account for the excess runoff from new impervious surfaces. The Navy may install underground stormwater retention infrastructure; infiltrate stormwater via wet ponds, ditches, and swales; or employ a combination of these measures to meet the standards established by the Washington State Department of Ecology in its 2012 Western Washington Stormwater Manual. These measures would be developed and incorporated into facility design based on existing site conditions.

4.9.2.1.3 Wetlands

Each of the three alternatives would have no direct impacts on wetlands at NAS Whidbey Island because no wetlands occur in or adjacent to the proposed construction areas. Stormwater runoff from construction activities could have indirect impacts on nearby wetlands, such as increased turbidity and pollutant levels. However, implementation of BMPs during construction, similar to those described for Section 4.9.2.1.2, Surface Waters, would minimize runoff into nearby wetlands.

4.9.2.1.4 Floodplains

No construction would occur within Federal Emergency Management Agency-mapped floodplains under any of the three alternatives. Therefore, there would be no impacts on floodplains, and all three alternatives would be fully consistent with EO 11988.

Storm-related flooding at Ault Field and the Seaplane Base has only been an issue related to high tide and high wind events. The Final Installation Development Plan recommends use of green infrastructure outside of the airfield and runways and use of LID practices be used in construction projects (NAVFAC, 2016b). These practices would minimize potential impacts from storm-related flooding regarding the new construction associated with the Proposed Action.

4.9.2.1.5 Marine Waters and Sediments

The projected increase in new impervious surfaces under each alternative would increase the quantity and velocity of stormwater runoff. This would increase the susceptibility of marine water sediments to impacts such as increased turbidity and pollutant levels. These impacts would be minimized or avoided by implementing the BMPs described above in Section 4.9.2.1.2, Surface Waters. This includes impacts to surface water bodies such as Puget Sound and the Salish Sea.

4.9.3 Water Resources Conclusion, Alternatives 1 through 3

Overall, as discussed above, implementation of the Proposed Action at NAS Whidbey Island would not result in significant impacts to water resources. There would be no impact on groundwater because new construction under each of the alternatives would not extend below the ground surface to a depth that would impact the underlying water tables, and implementation of BMPs, such as immediate cleanup of spills, would prevent any infiltration from spills into the underlying groundwater. The Proposed Action would result in up to 2.3 acres of new impervious surface, but impacts to surface waters, floodplains, and marine waters and sediment would be minimized and avoided through implementation of BMPs, LIDs, and green infrastructure and therefore would not be significant. Each of the three alternatives would have no direct impacts on wetlands at NAS Whidbey Island because no wetlands occur in or adjacent to the proposed construction areas. Indirect impacts to wetlands, as discussed above, would be minimized through use of BMPs. Construction activities are similar under the three alternatives and therefore there would be negligible differences in impacts to water resources. The differences between alternatives in regard to their impacts would only result in slight local variations in groundwater and surface water quality.

4.10 Socioeconomics

Analysis of impacts to socioeconomics is focused on the issues of the effects of the alternatives on population, economy, employment and income, housing, local government revenues and expenditures, and community services and facilities.

This socioeconomic analysis focuses on impacts caused by changes in military and civilian personnel levels and those caused by an increase in construction expenditures. Economic impacts are defined to include direct effects, such as changes to employment, payrolls, and expenditures that affect the flow of dollars into the local economy, and indirect effects, which result from the “ripple effect” of spending and re-spending in response to the direct effects.

Socioeconomic impacts, particularly impacts such as those being evaluated in this EIS, are often mixed: beneficial in terms of gains in jobs, expenditures, and tax revenues but adverse in terms of growth-management issues, such as demands for housing and community services.

Socioeconomics

Construction impacts would result in temporary and positive impacts to the local economy. Operational impacts would result in positive impacts to the local economy.

The action alternatives would have minor impacts on the local and regional population, and local government revenues. Significant impacts to housing availability and housing affordability may occur in Oak Harbor.

Local school districts, particularly the Oak Harbor School District, would experience significant impacts. Minimal to no impact is expected on medical, police, and fire services.

4.10.1 Socioeconomics, No Action Alternative

Under the No Action Alternative, no additional personnel would be assigned to the NAS Whidbey Island complex, and no additional construction would occur at Ault Field or OLF Coupeville compared to the affected environment conditions. Therefore, there would be no impacts to local population, the regional economy, or housing market. In addition, there would be no fiscal impacts to local governments, and there would not be any change to the provision of local community services and facilities compared to the affected environment conditions. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

4.10.2 Socioeconomic Impacts, Alternatives 1 through 3

The affected environment for the more general socioeconomic impact analyses for Alternatives 1 through 3 is defined as Island and Skagit Counties. However, as described in Section 3.10.3, more focused areas have been utilized for the analyses of specific community services and facilities. The Oak Harbor, Coupeville, and Anacortes school districts are the defined affected environment for the assessment of impacts to public education; Island and Skagit Counties are the defined affected environment for the assessment of impacts to medical facilities; and the City of Oak Harbor and the Town of Coupeville are the defined affected environment for the assessment of impacts to emergency services such as police and fire protection.

4.10.2.1 Population Impacts

Implementation of Alternatives 1 through 3 would result in minor impacts on the personnel loading at the NAS Whidbey Island complex and on total population in the region. Total Growler personnel loading at the NAS Whidbey Island complex is expected to increase under Alternatives 1 through 3 when

compared to the personnel loading under the No Action Alternative. As shown on Table 4.10-1, the total number of military personnel associated with the Growler aircraft at the NAS Whidbey Island complex under the No Action Alternative would be 4,104 personnel, including 517 officers and 3,587 enlisted personnel. Once all transition activities are complete in 2021, total Growler personnel at the station would range between a low of 4,439 personnel under Alternative 1 to a high of 4,732 personnel under Alternative 2. These personnel numbers would correspond to an increase of between 335 and 628 personnel when compared to the No Action Alternative, depending on the alternative selected. Table 4.10-1 shows both the total number of Growler personnel who would be assigned to the NAS Whidbey Island complex under each alternative and the expected change in personnel loading when compared to the No Action Alternative. Estimates of the total number of military dependents have also been included in this table (see Table 4.10-1).

The population and demographic characteristics of Island and Skagit Counties would be similarly impacted under each alternative. Table 4.10-2 provides an estimate of regional population impacts for each of the three alternatives. As additional military personnel are stationed at the NAS Whidbey Island complex, it is assumed that their dependents (e.g., spouses and children) would also move into the region. The number of military dependents affected by the proposed alternatives was calculated using 2013 data collected by the Office of the Deputy Assistant Secretary of the Defense (Military Community and Family Policy) on the average number of dependents (e.g., spouses and children) for Navy and DoD personnel (DoD, n.d.). These average percentages were applied to the expected number of personnel who would be reassigned under each of the proposed alternatives to determine the corresponding number of dependents (see Table 4.10-2).

As shown on Table 4.10-2, the resulting changes in population are expected to be minor compared to the size of the regional population under all three alternatives. Alternative 2 is expected to cause the largest demographic impact out of the three alternatives considered. Under Alternative 2, 1,488 military personnel and dependents would move into the region compared to the No Action Alternative level. Assuming that the geographic distribution of the new personnel will be similar to the current geographical distribution of Navy personnel, the majority of these new residents (1,171 residents) would likely live in Island County. The remaining personnel and dependents are expected to live in Skagit County (317 residents). This increase in population would amount to an increase of approximately 1.4 percent over Island County's 2020 projected population level and an increase of 0.2 percent over Skagit County's 2020 projected population level. An estimated 794 additional military personnel and dependents under Alternative 1; 1,488 additional military personnel and dependents under Alternative 2; and 808 additional military personnel and dependents under Alternative 3 are expected to reside in the two counties compared to the No Action Alternative. In total, Alternative 1 would result in an increase of 0.4 percent, Alternative 2 would result in an increase of 0.7 percent, and Alternative 3 would result in an increase of 0.4 percent of the total population in the two counties (see Table 4.10-2).

See Table 4.10-2 for the demographic impacts associated with all three alternatives.

Table 4.10-1 EA-18G Growler Personnel Loading at the NAS Whidbey Island Complex under Each Alternative in 2021

	<i>No Action Alternative</i>	<i>Alternative 1</i>		<i>Alternative 2</i>		<i>Alternative 3</i>	
		<i>Personnel</i>	<i>Change from No Action Alternative</i>	<i>Personnel</i>	<i>Change from No Action Alternative</i>	<i>Personnel</i>	<i>Change from No Action Alternative</i>
Officers	517	597	80	619	102	597	80
Enlisted	3,587	3,842	255	4,113	526	3,848	261
Military Personnel Total	4,104	4,439	335	4,732	628	4,445	341
Military Dependents ¹	5,627	6,086	459	6,487	860	6,094	467
Total Military and Dependents	9,731	10,525	794	11,219	1,488	10,539	808

Note:

¹ Military dependents include spouses and children aged 0-22 years residing with military personnel.

Table 4.10-2 Regional Population Impacts¹ Resulting from the Changes in EA-18G Growler Personnel Loading at the NAS Whidbey Island Complex Compared to the Affected Environment Levels

	<i>Change from Affected Environment</i>		
	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
Military Personnel	335	628	341
Military Dependents	459	860	467
Total Population Change²	794	1,488	808
<i>Island County Impacts</i>			
Number of Military Personnel and Dependents Expected to Reside in Island County	625	1,171	636
Island County's 2020 Projected Population	84,044	84,044	84,044
Total Population Change as a Percentage of Island County's 2020 Population	0.7%	1.4%	0.8%
<i>Skagit County Impacts</i>			
Number of Military Personnel and Dependents Expected to Reside in Skagit County	169	317	172
Skagit County's 2020 Population	130,705	130,705	130,705
Total Population Change as a Percentage of Skagit County's 2020 Population	0.1%	0.2%	0.1%

Source: Washington State Office of Financial Management, 2017

Notes:

- ¹ All population impacts are calculated for 2021, the time when all transition activities have been completed. The current geographical distribution of the personnel stationed at and employed by the NAS Whidbey Island complex, as listed in Table 3.10-2, was used to forecast the expected geographic distribution of the Growler personnel by county.
- ² Total population change also includes those military personnel and dependents who are expected to live outside of Island and Skagit Counties.

4.10.2.2 Economy, Employment, and Income Impacts

Implementation of Alternatives 1 through 3 would have the potential to impact the regional economy in two ways. First, any additional construction activity that is required to support the mission would have a short-term positive economic effect as these funds were injected into the regional economy. Secondly, there would be a positive, long-term economic impact on the regional economy as a result of the increased employment and payroll at the NAS Whidbey Island complex that is associated with each alternative. The impacts from construction would be one-time in nature, whereas the impacts from the increased employment and employee earnings would be annual and long term.

In order to quantify the total economic impact the proposed alternatives would have on the regional economy, the Navy used the Regional Input-Output Modeling System, designed by the U.S. Bureau of Economic Analysis. The multipliers utilized in this input-output model are based on regional information derived from databases analyzing commercial, industrial, and household spending patterns and relationships. These multipliers also estimate the potential number of jobs created or lost as a result of changes in earning and spending patterns. Both one-time, short-term construction-related economic impacts and annual, long-term operational spending impacts are discussed below.

4.10.2.2.1 Short-term Construction-related Impacts

Implementation of the proposed alternatives would necessitate the expenditure of different levels of construction funds to support the revised mission. At present time, detailed cost estimates for each alternative are not available. However, the Navy expects that the total construction costs would range between approximately \$47.8 million and \$122.5 million for each alternative, depending on the facilities constructed.

This increase in construction spending would directly impact the regional economy by increasing employment and earnings in the construction industry. In addition, these construction expenditures would also have a positive indirect impact on the local economy.

As the new construction workers spend a portion of their payroll in the local area and construction companies purchase materials from local suppliers, the overall demand for local goods and services would expand. Revenues at local retail outlets and service providers would increase. As these local merchants respond to this increase in demand, they may in turn increase employment at their operations and/or purchase more goods and services from their providers. These new workers may then spend a portion of their income in the area, thus “multiplying” the positive economic impacts of the original injection of funds. These “multiplier” effects would continue until all of the original funds have left the regional economy through either taxes, savings, or purchases from outside the local area.

Table 4.10-3 shows the direct and indirect impacts from construction under both the low-cost estimate and under the high-cost estimate.

Table 4.10-3 Total Direct and Indirect Impacts Resulting from Construction Expenditures under Each Alternative at the NAS Whidbey Island Complex

	<i>Low Cost Estimate</i>	<i>High Cost Estimate</i>
Total Construction Expenditures	\$47,800,000	\$122,500,000
Change in Regional Output	\$63,300,000	\$162,300,000
Change in Value Added	\$33,200,000	\$85,100,000
Change in Employee Earnings	\$18,000,000	\$46,100,000
Change in Employment (jobs)	327	839

Source: Navy, 2015e; U.S. Bureau of Economic Analysis, 2015

Because these construction costs represent one-time expenditures, the resulting positive economic impacts would last only a short time. Once these funds leave the regional economy through leakages such as savings, taxes, or through the purchase of goods and services from outside the region, these positive economic impacts would cease.

4.10.2.2.2 Long-term Employee Earnings and Spending Impacts

As described above, direct Navy employment at NAS Whidbey Island would expand by an additional 335 to 628 personnel under the three proposed alternatives compared to the No Action Alternative level. As additional income is injected into the regional economy through changes in the NAS Whidbey Island complex’s payroll, employment and earnings in the regional economy would be expanded or be multiplied. Every additional job created at the NAS Whidbey Island complex would stimulate the regional economy and create more employment and business opportunities.

As more personnel are assigned to the NAS Whidbey Island complex, these new employees would spend a portion of their additional disposable income in the regional economy, and the profits and sales of local merchants would increase. These local merchants may, in turn, increase employment or increase output as a direct result of the additional demand for their goods and services. Thus, the positive economic impacts of the original injection of funds would be cycled back into the economy, repeating or multiplying the effect.

Table 4.10-4 summarizes projected changes in employment and payroll at the NAS Whidbey Island complex under each of the alternatives. Payroll expenditures were calculated for all additional personnel expected to move to the area under each of the alternatives. The change in direct payroll for personnel stationed or employed at the NAS Whidbey Island complex is shown in Table 4.10-4. The alternatives would result in an increase in employee earnings in the region directly related to the military, ranging from approximately \$12.2 million under Alternatives 1 and 3 to \$21.4 million under Alternative 2.

Table 4.10-4 NAS Whidbey Island Complex Direct Employment and Employee Earnings Impacts Associated with Each Alternative Compared to the Affected Environment

	<i>Total Employment</i>	<i>Total Employee Earnings</i>
Alternative 1	335	\$12,200,000
Alternative 2	628	\$21,400,000
Alternative 3	341	\$12,300,000

4.10.2.2.3 Impacts to Other Industries

4.10.2.2.3.1 Agriculture

Alternatives 1 through 3 would not directly impact agricultural production in the affected area. No agricultural lands will be removed from production as a direct result of implementation of the proposed alternatives, and agricultural production in the region is expected to remain unchanged.

However, some minor increases in the cost of production may occur as a result of the proposed alternatives. Farm operations within the greater than 65 dB DNL contours may experience some loss of productivity during flight activities as spoken communication may become difficult. In addition, depending upon the exact location of the farm and the amount of its expected noise exposure, some of these agricultural operations may be required to expend funds to meet Occupational Safety and Health Administration health and safety requirements for noise protection for outdoor farm workers.

Finally, it is possible that noise levels from flight operations may impact patronage at outdoor farmers’ markets and food stands during flight times. While this reduction in patronage may affect the sales revenues of certain farmers and vendors at specific times, these reductions would likely be minor compared to overall agricultural revenues.

4.10.2.2.3.2 Tourism

Increased flight operations and the resulting noise exposure under Alternatives 1 through 3 may have a negative impact on some visitors’ experiences at certain tourist destinations in the greater than 65 dB

DNL contours (See Section 4.5, Land Use, for a discussion of noise-related impacts on recreational activities within the study area).

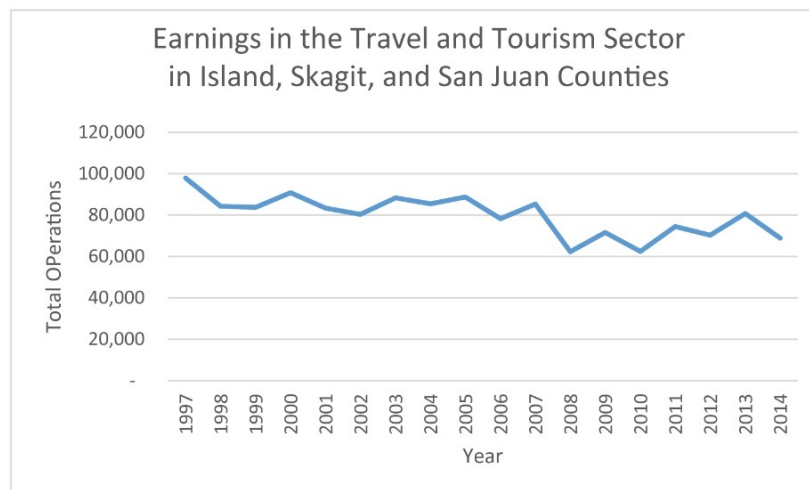
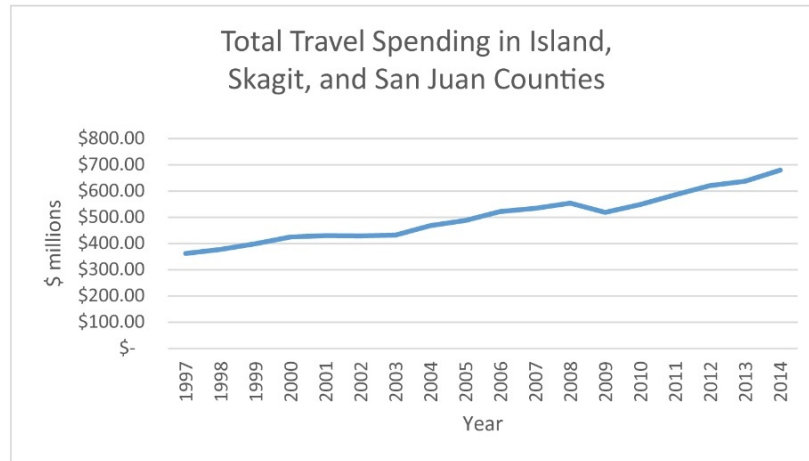
Susceptible locations include outdoor recreation and ecotourism sites such as state and federal parks that fall within the greater than 65 dB DNL contours. The increase in noise created by flight operations associated with the Proposed Action could reduce the perceived quality of visits to these locations by certain tourists, who may elect to not visit again, choose different sites in the region to visit, or shorten their visits as a result (see Section 4.2, Noise Associated with Aircraft Operations, for a discussion of the increased noise from the Proposed Action). This perceived change in quality of the visitor experience could lead to some reduction in attendance at the various parks and destinations discussed in Section 3.10.2, Tourism, and may reduce tourism-related expenditures in Island, San Juan, and Skagit Counties.

However, this reduction in tourism expenditures is not anticipated to be substantial, given historical evidence that travel and tourism-related spending, earnings, and tax receipts have increased in the three counties over the past decades alongside increases in total aircraft operations at the NAS Whidbey Island complex (See Section 3.10.2, Tourism, for information on travel and tourist expenditures in Island, San Juan, and Skagit Counties). Figure 4.10-1 shows the number of airfield operations at the NAS Whidbey Island complex as well as employment estimates and total spending in the travel and tourism industry in Island, Skagit, and San Juan Counties between 1997 and 2014. As shown on the figure, there is no obvious direct correlation between operations at the NAS Whidbey Island complex and tourism-related employment or spending patterns in the three counties.

Attendance at state parks near the NAS Whidbey Island complex has alternatively risen and fallen over past decades. Some decrease in attendance may be attributable to increased noise from expanded flight operations at the NAS Whidbey Island complex over the years; however, this change in noise levels would be only one among several factors that influence travel and tourism expenditures and choice of visitor destinations. For example, economic growth and recessions during known periods appear to have influenced attendance figures at several parks studied. In the past 5 years--a period of steady economic growth--attendance recorded at Deception Pass State Park has steadily risen despite a moderate increase in flight operations at the NAS Whidbey Island complex. Visitation to parks within Ebey's Landing National Historical Reserve surged in 2012 and 2013 and then dropped off, a trend that would not be attributable to increased noise from the NAS Whidbey Island complex because Navy operations were greater during 2012 and 2013 than during 2014 and 2015.

In summary, Alternatives 1 through 3 could potentially reduce attendance levels at certain tourist destinations from reaching the levels that would have occurred without the Proposed Action; however, the effect of the Proposed Action on the tourism industry as a whole is not expected to be substantial. Based on past evidence and the limited number of locations affected by the change in noise levels under the Proposed Action, Alternatives 1 through 3 are not expected to eliminate a large numbers of visitors from the region. Additionally, visitor days and visitor expenditures are not expected to be reduced such that the tourism industries in Island, Skagit, or San Juan Counties would decline significantly.

02:002860 B4325-0041-11



SOURCE: Ecology and Environment, Inc. 2017

Figure 4.10-1 Tourism Revenue and Employment in Island, Skagit, and San Juan Counties, 1997-2014

4.10.2.2.3.3 Other Noise-Sensitive Industries

Other noise-sensitive industries that fall within the greater than 65 dB DNL contours, such as recording studios, meditation spas, and other businesses that require low ambient noise levels to function, may experience some negative impacts as a result of implementation of Alternatives 1 through 3. Increased noise levels during flight operations may reduce the amount of time that these noise-sensitive businesses can effectively operate, thereby potentially impacting their revenue and profitability. However, given the fact that relatively few noise-sensitive industries are located within the greater than 65 dB DNL contours, this impact, while potentially substantial to individual businesses, will be relatively minor in terms of the regional economy.

4.10.2.2.4 Economy, Employment, and Income Summary

Implementation of Alternatives 1 through 3 would, in general, have a positive economic effect on the regional economy. Construction activities under each alternative would generate positive, short-term direct and indirect economic impacts through an increase in construction employment and construction expenditures. The additional personnel stationed at the complex would generate positive long-term direct and indirect economic impacts through their additional payroll expenditures and the resulting increase in economic activity in the region. However, some negative economic impacts may occur to specific industries such as tourism and other noise-sensitive industries. No significant impact is expected to occur to the agricultural industry as a result of the proposed alternatives.

4.10.2.3 Housing Impacts

All types of housing around the NAS Whidbey Island complex, including military-controlled housing, would experience an increase in demand as a result of the personnel changes associated with the proposed alternatives. However, nearly all these additional households are expected to reside off base. In May 2016, of the 1,509 Public Private Venture family housing units at the NAS Whidbey Island complex, less than 2 percent were vacant. In addition, less than 10 percent of the 1,625 bachelor enlisted quarters housing units were vacant in May 2016. No additional military-controlled housing is currently planned to be built as a result of the proposed alternatives; therefore, only a limited number of the newly assigned personnel would be able to reside on station (Switalski, 2016). However, the Navy periodically assesses on- and off-base housing demand and availability to determine whether additional Navy-controlled housing is required for service members and their dependents. For the purposes of this analysis, however, it has been assumed that all additional personnel would be required to seek accommodations in the community.

The change in personnel loading at the NAS Whidbey Island complex that would occur under any of the proposed alternatives compared to the No Action Alternative would have a moderate impact on the overall housing market in the two counties under all three alternatives. Implementation of the proposed alternatives would result in 335 personnel, 628 personnel, and 341 personnel relocating to the region under Alternative 1, 2, and 3, respectively. If it is assumed that each additional personnel at the NAS Whidbey Island complex would bring his or her entire household and that each relocating household would require a housing unit, then between 335 and 628 additional housing units would be required under the three alternatives. These figures may slightly overestimate the total number of housing units required because some households may voluntarily refrain from moving to the area, and some Navy personnel may choose to share housing.

To further refine the analysis, Navy-wide demographic statistics, which showed that approximately 51.5 percent of all Navy personnel are married, were used to approximate the number of military personnel who would require family housing. Using these statistics, Alternatives 1, 2, and 3 would require, respectively, 173 family housing units, 323 family housing units, and 176 family housing units. In addition, 162 unaccompanied personnel housing units would be required under Alternative 1, 305 unaccompanied personnel housing units would be required under Alternative 2, and 165 unaccompanied personnel housing units would be required under Alternative 3.

In 2017, a housing study completed for the NAS Whidbey Island complex found that without including the effects of the Proposed Action, there would be a surplus of 54 acceptable family housing units in the housing market area by 2022 but a deficit of 914 unaccompanied personnel housing units (Leidos, Inc., 2017).

Implementation of Alternatives 1 or 3 would result in a moderate increase in the number of housing units needed by Navy personnel. The increase in Navy personnel stationed at the NAS Whidbey Island complex would likely increase the projected deficit of unaccompanied personnel housing units to 1,076 units under Alternative 1 and 1,079 units under Alternative 3. In addition, the projected surplus of family housing units would change to a deficit of 119 family housing units under Alternative 1 and a deficit of 122 family housing units under Alternative 3. Likewise, implementation of Alternative 2 would likely increase the projected deficit of unaccompanied personnel housing units at the complex to 1,219 units and change the existing surplus in family housing units to a deficit of 269 units.

The housing market study also estimated that there would be a total of 19,221 suitable rental units, with 359 of these units vacant and available for rent in 2022 without implementation of the Proposed Action (Leidos, Inc., 2017). Suitable units were those units that met the Navy's physical conditions and health and safety requirements. However, many of these units would not meet the Navy's size and/or affordability requirements. The Navy does not consider studio apartments or efficiency apartments adequate for either unaccompanied personnel or Navy families. Also, the Navy uses criteria for the number of bedrooms required based on rank and household size. Depending on the rank and household size of the personnel occupying a unit, some units may not meet Navy housing requirements. In addition, units that exceed the Navy's Maximum Allowable Housing Cost or that fall below the Navy's cost of a minimal acceptable housing unit also do not meet Navy housing requirements (Leidos, Inc., 2017).

On average, 48.3 percent of all officers, 56.1 percent of all E7 to E9 enlisted personnel, and 23.9 percent of all E4 to E6 personnel choose to purchase housing in the local community instead of rent their housing. All E1 to E3 enlisted personnel are required to reside on base (Leidos, Inc., 2017).

Based on these findings, under Alternatives 1 or 3, an adequate number of vacant, suitable rental housing units would be available in the region to accommodate the incoming military personnel. However, not all of these units would meet the Navy's size and affordability standards. Under Alternative 2, a sufficient number of vacant, suitable rental properties would not be available in the housing area. As a result, some Navy personnel would likely have to commute longer than one hour, reside with other Navy personnel, and/or live in housing that does not meet Navy suitability requirements. In addition, other Navy personnel may be unable to locate rental property that meets Navy size and affordability standards.

The influx of Navy personnel under Alternatives 1, 2, or 3 could have a significant impact on the regional housing market. As described in Section 3.10.3, the housing market in the region currently has low homeowner and rental vacancy rates, with a limited number of properties available for sale or rent. The increase in personnel stationed at the NAS Whidbey Island complex is expected to increase the regional demand for housing. This additional demand is expected to further limit the available properties for sale or rent in the region, likely leading to some increase in property prices and rental costs. In the longer run, it is anticipated that local developers will respond to the increased price and demand for housing by constructing more units, thereby slightly reducing the expected housing deficit.

However, given the existing deficit of affordable housing in Island and Skagit Counties, the influx of Navy personnel to the region would likely exacerbate affordable housing issues in the region. Any increase in regional housing prices would most likely result in more households spending more than 30 percent of their income on housing costs. The Navy further acknowledges that the increase in the cost of housing and the decrease in available properties may have a negative impact on low-income residents, who typically spend a larger proportion of their income on housing than the general population.

4.10.2.4 Property Values

Aircraft noise could negatively affect the value of property within the greater than 65 DNL noise contours. Economic studies have analyzed the impacts of noise on the sale price of properties and have discovered a correlation between noise and the sale price of properties.

The relationship between the price and noise is usually presented as the Noise Depreciation Index (NDI) or Noise Sensitivity Depreciation Index, both of which estimate the percent loss of value per dB (measured by the DNL metric). An early study by Nelson (1978) at three airports found an NDI of 1.8 to 2.3 percent per dB. Nelson also noted a decline in NDI over time, which he theorized could be due to either a change in population or the increase in commercial value of the property near airports. Crowley (1973) reached a similar conclusion. A larger study by Nelson (1980) looking at 18 airports found an NDI from 0.5 to 0.6 percent per dB.

In a review of property value studies, Newman and Beattie (1985) found a range of NDI from 0.2 to 2 percent per dB. They noted that many factors other than noise affected values.

Fidell et al. (1996) studied the influence of aircraft noise on actual sale prices of residential properties in the vicinity of a military base in Virginia and one in Arizona. They found no meaningful effect on home values. Their results may have been due to non-noise factors, especially given the wide differences in homes between the two study areas.

Recent studies of noise effects on property values have recognized the need to account for non-noise factors. J. P. Nelson (2004) analyzed data from 33 airports and discussed the need to account for those factors and the need for careful statistics. His analysis showed NDI from 0.3 to 1.5 percent per dB, with an average of about 0.65 percent per dB. Nelson (2007) and Andersson et al. (Andersson, Jonsson, and Ogren, 2013) discuss statistical modeling in more detail. Enough data are available to conclude that aircraft noise has a real effect on property values. This effect falls in the range of 0.2 to 2.0 percent per dB, with the average on the order of 0.5 percent per dB. The actual value varies from location to location and is very often small compared to that of non-noise factors. Real property values are dynamic and influenced by a combination of factors, including market conditions, neighborhood characteristics, and individual real property characteristics (e.g., the age of the property, its size, and amenities). The

degree to which a particular factor may affect property values is influenced by many other factors that fluctuate widely with time and market conditions.

Frankel (1988) found that economic impacts to noise-affected property owners differed depending on when their properties were purchased. In his study, Frankel divided property owners into three categories: those owners who purchased their property when the location was quiet and who were then subsequently exposed to aircraft noise; those owners who purchased their property after the airport and flight operations were established; and those owners who purchased their property after the airport and some flight operations were occurring but were then at a later date subjected to an increase in aircraft noise. As described in his study, property owners who purchased their property when the location was quiet are the most significantly impacted. The monetary impact to these property owners includes the entire decrease in the value of their property (Frankel, 1988).

In contrast, those owners who willingly purchased their property after the airport and flight operations were established would not be economically or monetarily injured. Since these individuals voluntarily purchased their properties after aircraft noise was already occurring, they would have received the property at a discounted price. Any discount in the sale price of the property would be, in essence, compensation for the nuisance costs attributable to aircraft noise. Because each property owner willingly entered into this real estate transaction, it can be assumed that these owners accepted the lower price as compensation for the aircraft noise (Frankel, 1988).

The third category of owners, those owners who purchased their property after flight operations were already occurring but later experienced an increase in aircraft noise, would experience some economic loss, but these losses would not be as large as those of the first group. Frankel found that this group would already have been compensated for the pre-existing noise level through the discounted property price. However, any loss in property value caused by the incremental increase in noise would be an economic loss to this category of owner (Frankel, 1988).

Based on the economic literature, the majority of property owners around the NAS Whidbey Island complex impacted by the Proposed Action would fall within this third category and would experience an economic loss associated with the incremental increase in noise. Only a small portion of original owners would experience the entire loss in property values associated with aircraft noise from the NAS Whidbey Island complex. New property owners who purchase their land/residences after implementation of the Proposed Action would not experience an economic or monetary loss.

4.10.2.5 Local Government Revenues

The increase of personnel at the NAS Whidbey Island complex would have a positive impact on the generation of tax revenues in Island and Skagit Counties and on the State of Washington as a whole under all three alternatives. Because the majority of the additional personnel currently do not reside in Washington or in Island or Skagit Counties, any taxes these individuals pay would represent a net increase in revenues for the state and local areas. Property tax and sales tax receipts would all increase as a direct result of the expanded regional economy.

Table 4.10-5 provides estimates of the increase in tax revenues resulting from changes in personnel loading at the NAS Whidbey Island complex for all three alternatives. Alternative 2, which is expected to have the largest impact in terms of tax generation, is expected to increase tax receipts in Island County by \$415,000 and Skagit County by \$181,000. These additional tax receipts under Alternative 2 would represent an estimated 1.5-percent increase in annual tax receipts in Island County and an estimated

0.3-percent increase in annual tax receipts in Skagit County when compared to the No Action Alternative.

Table 4.10-5 Estimated Increase in Tax Revenues Resulting from the Changes in EA-18G Growler Personnel Loading at the NAS Whidbey Island Complex Compared to the Affected Environment Levels

	<i>Change from Affected Environment</i>		
	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
Island County Impacts			
Number of Military Personnel and Dependents Expected to Reside in Island County	625	1,171	636
Per Capita Tax Contribution	\$354.66	\$354.66	\$354.66
Estimated Increase in Tax Revenues	\$222,000	\$415,000	\$226,000
Skagit County Impacts			
Number of Military Personnel and Dependents Expected to Reside in Skagit County	169	317	172
Per Capita Tax Contribution	\$570.50	\$570.50	\$570.50
Estimated Increase in Tax Revenues	\$96,000	\$181,000	\$98,000

Note:

¹ All population impacts are calculated for 2021, the time when all transition activities have been completed. The estimated per capita tax contribution is calculated using total Fiscal Year 2014 tax revenue figures described in Section 4.10.2.4 and total population estimates for Island and Skagit Counties from the U.S. Census Bureau’s 2014 American Community Survey (1-year estimates). The estimated increase in tax revenues was calculated by multiplying the number of military personnel and dependents by the per capita tax contribution.

4.10.3 Community Services Impacts, Alternatives 1 through 3

4.10.3.1 Education

The anticipated personnel changes at the NAS Whidbey Island complex under each of the proposed alternatives are expected to increase the number of school-aged children living in the area. Assuming that all additional military personnel and their families stationed at the NAS Whidbey Island complex relocate to the area, a net increase in the population of school-aged children would occur under all three proposed alternatives (see Table 4.10-6). Total military-connected children and total military school-aged children were calculated utilizing Navy and DoD-wide statistics on the average number of children per active duty personnel and statistics on the typical age distribution of children throughout the Navy (DoD, n.d.).

The enrollment gains attributable to military school-aged dependents are expected to be concentrated in schools with a history of high enrollment by students who are affiliated with the NAS Whidbey Island complex. If the geographical distribution of the relocating military families is similar to the geographical distribution of military families currently stationed at the NAS Whidbey Island complex, then the vast majority of these additional students would attend the schools in the Oak Harbor School District. Table 4.10-6 shows the distribution of school-aged children by district for each alternative.

Table 4.10-6 Projected Number of School-aged Children Relocating to the Region as a Result of Changes in EA-18G Growler Personnel Loading at NAS Whidbey Island Compared to the No Action Alternative Levels

	<i>Change from No Action Alternative</i>		
	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
Military Personnel	335	628	341
Total Military-connected Children (ages 0 to 22 residing with Navy personnel)	287	538	292
Total Military School-aged Children (ages 5 to 18)	173	324	176
Oak Harbor School District	121	226	123
Coupeville School District	8	15	8
Anacortes School District	21	39	21
All Other Districts	23	43	24

Source: DoD, n.d.

Note: Due to rounding, totals may not sum.

In addition, given the demographic characteristics of Navy personnel, the majority of these school-aged children would be elementary-school-aged. According Navy-wide statistics, elementary-school-aged dependents account for approximately 62.8 percent of all Navy school children. Middle-school- and high-school-aged students are less common and account each for only 18.6 percent of all Navy school children (DoD, n.d.).

The increase in “federally connected students” attending local district schools would result in a corresponding increase in federal impact aid received by the district. However, federal impact aid typically does not cover the full per-pupil costs experienced by the district and has been declining over time.

Given the relatively few additional students expected to attend the Coupeville School District or the Anacortes School District, only minor impacts are expected to occur to these districts. However, given the serious overcrowding issues already facing the Oak Harbor School District, the potential increase of between 121 and 226 additional students would further exacerbate the overcrowding problem and have a significant adverse impact on the district. Table 4.10-7 shows the expected enrollment gains at Oak Harbor School District by type of school and by alternative. Under the alternative with the maximum impact (Alternative 2), an additional 226 students could relocate to the district, including 143 elementary students (grades Kindergarten through 5); 42 middle school students (grades 6 through 8); and 41 high school students (grades 9 through 12). The majority of the additional students would be elementary-school-aged, further skewing the district’s enrollment in favor of the younger grades. Additional schools would need to be built, additional portable classrooms would have to be purchased, and/or additional reconfiguring of the district’s schools would have to occur to accommodate these students. Additional staff would also be required to handle the increase in enrollment. Because state aid and federal impact aid has been at a static or declining per-pupil level, additional local funding sources would likely be required to finance the additional expenditures, if present programing is to be maintained.

Table 4.10-7 Projected Number of School-aged Children Enrolling in the Oak Harbor School District as Result of Changes in EA-18G Growler Personnel Loading at NAS Whidbey Island Compared to the No Action Alternatives Levels

	<i>Change from No Action Alternative</i>		
	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>
Total Change in Enrollment	121	226	123
Elementary School (K-5 th)	76	143	78
Middle School (6 th -8 th)	23	42	23
High School (9 th -12 th)	22	41	22

Source: DoD, n.d.

Note: Due to rounding, totals may not sum.

4.10.3.2 Medical Services

The proposed relocation of Growler squadrons under all three alternatives is not anticipated to negatively impact the provision of medical services at either the NAS Whidbey Island complex or in the region as a whole.

Implementation of Alternative 1, 2, or 3 is expected to have only a minimal impact on the Naval Hospital Oak Harbor. Some additional demand for services from Naval Hospital Oak Harbor would occur under each alternative as active duty personnel and their dependents would be eligible for treatment at the facility. Some additional hiring and billet changes may be required to meet the expected influx of additional patients; however, this increase is not expected to be substantial. All active duty personnel would be covered by additional squadron assets such as unit flight surgeons and would, therefore, not place an additional patient load on existing personnel at Naval Hospital Oak Harbor. In addition, a facilities modernization program began in 2017 and is ongoing to improve flow and access to care throughout the hospital (Rose, 2018).

Given the large coverage area served by the regional medical facilities and the relative infrequency with which these facilities are typically utilized by an individual, the minor increase in the populations served associated with the alternatives would have only a negligible impact on the provision of these services. Existing medical facilities in the local community are anticipated to be adequate to serve the relocating military personnel and their dependents regardless of the alternative selected.

4.10.3.3 Fire and Emergency Services

No impacts are expected to occur to the Navy Region Northwest Fire and Emergency Services department at NAS Whidbey Island as a result of implementation of any of the three alternatives. With the addition of the Growlers to the NAS Whidbey Island complex, Ault Field would remain a Type 2 airfield; therefore, staff, facilities, and apparatus needs are expected to remain unchanged. No impacts to response time are anticipated as a result of the additional growth and new construction (Merrill, 2016).

The increase in population in the City of Oak Harbor or the Town of Coupeville is expected to have only a minimal impact on the provision of fire and emergency services in the communities under any of the three alternatives. In 2016, the Oak Harbor Fire Department responded to 62 calls for assistance due to fires and 536 calls for assistance due to emergency medical service (EMS)/rescue incidents, while serving a city population of an estimated 22,693 residents (City of Oak Harbor Fire Department, 2017). This

equates to answering approximately three fire calls for every 1,000 residents and 24 EMS/rescue calls per 1,000 residents per year.

Implementation of Alternative 2, the alternative with the maximum population impacts, is anticipated to increase total population in the City of Oak Harbor by 1,040 residents and the Town of Coupeville by 69 residents. Assuming that these ratios of incidents to population remain constant and apply to both the City of Oak Harbor and the Town of Coupeville, implementation of Alternative 2 could potentially result in an additional three fire calls and 25 EMS/rescue calls per year for the Oak Harbor Fire Department and no fire calls and only two additional EMS/rescue call per year in the Town of Coupeville.

While the additional population under any of these alternatives would increase the demand for fire and emergency services, this increase is not expected to be substantial. Additional tax revenues that would be paid by the relocating households and the additional tax revenues that would be generated by the increased economic activity associated with the construction and operations on station could be used to offset any additional increased expenditures associated with the additional demand for fire and emergency services.

4.10.3.4 Police Protection

The relocation of Growler aircraft squadrons and associated personnel positions to the NAS Whidbey Island complex is not anticipated to significantly impact Oak Harbor's or Coupeville's ability to provide adequate police protection to its residents under any of the three alternatives. The City of Oak Harbor currently has approximately 1.7 police officers per 1,000 residents. Even under the alternative with the maximum population impact (Alternative 2), this ratio is expected to change to approximately 1.6 police officers per 1,000 residents as a result of the projected influx of residents associated with the proposed relocation. The Town of Coupeville currently has approximately 1.0 police officers per 1,000 residents. Under Alternative 2 (the maximum population impact), this ratio would decline slightly to 0.9 police officers per 1,000.

However, if a portion of the additional tax revenues that would be paid by the relocating households and the additional tax revenues that would be generated by the increased economic activity associated with the construction and operations on station were used to hire more police officers and offset any additional increased expenditures needed, a similar level of police protection could continue to be provided.

4.10.4 Socioeconomics Conclusion, Alternatives 1 through 3

The Proposed Action would have negligible to minor to moderate impacts on the local and regional population and local government revenues. The alternatives would have a moderate short-term positive impact and a minor positive long-term impact on the local and regional economy. Employment and earnings would increase under all three alternatives. However, some negative economic impacts may occur to specific industries, such as tourism. Alternatives 1 through 3 could potentially reduce attendance levels at certain tourist destinations from reaching the levels that would have occurred without the Proposed Action; however, the effect of the Proposed Action on the tourism industry as a whole is not expected to be substantial. Alternatives 1 through 3 are not expected to eliminate a large number of visitors from the region. Additionally, visitor days and visitor expenditures are not expected to be reduced such that the tourism industries in Island, Skagit, or San Juan Counties would decline significantly. No significant impact is expected to occur to the agricultural industry as a result of the proposed alternatives.

The influx of Navy personnel under Alternatives 1, 2, or 3 could have a significant impact on the regional housing market, particularly affecting housing availability and affordability. In addition, aircraft noise could negatively affect the value of property within the greater than 65 DNL noise contours. The provision of medical services and fire and rescue services and police protection are not expected to be significantly impacted. The Oak Harbor School District would receive a significant adverse impact under the proposed alternatives, with the majority of the school-aged military dependents expected to attend schools in that district. Elementary schools in the Oak Harbor School District would experience the greatest impact under all three alternatives. The Navy's Fleet and Family Support Program would be the first stop for Navy personnel and their dependents needing access to other social and financial support services, and it is expected the Proposed Action would have a negligible to minor impact on other social services within the community. Impacts on socioeconomic resources are dependent on the number of personnel and amount of construction and not on the number and/or location of aircraft operations; therefore, there would be no difference in impacts between scenarios or between average year and high-tempo FCLP year conditions.

4.11 Environmental Justice

This section identifies the existence of environmental justice communities (i.e., minority or low-income populations) impacted by the Proposed Action and determines whether impacts on these communities are disproportionately high and adverse. This section is organized as follows: Section 4.11, general methodology and identifying environmental justice communities in affected census block groups; Section 4.11.1, identifying environmental justice communities and identifying disproportionately high and adverse impacts under the No Action Alternative with respect to communities living under conceptual and existing APZs, communities living under the noise contours, and community access to public education, specifically in Oak Harbor; Section 4.11.2, identifying environmental justice communities and identifying potential disproportionately high and adverse impacts under Alternatives 1 through 3 with respect to communities living under conceptual and existing APZs, communities living under the noise contours, community access to public education, specifically in Oak Harbor, and housing affordability.

Environmental Justice

The Navy has determined there will be no disproportionately high and adverse human health or environmental effects from the Proposed Action or any alternatives on minority or low-income populations from noise, Clear Zones/APZs, and school overcrowding. However, impacts on housing availability and housing affordability could disproportionately impact low-income communities.

4.11.1 Methodology

This analysis focuses on the potential for a disproportionate and adverse exposure of specific off-station population groups to the projected adverse consequences discussed in the previous sections of this chapter. As described in previous sections, noise impacts are expected to be the primary negative environmental and human health impact associated with the Proposed Action. Other adverse human health and environmental consequences of the Proposed Action include an increased safety risk associated with the additional aircraft operations and new APZs located around OLF Coupeville and the potential negative impacts to the pupils at the Oak Harbor School District caused by the projected influx of additional students to the district.

Due to the importance of the potential noise impacts, the study area for the environmental justice analysis has been defined as the census block groups that either fully or partially fall beneath the modeled dB DNL contours for each scenario under each alternative. This study area also encompasses all areas under the conceptual and existing APZs at Ault Field and OLF Coupeville. Additionally, the majority of the Oak Harbor School District falls within the greater than 65 dB DNL noise contours.

4.11.1.1 Methodology for Identifying Environmental Justice Communities

In order to assess the impacts to minority and low-income communities, the Navy first identified whether there are any areas of minority and low-income populations that may experience disproportionately high and adverse impacts from the Proposed Action. These environmental justice communities were determined by analyzing the demographic and economic characteristics of the affected area and comparing those to the characteristics of the larger community as a whole. This larger community is known as the community of comparison.

Environmental justice communities were identified by comparing population characteristics from all the census block groups with the community of comparison—in this case, the county within which the census block groups are located. For the purposes of this analysis, minority populations of concern (environmental justice communities) were identified where the minority population of the affected area is “meaningfully greater” than the minority population percentage in the general population or other comparison group. “Meaningfully greater” was defined as where the minority population percentage within a census block group is 15 percent or more than the community of comparison (county percentage of minorities). Low-income environmental justice communities were defined as census block groups where the percentage of the population considered to be low income is greater than the percentage of the general population with low incomes in the community of comparison.

The dB DNL noise contours extend into Jefferson and San Juan Counties; however, no permanent residences are located within these dB DNL contours; therefore, these counties have been excluded from this analysis. In addition, any census block groups that exist solely over water are excluded from this analysis.

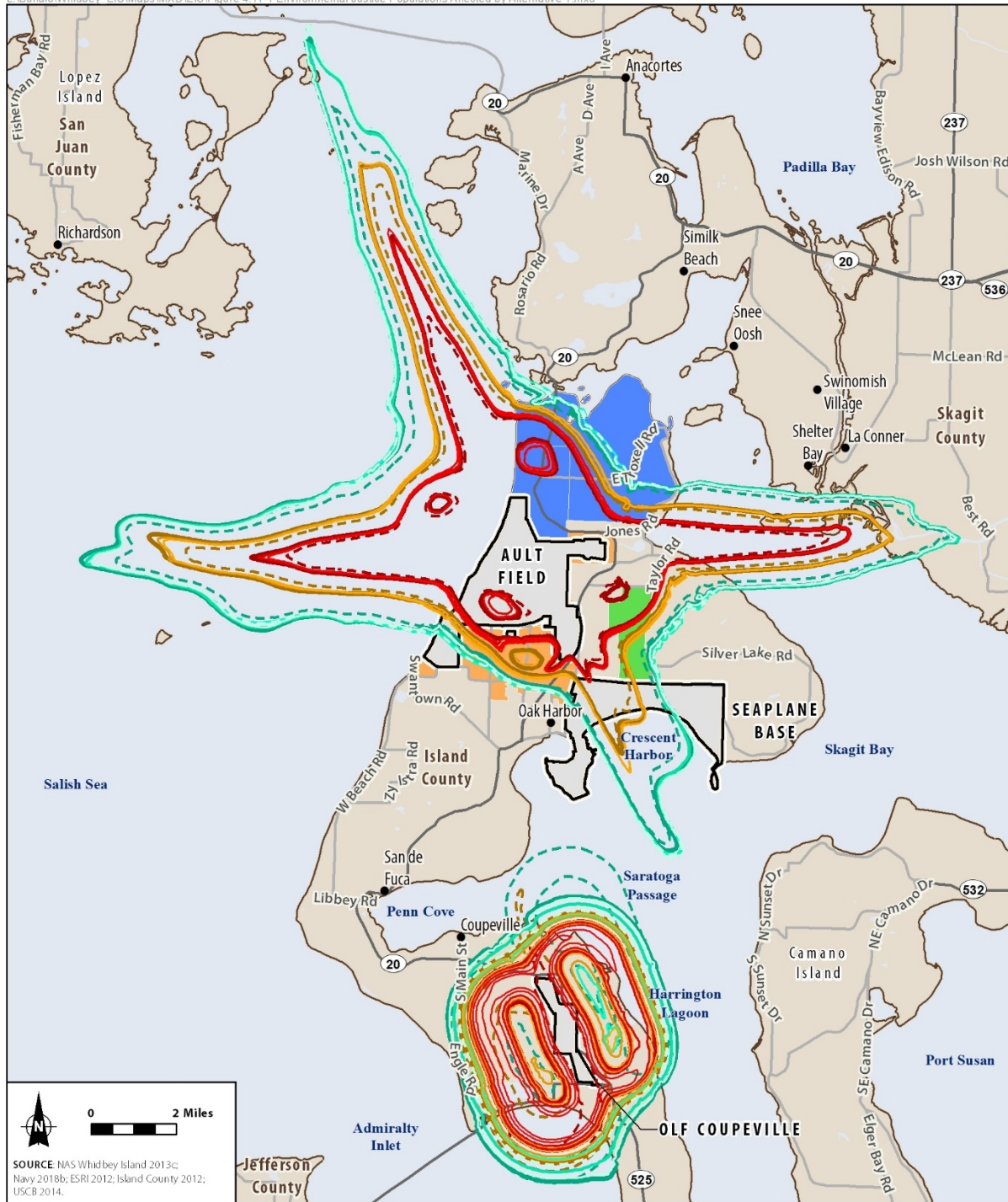
To simplify the analysis, demographic and economic statistics for Island County were used as the community of comparison for all areas within the greater than 65 dB DNL contours, including those areas that fell within Skagit County, because approximately 99.7 percent of all residents impacted by the greater than 65 dB DNL contours reside in Island County, while no more than 0.3 percent of these residents (or 41 persons) reside in Skagit County. Additionally, Island County has a smaller percentage of minority and low-income residents than Skagit County, making the analysis more conservative by utilizing Island County data.

Table 4.11-1 provides demographic and economic data for all of the census block groups either wholly or partially impacted by the greater than 65 dB DNL noise contours under any of the alternatives or scenarios. Figures 4.11-1 through 4.11-3 show the location of the census block groups that are considered environmental justice communities under the alternatives. To further refine the analysis and to estimate the actual number of minority and low-income residents affected by each of the dB DNL contours, the dB DNL contours were overlaid onto mapped U.S. Census Bureau 2010 population and demographic data to calculate the total affected area within each census block. See Figure 3.11-1 for the location of the census tracts and census block groups affected by the No Action Alternative. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period, thereby calculating the total affected population for each alternative and scenario, including the No Action Alternative (Washington State Office of Financial Management, 2017).

Demographic characteristics of the corresponding census block groups were then compared to the total affected population number to estimate the total minority and low-income populations impacted by each dB DNL contour for each alternative and scenario. These calculations assume an even distribution of the population across the census block and census block groups, and they exclude populations on military properties within the dB DNL contours.

Cells in Table 4.11-1 (and in subsequent tables throughout this section) that are shaded grey identify census blocks where an environmental justice community exists based on thresholds defined in Section 3.11. Appendix F provides data on potential environmental justice issues under the high-tempo FCLP year conditions.

L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.11-1 Environmental Justice Populations Affected by Alternative 1.mxd

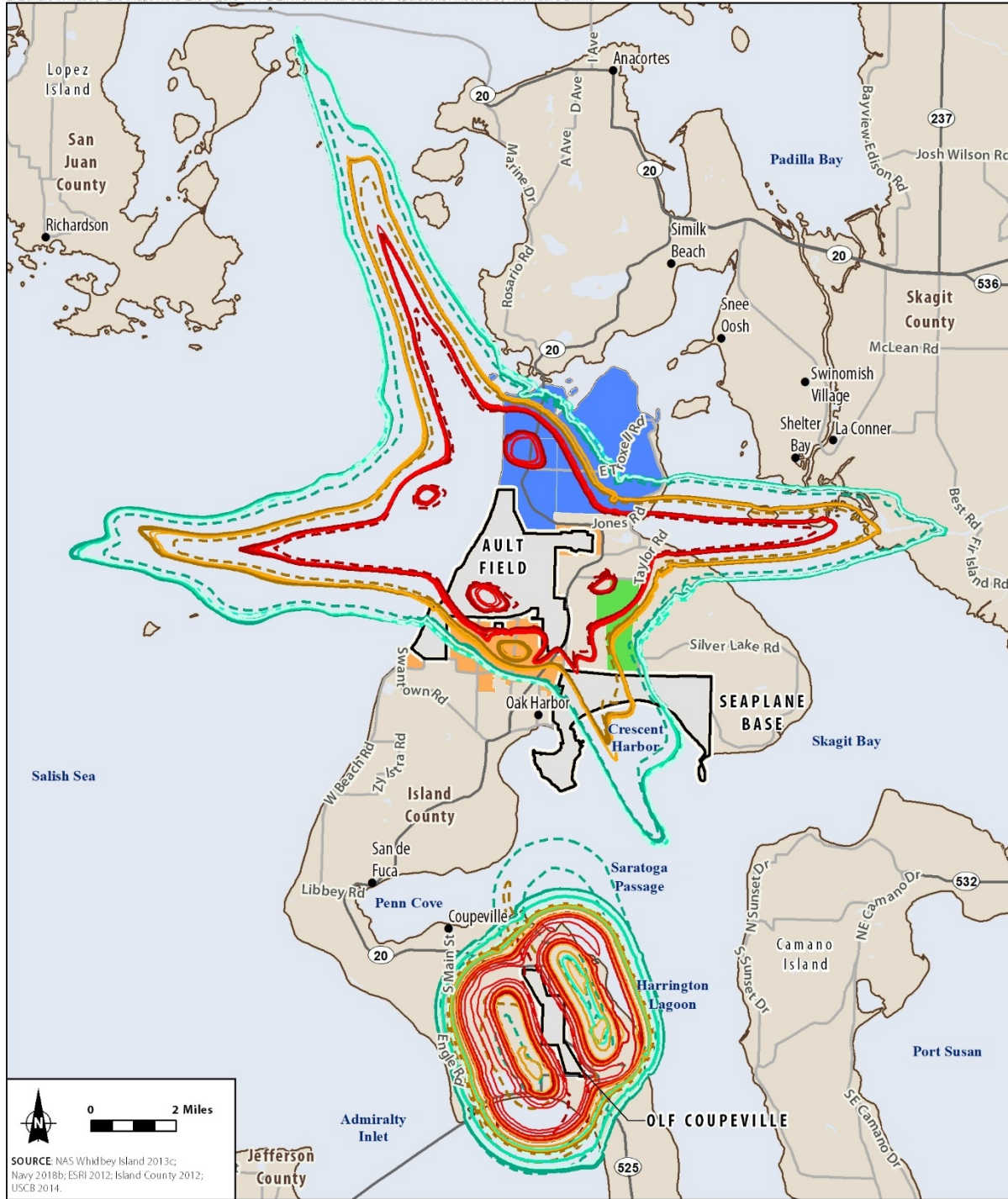


SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2012; Island County 2012; USCB 2014.

<ul style="list-style-type: none"> ● City — County Boundary — U.S. and State Highway — Major Road ■ Installation Area 	No Action (Average) DNL Noise Contour (dB) --- 65 --- 70 --- 75	Alternative 1A (Average) DNL Noise Contour (dB) --- 65 --- 70 --- 75	Alternative 1B (Average) DNL Noise Contour (dB) --- 65 --- 70 --- 75	Alternative 1C (Average) DNL Noise Contour (dB) --- 65 --- 70 --- 75	Alternative 1D (Average) DNL Noise Contour (dB) --- 65 --- 70 --- 75	Alternative 1E (Average) DNL Noise Contour (dB) --- 65 --- 70 --- 75	<ul style="list-style-type: none"> ■ Minority and Low-Income Census Tract/Block Boundary ■ Minority Only Census Tract/Block Boundary ■ Low-Income Only Census Tract/Block Boundary
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Figure 4.11-1
Environmental Justice Populations
Affected by Alternative 1
NAS Whidbey Island Complex
 Whidbey Island, Island County, WA

L:\Buffalo\Whidbey_EIS\Maps\MXD\EIS\Figure 4.11-2 Environmental Justice Populations Affected by Alternative 2.mxd



SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2012; Island County 2012; USCB 2014.

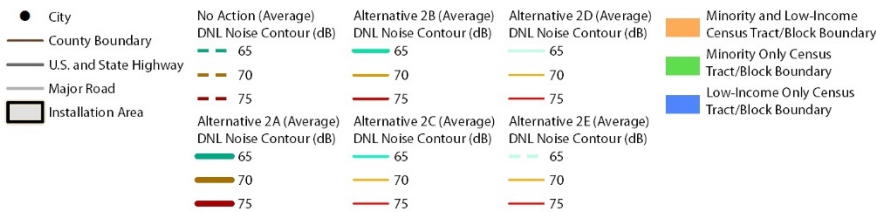
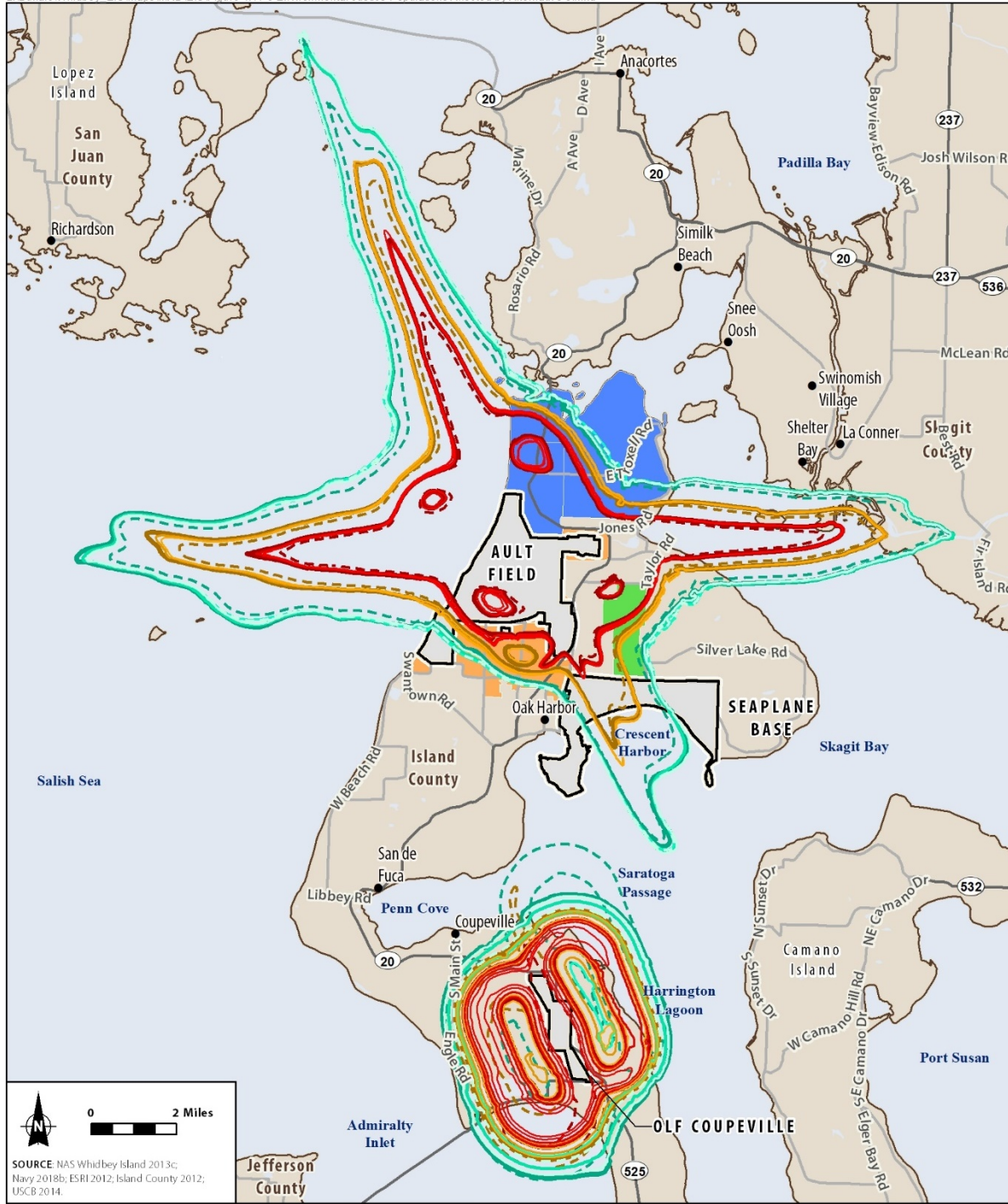


Figure 4.11-2
Environmental Justice Populations
Affected by Alternative 2
NAS Whidbey Island Complex
 Whidbey Island, Island County, WA

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0 2 Miles

SOURCE: NAS Whidbey Island 2013c; Navy 2018b; ESRI 2012; Island County 2012; USCSB 2014.

● City	No Action (Average) DNL Noise Contour (dB)	Alternative 3B (Average) DNL Noise Contour (dB)	Alternative 3D (Average) DNL Noise Contour (dB)	Minority and Low-Income Census Tract/Block Boundary
— County Boundary	65	65	65	Minority Only Census Tract/Block Boundary
— U.S. and State Highway	70	70	70	Low-Income Only Census Tract/Block Boundary
— Major Road	75	75	75	
■ Installation Area	Alternative 3A (Average) DNL Noise Contour (dB)	Alternative 3C (Average) DNL Noise Contour (dB)	Alternative 3E (Average) DNL Noise Contour (dB)	
	65	65	65	
	70	70	70	
	75	75	75	

Figure 4.11-3
Environmental Justice Populations
Affected by Alternative 3
NAS Whidbey Island Complex
 Whidbey Island, Island County, WA

Table 4.11-1 Minority and Low-Income Populations in Census Block Groups Underlying Ault Field and OLF Coupeville dB DNL Contours,* either Wholly or Partially Impacted by the Greater than 65 dB DNL Noise Contour by Any Alternatives or Scenarios, Average Year

<i>Census Block Group</i>	<i>Percent Population Total Minority²</i>	<i>Percent Population below Poverty Level³</i>
<i>Island County – Community of Comparison</i>	16.9%	8.0%
Block Group 1, Census Tract 9701	18.7%	14.1%**
Block Group 2, Census Tract 9701	13.6%	14.1%
Block Group 1, Census Tract 9702	35.2%	23.4%
Block Group 1, Census Tract 9703	24.3%	4.4%
Block Group 2, Census Tract 9703	15.7%	4.4%
Block Group 3, Census Tract 9703	13.5%	4.4%
Block Group 4, Census Tract 9703	11.6%	4.4%
Block Group 1, Census Tract 9704	39.3%	8.6%
Block Group 2, Census Tract 9704	31.9%	8.6%
Block Group 1, Census Tract 9706.01	41.3%	11.2%
Block Group 2, Census Tract 9706.01	30.8%	11.2%
Block Group 1, Census Tract 9708	25.9%	8.7%
Block Group 1, Census Tract 9710	12.7%	6.3%
Block Group 1, Census Tract 9711	14.7%	2.9%
Block Group 2, Census Tract 9711	7.5%	2.9%
Block Group 3, Census Tract 9713	5.9%	6.8%
<i>Skagit County – Community of Comparison</i>	23.3%	11.7%
Block Group 1, Census Tract 9403	7.4%	6.2%
Block Group 1, Census Tract 9408	31.7%	18.2%
Block Group 2, Census Tract 9521	13.2%	9.1%
Block Group 3, Census Tract 9527	12.9%	7.3%

Table 4.11-1 Minority and Low-Income Populations in Census Block Groups Underlying Ault Field and OLF Coupeville dB DNL Contours,* either Wholly or Partially Impacted by the Greater than 65 dB DNL Noise Contour by Any Alternatives or Scenarios, Average Year

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Total population for each affected census block group is the total 2010 population for the entire census block group as reported by the U.S. Census Bureau. These numbers may be greater than the total number of residents affected by the dB DNL contours because in many instances only a portion of the census block group falls under the dB DNL contours.
- ² Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ³ The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** Shaded cells identify census block groups with a “meaningfully greater” percentage of a minority population than the community of comparison (i.e., the county within which the census block group is located) or the percentage of the population considered to be low income in the census block is greater than the percentage considered low income in the community of comparison. For this analysis, “meaningfully greater” is defined as demographic or economic statistics that differ by more than 15 percent from those of the community of comparison. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$

Tables 4.11-2 and 4.11-4 through 4.11-12 (see Section 4.11.2) present estimates of the affected minority and low-income populations under each dB DNL contour for each alternative and scenario, for the average year.

Demographic data from the U.S. Census Bureau's 2010 Census of Population and Housing were used throughout this analysis. This data source is the most current available that provides demographic detail to the block level. Some changes in the geographical distribution of environmental justice communities may occur between 2010 and the 2021; however, at this point, it is impossible to forecast these changes. Therefore, this analysis assumes that there would be no change in the geographical distribution of environmental justice communities between 2010 and 2021.

In an effort to analyze the environmental justice impacts on agricultural workers who worked but did not reside within the 65 dB DNL contours, *2012 Census of Agriculture* data on migrant farm workers were utilized to assess this potentially affected population. As described in Section 3.10.2.2 (Economy, Employment, and Income—Other Industries), only a very small number of migrant agricultural workers were reported employed in all of Island or Skagit counties. According to the survey, in 2012 only seven migrant workers were employed on three farms in all of Island County. Similarly, in 2012 only two farms in all of Skagit County reported employing any migrant workers. The total number of migrant workers in Skagit County was not disclosed due to confidentiality rules (USDA, National Agricultural Statistics Service, 2014). Given the very small number of migrant workers potentially affected by the Proposed Action, no detailed environmental justice analysis was completed on the issue.

4.11.2 Environmental Justice, No Action Alternative

Under the No Action Alternative, no change in the aircraft or personnel loadings at the NAS Whidbey Island complex would occur compared to current conditions. Therefore, no additional environmental or human health impacts would be associated with the implementation of the No Action Alternative. Table 4.11-2 shows the demographic and economic characteristics of the population that currently resides under the greater than 65 dB DNL contours for Ault Field and OLF Coupeville. Total population estimates have been revised to reflect an expected 7.1-percent increase in total population in Island County between 2010 and 2020.

Table 4.11-2 Environmental Justice Populations at NAS Whidbey Island Complex under the No Action Alternative, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low Income Population²</i>	<i>Percent Low-Income</i>
Community of Comparison (Island County)			16.9%		8.0%
65-70 dB DNL	4,140	1,020	24.6%***	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population^{3***}	11,171	2,467	22.1%	870	7.8%

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level. Consequently, block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections for Island County during that period (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

4.11.2.1 Identifying Environmental Justice Communities Analysis under the No Action Alternative

Table 4.11-2 presents estimates of the affected minority and low-income populations within each dB DNL contour under the No Action Alternative. The shaded cells indicate where percentages of minority populations are “meaningfully greater” than those in the community of comparison, which is the percentage of minority populations in Island county, and where the low-income population is greater than the percentage of residents with low incomes in the community of comparison. These calculations allow the Navy to determine the minority and/or low-income populations impacted by each alternative and scenario.

4.11.2.2 Identifying Disproportionately High and Adverse Impacts under the No Action Alternative Methodology

Once the presence or absence of environmental justice communities was determined, the Navy then assessed the impacts from the Proposed Action and determined whether these impacts would have a disproportionately high and adverse effect on these populations. This analysis involved comparing the impacts on the identified environmental justice communities to the general population within the affected environment (e.g., within the noise contours). In determining whether potential disproportionately high and adverse impacts exist, the Navy also considered the significance of the impacts under NEPA.

The Council on Environmental Quality (CEQ) guidance on environmental justice analysis requires that any disproportionately high and adverse human health or environmental effects on minority and low-income populations be identified and analyzed. A disproportionate effect is defined as an adverse effect that either is predominately borne by a minority population and/or low-income population or is an effect that will be suffered by the minority and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or low-income population.

As informed by CEQ’s *Environmental Justice Guidance Under the National Environmental Policy Act* (December 1997) and based on recommendations from the report of the Federal Interagency Working Group on Environmental Justice and NEPA Committee, *Promising Practices for EJ Methodologies in NEPA Reviews* (USEPA, 2016h), disproportionately high and adverse impacts are typically determined based on the impacts in one or more resource topics analyzed in NEPA documents. Any identified impact to human health or the environment (e.g., impacts on noise, biota, air quality, traffic/congestion, or land use) that potentially affects minority populations and low-income populations in the affected environment might result in disproportionately high and adverse impacts.

According to the CEQ guidance mentioned above (December 1997), when determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

1. whether there is, or will be, an impact on the natural or physical environment that significantly and adversely affects a minority or low-income population
2. whether environmental effects are significant (as defined by NEPA) and are, or may be, having an adverse impact on minority or low-income populations that appreciably exceeds or is likely to exceed those on the general population or other appropriate comparison group

3. whether the environmental effects occur, or would occur, in a minority or low-income population affected by cumulative or multiple adverse exposures from environmental hazards

Similar factors are considered in determining whether there are disproportionately high and adverse human health effects, including significance of measured health effects, in risk and rates, of hazard exposure and whether this hazard exposure exceeds the risk or rate of exposure to the general population or appropriate comparison groups.

The report from the Federal Interagency Working Group on Environmental Justice and NEPA (USEPA, 2016h) also provides recommendations for determining whether the impacts to minority or low-income populations may be disproportionately high and adverse. The Federal Interagency Working Group on Environmental Justice suggests that agencies should consider the following factors:

1. The significance of any direct, indirect, or cumulative impacts to minority and low-income populations in the affected environment for each alternative carried forward for detailed analysis in the NEPA document (as employed by NEPA). Agencies' approaches should not determine that a Proposed Action or alternative would not have a disproportionately high and adverse impact on minority and low-income populations solely because the potential impacts of the Proposed Action or alternative on the general population would be less than significant (as defined by NEPA).
2. The distribution of beneficial and adverse impacts between minority and low-income populations and the general population in the affected environment, as well as how adverse impacts are mitigated.

After considering all appropriate mitigation measures, balance any remaining adverse impacts with beneficial impacts of the project to the community, as appropriate. If an adverse impact to minority and low-income populations remains after accounting for all appropriate mitigation measures and related project benefits, continue to consider whether the remaining adverse impact(s) is/are disproportionately high and adverse. In determining the balance between beneficial and adverse impacts, the beneficial impacts and mitigation should be related to the type and location of the adverse impact. Agencies should not balance adverse impacts that directly affect human health at levels of concern, especially those that exceed health criteria, with project benefits.

Situations in which minority and low-income populations receive an uneven distribution of benefits in the presence of adverse impacts (e.g., a smaller proportion of beneficial impacts accrue to minority and low-income populations than to the general population) could indicate a potential disproportionately high and adverse impact.

3. Comparing direct, indirect, and cumulative adverse impacts to minority and low-income populations in the affected environment within the geographic unit of analysis to an appropriate comparison group.

Identify a relevant and appropriate comparison group when evaluating the impact of the proposed federal action on minority and low-income populations. The comparison group provides context for the analysis of human health effects, environmental effects, and the risk or rate of hazard exposure to minority and low-income populations in the affected environment. This comparison group is distinct from the reference community, which was used to identify the existence of minority and low-income populations.

In the disproportionately high and adverse impact analysis, agencies compare impacts to minority and low-income populations *in the affected environment* with an appropriate comparison group *within the affected environment*. Relevant and appropriate comparison groups are selected based on the nature and scope of the proposed project.

4. The degree to which any of the following seven factors could amplify identified impacts. Factors that can potentially amplify an impact to minority and low-income populations in the affected environment include, but are not limited to, the following:
 - a. proximity and exposure to chemical and other adverse stressors, e.g., impacts commonly experienced by fenceline communities
 - b. vulnerable populations, e.g., minority and low-income children, pregnant women, elderly, or groups with high asthma rates
 - c. unique exposure pathways, e.g., subsistence fishing, hunting, or gathering in minority and low-income populations
 - d. multiple or cumulative impacts, e.g., exposure to several sources of pollution or pollutants from single or multiple sources
 - e. ability to participate in the decision-making process, e.g., lack of education or language barriers in minority and low-income populations
 - f. physical infrastructure, e.g., inadequate housing, roads, or water supplies in communities
 - g. non-chemical stressors, e.g., chronic stress related to environmental or socioeconomic impacts

The identification of a disproportionately high and adverse impact on minority and low-income populations does not preclude a proposed agency action from going forward and does not necessarily compel a conclusion that a Proposed Action is environmentally unsatisfactory. If an agency determines there is a disproportionately high and adverse impact to minority and low-income populations, that agency may wish to consider heightening its focus on meaningful public engagement regarding community preferences, considering an appropriate range of alternatives (including alternative sites), and mitigation and monitoring measures.

In certain instances where an impact from the Proposed Action initially appears to be identical to both the affected general population and the affected minority and low-income populations, there may be inter-related ecological, aesthetic, historic, cultural, economic, social, or health factors that amplify the impact (e.g., unique exposure pathways, social determinants of health, or community cohesion). After consideration of factors that can amplify an impact to minority and low-income populations in the affected environment, an agency may determine the impact to be disproportionately high and adverse.

4.11.2.3 Analysis for Identifying Disproportionately High and Adverse Impacts under the No Action Alternative

As described throughout this EIS, aircraft noise impacts are expected to be the primary adverse environmental impact associated with the Proposed Action. Other impacts described in this EIS that have the potential to be disproportionately high and adverse on environmental justice communities include potential safety risks from a concentration of environmental justice populations within APZs and concentration of overcrowding in schools within the Oak Harbor School District. As discussed under *Methodology* above, this section compares the potential impacts on the environmental justice

populations within the affected area to the general population within the affected area and makes a determination of whether or not these impacts are disproportionately high and adverse upon the previously identified environmental justice communities.

4.11.2.3.1 Aircraft Noise

Populations living under the No Action Alternative dB DNL noise contours experience a significant amount of noise. In order to assess whether the impacts on the population within the noise contours are disproportionately high and adverse on identified environmental justice communities, the Navy compared the potential impacts on the affected general population (the total population within the different dB DNL noise contours for each alternative/scenario) to the identified environmental justice populations in the affected area (within the dB DNL noise contours for the No Action Alternative).

Based on the data shown in Tables 4.11-2, the comparison of the impacts to the identified environmental justice communities (shaded cells in the tables) within the affected environment to the impacts on the general population (the non-environmental justice communities) within the affected environment indicates that the identified environmental justice communities are not experiencing disproportionately high and adverse impacts. Even though the noise impacts to the entire community may be significant, it does not appear that these adverse impacts appreciably exceed or are likely to exceed those experienced by the total affected population. Therefore, the Navy has determined there will be no disproportionately high and adverse human health or environmental effects from the No Action Alternative on minority or low-income populations.

Additionally, there are no known cumulative or multiple adverse exposures from environmental hazards on minority or low-income environmental justice communities identified in the tables above. Finally, there do not appear to be any of the seven factors identified above under Section 4.11.1.2, Methodology, that could amplify identified impacts on minority or low-income communities. Therefore, the Navy has determined there will be no disproportionately high or adverse human health or environmental effects from the No Action alternative on minority populations or low-income populations.

4.11.2.3.2 Potential Increased Risk of Aircraft Mishaps in Clear Zones/Accident Potential Zones

Under the No Action Alternative, there would not be an increase in the risk of a mishap because there would be no additional Growler flight operations over existing conditions. APZs are created based on projected operations for approach, departure, and flight tracks for a runway. APZs are based on historical accident and operations data throughout the military and the specific areas that would be impacted (which have been determined to be potential impact areas) if an accident were to occur.

There are existing APZs at Ault Field and Clear Zones at OLF Coupeville (see Section 3.3, Public Health and Safety, and Figure 3.3-2 for 2005 AICUZ Clear Zones and APZs at Ault Field and Figure 3.3-3 for 2005 AICUZ Clear Zones at OLF Coupeville).

An existing, potential environmental justice issue could be raised if environmental justice communities were concentrated in higher-risk areas and subjected to disproportionate adverse impacts, such as being located within APZs. Using the same methodology employed for identifying environmental justice communities within the noise contours, the Navy estimated the number of minority and low-income residents located within the APZs at Ault Field and OLF Coupeville.

All APZs identified in Section 3.3 (2005 AICUZ APZs at Ault Field and 2005 AICUZ Clear Zones at OLF Coupeville) were overlaid onto mapped U.S. Census Bureau 2010 population and demographic data to calculate the total affected area within each census block. The percent area of the census block covered by the Clear Zones/APZs was applied to the population of that census block to estimate the population within the Clear Zone/APZ boundary. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period, thereby calculating the total affected population for each alternative and scenario, including the No Action Alternative (Washington State Office of Financial Management, 2017).

Demographic characteristics of the corresponding census block groups were then applied to this total affected population number to estimate the total minority and low-income populations impacted by each Clear Zone/APZ. These calculations assume an even distribution of the population across the census block groups, and they exclude populations on military properties within the Clear Zones/APZs. Table 4.11-3 presents estimates of the affected minority and low-income populations under each existing Clear Zone/APZ.

The Navy has determined there are environmental justice communities living within the 2005 AICUZ APZs at Ault Field (see Table 4.11-3). Under the No Action Alternative, there would be no increase in the number of operations at Ault Field and, therefore, no increase in risk for mishap, as well as no impact on the land use of any population living within the boundaries of the APZs. In addition, the Navy has determined there are no environmental justice communities living within the 2005 Clear Zones at OLF Coupeville (see Table 4.11-3).

Potential aircraft mishaps are the primary safety concern with regard to military training flights. NAS Whidbey Island maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to mishaps, whether on or off the installation. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoDI 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*) (DoD, 2011).

Table 4.11-3 Environmental Justice Populations at NAS Whidbey Island Complex under Clear Zones/APZs for Ault Field and OLF Coupeville

<i>APZ</i>	<i>Total Affected Population*</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Ault Field Existing APZs	1,860	523	28.1%**	230	12.4%
OLF Coupeville Clear Zones	96	9	9.4%	3	3.1%
Island County			16.9%		8.0%

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

¹ Minority is defined as individual(s) who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the Census Tract level, and Block Groups within the same Census Tract will report the same value.

* All population estimates for areas within the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

** The shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. For this analysis, “meaningfully greater” is defined as demographic statistics that differ by more than 15 percent from those of the community of comparison. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$

This EIS has determined there would not be an increase of risk under the No Action Alternative because there would not be any increase in aircraft operations. In addition, no schools or churches are within the existing Clear Zones/APZs surrounding Ault Field (see Figure 3.3-2) or OLF Coupeville (see Figure 4.3-1). However, there are existing businesses that may entertain or house large groups of people at a single time, such as shopping centers, group camps, dance classes, and halls and lodging within the APZs surrounding Ault Field. No businesses are within existing clear zones at OLF Coupeville. Since the EIS has determined there would not be an increase of risk under the No Action Alternative, the Navy has determined that although there are environmental justice communities within the Clear Zones/APZs, the risk associated with aircraft mishaps is not expected to increase within the areas surrounding both Ault Field and OLF Coupeville under the No Action Alternative. Therefore, the Navy has determined there will be no disproportionately high and adverse human health or environmental effects from the No Action Alternative on minority populations and low-income populations.

4.11.2.3.3 Potential Impacts from Overcrowding at Oak Harbor School District

The EIS concluded that the elementary schools in the Oak Harbor School District are experiencing significant overcrowding. Implementation of the No Action Alternative would have no impact on current school enrollment and therefore no impact on overcrowding at the Oak Harbor School District.

4.11.2.3.4 Potential Impacts on Housing Affordability

While the EIS has concluded that the regional housing market is experiencing low homeowner and rental vacancy rates, implementation of the No Action Alternative would have no impact on regional housing demand or supply and, therefore, have no impact on housing availability or affordability in Island or Skagit Counties.

4.11.3 Environmental Justice, Alternatives 1 through 3

4.11.3.1 Identifying Environmental Justice Communities Analysis under Alternatives 1 through 3

As indicated above, Tables 4.11-4 through 4.11-18 present estimates of the affected minority and low-income populations within each dB DNL contour under each alternative and scenario, for the average year. The shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in the community of comparison, which is the percentage of minority populations in Island County, and where the low-income population is equal to or greater than the percentage of residents with low incomes in the community of comparison. These calculations allow the Navy to determine the minority and/or low-income populations impacted by each alternative and scenario.

Under all alternatives/scenarios, there are minority populations and low-income populations living within the affected environment. Likewise, under the high-tempo FCLP year, there are minority populations and low-income populations under all alternatives/scenarios (see Appendix F).

Table 4.11-4 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario A, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 1A					
65-70 dB DNL	4,257	1,088	25.6%**	346	8.1%
70-75 dB DNL	2,844	593	20.9%	191	6.7%
75+ dB DNL	5,475	907	16.6%	387	7.1%
Total Affected Population	12,576	2,588	20.6%	924	7.3%

Table 4.11-4 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario A, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
<i>Population Change from No Action Alternative</i>					
65-70 dB DNL	117	68	-	31	-
70-75 dB DNL	-225	-121	-	-27	-
75+ dB DNL	1,513	174	-	50	-
Population Change from No Action Alternative^{3***}	1,405	121	8.6%	54	3.8%

Sources: USCB, 2012c, 2012f, n.d.[d]

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level. Consequently, block groups within the same census tract will report the same value.
- ⁴ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent: $\frac{|V_1 - V_2|}{(V_1 + V_2) / 2} \times 100$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-5 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario B, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 1B					
65-70 dB DNL	4,161	1,071	25.7%**	341	8.2%
70-75 dB DNL	3,511	810	23.1%	243	6.9%
75+ dB DNL	5,317	918	17.3%	396	7.4%
Total Affected Population	12,989	2,799	21.5%	980	7.5%
Population Change from No Action Alternative					
65-70 dB DNL	21	51	-	26	-
70-75 dB DNL	442	96	-	25	-
75+ dB DNL	1,355	185	-	59	-
Population Change from No Action Alternative^{3***}	1,818	332	18.3%	110	6.1%

Table 4.11-5 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario B, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d]

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-6 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario C, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 1C					
65-70 dB DNL	4,802	1,187	24.7%**	366	7.6%
70-75 dB DNL	3,551	829	23.3%	245	6.9%
75+ dB DNL	4,668	865	18.5%	391	8.4%
Total Affected Population	13,021	2,881	22.1%	1,002	7.7%
Population Change from No Action Alternative					
65-70 dB DNL	662	167	-	51	-
70-75 dB DNL	482	115	-	27	-
75+ dB DNL	706	132	-	54	-
Population Change from No Action Alternative^{3***}	1,850	414	22.4%	132	7.1%

Table 4.11-6 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario C, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-7 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario D, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 1D					
65-70 dB DNL	4,243	1,098	25.9%**	349	8.2%
70-75 dB DNL	3,163	702	22.2%	217	6.9%
75+ dB DNL	5,529	927	16.8%	397	7.2%
Total Affected Population	12,935	2,727	21.1%	963	7.4%
Population Change from No Action Alternative					
65-70 dB DNL	103	78	-	34	-
70-75 dB DNL	94	-12	-	-1	-
75+ dB DNL	1,567	194	-	60	-
Population Change from No Action Alternative^{3***}	1,764	260	14.7%	93	5.3%

Table 4.11-7 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario D, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-8 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario E, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 1E					
65-70 dB DNL	4,568	1,145	25.1%**	356	7.8%
70-75 dB DNL	3,545	820	23.1%	244	6.9%
75+ dB DNL	4,937	890	18.0%	396	8.0%
Total Affected Population	13,050	2,855	21.9%	996	7.6%
Population Change from No Action Alternative					
65-70 dB DNL	428	125	-	41	-
70-75 dB DNL	476	106	-	26	-
75+ dB DNL	975	157	-	59	-
Population Change from No Action Alternative^{3***}	1,879	388	20.6%	126	6.7%

Table 4.11-8 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 1, Scenario E, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-9 Environmental Justice Populations at NAS Whidbey Island Complex under the Alternative 2, Scenario A, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 2A					
65-70 dB DNL	4,238	1,087	25.6%**	346	8.2%
70-75 dB DNL	2,873	590	20.5%	191	6.6%
75+ dB DNL	5,376	894	16.6%	383	7.1%
Total Affected Population	12,487	2,571	20.6%	920	7.4%
Population Change from No Action Alternative					
65-70 dB DNL	98	67	-	31	-
70-75 dB DNL	-196	-124	-	-27	-
75+ dB DNL	1,414	161	-	46	-
Population Change from No Action Alternative^{3***}	1,316	104	7.9%	50	3.8%

Table 4.11-9 Environmental Justice Populations at NAS Whidbey Island Complex under the Alternative 2, Scenario A, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-10 Environmental Justice Populations at NAS Whidbey Island under the Alternative 2, Scenario B, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 2B					
65-70 dB DNL	4,178	1,066	25.5%**	339	8.1%
70-75 dB DNL	3,488	800	22.9%	241	6.9%
75+ dB DNL	5,210	905	17.4%	391	7.5%
Total Affected Population	12,876	2,771	21.5%	971	7.5%
Population Change from No Action Alternative					
65-70 dB DNL	38	46	-	24	-
70-75 dB DNL	419	86	-	23	-
75+ dB DNL	1,248	172	-	54	-
Population Change from No Action Alternative^{3***}	1,705	304	17.8%	101	5.9%

Table 4.11-10 Environmental Justice Populations at NAS Whidbey Island under the Alternative 2, Scenario B, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percent of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-11 Environmental Justice Populations at NAS Whibbey Island Complex under Alternative 2, Scenario C, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 2C					
65-70 dB DNL	4,760	1,167	24.5%**	360	7.6%
70-75 dB DNL	3,490	815	23.4%	241	6.9%
75+ dB DNL	4,564	845	18.5%	385	8.4%
Total Affected Population	12,814	2,827	22.1%	986	7.7%
Population Change from No Action Alternative					
65-70 dB DNL	620	147	-	45	-
70-75 dB DNL	421	101	-	23	-
75+ dB DNL	602	112	-	48	-
Population Change from No Action Alternative^{3***}	1,643	360	21.9%	116	7.1%

Table 4.11-11 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 2, Scenario C, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. Because the American Community Survey does not estimate data at the census block group level, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-12 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 2, Scenario D, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
<i>Community of Comparison (Island County)</i>			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 2D					
65-70 dB DNL	4,221	1,089	25.8%**	346	8.2%
70-75 dB DNL	3,216	704	21.9%	218	6.8%
75+ dB DNL	5,380	905	16.8%	390	7.2%
Total Affected Population	12,817	2,698	21.1%	954	7.4%
Population Change from No Action Alternative					
65-70 dB DNL	81	69	-	31	-
70-75 dB DNL	147	-10	-	0	-
75+ dB DNL	1,418	172	-	53	-
Population Change from No Action Alternative^{3***}	1,646	231	14.0%	84	5.1%

Table 4.11-12 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 2, Scenario D, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. Because the American Community Survey does not estimate data at the census block group level, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-13 Environmental Justice Populations at NAS Whibbey Island Complex under Alternative 2, Scenario E, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
<i>Community of Comparison (Island County)</i>			16.9%		8.0%
<i>No Action Alternative</i>					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
<i>Alternative 2E</i>					
65-70 dB DNL	4,563	1,130	24.8%**	352	7.7%
70-75 dB DNL	3,482	802	23.0%	239	6.9%
75+ dB DNL	4,844	875	18.1%	390	8.1%
Total Affected Population	12,889	2,807	21.8%	981	7.6%
<i>Population Change from No Action Alternative</i>					
65-70 dB DNL	423	110	-	37	-
70-75 dB DNL	413	88	-	21	-
75+ dB DNL	882	142	-	53	-
Population Change from No Action Alternative^{3***}	1,718	340	19.8%	111	6.5%

Table 4.11-13 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 2, Scenario E, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. Because the American Community Survey does not estimate data at the census block group level, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than (those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-14 Environmental Justice Populations at NAS Whidbey Island Complex under the Alternative 3, Scenario A, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 3A					
65-70 dB DNL	4,244	1,087	25.6%**	346	8.2%
70-75 dB DNL	2,839	583	20.5%	189	6.7%
75+ dB DNL	5,400	896	16.6%	383	7.1%
Total Affected Population	12,483	2,566	20.6%	918	7.4%
Population Change from No Action Alternative					
65-70 dB DNL	104	67	-	31	-
70-75 dB DNL	-230	-131	-	-29	-
75+ dB DNL	1,438	163	-	46	-
Population Change from No Action Alternative^{3***}	1,312	99	7.5%	48	3.7%

Table 4.11-14 Environmental Justice Populations at NAS Whidbey Island Complex under the Alternative 3, Scenario A, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-15 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario B, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 3B					
65-70 dB DNL	4,150	1,061	25.6%**	338	8.1%
70-75 dB DNL	3,474	797	22.9%	240	6.9%
75+ dB DNL	5,256	909	17.3%	392	7.5%
Total Affected Population	12,880	2,767	21.5%	970	7.5%
Population Change from No Action Alternative					
65-70 dB DNL	10	41	-	23	-
70-75 dB DNL	405	83	-	22	-
75+ dB DNL	1,294	176	-	55	-
Population Change from No Action Alternative^{3***}	1,709	300	17.6%	100	5.9%

Table 4.11-15 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario B, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-16 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario C, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 3C					
65-70 dB DNL	4,743	1,163	24.5%**	359	7.6%
70-75 dB DNL	3,496	813	23.3%	241	6.9%
75+ dB DNL	4,585	847	18.5%	385	8.4%
Total Affected Population	12,824	2,823	22.0%	985	7.7%
Population Change from No Action Alternative					
65-70 dB DNL	603	143	-	44	-
70-75 dB DNL	427	99	-	23	-
75+ dB DNL	623	114	-	48	-
Population Change from No Action Alternative^{3***}	1,653	356	21.5%	115	7.0%

Table 4.11-16 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario C, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than (or equal to) those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-17 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario D, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
No Action Alternative					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
Alternative 3D					
65-70 dB DNL	4,210	1,088	25.8%**	345	8.2%
70-75 dB DNL	3,205	700	21.8%	217	6.8%
75+ dB DNL	5,402	907	16.8%	390	7.2%
Total Affected Population	12,817	2,695	21.0%	952	7.4%
Population Change from No Action Alternative					
65-70 dB DNL	70	68	-	30	-
70-75 dB DNL	136	-14	-	-1	-
75+ dB DNL	1,440	174	-	53	-
Population Change from No Action Alternative^{3***}	1,646	228	13.9%	82	5.0%

Table 4.11-17 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario D, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

Table 4.11-18 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario E, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
<i>Community of Comparison (Island County)</i>			16.9%		8.0%
<i>No Action Alternative</i>					
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	11,171	2,467	22.1%	870	7.8%
<i>Alternative 3E</i>					
65-70 dB DNL	4,532	1,125	24.8%**	351	7.7%
70-75 dB DNL	3,483	800	23.0%	239	6.9%
75+ dB DNL	4,869	877	18.0%	390	8.0%
Total Affected Population	12,884	2,802	21.7%	980	7.6%
<i>Population Change from No Action Alternative</i>					
65-70 dB DNL	392	105	-	36	-
70-75 dB DNL	414	86	-	21	-
75+ dB DNL	907	144	-	53	-
Population Change from No Action Alternative^{3***}	1,713	335	19.6%	110	6.4%

Table 4.11-18 Environmental Justice Populations at NAS Whidbey Island Complex under Alternative 3, Scenario E, Average Year

<i>dB DNL Contours*</i>	<i>Total Affected Population</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
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Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates because the U.S. Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level; therefore, the percentage of the population below the poverty level is displayed in this table at the census tract level, and block groups within the same census tract will report the same value.
- ³ Due to rounding, some totals may not sum.
- * dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.
- ** The grey-shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than those in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. These shaded cells indicate where environmental justice communities have been identified based upon the indicated thresholds. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{V_1 + V_2}{2}} \times 100$$
- *** All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

Key:

dB DNL = day-night average sound level in decibels

4.11.3.2 Methodology for Identifying Disproportionately High and Adverse Impacts under Alternatives 1 through 3

As described in detail in Section 4.11.1.2, once the presence or absence of environmental justice communities was determined, the Navy then assessed the impacts from the Proposed Action and determined whether these impacts would have a disproportionately high and adverse effect on these populations. This analysis involved comparing the impacts on the identified environmental justice communities to the general population within the affected environment (e.g., noise contours). In determining whether potential disproportionately high and adverse impacts existed, the Navy also considered the significance of the impacts under NEPA. The methodology for identifying disproportionately high and adverse impacts under the alternatives is the same as defined for the No Action Alternative.

4.11.3.3 Analysis for Identifying Disproportionately High and Adverse Impacts under Alternatives 1 through 3

As described throughout this EIS, aircraft noise impacts are expected to be the primary adverse environmental impact associated with the Proposed Action. Other impacts described in this EIS that have the potential to have disproportionately high and adverse impacts on environmental justice communities include potential safety risks from a concentration of environmental justice populations within Clear Zones/APZs; concentration of overcrowding in schools within the Oak Harbor School District; and impacts of housing affordability and housing availability on low-income populations. As discussed under Methodology above, this section compares the potential impacts on the environmental justice populations within the affected area to the general population within the affected area and makes a determination of whether or not these impacts are disproportionately high and adverse on the previously identified environmental justice communities.

4.11.3.3.1 Aircraft Noise

This EIS determines there is a significant impact to the populations living under the noise contours from implementation of all alternatives/scenarios (see Section 4.2). In order to assess whether the significant impacts on the population under the noise contours are disproportionately high and adverse upon identified environmental justice communities, the Navy compared the potential impacts on the affected general population (the total population under the different dB DNL noise contours for each alternative/scenario) to the identified environmental justice populations in the affected area (under the dB DNL noise contours for each alternative/scenario).

Based on the data shown in Tables 4.11-2 and Tables 4.11-4 through 4.11-18, the comparison of the impacts to the identified environmental justice communities (shaded cells in the tables) within the affected environment to the impacts on the general population (the non-environmental justice communities) within the affected environment indicates that the identified environmental justice communities are not experiencing disproportionately high and adverse impacts. Even though the noise impacts to the entire community may be significant under NEPA, it does not appear that these adverse impacts appreciably exceed or are likely to exceed those experienced by the total affected population. The tables indicate that for each noise contour (greater than 65 dB DNL), the identified environmental justice communities are not concentrated in higher noise zones. The environmental justice communities represent a range of approximately 21 percent to 22 percent for identified minority populations and approximately 7 percent to 8 percent for identified low-income populations within each noise contour.

Consequently, these identified communities do not appear to be subjected to an uneven distribution of adverse impacts.

The significance of the impacts under NEPA is also a factor in determining whether impacts to environmental justice communities may be disproportionately high and adverse. As part of this determination, the net change between each alternative and the No Action Alternative of each environmental justice community was analyzed. For this analysis, the estimates of the affected minority, and low-income populations for each alternative/scenario were compared to the results of the analysis for the No Action Alternative. The net change in the total population and the net change in the environmental justice populations between the various alternatives/scenarios and the No Action Alternative were then calculated. The results of these analyses can be found on Tables 4.11-2 and Tables 4.11-4 through 4.11-18 and are summarized on Table 4.11-19. See Appendix F for detailed tables showing the effects of the high-tempo FCLP year conditions; summary conclusions are included on Table 4.11-19. This calculation allows the Navy to determine the minority and/or low-income populations impacted by each alternative and scenario.

As shown on Table 4.11-19 under the average year, the change in minority environmental justice communities within the dB DNL noise contours under the 15 alternatives/scenarios when compared to the No Action Alternative ranges from 7.5 percent to 22.4 percent. This means that 7.5 percent to 22.4 percent of the residents within the greater than 65 dB DNL noise contour are calculated to be a minority (and 77.6 percent to 92.5 percent are calculated to be a non-minority). In a similar calculation, 3.7 percent to 7.1 percent of the population residing within the 65 dB DNL noise contours for the alternatives are calculated to be part of the low-income population (and 92.9 percent to 96.3 percent are calculated to be not in the low-income population).

Under the high-tempo FCLP year, the change in minority environmental justice communities within the dB DNL noise contours under the 15 alternatives/scenarios when compared to the No Action Alternative ranges from 0.0 percent to 19.2 percent of the population residing under the dB DNL contours (80.8 percent to 100.0 percent are calculated to be non-minority) and 0.0 percent to 6.5 percent to be part of the low-income population (93.5 percent to 100.0 percent are calculated to be not in the low-income population). In fact, for scenario A under all three alternatives, the absolute number of minority residents declined when compared to the No Action Alternative. In addition, the absolute number of low-income residents when compared to the No Action Alternative declined by one person in Alternative 3, Scenario A (see Appendix F).

Table 4.11-19 Demographic and Economic Characteristics of the Population Change from the No Action Alternative for Each Alternative and Scenario under the Average Year and High-Tempo FCLP Year

<i>Geographical Area*</i>	<i>Population Change from No Action Alternative</i>		
	<i>Total Affected Population**</i>	<i>Difference in Percent Minorities</i>	<i>Difference In Percent Low Income</i>
<i>No Action Alternative</i>			
Average Year	11,171	22.1%	7.8%
High-tempo FCLP Year	11,804	22.7%	7.9%
<i>Alternative 1A</i>			
Average Year	1,405	8.6%	3.8%
High-tempo FCLP Year	945	0.0%***	1.0%
<i>Alternative 1B</i>			
Average Year	1,818	18.3%	6.1%
High-tempo FCLP Year	1,362	12.8%	4.8%
<i>Alternative 1C</i>			
Average Year	1,850	22.4%	7.1%
High-tempo FCLP Year	1,457	19.2%	6.5%
<i>Alternative 1D</i>			
Average Year	1,764	14.7%	5.3%
High-tempo FCLP Year	1,318	7.4%	3.7%
<i>Alternative 1E</i>			
Average Year	1,879	20.6%	6.7%
High-tempo FCLP Year	1,458	16.9%	5.9%
<i>Alternative 2A</i>			
Average Year	1,316	7.9%	3.8%
High-tempo FCLP Year	829	0.0%***	0.1%
<i>Alternative 2B</i>			
Average Year	1,705	17.8%	5.9%
High-tempo FCLP Year	1,279	12.3%	4.7%
<i>Alternative 2C</i>			
Average Year	1,643	21.9%	7.1%
High-tempo FCLP Year	1,246	16.4%	5.9%
<i>Alternative 2D</i>			
Average Year	1,646	14.0%	5.1%
High-tempo FCLP Year	1,167	5.1%	3.2%
<i>Alternative 2E</i>			
Average Year	1,718	19.8%	6.5%
High-tempo FCLP Year	1,262	14.0%	5.3%
<i>Alternative 3A</i>			
Average Year	1,312	7.5%	3.7%
High-tempo FCLP Year	826	0.0%***	0.0%***
<i>Alternative 3B</i>			
Average Year	1,709	17.6%	5.9%
High-tempo FCLP Year	1,258	11.1%	4.4%
<i>Alternative 3C</i>			
Average Year	1,653	21.5%	7.0%
High-tempo FCLP Year	1,178	15.7%	5.7%

Table 4.11-19 Demographic and Economic Characteristics of the Population Change from the No Action Alternative for Each Alternative and Scenario under the Average Year and High-Tempo FCLP Year

<i>Geographical Area*</i>	<i>Population Change from No Action Alternative</i>		
	<i>Total Affected Population**</i>	<i>Difference in Percent Minorities</i>	<i>Difference In Percent Low Income</i>
Alternative 3D			
Average Year	1,646	13.9%	5.0%
High-tempo FCLP Year	1,168	5.5%	3.1%
Alternative 3E			
Average Year	1,713	19.6%	6.4%
High-tempo FCLP Year	1,307	15.7%	5.4%

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

* Residents living in Island and Skagit Counties within the 65+ dB DNL contours are included in this analysis. dB DNL contours extend into Jefferson and San Juan Counties; however, because no permanent residences are located within these dB DNL contours, these counties have been excluded from the analysis. Populations on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have also been excluded from the analysis.

** Total Affected Population equals the total population in Island and Skagit Counties that falls within the 65+ dB DNL contours under the No Action Alternative. The Total Affected Population under all other alternatives/scenarios represents the change in the total population within the 65+ dB DNL contours compared to the No Action Alternative. All population estimates for areas under the DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours. Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.

*** Under Alternatives 1A, 2A, and 3A during the high-tempo FCLP year, the absolute number of minority residents would decline when compared to the No Action Alternative. In addition, under Alternative 3A, the absolute number of low-income residents impacted also would decline when compared to the No Action Alternative.

Key:

FCLP = field carrier landing practice

When analyzing data provided on Tables 4.11-2 and Tables 4.11-4 through 4.11-18, it is shown that within the affected area, minority and low-income residents are more likely to reside within quieter dB DNL contours (i.e., 65 to 70 dB DNL contours) than in the louder dB DNL contours (i.e., 75 dB DNL or greater contours) when compared to the total affected population. For instance, in the alternative that records the largest percentage of minorities impacted when compared to the No Action Alternative under the average year (Alternative 1, Scenario E), approximately 20.6 percent of this population change

are minority residents. At the same time, 25.1 percent of all residents living in the 65 to 70 dB DNL contours are minorities, while only 18.0 percent of all residents living in the 75 dB DNL or greater contours are minorities. This relationship holds true for all alternatives and scenarios in both the average and the high-tempo FCLP year. Similarly, low-income residents are more likely to reside in the quieter dB DNL contours (i.e., 65 to 70 dB DNL contours) than in the louder dB DNL contours (i.e., 75 dB DNL or greater contours) when compared to the total affected population. With the exception of Scenario C and Scenario E under all three alternatives, there is typically a greater concentration of low-income populations in the 65 to 70 dB DNL contours than those found in the greater than 75 dB DNL contours. In Scenario C and Scenario E under all three alternatives, there is a slightly greater concentration of low-income populations within the greater than 75 dB DNL contours than in the 65 to 70 dB DNL contours. On average, non-minority populations and populations that are not low-income are more likely to be affected by the louder dB DNL contours than the communities of concern. Therefore, while minority and low-income residents are potentially significantly and adversely affected by aircraft noise under each of the alternatives/scenarios, these populations do not experience disproportionately high and adverse impacts when compared to the total affected population.

Additionally, there are no known cumulative or multiple adverse exposures from environmental hazards on minority or low-income environmental justice communities identified in the tables above. Finally, there do not appear to be any of the seven factors identified above under Methodology that could amplify identified impacts on minority or low-income communities. Therefore, the Navy has determined there will be no disproportionately high and adverse human health or environmental effects from the Proposed Action or any alternatives on minority populations or low-income populations.

4.11.3.3.2 Potential Increased Risk of Aircraft Mishaps in Clear Zones/Accident Potential Zones

This EIS identifies that because under all alternatives/scenarios the Proposed Action would add 35 or 36 Growler aircraft and increase overall airfield flight operations at the NAS Whidbey Island complex, there would be a negligible increase in the risk of a mishap (see Section 4.3.1.1). Clear Zones/APZs are created based on projected operations for approach, departure, and flight tracks for a runway. Clear Zones/APZs are based on historical accident and operations data throughout the military and the specific areas that would be impacted (which have been determined to be potential impact areas) if an accident were to occur.

It is not expected that the Clear Zones at Ault Field would change regardless of alternative selected under this Proposed Action; however, this would be confirmed through the Navy's subsequent AICUZ Update process (see Figure 3.3-2 for 2005 AICUZ Clear Zones at Ault Field).

A potential environmental justice issue could be raised if environmental justice communities were concentrated in higher-risk areas and subjected to disproportionate adverse impacts, such as being located in Clear Zones/APZs. Using the same methodology employed for identifying environmental justice communities under the noise contours, the Navy estimated the number of minority and low-income residents located within the existing Clear Zones at Ault Field and OLF Coupeville. All Clear Zones/APZs identified in Section 4.3 (2005 AICUZ Clear Zones at Ault Field, 2005 AICUZ Clear Zones at OLF Coupeville, and Conceptual APZs at OLF Coupeville) were overlaid onto mapped U.S. Census Bureau 2010 population and demographic data to calculate the total affected area within each census block. The percent area of the census block covered by the Clear Zones/APZs was applied to the population of that census block to estimate the population within the Clear Zone/APZ boundary. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and

2020 based on medium forecasted population projections during that period, thereby calculating the total affected population for each alternative and scenario, including the No Action Alternative (Washington State Office of Financial Management, 2017).

Demographic characteristics of the corresponding census block groups were then applied to this total affected population number to estimate the total minority and low-income populations impacted by each Clear Zone/APZ. These calculations assume an even distribution of the population across the census block groups, and they exclude populations on military properties within the Clear Zones/APZs. Table 4.11-20 presents estimates of the affected minority and low-income populations under each Clear Zone/APZ.

As mentioned above, the potential development of APZs does not directly correlate to an increased risk of incident for the population living under the APZs. The Navy's official recommendation for APZs at OLF Coupeville will be confirmed through the AICUZ study process. However, it is up to the municipality to consider and establish an APZ for OLF Coupeville and to adopt zoning to enhance public safety. It is the municipality's action that will influence future land use decisions. In fact, the municipality has choices on the degree to which the Navy's land use recommendations are implemented--for instance, it could decide to establish an APZ for Runway 14 even though the current or proposed number of operations does not warrant one under Navy policy.

The Navy has determined there are environmental justice communities living within the 2005 AICUZ Clear Zones at Ault Field (see Table 4.11-20). Additionally, as shown in Table 4.11-20 and described in detail in Section 4.3.1, the increase in airfield operations at Ault Field under all of the alternatives/scenarios would not result in a change to the existing Clear Zones surrounding the installation. Consequently, there would be an increase in the number of operations at Ault Field from the Proposed Action and, therefore, an increase in risk for mishap, but there would be no impact on the land use of any population living within the boundaries of the Clear Zones.

The Navy has determined there are no environmental justice communities living within the 2005 AICUZ Clear Zones at OLF Coupeville.

Under Scenario C and E for all alternatives, the number of airfield operations would not warrant additional APZs at OLF Coupeville; therefore, only the Clear Zones would be required. Consequently, there would be an increase in the number of operations at OLF Coupeville under Scenario C and E for all alternatives and, therefore, an increase in risk for mishap, but there would be no impact on the land use of any population living within the boundaries of the Clear Zones.

Under Scenarios A, B, and D for all alternatives, this EIS determined there is a potential for APZs to be warranted due to the number and type of flight operations at OLF Coupeville. Under Scenarios A, B, and D, conceptual APZs may be warranted. Official APZs are established through the AICUZ study process and would depend on the findings of this study. There would be an increase in the number of operations at OLF Coupeville under Scenarios A, B, and D for all alternatives and, therefore, an increase in risk for mishap, and there would be a minor impact on land use under the conceptual APZs for these three scenarios. Because there are no environmental justice communities identified under the conceptual APZ, the Navy has determined implementation of the Proposed Action or any alternatives is not expected to have disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

Table 4.11-20 Environmental Justice Populations at NAS Whidbey Island Complex under Clear Zones/APZs for Ault Field and OLF Coupeville

<i>APZ</i>	<i>Total Affected Population*</i>	<i>Total Minority Population¹</i>	<i>Percent Minority</i>	<i>Total Low-Income Population²</i>	<i>Percent Low Income</i>
Community of Comparison (Island County)			16.9%		8.0%
Ault Field Existing Clear Zones	1,860	523	28.1%**	230	12.4%
OLF Coupeville Existing Clear Zones ³	96	9	9.4%	3	3.1%
OLF Coupeville Conceptual APZs ⁴	677	92	13.6%	21	3.1%

Sources: USCB, 2012c, 2012f, n.d.[d].

Notes:

- ¹ Minority is defined as individual(s) who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.
- ² The analysis relied on poverty data from the 2006-2010 American Community Survey 5-Year Estimates as the US Census Bureau no longer reports poverty data in the decennial census. The American Community Survey does not estimate data at the census block group level, therefore the percent of the population below the poverty level is displayed in this table at the Census Tract level; therefore, Block Groups within the same Census Tract will report the same value.
- ³ Under Alternative 1, Scenario C; Alternative 1, Scenario E; Alternative 2, Scenario C; Alternative 2, Scenario E; Alternative 3, Scenario C; and Alternative 3, Scenario E no new APZs would be required at OLF Coupeville. There would be no change in the Clear Zones at Ault Field or OLF Coupeville compared to existing conditions.
- ⁴ Under Alternative 1, Scenario A; Alternative 1, Scenario B; Alternative 1, Scenario D; Alternative 2, Scenario A; Alternative 2, Scenario B; Alternative 2, Scenario D; Alternative 3, Scenario A; Alternative 3, Scenario B; and Alternative 3, Scenario D OLF Coupeville Conceptual APZs would be required. There would be no change in Clear Zones at Ault Field compared to existing conditions.
- * All population estimates for areas within the Clear Zones/APZs utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). Section 4.11.2.2 describes the methodology utilized in the analysis in greater detail and also explains why Island County is utilized as the community of comparison throughout the analysis.
- ** The shaded cells indicate the alternatives/scenarios that contain percentages of minority populations that are “meaningfully greater” than in Island County as a whole or that contain percentages of low-income populations that are greater than those in Island County. For this analysis, “meaningfully greater” is defined as demographic statistics that differ by more than 15 percent from those of the community of comparison. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$

This EIS has determined that there is not a significant increase in risk associated with the increase in aircraft operations under the alternatives/scenarios because current airspace safety procedures, maintenance, training, and inspections would continue to be implemented, and airfield flight operations would adhere to established safety procedures. While it is generally difficult to project future safety/mishap rates for any aircraft, the Growler has a well-documented and established safety record as a reliable aircraft.

Potential aircraft mishaps are the primary safety concern with regard to military training flights. NAS Whidbey Island maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to mishaps, whether on or off the installation. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed (DoDI 6055.07, *Mishap Notification, Investigation, Reporting, and Record Keeping*) (DoD, 2011).

In addition, no schools or churches are within the existing Clear Zones or APZs surrounding Ault Field (see Figure 3.3-2) or OLF Coupeville (see Figures 4.3-1). However, there are existing businesses that may entertain or house large groups of people at a single time, such as shopping centers, transit authorities, animal shelters, group camps, dance classes, and halls and lodging.

The Navy has determined implementation of the Proposed Action is not expected to have disproportionately high and adverse impacts on minority populations or low-income populations.

4.11.3.3.3 Potential Impacts from Overcrowding at Oak Harbor School District

The EIS concluded that because the elementary schools in the Oak Harbor School District are currently experiencing significant overcrowding, implementation of the Proposed Action would increase the number of students attending schools in the district and exacerbate an existing issue. The Navy considered whether this impact had the potential to have disproportionately high and adverse impacts on environmental justice communities and concluded that overcrowding, as with noise impacts, would be equally felt across the affected area. The Navy concluded that although environmental justice communities do exist, they are not expected to be subjected to disproportionately high and adverse impacts on education because overcrowding and noise impacts would be equally felt across the school district in the affected area.

4.11.3.3.4 Potential Impacts to Housing Affordability

As described in greater detail in Section 4.10.3, the data indicate that Island and Skagit Counties are experiencing a high demand and relatively low supply of housing, which has led to low homeowner and rental vacancies, and upward price pressure. Implementation of the Proposed Action would increase the number of Navy families and unaccompanied personnel requiring housing in the region and exacerbate the current tight housing market. Housing and rental prices are expected to increase, and housing availability is expected to decline as a result of the increase in demand for housing. In the longer run, it is anticipated that local developers will respond to the increased price and demand for housing by constructing more units, thereby slightly reducing the expected housing deficit. However, because low-income residents typically spend a larger proportion of their income on housing than the general

population, if housing prices were to increase, low-income households would experience a greater impact. Therefore, the Navy has concluded that the impacts on housing availability and affordability could have the potential to have a disproportionately high and adverse impact on low-income communities. In accordance with current Navy policies, the Navy will periodically assess on- and off-base housing demand and availability to determine whether additional Navy-controlled housing is required.

4.11.4 Environmental Justice Conclusion, Alternatives 1 through 3

The Navy has determined that there are environmental justice communities within the affected area and there are significant impacts outlined within the EIS to populations living within the affected area (noise impacts to those living within the 65 dB DNL noise contours, risks to those living within the Clear Zones/APZs, overcrowding at Oak Harbor School District schools). However, the Navy has determined there will be no disproportionately high and adverse human health or environmental effects from noise, Clear Zones/APZs, and the overcrowding of schools on minority populations or low-income populations. The Navy has, however, concluded that the impacts on housing availability and affordability could have the potential to have a disproportionately high and adverse impact on low-income communities.

The Navy has embarked on a robust community outreach program as part of this EIS process. As detailed in Section 1.9, Public and Agency Participation and Intergovernmental Coordination, the Navy has held eight public scoping meetings and has kept residents informed throughout the process with mailings (both letters and postcards), newspaper advertisements, press releases, a project website, and digital advertisements. Project documents have been made available at local public libraries as well as online at the project's website. Public outreach efforts will continue throughout the public comment period to ensure that impacted environmental justice populations are kept informed and involved in the decision-making process.

4.12 Transportation

This section summarizes the potential transportation impacts that could result from renovation of facilities and an increase in Growler operations at NAS Whidbey Island under the No Action Alternative and Alternative 1 through Alternative 3. As discussed in Section 3.12.2, the study area consists of:

- State Route (SR) 20 between Burlington and SR 525
- SR 525 between SR 20 and Clinton
- Interstate (I)-5 at the interchange with SR 20 in Burlington
- roadways serving NAS Whidbey Island or immediately adjacent to NAS Whidbey Island

Potential transportation impacts were estimated by evaluating how the proposed increase in personnel and dependents under each alternative could affect traffic volume and level of service (LOS) on major roadways within the project study area. Traffic volumes were estimated and assessed based on the following:

- Full transition of P-8A squadrons to NAS Whidbey Island would occur by 2020.
- Background growth factors of 1.5 percent in Island County and 5.3 percent in Skagit County would apply based on medium county population projections (Washington State Office of Financial Management, 2017), which account for regional growth in traffic volumes through 2020.
- Trip generation was based on the assumption that each new Navy personnel would result in one new household with dependents, as described in Section 4.10. The Institute of Traffic Engineers Trip Generation Manual 9th Edition (ITE [Institute of Traffic Engineers], 2012) was used to determine weekday trip generation rates for households based on the housing unit types in the region (USCB, n.d.[c]). Trips were assigned to study area road segments (I-5, SR 20, and SR 525) based on the percentage of personnel stationed and employed at NAS Whidbey Island by place of residence (Cory, 2018).
 - It was assumed that no new Navy personnel under the alternatives would be living on base; therefore, the percentage of NAS Whidbey Island personnel living on-base (37 percent) was distributed proportionally across the study area for future trip generation.
 - It was assumed two of the weekday trips generated by each household would be attributed to Navy personnel traveling between a place of residence and Ault Field. It was assumed remaining trips generated by each household would occur within a place of residence (see Appendix D).

Transportation

Construction results in increased traffic on and off the installation, but roadways would be able to handle the increase.

Increase in personnel and dependents results in an increase in traffic on local roads. Traffic would be spread throughout roads in Island and Skagit Counties and is not expected to result in LOS falling below established LOS standards.

Increase in gate traffic may result in queuing of vehicles, but this would be limited to peak hours during the day.

No significant increase in use of transit, pedestrian, and bicycle facilities because the majority of new traffic would be car-based.

- A general LOS analysis under No Action Alternative and action alternative conditions was performed using the 2010 Highway Capacity Manual generalized daily service volumes for urban freeway facilities, rural multilane highways, urban multilane highways, and urban street facilities (see Appendix D). LOS under the action alternatives was compared to LOS standards under the No Action Alternative.
- For a conservative analysis, no transit, bicycle, or pedestrian trips were assumed for Navy personnel and dependents.
- Personnel would commute to Ault Field under each scenario; therefore, traffic impacts under a given alternative would be the same under each scenario.

4.12.1 Transportation, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to transportation. SR 20, SR 525, and I-5 and local roads would experience an increase in traffic over affected environment conditions that would be attributed to background community growth. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

4.12.2 Transportation, Alternatives 1 through 3

Construction activities associated with the Proposed Action under each alternative would result in short-term but negligible increases in traffic, and they would not result in a worsening of LOS on major roadways under No Action conditions. Operations associated with the Proposed Action under each alternative would result in a long-term and moderate increase in traffic, but they would not result in a worsening of LOS on major roadways beyond LOS standards. Some local roadways and intersections near Ault Field may see increases in traffic delay from personnel accessing gates to Ault Field, however impacts would be limited to peak hours during the day and are expected to be less than significant. Therefore, implementation of the Proposed Action under any alternative would not result in significant impacts to transportation.

4.12.2.1 Renovation of Existing Facilities at NAS Whidbey Island

Construction-related traffic from the renovation of facilities at NAS Whidbey Island would consist of delivery trucks, dump trucks, heavy equipment, and vehicles driven by construction crews. This could result in short-term impacts on traffic from additional truck trips and slower-moving vehicles. Trips are assumed to access Ault Field via SR 20, Ault Field Road, and Charles Porter Avenue. The number of construction trips on these roadways would be negligible and temporary. No construction trips are expected to access the Seaplane Base as a result of the Proposed Action. Oversize vehicles would need to obtain permits from the appropriate jurisdiction. Pilot/escort vehicles or flaggers may be requirements of an oversize or overweight permit to facilitate the movement of these vehicles through traffic.

4.12.2.2 Off-base Operations, Trip Generation

The Proposed Action would generate between 122 and 2,051 new trips per weekday under Alternative 1; 229 to 3,845 new trips per weekday under Alternative 2; and 125 to 2,088 new trips per weekday under Alternative 3 within the study area. Table 4.12-1 shows the daily traffic volumes generated on segments of SR 20, SR 525, and I-5 under each alternative. Under each alternative, traffic volumes at each of the existing road segments would be expected to increase compared to the No Action

Alternative. Trip projections take into account an annual background growth based on population projections from the Washington State Office of Financial Management. Trips do not take into account deployment schedules, and actual traffic during deployment may be lower. Table 4.12-2 compares traffic volumes for each alternative and demonstrates that much of the increase in traffic volumes in Skagit County can be attributed to background growth. Whereas, increases in Island County traffic near NAS Whidbey Island can largely be attributed to trips generated under the alternatives. The largest trip percentage increase over the No Action Alternative would occur on SR 20 north of Case Road in Oak Harbor and would range from 16 percent under Alternative 1 and Alternative 3 to 29 percent under Alternative 2.

Table 4.12-1 NAS Whidbey Island Trip Distribution

<i>Road</i>	<i>Location</i>	<i>Alternative</i>			
		<i>1</i>	<i>2</i>	<i>3</i>	<i>No Action</i>
I-5	North and South of SR 20	166	311	169	0
SR 20	Under I-5	166	311	169	0
SR 20	East of Pulver Road to West of March Point Road	154	290	157	0
SR 20	East of SR 20 Spur to South of SR 20 Spur	420	787	427	0
SR 20	North of Rosario Drive to South of Rosario Drive	236	443	240	0
SR 20	North of Banta Road to South of Frostad Road	238	445	242	0
SR 20	North of Regatta Drive to South of Swantown Road	2,051	3,845	2,088	0
SR 20	North of Sidney Street to South of Libbey Road	153	287	156	0
SR 20	West of Main Street to East of Main Street	156	292	159	0
SR 20/SR 525	West of Quail Trail Lane to Clinton Ferry Dock	122	229	125	0
Banta Road	East of SR 20 Spur	128	239	130	0
Clover Valley Road	West of Heller Road	161	302	164	0
Heller Road	South of Ault Field Road	228	428	232	0
Ault Field Road	West of Langley Boulevard	161	302	164	0
Ault Field Road	East of Langley Boulevard	429	805	437	0
Ault Field Road	East of Oak Harbor Road	295	553	301	0
Ault Field Road	East of Goldie Road	329	616	335	0
Oak Harbor Road	South of Ault Field Road	262	491	266	0
Goldie Road	North of Ault Field Road	282	528	287	0
Goldie Road	South of Ault Field Road	228	428	232	0

Note: Based on percentage of personnel stationed and employed at NAS Whidbey Island by place of residence (Cory, 2018), ITE Trip Generation Manual 9th Edition (ITE, 2012), and Housing Unit Type (USCB, n.d.[c]); assumes 2 trips per household from ITE trip generation rate were Navy personnel traveling to and from Ault Field; assumes remaining trips on major roadways occur within place of residence. Number of dependents is based on discussion in Section 4.10.

Table 4.12-2 NAS Whidbey Island Projected Average Daily Traffic and Level of Service

Location	LOS Standard	Alternative									
		Affected Environment		1		2		3		No Action	
		ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS
Road: Interstate 5 (I-5)											
Municipality: Burlington											
South of SR 20	D	73,000	C	77,000	D	77,200	D	77,000	D	76,900	D
North of SR 20	D	57,000	B	60,200	B	60,300	B	60,200	B	60,000	B
Road: State Route 20 (SR 20)											
Municipality: Burlington											
Under I-5	D	27,000	B	28,600	B	28,700	B	28,600	B	28,400	B
Municipality: Skagit County											
East of Pulver Road	D	28,000	B	29,600	B	29,800	B	29,600	B	29,500	B
East of Avon Allen Road	D	29,000	B	30,700	B	30,800	B	30,700	B	30,500	B
West of Avon Allen Road	D	27,000	B	28,600	B	28,700	B	28,600	B	28,400	B
East of SR 536	D	25,000	B	26,500	B	26,600	B	26,500	B	26,300	B
West of SR 536	D	32,000	B	33,900	B	34,000	B	33,900	B	33,700	B
East of LaConner Whitney Road	D	34,000	B	36,000	B	36,100	B	36,000	B	35,800	B
West of LaConner Whitney Road	D	34,000	B	36,000	B	36,100	B	36,000	B	35,800	B
East of March Point Road	D	33,000	B	34,900	B	35,000	B	34,900	B	34,700	B
West of March Point Road	D	33,000	B	34,900	B	35,000	B	34,900	B	34,700	B
Road enters Anacortes											
North of Rosario Drive	D	15,000	D	16,000	D	16,200	D	16,000	D	15,800	D
South of Rosario Drive	D	18,000	D	19,200	D	19,400	D	19,200	D	19,000	D
Road enters Island County											
Municipality: Anacortes											
East of SR 20 Spur	D	33,000	B	35,200	B	35,500	B	35,200	B	34,700	B
South of SR 20 Spur	D	19,000	D	20,400	D	20,800	D	20,400	D	20,000	D
Municipality: Island County											
North of Banta Road	D	17,000	D	17,500	D	17,700	D	17,500	D	17,300	D
North of Frostad Road	D	17,000	D	17,500	D	17,700	D	17,500	D	17,300	D
South of Frostad Road	D	18,000	D	18,500	D	18,700	D	18,500	D	18,300	D
Road enters Oak Harbor											
North of Sidney Street	D	13,000	C	13,300	C	13,500	C	13,400	C	13,200	C

Table 4.12-2 NAS Whidbey Island Projected Average Daily Traffic and Level of Service

Location	LOS Standard	Alternative									
		Affected Environment		1		2		3		No Action	
		ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS
South of Libbey Road	D	12,000	C	12,300	C	12,500	C	12,300	C	12,200	C
Road enters Coupeville											
East of Quail Trail Lane	D	8,800	C	9,100	C	9,200	C	9,100	C	8,900	C
North of SR 525 and Race Road	D	7,100	B	7,300	B	7,400	B	7,300	B	7,200	B
West of SR 525 and Race Road	D	1,100	B	1,200	B	1,300	B	1,200	B	1,100	B
Municipality: Oak Harbor											
North of Regatta Drive	E	17,000	D	19,300	D	21,100	D	19,300	D	17,300	D
North of Case Road	E	13,000	C	15,200	D	17,000	D	15,300	D	13,200	C
North of Goldie Street	E	15,000	C	17,300	C	19,100	D	17,300	C	15,200	C
South of SE Midway Boulevard	E	18,000	C	20,300	C	22,100	C	20,400	C	18,300	C
North of SE Sixth Avenue	E	21,000	C	23,400	C	25,200	C	23,400	C	21,300	C
South of SE Sixth Avenue	E	21,000	C	23,400	C	25,200	C	23,400	C	21,300	C
North of SE Barrington Avenue	E	19,000	C	21,300	C	23,100	C	21,400	C	19,300	C
North of SE Pioneer Way	E	15,000	C	17,300	C	19,100	C	17,300	C	15,200	C
West of Beeksma Drive	E	18,000	C	20,300	C	22,100	C	20,400	C	18,300	C
North of Swantown Road	E	20,000	C	22,400	C	24,100	C	22,400	C	20,300	C
South of Swantown Road	E	16,000	C	18,300	D	20,100	E	18,300	D	16,200	D
Municipality: Coupeville											
West of Main Street	D	11,000	C	11,300	C	11,500	C	11,300	C	11,200	C
East of Main Street	D	8,500	B	8,800	C	8,900	C	8,800	C	8,600	B
State Route 525 (SR 525)											
Municipality: Island County											
South of SR 20	D	7,600	B	7,800	B	7,900	B	7,800	B	7,700	B
North of Ellwood Drive	D	7,000	B	7,200	B	7,300	B	7,200	B	7,100	B
Road enters Freeland											
West of Bayview Road	D	13,000	C	13,300	C	13,400	C	13,300	C	13,200	C
West of Maxwelton Road	D	12,000	C	12,300	C	12,400	C	12,300	C	12,200	C
East of Maxwelton Road	D	11,000	C	11,300	C	11,400	C	11,300	C	11,200	C
West of Campbell Road	D	9,500	C	9,800	C	9,900	C	9,800	C	9,600	C
East of Cedar Vista Drive	D	9,400	C	9,700	C	9,800	C	9,700	C	9,500	C

Table 4.12-2 NAS Whidbey Island Projected Average Daily Traffic and Level of Service

Location	LOS Standard	Alternative									
		Affected Environment		1		2		3		No Action	
		ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS
West of Humphrey Road	D	8,700	C	9,000	C	9,100	C	9,000	C	8,800	C
East of Humphrey Road	D	7,300	C	7,500	C	7,600	C	7,500	C	7,400	C
At Clinton Ferry Dock	D	6,100	C	6,300	C	6,400	C	6,300	C	6,200	C
Municipality: Freeland											
West of Honeymoon Bay Road	D	7,200	B	7,400	B	7,500	B	7,400	B	7,300	B
East of Honeymoon Bay Road	D	12,000	C	12,300	C	12,400	C	12,300	C	12,200	C
West of Fish Road	D	14,000	C	14,300	C	14,400	C	14,300	C	14,200	C
Road: Banta Road (Island County)											
West of SR 20	D	1,470	C	1,600	C	1,700	C	1,600	C	1,500	C
Road: Clover Valley Road (Island County)											
West of Heller Road	D	2,864	C	3,100	C	3,200	C	3,100	C	2,900	C
Road: Heller Road (Island County)											
South of Ault Field Road	D	6,995	C	7,500	C	7,700	C	7,500	C	7,300	C
Road: Ault Field Road (Island County)											
West of Langley Boulevard	D	8,171	C	8,700	C	8,800	C	8,700	C	8,500	C
East of Langley Boulevard	D	10,073	C	10,900	C	11,300	C	10,900	C	10,500	C
East of Oak Harbor Road	D	10,506	C	11,300	C	11,500	C	11,300	C	11,000	C
East of Goldie Road	D	8,876	C	9,600	C	9,900	C	9,600	C	9,300	C
Road: Oak Harbor Road (Island County)											
South of Ault Field Road	D	5,174	C	5,700	C	5,900	C	5,700	C	5,400	C
Road: Goldie Road (Island County)											
North of Ault Field Road	D	8,864	C	9,800	C	10,000	C	9,800	C	9,500	C
South of Ault Field Road	D	7,561	C	8,300	C	8,500	C	8,300	C	8,100	C

Table 4.12-2 NAS Whidbey Island Projected Average Daily Traffic and Level of Service

Location	LOS Standard	Alternative										
		Affected Environment		1		2		3		No Action		
		ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS	

Sources: ADT (WSDOT, 2016e; Island County, 2010, 2011, 2014, and 2016c); LOS Standards (Island County, 2015c; City of Oak Harbor, 2014a; Skagit County, 2007a) Trip Generation (ITE, 2012)

Note: Trip generation is based on Trip Generation Manual 9th Edition (ITE, 2012) and LOS is based on 2010 Highway Capacity Manual (Transportation Research Board, 2010), Appendix D; ADT is rounded to nearest 100. In addition, a 1.5-percent (Island County) and 5.3-percent (Skagit County) growth factor was applied to the 2016 Washington State Department of Transportation traffic counts to account for population changes between 2016 and 2020 based on median forecasted population projections during that period (Washington State Office of Financial Management, 2017)

- Key:
 ADT = average daily traffic
 LOS = level of service
 SR = State Route

Additional trips from Navy personnel and dependents would be expected on other local roads and would vary depending on housing decisions. The largest increase in traffic volumes on local roads would be expected to occur on roads near Ault Field and the Seaplane Base from Navy personnel commuting to and from the installation. The increase in trips on local roadways providing access to Ault Field would range from 6 percent on Ault Field Road east of Langley Boulevard under Alternative 1 to 16 percent on Banta Road west of SR 20 under Alternative 2.

4.12.2.3 Off-base Operations, Level of Service

The majority of road segments studied would not experience a change in LOS under the alternatives compared to the affected environment or the No Action Alternative. SR 20 south of Swantown Road would experience degradation in LOS under each alternative compared to the affected environment. SR 20 South of Swantown Road currently operates at LOS C and would operate at LOS D under Alternative 1, Alternative 3, and the No Action Alternative; under Alternative 2, this road segment would drop to LOS E. The road segment would still operate at or better than the LOS standard of E under each alternative. SR 20 north of Goldie Street currently operates at LOS C but would degrade to LOS D under Alternative 2. However, SR 20 north of Goldie Street would still operate above the LOS standard of E. SR 20 north of Case Road currently operates at LOS C and would continue to operate at that LOS under the No Action Alternative. This road segment would degrade to LOS D under the three action alternatives but continue to operate at a better LOS than the LOS standard of E. SR 20 east of Main Street in Coupeville currently operates at LOS B but would degrade to LOS C under the No Action Alternative and Alternatives 1, 2, and 3. Similar to the other segments that would see a worsening of LOS, SR 20 east of Main Street would continue to operate above LOS standards under each of the alternatives. I-5 south of SR 20 currently operates at LOS C but would operate at LOS D under each of the action alternatives and the No Action Alternative. I-5 would not exceed the LOS standard of D under any of the alternatives. No road segments along SR 20, SR 525, and I-5 under the Proposed Action (any of the alternatives) would fail to operate at or better than LOS standards.

County and local roads would be expected to see some increase in traffic volumes. LOS was only determined for some local roads near Ault Field due to a lack of recent traffic counts on local roads and the regional nature of traffic patterns that is difficult to predict for local roadways (e.g., exact location of residences for Navy personnel and work and school destinations for dependents). The increase in trips on local roads is expected to be greatest near Oak Harbor based on the percentage of Navy personnel currently residing in Oak Harbor and at NAS Whidbey Island. However, these trips would be spread throughout the community and would not be expected to cause significant impacts to traffic.

Local roads providing access to Ault Field gates (i.e., Ault Field Road, Langley Boulevard, Clover Valley Road, North Saratoga Street, and West Banta Road) would be expected to see the greatest increase in traffic from additional Navy personnel under the Proposed Action. Local road segments near Ault Field gates currently operate at LOS C and would continue to operate at LOS C under all alternatives. The Navy has identified the intersection of SR 20 and Banta Road, to the north of Ault Field, as an area of concern. SR 20 currently operates at LOS D, and it is expected to continue to operate at LOS D under all Alternatives. The number of trips using this intersection is expected to increase by 238 vehicles (Alternative 1) to 445 trips (Alternative 2) compared to the No Action Alternative. The intersection is currently controlled by a stop sign on Banta Road and North Gate Drive to SR 20. WSDOT is currently studying improvements to this intersection, such as installation of a traffic signal or roundabout. Construction will begin in spring 2019 and be completed by fall 2019 (WSDOT, 2018b). This increase in

trips at this intersection may result in vehicles queuing in the right and left-turn only lanes on SR 20 and Banta Road from vehicles entering and exiting Ault Field from Saratoga Gate. Vehicle queuing would be limited to peak traffic hours and alleviated by planned intersection improvements, and general LOS on this segment of SR 20 would not be expected to worsen under the Proposed Action under any of the alternatives.

The City of Oak Harbor Comprehensive Plan indicates that currently all intersections meet the city's adopted LOS standards (City of Oak Harbor, 2014a). The plan identified four intersections that may fail to meet LOS standards with additional development:

- SR 20 and Beeksma Drive (LOS F)
- SR 20 and Scenic Heights Road (LOS F)
- Heller Street and SW Swantown Avenue (LOS E)
- Midway Avenue and NE 7th Avenue (LOS F)

Traffic under any of the alternatives may contribute to the degradation of LOS at these intersections; however, the comprehensive plan includes a number of priority projects that would improve LOS at these intersections (City of Oak Harbor, 2016). Oak Harbor and Washington State Department of Transportation also recently completed a traffic study for a corridor of SR 20 that includes the Beeksma Drive intersection and identified the addition of turning lanes or roundabouts as possible roadway improvements to improve LOS along SR 20 (WSDOT, 2012).

An increase in traffic on the Deception Pass Bridges would occur similar to what would be experienced on the segments of SR 20 North of Banta Road and South of Rosario Road. Similar to these segments, the Deception Pass Bridges are not expected to experience a drop in LOS under any of alternatives. The Navy would not transport any new, large military vehicles or equipment across the bridges under any of the alternatives. Recent improvements to the bridges should ensure they remain structurally sound and would not be significantly impacted under any of the alternatives (WSDOT, 2015c; Island County Sub-Regional RTPO, 2012).

Any increase in traffic would likely result in a corresponding increase in collisions involving one or more vehicles, pedestrians, or bicyclists. However, the increase in traffic under each alternative is not expected to be significant, and Island County has a comparatively low collision rate compared to statewide averages. As discussed above, the installation of roundabouts at multiple intersections within the study area is already being considered, and roundabouts have been shown to significantly reduce collision rates while improving traffic flows (City of Oak Harbor, 2014a; WSDOT, 2012; WSDOT, 2017).

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to transportation.

4.12.2.4 On-base Operations

The four gates providing access to NAS Whidbey Island process approximately 19,400 vehicles daily. Assuming one round trip for each Navy personnel under the alternatives, gates at Ault field could see an increase of between 670 and 1,256 daily trips (approximately 3 percent to 6 percent over No Action Alternative traffic volumes entering and exiting the installation). It is assumed the increase in traffic would worsen existing backups identified in the NAS Whidbey Island Transportation Plan at the intersections of Midway Street and Langley Boulevard; the intersection of Midway Street and Charles Porter Avenue; and on Lexington Street near Building 113. The NAS Whidbey Island Transportation Plan

has identified installation of a roundabout at the intersection of Midway Street and Langley Boulevard, and Rerouting Lexington Street to create a 90-degree connection with Princeton Street as potential roadway improvements to improve traffic flow. It is assumed that there would be no housing available on station at the Seaplane Base; however, some additional trips may result from Navy personnel and dependents accessing services located at the Seaplane base.

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to transportation.

4.12.2.5 Transit, Pedestrian, and Bicycle Facilities

Use of transit, pedestrian, and bicycle facilities would be expected to increase under any of the alternatives. The increase in use of these facilities by Navy personnel and dependents is not expected to be significant because it is expected that the automobile would be used as the primary means of transportation. Transit, pedestrian, and bicycle facilities are not expected to significantly reduce actual vehicle trip generation on road segments in the study area. Ferries may see an increase in ridership, but because the majority of new Navy personnel are expected to reside on Whidbey Island and within Skagit County, ferries would not be regularly used for commuting.

Therefore, implementation of the Proposed Action under any of alternatives would not result in significant impacts to transportation.

4.12.3 Transportation Conclusion, Alternatives 1 through 3

Implementation of the Proposed Action would not result in significant impacts to transportation resources. Construction under each alternative would result in an increase in construction vehicles on roadways in and outside of the installation. Roadways are expected to be able to handle the temporary increase in construction vehicles. The increase in personnel and dependents during operations would result in an increase in traffic on local roads. Traffic would be spread throughout roads in Island and Skagit Counties and is not expected to result in LOS falling below established LOS standards. An increase in traffic at gates providing access to NAS Whidbey Island would result under each alternative; however any increase in traffic delays would be limited to peak traffic hours. The automobile is expected to be the primary mode of transportation for Navy personnel and therefore, there would be no significant increase in use of transit, pedestrian, and bicycle facilities. Impacts on traffic and transportation resources are dependent on number of personnel and not number and/or location of aircraft operations; therefore there would be no difference in impacts between scenarios or between average year and high-tempo FCLP year conditions.

If identified by the County or local municipality, measures could be implemented that would reduce congestion during peak traffic hours, such as restricting access at specific gates, changes to gate hours of operations, utilizing flaggers to direct traffic during peak traffic hours, or other traffic control devices. Roadway improvements at Ault field and in Oak Harbor already identified in the NAS Whidbey Island Transportation Plan, the City of Oak Harbor's comprehensive plan, and by the Washington State Department of Transportation would further reduce congestion on SR 20 and local roadways.

4.13 Infrastructure

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 (Cory, 2018). The analysis assumed each new Navy personnel would result in a new household with dependents. The number of dependents under each alternative is discussed in Section 4.10 and would range from 459 (Alternative 1) to 860 (Alternative 2). For the purposes of this analysis, it is not expected there would be any vacant housing units at the Seaplane Base.

4.13.1 Infrastructure, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to the existing infrastructure at Ault Field. Minor increases in demand for utilities would be expected under the No Action Alternative due to an increase in background community growth.

Therefore, no significant impacts to infrastructure would occur with implementation of the No Action Alternative.

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.

4.13.2 Infrastructure, Alternatives 1 through 3

4.13.2.1 Potable Water Impacts

The increase in military personnel and dependents in the study area would result in an increased demand for potable water. However, as shown in Table 4.13-1, NAS Whidbey Island, Oak Harbor, and Anacortes currently have additional water capacity. Therefore, each alternative is expected to have a negligible impact on potable water sources.

Table 4.13-1 NAS Whidbey Island Water Supply Capacity by District

<i>Water District</i>	<i>Daily Consumption (gpd)</i>	<i>Daily Supply Capacity (gpd)</i>	<i>Additional Supply Capacity (gpd)</i>
NAS Whidbey Island	630,000	4,500,000 ¹	3,870,000
Oak Harbor	2,218,000 ²	2,740,000	522,000
Anacortes	15,700,000 ²	42,000,000	26,300,000
Skagit PUD	12,000,000	24,000,000	12,000,000

Sources: City of Oak Harbor, 2014b; City of Anacortes, 2018a; NAVFAC, 2014; Skagit PUD, 2014

Notes:

- ¹ Capacity does not include emergency wells or wells located at OLF Coupeville
- ² Oak Harbor consumption includes NAS Whidbey Island; Anacortes consumption includes NAS Whidbey Island and Oak Harbor

Key:

- gpd = gallons per day
- PUD = Public Utility District

Table 4.13-2 identifies the projected water demand per alternative. Approximately 94,000 (Alternative 1) to 176,000 (Alternative 2) gallons per day would be needed to support 335 to 628 additional households in the region, depending on the alternative selected. Additional water consumption at Ault Field for new and renovated facilities under each alternative is presented in Table 4.13-3. Facility projections include consumption projects for uses in existing space that would be renovated. Facility consumption would be within the installation’s current water supply capacity and would represent less than 1 percent of Ault Field’s additional supply capacity.

Table 4.13-2 NAS Whidbey Island Area Projected Water Consumption per Alternative

<i>Water District</i>	<i>Number of Households</i>	<i>Projected Water Usage (gpd)</i>	<i>Percent of Additional Supply Capacity</i>
Alternative 1			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	234	65,600	12.6%
Anacortes	275	77,000	0.3%
Skagit PUD	17	4,700	0.0%
Unincorporated ¹	44	12,200	n/a
Study Area	335	93,800	n/a
Alternative 2			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	439	122,900	23.5%
Anacortes	516	144,400	0.5%
Skagit PUD	31	8,800	0.1%
Unincorporated	82	22,900	n/a
Study Area	628	175,800	n/a
Alternative 3			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	238	67,700	12.8%
Anacortes	280	78,400	0.3%
Skagit PUD	17	4,800	0.0%
Unincorporated	44	12,400	n/a
Study Area	341	95,500	n/a

Source: Nelson, Arthur C., 2004

¹ Unincorporated includes Coupeville, Washington

Note: Totals do not sum because Oak Harbor consumption includes NAS Whidbey Island; Anacortes consumption includes NAS Whidbey Island and Oak Harbor. Totals also do not sum due to rounding. Residential household consumption was assumed to be 280 gpd; additional supply capacity is based on the data shown in Table 4.13-1.

Key:

gpd = gallons per day

n/a = not applicable

PUD = Public Utility District

Table 4.13-3 Projected Annual Water Consumption for New Facilities at Ault Field (gpd)

<i>Alternative</i>	<i>Armament Storage</i>	<i>Mobile Maintenance Facility</i>	<i>Hangar Space</i>	<i>Total</i>
No Action Alternative	-	-	-	-
Alternative 1	40	390	560	990
Alternative 2	40	390	1,650	2,080
Alternative 3	40	390	560	990

Source: Navy, 2015b

Note: Projected totals are based on projected water consumption for similar future facilities at NAS Whidbey Island and include new construction and renovated existing structures

Key:
gpd = gallons per day

The percent of existing additional supply capacity in Oak Harbor ranges from 13 percent (Alternative 1) to 24 percent (Alternative 2). Oak Harbor anticipates having sufficient supply capacity until 2035 under current production and until 2060 with increased groundwater production (City of Oak Harbor, 2014b). NAS Whidbey and Oak Harbor both rely on Anacortes as their primary source of water. Total projected water demand represents less than 1 percent of Anacortes’ current water capacity of 42 million gallons per day (mgd), and Anacortes has water rights for, and the ability to expand to, 55 mgd (City of Anacortes, 2011, 2018a). Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to public water supplies.

New households in unincorporated areas of Island or Skagit Counties would rely on individual wells or small water districts using groundwater. Due to the small number of new households and the likelihood they would be spread out over a large geographic area, impacts to these water resources are expected to be minimal. Existing houses in unincorporated areas are expected to retain their existing access to water via a well or connection to a water district, and no new wells or connections would be needed. Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to the water district.

Implementation of the Proposed Action under any of the alternatives would not result in significant impacts to potable water.

4.13.2.2 Wastewater Impacts

The increase in military personnel and dependents in the study area would result in an increased production of wastewater. However, as shown in Table 4.13-4, NAS Whidbey Island, Oak Harbor, and Anacortes all currently have additional wastewater treatment capacity. Therefore, the Proposed Action, regardless of alternative selected, is expected to have an impact, but not significant, on wastewater treatment.

Table 4.13-4 NAS Whidbey Island Area Wastewater Treatment Capacity

<i>Water District</i>	<i>Daily Processing (gallons/day)</i>	<i>Daily Capacity (gallons/day)</i>	<i>Additional Capacity (gallons/day)</i>
NAS Whidbey Island	360,000	850,000	490,000
Oak Harbor	2,900,000	5,200,000	2,300,000
Anacortes	1,890,000	4,500,000	2,610,000
Mount Vernon	4,000,000	16,500,000	12,500,000

Sources: USEPA, 2008; Carollo Engineers, 2013; City of Oak Harbor, 2015c, 2017; City of Anacortes, 2018b; Mount Vernon, n.d.

Note: Oak Harbor consumption includes the Seaplane Base. Oak Harbor capacity assumes the Oak Harbor Clean Water Facility is operational by 2018

Table 4.13-5 identifies projected wastewater production under each alternative. Approximately 84,000 to 158,000 gallons per day would be produced by 335 to 628 additional households in the region. Additional wastewater production at Ault Field for new and renovated facilities under each alternative is presented in Table 4.13-6. Facility projections include production for existing space that would be renovated. Facility production would be within the installation’s current wastewater treatment capacity of 0.85 mgd, representing less than 1 percent of the additional capacity (USEPA, 2008).

Additional households in Oak Harbor and Anacortes would produce significantly less wastewater than their respective wastewater treatment capacities. Therefore, implementation of the Proposed Action would not result in significant impacts to wastewater treatment.

New households in unincorporated areas of Island and Skagit Counties would rely on on-site wastewater treatment systems. Existing houses are assumed to already have on-site wastewater systems. Property owners would be responsible for ensuring on-site wastewater systems meet state and local regulations.

Implementation of the Proposed Action under any of the alternatives would not result in significant impacts to wastewater.

Table 4.13-5 NAS Whidbey Island Area Projected Wastewater Production

<i>Wastewater District</i>	<i>Number of Households</i>	<i>Projected Wastewater Production (gpd)</i>	<i>Percent of Additional Capacity</i>
Alternative 1			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	234	59,000	2.6%
Anacortes	41	10,300	0.2%
Mount Vernon	17	4,200	0.0%
Unincorporated	44	11,000	n/a
Study Area	335	84,400	n/a
Alternative 2			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	439	110,600	4.8%
Anacortes	77	19,300	0.7%
Mount Vernon	31	7,900	0.1%
Unincorporated	82	20,600	n/a
Study Area	628	158,300	n/a
Alternative 3			
NAS Whidbey Island	0	n/a	n/a
Oak Harbor	238	60,100	2.6%
Anacortes	42	10,500	0.4%
Mount Vernon	17	4,300	0.0%
Unincorporated	44	11,200	n/a
Study Area	341	85,900	n/a

Source: Nelson, Arthur C., 2004

Note: Assumed residential household production of 252 gpd; additional capacity based on the totals listed in Table 4.13-4.

Key:
 gpd = gallons per day
 n/a = not applicable

Table 4.13-6 Projected Annual Wastewater Production for New Facilities at Ault Field (gpd)

<i>Alternative</i>	<i>Armament Storage</i>	<i>Mobile Maintenance Facility</i>	<i>Hangar Space</i>	<i>Total</i>
No Action	0	0	0	0
Alternative 1	40	150	560	750
Alternative 2	40	150	1,650	1,840
Alternative 3	40	150	560	750

Source: Navy, 2015b

Note: Totals are based on projected wastewater consumption for similar future facilities at NAS Whidbey Island and include new construction and renovated existing structures

Key:
 gpd = gallons per day

4.13.2.3 Stormwater Impacts

The Proposed Action would result in an increase in total impervious surface area at Ault Field. Specifically, 2.3 acres of new impervious surface area would be created on Ault Field as a result of new armament storage, the mobile maintenance facility storage area, vehicle parking, and hangar space. The projected 2.3 acres of impervious surface area would be an increase of less than 1 percent over the existing approximately 600 acres of existing impervious surface at Ault Field. Because more than 1 acre would be disturbed during construction under all alternatives, a construction NPDES stormwater permit would be obtained from the USEPA through its water quality permit program (see Section 4.9.2). The installation would need to implement BMPs to ensure that any new stormwater runoff would not further degrade the quality of water discharged into Dugualla Bay beyond current NPDES permit limits. NAS Whidbey Island currently complies with the State Stormwater Management Manual for Western Washington (NAVFAC, 2016b). BMPs in the manual include proper use and handling of de/anti-icing chemicals for aircraft and requirements and performance standards for LID. No new facilities or housing are expected to be constructed at the Seaplane Base under the Proposed Action; therefore, no impacts to stormwater would result there.

The stormwater system in areas of Oak Harbor is at or over capacity. However, the Proposed Action is not expected to impact stormwater in Oak Harbor or other areas of Island and Skagit Counties. Within the City of Oak Harbor and other areas of Island and Skagit Counties, mitigation is required by property developers under local regulations to reduce stormwater impacts.

If any new housing units were built as a result of the Proposed Action, stormwater impacts would be reduced through the implementation of stormwater management practices required by local and state regulations. Oak Harbor requires developers to be responsible for drainage in and through subdivisions, and it may require storm drain detention or infiltration systems (Code Publishing, 2016).

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to stormwater management systems.

4.13.2.4 Solid Waste Management Impacts

An increase in total solid waste generation is expected at NAS Whidbey Island and within the City of Oak Harbor and other areas of Island and Skagit Counties under the Proposed Action. However, regional landfill facilities have sufficient capacity. Therefore, no significant impact on solid waste management is expected.

Table 4.13-7 shows the projected solid waste production under each alternative. Additional households would generate between approximately 3,500 and 6,500 pounds of solid waste daily. Approximately 1,200 to 2,200 pounds of total solid waste generated would be recycled or composted. New facilities under each alternative would be expected to increase solid waste and hazardous waste generation by approximately 2 percent, based on the increase in square footage of facilities at Ault Field under each alternative. Hazardous waste collection and disposal is discussed in more detail in section 4.15. All municipal solid waste in the study area is sent to the Roosevelt Regional Landfill. Waste generated under any of the alternatives would represent a negligible amount of the facility's permitted capacity of 120 million tons.

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to solid waste management.

Table 4.13-7 NAS Whidbey Island Projected Solid Waste Production (pounds per day)

<i>Alternative</i>	<i>Total Solid Waste</i>	<i>Waste Recycled/Composted</i>
Alternative 1	3,500	1,200
Alternative 2	6,500	2,200
Alternative 3	3,600	1,200
No Action	0	0

Source: USEPA, 2015b

Notes: Assumes population increase described in Section 4.10.
 Assumes solid waste generation rate of 4.4 pounds per person.
 Assumes recycling/composting rate of 1.51 pounds per person.

4.13.2.5 Energy Impacts

An increase in total energy consumption at NAS Whidbey Island and within the City of Oak Harbor and other areas of Island and Skagit Counties would be expected under each alternative. However, projections anticipate sufficient energy supply for the foreseeable future. Therefore, no significant impact to energy supply is expected under any of the alternatives.

Approximately 1.4 million kWh to 2.6 million kWh of electricity per year (see Table 4.13-8) is expected to support new households under the Proposed Action. New households would require new connections to the existing distribution system, and some areas may require new infrastructure to accommodate increased capacity, depending on the location and quantity of housing.

The data in Table 4.13-8 show that 25,100 million British thermal units to 47,000 million British thermal units of additional natural gas would be needed within the region to support new homes under the alternatives. Property owners would be responsible for contacting Cascade Natural Gas Corporation (CNG) to obtain a connection to the existing gas distribution system. New properties too far from existing gas mains may be required to find other fuel sources, such as propane; however, the number of these homes would be minimal and would not impact alternative fuel types.

Table 4.13-8 NAS Whidbey Island Projected Annual Energy Consumption

	<i>Households</i>	<i>Electricity Consumption (kWh)</i>	<i>Natural Gas (MMBTU)</i>
Alternative 1	335	1,390,200	25,100
Alternative 2	628	2,606,000	47,000
Alternative 3	341	1,415,100	25,500
No Action	0	0	0

Source: EIA, 2013

Note: Assumed daily household consumption of 12.57 megawatt hours for electricity and 74.8 MMBTU for natural gas (EIA, 2013).

Key:
 kWh = kilowatt hours
 MMBTU = million British thermal units

The data in Tables 4.13-9 and 4.13-10 show projected annual electricity and natural gas consumption for new facilities that would be needed at Ault Field under each alternative. New energy use was estimated using projected building square footage and was based on Energy Information Administration commercial building energy-use intensities (EIA, 2008). New federal buildings are required to use 30 percent less energy than those built using traditional construction techniques, and this requirement was incorporated into the energy-use estimates. No areas of concern have been identified at Ault Field, and upgrades or expansion to the existing electric power distribution system on the installation are expected under the alternatives. The Navy would need to perform an economic analysis to determine if the addition of the new facilities at Ault Field to the installation's existing steam system is feasible (NAVFAC, 2016a).

Table 4.13-9 Projected Annual Electricity Consumption for New Facilities at Ault Field (kWh)

<i>Alternative</i>	<i>Armament Storage</i>	<i>Mobile Maintenance Facility</i>	<i>Hangar Space</i>	<i>Total</i>
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)

<i>Alternative</i>	<i>Armament Storage</i>	<i>Mobile Maintenance Facility</i>	<i>Hangar Space</i>	<i>Total</i>
Alternative 1	70	540	940	1,550
Alternative 2	70	540	2,760	3,770
Alternative 3	70	540	940	1,710
No Action	0	0	0	0

Source: Navy, 2015b

Note: Totals are based on projected natural gas consumption from new buildings and on EIA's commercial building survey (EIA, 2008), assuming a reduction of 30 percent as required by federal energy efficiency requirements for new federal buildings.

Key:
MMBTU = million British thermal units

As discussed in Section 3.13, NAS Whidbey Island has improved its electricity-use efficiency through implementation of several building renovation projects, thereby reducing its overall energy usage 40

percent between 2003 and 2015 (NAS Whidbey Island, 2016). The projected increase in building energy use from this action under any alternative would be less than 2 percent of total building energy use in 2015. New building energy efficiency standards would be implemented at the new buildings as NAS Whidbey Island continues to reduce site-wide energy use to meet DoD requirements.

The State of Washington is home to abundant and cheap supplies of hydroelectric power. The state is a net exporter of electricity and provides power to the Canadian power grid as well as California and the Southwest (EIA, 2018b). Washington State has produced over 114 million megawatt hours, with retail sales of only 89 megawatt hours (EIA, 2018a). Electricity demand under any of the alternatives would account for less than 1 percent of surplus production.

CNG projects natural gas production of over 4.2 million therms (1 therm equals 100,000 British thermal units) and demand of just over 4 million therms in 2021 (CNG, 2011). Projected natural gas consumption under any of the alternatives represents a small fraction of projected surplus. CNG has acknowledged it will need to identify additional capacity resources or supply arrangements to meet peak demands within its service area. However, the company's integrated resource plan indicates that, thanks to new technologies, the gas supply is adequate to meet growing demands in the Pacific Northwest and North America (CNG, 2011).

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to energy utilities.

4.13.2.6 Communications Impacts

It is expected that existing housing is already connected to telephone networks. Cell phone service is provided by multiple carriers throughout the study area. Capacity is largely driven by consumer demand, and it is expected carriers would install new cell towers or upgrade existing cell towers as needed to meet demand.

The Proposed Action is expected to result in an increased use of the bandwidth of existing communication systems at NAS Whidbey Island resulting from the increased number of personnel and operations. Existing capacity does not currently keep up with peak demand. Renovation or construction of new facilities under the alternatives would include new or upgraded communication networks to facilities, such as fiber optic and copper cables to support alarms, telephones, video teleconferencing, processing, perimeter security, enterprise land mobile radio, legacy applications, environmental controls, and information assurance and cyber security. Upgrades during renovation and construction would ensure existing communications at Ault Field are not significantly impacted.

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to communications utilities.

4.13.2.7 Facilities Impacts

Existing facilities at Ault Field would need to be modified, and new facilities would be constructed in order to support the necessary training, maintenance, and operational requirements under each alternative. See Section 2.3.2.3 for a description of these facilities. All planned construction activities would occur on the north end of the flight line at Ault Field, and sufficient space at the installation exists to accommodate all planned facilities. Renovation and construction of new facilities would have a beneficial impact to facilities under each alternative. No new facilities would be constructed off station.

Therefore, implementation of the Proposed Action under any of the alternatives would not result in significant impacts to facilities.

4.13.3 Infrastructure Conclusion, Alternatives 1 through 3

Overall, as discussed above, implementation of Alternatives 1 through 3 at NAS Whidbey Island would not result in significant impacts to infrastructure resources. Each alternative would result in increased consumption or demand for water, wastewater, stormwater, solid waste management, energy, and communications systems. Increased demand under each alternative would result from an increase in population that would be spread throughout Island and Skagit Counties. New facilities under each alternative would also result in increased demand for infrastructure resources. Based on existing and future capacity and projected demand, Navy and local infrastructure systems are expected to have sufficient capacity to accommodate the increase in population and facility requirements. Therefore, the impact under each alternative would be less than significant. Difference in impacts between alternatives would only occur due to slight differences in construction and personal needs and would be negligible. Impacts on infrastructure needs are dependent on number of personnel and not number and/or location of aircraft operations; therefore there would be no difference in impacts between scenarios or between average year and high-tempo FCLP year conditions for all resources.

4.14 Geological Resources

This section assesses potential impacts of the Proposed Action on geological resources, including topography, geology, seismic events, and soils. The analysis of geological resources focuses on the area of proposed construction where soils would be disturbed and where there would be potential for soil erosion. BMPs are identified to minimize soil impacts and prevent or control pollutant discharge into stormwater.

4.14.1 Geological Resources, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to geological resources. Therefore, no significant impacts to geological resources would occur with implementation of the No Action Alternative.

4.14.2 Geological Resources, Alternatives 1 through 3

New construction under Alternatives 1 through 3 would include expanded hangar space and/or new hangars, armament storage, maintenance facilities, and expanded personnel parking areas. All planned construction would occur in proximity to the flight line at Ault Field. No construction would occur at OLF Coupeville. Each alternative would result in up to 2.3 acres of new impervious surface at NAS Whidbey Island.

4.14.2.1 Geological Resources Potential Impacts

4.14.2.1.1 Topography Impacts

Alternatives 1 through 3 would have no impact on topography as topography at the construction sites would not be affected by minor grading because the sites are generally level.

4.14.2.1.2 Geology Impacts

Under each of the three alternatives, construction would not include clearing or blasting of earth or rock. There would only be minor grading, around 18 to 24 inches deep, which would not affect bedrock or geology. Therefore, no significant impacts on geology would occur.

4.14.2.1.3 Seismic Activity and Geologic Hazard Impacts

Under each of the three alternatives, construction and operation activities, including increases in Growler activity, would not result in impacts to seismic activity, liquefaction risk, landslide risk, or bluff erosion.

In the event of an earthquake, seismic hazards including liquefaction may result in damage to buildings or other structures. Potential for damage from ground shaking is highest in local areas that contain

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.

artificial fill, areas underlain by peat, existing landslides, and valley floors underlain by unconsolidated alluvial sediments. Much of the runway and airfield areas at Ault Field were constructed on artificial fill. However, all buildings constructed under the Proposed Action would be designed to conform to the seismic provisions of the Washington State Building Code. In the event of an earthquake, there is also the potential for spills to occur. However, an SPCC plan would be developed and implemented in order to help prevent spills and to control and clean up spills in the event that they did occur. Therefore, if a seismic event were to occur, human health and safety would be protected to the maximum extent practicable.

4.14.2.1.4 Soils Impacts

Under each of the three alternatives, impacts to soils during construction could include compaction and rutting from vehicle traffic and an increase in erosion. Up to 2.3 acres of new impervious surfaces would increase the quantity and velocity of stormwater runoff, which would increase the susceptibility of surrounding soils to erosion. These impacts would be minimized or avoided by using standard soil erosion- and sedimentation-control techniques at the construction site such as a silt barrier (filter fabric) and appropriate revegetation techniques upon completion. Areas that cannot be covered would have their stormwater runoff retained and diverted to the sanitary sewer system.

Minor grading, around 18 to 24 inches deep, would occur and the soils removed. To the extent possible, soils from grading would be reused on site for the project. Any remaining soils would be taken off station to a designated soil disposal site. In addition, construction practices would meet the policies and objectives contained within OPNAVINST 5090.1D, which are to protect, conserve, and manage the vital elements of the natural resource program, including soils, as well as basing land use practices on scientifically sound conservation procedures and techniques. Construction practices would also be consistent with the goals of the Integrated Natural Resources Management Plan, which directs identification of and appropriate use of soil in accordance with, and within the limits of, its physical characteristics while protecting it from uncontrolled stormwater runoff to prevent and control soil erosion (NAS Whidbey Island, 2013a). Revegetation techniques would include replanting disturbed areas with native plants.

Therefore, implementation of each of the three alternatives would not result in significant impacts on soils.

4.14.3 Geological Resources Conclusion

Overall, as discussed above, implementation of Alternatives 1, 2, or 3 at NAS Whidbey Island would not result in significant impacts to geological resources. Topography would not be impacted because new construction would be conducted in generally level areas. Construction would not include clearing or blasting of earth or rock, and only minor grading, and, therefore, no significant impacts on geologic resources would occur. There would be no impact on resistance to seismic events because all buildings constructed under the Proposed Action would be designed to conform to the seismic provisions of the Washington State Building Code, and an SPCC plan would be in place during construction. Up to 2.3 acres of new impervious surfaces would result from construction activities; however, implementation of each of the three alternatives would not result in significant impacts on soils due to the use of BMPs to reduce or eliminate any potential impacts. Construction activities are similar under the three alternatives and therefore there would be negligible differences in impacts to geological resources.

4.15 Hazardous Materials and Wastes

The hazardous materials and wastes analysis contained in the respective sections addresses issues related to the use and management of hazardous materials and wastes as well as the presence and management of specific cleanup sites at NAS Whidbey Island.

4.15.1 Hazardous Materials and Wastes, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur; this means the Navy would not operate additional Growler aircraft and would not add additional personnel at NAS Whidbey Island. Annual Growler airfield operations would be maintained at levels consistent with those identified in the 2005 and 2012 transition EAs. Consequently, there would not be any improvements to the Navy's electronic attack capability and no construction to support additional Growler aircraft or personnel. The No Action Alternative would not meet the purpose of or need for the Proposed Action; however, as required by NEPA, the No Action Alternative is carried forward for analysis in this EIS and provides a benchmark for measuring the environmental consequences of the alternatives.

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change associated with hazardous materials and wastes. Therefore, no significant impacts associated with hazardous materials and wastes would occur with implementation of the No Action Alternative.

4.15.2 Hazardous Materials and Wastes, Alternatives 1 through 3

The analysis of hazardous materials, hazardous waste, and contaminated sites focuses on the potential for these substances to be introduced into the environment during construction activities or from aircraft operations and maintenance. Potentially affected areas consist of proposed construction areas, the airfields, and aircraft support and maintenance facilities.

4.15.2.1 Hazardous Materials and Wastes Potential Impacts

Factors considered in the analysis include the potential for increased human health risk or environmental exposure, as well as changes in the quantity and types of hazardous substances transported, stored, used, and disposed. Operation and maintenance of additional Growler aircraft would not introduce any new hazardous materials and/or waste streams at the NAS Whidbey Island complex. While the addition of 35 or 36 Growler aircraft would increase the amount of hazardous materials handled and generate increased amounts of hazardous wastes, this increase would be managed by existing hazardous material and waste management functions and facilities at NAS Whidbey Island and would not result in significant impacts with regard to the handling, use, storage, or disposal of fuel, oils, and lubricants at the station. Increases in hazardous wastes would be negligibly higher under Alternatives 2 and 3 (36 aircraft) than under Alternative 1 (35 aircraft). There would be no difference in hazardous waste generation between scenarios or between average year and high-tempo FCLP year conditions. All hazardous wastes would continue to be collected and managed on site in

Hazardous Materials and Waste Potential Impacts

Hazardous materials and wastes would increase in quantity but would be managed under existing law and Navy regulations and management practices. The existing practices and strategies would successfully manage the use and disposal of these materials.

No proposed construction activities would impact existing DERP sites; therefore, ongoing remedial programs would not be impacted.

accordance with the installation's hazardous waste management plan. Appropriate procedures for handling of hazardous materials and BMPs for the management of hazardous substances and spill response at NAS Whidbey Island would be applied. Hazardous waste management activities would follow existing procedures for the safe handling, use, and disposal of hazardous substances and waste.

Therefore, the Proposed Action under any alternative would have no impact to hazardous materials and the waste management program at NAS Whidbey Island.

The Navy manages past releases of hazardous wastes through the Defense Environmental Restoration Program (DERP). The methodology for evaluating impact to or from contaminated sites compares the proximity of proposed facility development/construction activities to contaminated sites and considers the operational uses of the facilities to determine potential impacts to or from these sites. The Proposed Action would not interfere with any ongoing remedial programs at the NAS Whidbey Island complex or result in the potentially hazardous exposure of on-site personnel. No proposed construction activities would require removal or disturbance of surface soil, subsurface soil, groundwater, or existing groundcover near or within any DERP sites.

4.15.3 Hazardous Materials and Wastes Conclusion, Alternatives 1 through 3

Hazardous materials and wastes would increase in quantity but would be managed under existing law and Navy regulations and management practices. The existing practices and strategies would successfully manage the use and disposal of these materials. No proposed construction activities would occur within or in proximity to any DERP sites; therefore, ongoing remedial programs would not be impacted at Ault Field.

4.16 Climate Change and Greenhouse Gases

Increased GHG emissions are the primary cause of climate change, and therefore efforts to reduce GHG emissions are considered the best way to reduce the potential impacts of climate change. The Office of the Chief of Naval Operations M-5090.1D *Environmental Readiness Program Manual* (Navy, 2014a) states that the Navy must address the effects of climate change, identifying and quantifying GHG emissions (where possible) that may be generated in executing the Proposed Action, and also describing the beneficial activities being implemented Navy-wide to reduce GHG emissions. The State of Washington has also established goals to minimize climate change impacts and reduce GHG emissions.

As discussed in Chapter 3, global climate change threatens ecosystems, water resources, coastal regions, crop and livestock production, and human health. The continuing increase in GHG concentrations in the Earth's atmosphere will likely result in a continuing increase in global annual average temperature and climate change effects. Global, federal, and state initiatives to reduce GHG emissions have been implemented to reduce the severity of climate change impacts in the future. These changes would occur under all alternatives. The Proposed Action would result in an increase in GHG emissions compared to the No Action Alternative, primarily from the increase in the use of jet fuel for military aircraft operations. The Navy and the DoD have implemented other programs and policies to reduce GHG emissions from other sources. The Navy, the DoD, and the State of Washington have implemented laws, policies, and programs to address the impacts of climate change in the future.

As discussed in Section 1.13, four changes were applied to the noise analysis between release of the Draft EIS and the Final EIS, which include 1) updating the noise model using the latest version of NOISEMAP (Version 7.3); 2) applying refinements to certain flight profiles/aircraft operating assumptions; 3) incorporating the effects of PLM, also known as MAGIC CARPET, into the noise analysis; and 4) updating the number of pilots per squadron.

While climate change has been removed as a priority in some federal policies, the DoD and the Navy have not changed their policies or directives related to the review of and preparation for climate-related impacts (Sobczyk, 2018). Therefore, the analysis in this Final EIS is completed with the same methods defined in the Draft EIS in 2016. The Sabin Center for Climate Change Law at Columbia University (the Sabin Center) conducts regular surveys examining how federal agencies have been implementing climate change analysis in NEPA reviews. The Sabin Center reviewed 31 EISs published in the fall of 2016

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.

and noted that the NAS Whidbey Island Draft EIS was on the “most comprehensive end of the spectrum” in the specific quantification of GHG emissions (Sabin Center, 2017).

4.16.1 Global Climate Change Projections

Because GHGs remain in the atmosphere for long periods of time, the concentrations of GHGs in the atmosphere are likely to continue to remain elevated despite reductions in GHG emissions (IPCC, 2013), and therefore the impacts of climate change described in Chapter 3 are likely to continue to occur. Depending on society’s commitment to reducing GHG emissions, the USEPA predicts that carbon dioxide (CO₂) concentrations could be stabilized at about the current levels of 400 parts per million by the end of this century, but if unchecked could reach 1,300 parts per million by then. By 2100, global average temperatures are expected to rise between 2.7 degrees and 8.6 degrees Fahrenheit. These temperature levels would result in a continuation of effects, such as the increase in sea levels, extreme weather events, and ocean acidification—all of which will increase impacts on ecological and economic systems, as well as human health. Significant reductions in GHG emissions will only reduce the severity of climate change impacts; however, such reductions will be critical to limiting impacts on infrastructure and natural resources (USEPA, 2016e)

4.16.1.1 Projections for Impacts of Climate Change to Washington and Puget Sound

Washington State has identified several specific risks to the state and sensitive areas. The direct effects of climate change that will affect the state are warmer temperatures, rising sea levels, reduced snow pack, and extreme weather events (Washington State Department of Ecology, n.d.[h]).

Warmer temperatures will result in milder winters with more rain and hotter summers with less rain. Annual temperatures are predicted to be 2 degrees warmer in the 2020s and 3 degrees warmer in the 2040s compared to 1970 through 1999 averages. These changes will result in a decline in water supplies, more human health risks, a changing growing season, more pests, native plant and animal population decline (including salmon), and wetlands decline (Washington State Department of Ecology, n.d.[i]).

It is difficult to predict rising sea levels and their impacts on the coast of Washington and within Puget Sound because sea level is affected by many different local factors, including ocean currents, wind patterns, land loss, local glacial melt, and even the potential for earthquakes. Sea levels in Puget Sound are projected to continue rising through the 21st century, increasing by 14 to 54 inches by 2100 (relative to 2000), resulting in higher tidal/storm surge and increased coastal inundation, erosion, and flooding (Climate Impacts Group, 2015). Higher sea levels will increase wave heights, particularly during storm surges. Sea level rise effects include coastal community flooding, coastal erosion and landslides, seawater intrusion into groundwater wells, and lost wetlands and estuaries (Washington State Department of Ecology, n.d.[j]).

Reduced snow pack and earlier runoff will have a wide impact in Washington. Average spring snowpack in the Puget Sound region is projected to decline by 42 to 55 percent by the 2080s (relative to 1970 through 1999) (Climate Impacts Group, 2015). Less snow means that glaciers are not replenished. Downstream effects that will likely increase in the future include changes in the timing of peak freshwater flows, power output and hydropower facilities, winter recreation, fish migration, and water availability in the dry summer season (Washington State Department of Ecology, n.d.[k]).

Extreme weather resulting from climate change in Washington is likely to take the form of a greater intensity of wind storms, heat waves, droughts, heavy rains, snow storms, and dust storms. Storms

result in flooding, landslides, hail, and wind that endanger life, damage property, and challenge state and local emergency response capabilities. Heat waves are also dangerous to temperature-sensitive individuals (e.g., infants and elderly) and natural habitats (Washington State Department of Ecology, n.d.[i]).

Many Pacific salmon populations could be harmed by warming stream temperatures, increasing winter peak flows, and decreasing summer low flows, which could affect salmon reproduction, growth, and survival. Some species may not be harmed; however, it is likely that salmon species with an in-stream rearing life stage (e.g., steelhead, some Chinook sockeye, and Coho) will be affected (Climate Impacts Group, 2015).

Ocean water is becoming more acidic because of elevated levels of CO₂ related to human activities. The pH of Washington's coastal waters is projected to decline by 0.14 to 0.32 by 2111 (relative to 1986 through 2005 levels) (Climate Impacts Group, 2015). This process, known as ocean acidification, may be having negative impacts on marine animals, particularly shellfish. Scientists predict that ocean acidification will continue in the future, which could cause significant developmental problems for many species in Washington, such as oysters, clams, barnacles, geoduck, and plankton, which are important food sources for salmon, seabirds, whales and other marine wildlife in the region (Washington State Department of Ecology, n.d.[m]).

4.16.1.2 Projections for Impacts of Climate Change on Department of Defense

As discussed in Chapter 3, The 2014 DoD Climate Change Adaptation Roadmap indicates that rising global temperatures, changing precipitation patterns, increasing frequency or intensity of extreme weather events, and rising sea levels and associated storm surges are likely to affect the DoD's activities, and adaptation will require consideration of climate change in DoD plans, operations, training, infrastructure, and acquisition (DoD, 2014).

4.16.1.3 Projections for Impacts of Climate Change at NAS Whidbey Island

As NAS Whidbey Island is located within Puget Sound, it will experience the same climate change effects described above. Increased sea levels, storm surges, and extreme weather events could have an impact on NAS Whidbey Island's existing facilities and infrastructure. Station facilities are at elevations ranging from 10 feet to 75 feet above sea level. Sea level increases for the Strait of Juan de Fuca are projected to be 1 to 6 inches by 2030, 1 to 14 inches by 2050, and 6 to 55 inches by 2100 (Climate Impacts Group, 2015). While this predicted increase would not cause a permanent inundation of the station, it is likely to increase the potential for flooding events at the station during storms. Higher sea levels also increase the power of waves and the associated rate of coastal erosion around the station.

Climate change could also affect operations at NAS Whidbey Island. Extreme weather could impact aircrew training schedules, and heat waves may increase the number of "black flag" days (suspended outdoor training due to heat), fire hazards, or dust generation during activities. Increases in cooling degree days will require more energy for cooling of buildings and may require increased capability of building cooling systems. Increased frequency of intense rain events could tax the existing stormwater treatment systems, leading to localized flooding and increased pollution levels in runoff.

4.16.2 Changes in Greenhouse Gas Emissions from the Proposed Action

In accordance with Navy guidance (Navy, 2014a), the following section quantifies the estimated GHG emissions that would be generated in executing the Proposed Action.

4.16.2.1 Changes in Greenhouse Gas Emissions from the Proposed Action, No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. No new stationary sources would be installed, and no existing stationary sources would have an increase in emissions. There would be no significant change in aircraft operations. Therefore, no significant impacts to GHG emissions would occur with implementation of the No Action Alternative.

4.16.2.2 Changes in Greenhouse Gas Emissions from the Proposed Action, Alternative 1

Alternative 1 would expand carrier capabilities by adding three additional aircraft to each existing carrier squadron and augmenting the FRS with eight additional aircraft (a net increase of 35 aircraft). While no new squadrons would be created, this expansion would require new buildings and the renovation of space for maintenance hangars, armament storage, and classroom space. The Navy would also construct additional paved areas for vehicle parking and aircraft runway improvements and parking areas. The expansion of Growler operations would require an increase of 335 personnel at the NAS Whidbey Island complex. Alternative 1 represents the largest increase in aircraft operations of the three alternatives. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 1.

Implementation of Alternative 1 would contribute directly to emissions of GHGs from the combustion of fossil fuels. Fossil fuel combustion results in the GHG emissions of primarily CO₂, with negligible amounts of methane (CH₄) and nitrous oxide (N₂O). The emissions of CO₂ from aircraft are used as the carbon dioxide equivalent (CO₂e) emissions per AESO's recommendation (AESO, 2014). CH₄ and N₂O emissions have been converted to CO₂e and included in the totals where emissions factors are available. GHG emissions have been calculated using resources and emission factors as described in Section 4.4 (Air Quality), and detailed assumptions and calculations are provided in Appendix B.

As listed in Table 4.4-1, construction activities would generate approximately 1,950 metric tons (MT) of CO₂e during construction, but these emissions would be temporary and would occur before implementation of the Proposed Action.

Once the Proposed Action has been implemented, ongoing increased stationary source operations, Growler aircraft operations, and personnel commuting would generate an increase in GHG emissions compared to No Action Alternative GHG emissions. Table 4.16-1 provides a summary of the annual GHG emissions under the five different scenarios.

Table 4.16-1 NAS Whidbey Island Complex Annual GHG Emissions, Alternative 1

<i>Emission Source</i>	<i>GHG Emissions (MT per year CO_{2e})</i>					
	<i>No Action</i>	<i>Alt 1A</i>	<i>Alt 1B</i>	<i>Alt 1C</i>	<i>Alt 1D</i>	<i>Alt 1E</i>
Stationary Sources						
Site-wide Total GHG Emissions (2016 Reported)	11,575					
New Electricity Building Use (Indirect)	0	181	181	181	181	181
New Natural Gas Building Use (Direct)	0	276	276	276	276	276
Total Change in Stationary CO _{2e} Emissions		456	456	456	456	456
% increase in Stationary CO _{2e} Emissions		3%	3%	3%	3%	3%
Mobile Sources						
Aircraft Operations	87,730	125,906	118,430	111,453	123,547	113,317
GSE Emissions	134	166	159	154	164	156
Personnel Commute Emissions	9,091	9,833	9,833	9,833	9,833	9,833
Total Action-related Mobile CO _{2e} Emissions	96,954	135,904	128,422	121,440	133,543	123,305
Change in Mobile CO _{2e} Emissions		38,950	31,467	24,485	36,589	26,351
% increase in Mobile CO _{2e} Emissions		40%	32%	25%	37%	27%
Total Change in Emissions (Stationary and Mobile)		39,375	31,899	24,922	37,016	26,786
2013 Total CO _{2e} from Transportation in Washington State ¹		42,500,000				
Change in Mobile Emissions as % of Total 2013 Transportation CO _{2e} Emissions in Washington State		0.09%	0.07%	0.06%	0.09%	0.06%
2013 Total CO _{2e} from Aircraft in Washington State ¹		8,000,000				
Change in Aircraft Emissions as % of Total 2013 Aircraft CO _{2e} Emissions in Washington State		0.49%	0.39%	0.31%	0.46%	0.33%

Note:

¹ Washington State Department of Ecology, 2016b

Key:

CO₂ = carbon dioxide

CO_{2e} = carbon dioxide equivalent

GHG = greenhouse gas

MT = metric tons

Site-wide stationary source GHG emissions would increase by 3 percent, and site-wide mobile GHG emissions associated with the Proposed Action would increase by 25 percent to 40 percent. Regional GHG emissions inventories that include military aircraft emissions are not available; therefore, GHG emissions have been compared to applicable state sector totals (i.e., transportation and aircraft emissions) to provide a reference for the scale of emissions from the Proposed Action. The change in Growler GHG emissions represents less than 1 percent of aircraft emissions within the State of Washington.

Washington State has established GHG reduction targets to reduce overall emissions (Revised Code of Washington [RCW] 70.235.020 Washington State Legislature, 2008), and increases in GHG emissions could affect the state's efforts to meet these targets. While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million metric tons of equivalent carbon dioxide (MTCO_{2e}) between 1990 and 2013 (refer to Table 3.16-1 in Section 3.16), annual aircraft GHG emissions decreased from 9.1 to 6.57 million MTCO_{2e} over the same period (Washington State Department of Ecology, 2016b). The change in GHG emissions from the Proposed Action would only result in a small percentage of total aircraft GHG emissions in the State of Washington. Therefore, the GHG emissions from the Proposed Action should not have a significant impact on Washington's GHG emission goals.

4.16.2.3 Changes in Greenhouse Gas Emissions from the Proposed Action, Alternative 2

Alternative 2 would expand expeditionary and carrier capabilities by establishing two new expeditionary squadrons, adding two additional aircraft to each existing carrier squadron, and augmenting the FRS with eight additional aircraft (a net increase of 36 aircraft). This expansion would require construction of new buildings for maintenance hangars, armament storage, and classroom space. The Navy would also construct additional paved areas for vehicle parking and aircraft runway improvements and parking areas. The expansion of Growler operations would require an increase of 628 personnel at the NAS Whidbey Island complex. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 2.

Implementation of Alternative 2 would contribute directly to emissions of GHGs from the combustion of fossil fuels. GHG emissions have been calculated using resources and emission factors as described in Section 4.4 (Air Quality), and detailed assumptions and calculations are provided in Appendix B. As listed in Table 4.4-1, construction activities would generate approximately 1,950 MT of CO_{2e} during construction, but these emissions would be temporary and would occur before implementation of the Proposed Action.

Once the Proposed Action has been implemented, ongoing increased stationary source operations, Growler aircraft operations, and personnel commuting would generate an increase in GHG emissions under Alternative 2 compared to No Action Alternative GHG emissions. Table 4.16-2 provides a summary of the annual GHG emissions under the five different scenarios.

Table 4.16-2 NAS Whidbey Island Complex Annual GHG Emissions, Alternative 2

Emission Source	GHG Emissions (MT per year CO ₂ e)					
	No Action	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 2E
Stationary Sources						
Site-wide Total GHG Emissions (2016 Reported)	11,575					
New Electricity Building Use (Indirect)	0	181	181	181	181	181
New Natural Gas Building Use (Direct)	0	276	276	276	276	276
Total Change in Stationary CO ₂ Emissions		456	456	456	456	456
% increase in Stationary CO ₂ Emissions		3%	3%	3%	3%	3%
Mobile Sources						
Aircraft Operations	87,730	126,132	118,932	112,238	123,900	114,509
GSE Emissions	134	170	163	158	168	160
Personnel Commute Emissions	9,091	10,482	10,482	10,482	10,482	10,482
Total Action Related Mobile CO ₂ Emissions	96,954	136,783	129,577	122,878	134,549	125,151
Change in Mobile CO ₂ Emissions		39,829	32,623	25,924	37,595	28,197
% increase in Mobile CO ₂ Emissions		40%	33%	26%	38%	29%
Total Change in Emissions (Stationary and Mobile)		40,285	33,079	26,380	38,051	28,653
2013 Total CO ₂ from Transportation in Washington State ¹		40,400,000				
Change in Mobile Emissions as % of Total 2013 Transportation CO ₂ e Emissions in Washington State		0.10%	0.08%	0.06%	0.09%	0.07%
2013 Total CO ₂ e from Aircraft in Washington State ¹		6,570,000				
Change in Aircraft Emissions as % of Total 2013 Aircraft CO ₂ e Emissions in Washington State		0.61%	0.50%	0.39%	0.57%	0.43%

Note:

¹ Washington State Department of Ecology, 2016b

Key:

- CO₂ = carbon dioxide
- CO₂e = carbon dioxide equivalent
- GHG = greenhouse gas
- MT = metric tons

Site-wide stationary source GHG emissions would increase by 3 percent, and site-wide mobile GHG emissions associated with the Proposed Action would increase by 26 percent to 40 percent. Regional GHG emissions inventories that include military aircraft emissions are not available; therefore, GHG emissions have been compared to applicable state sector totals (i.e., transportation and aircraft emissions) to provide a reference for the scale of emissions from the Proposed Action. The change in Growler emissions represents less than 1 percent of aircraft GHG emissions within the State of Washington.

Washington State has established GHG reduction targets to reduce overall emissions (RCW 70.235.020 Washington State Legislature, 2008), and increases in GHG emissions could affect the state's efforts to meet these targets. While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million MTCO_{2e} between 1990 and 2013 (refer to Table 3.16-1 in Section 3.16), annual aircraft GHG emissions decreased from 9.1 to 6.57 million MTCO_{2e} over the same period (Washington State Department of Ecology, 2016b). The change in GHG emissions from the Proposed Action would only result in a small percentage of total aircraft GHG emissions in the State of Washington. Therefore, the GHG emissions from this Proposed Action should not have a significant impact on Washington's GHG emission goals.

4.16.2.4 Changes in Greenhouse Gas Emissions from the Proposed Action, Alternative 3

Alternative 3 would expand expeditionary and carrier capabilities by adding three additional aircraft to each existing expeditionary squadron, adding two additional aircraft to each existing carrier squadron, and augmenting the FRS with nine additional aircraft (a net increase of 36 aircraft). This expansion would require new buildings and the renovation of space for maintenance hangars, armament storage, and classroom space. The Navy would also construct additional paved areas for vehicle parking and aircraft runway improvements and parking areas. The expansion of the Growler community would require an increase of 341 personnel at the NAS Whidbey Island complex. The five different scenarios reflect different operation levels at Ault Field and OLF Coupeville. See Chapter 2 for a full description of the Proposed Action under Alternative 3.

Implementation of Alternative 3 would contribute directly to emissions of GHGs from the combustion of fossil fuels. GHG emissions have been calculated using resources and emission factors as described in Section 4.4 (Air Quality), and detailed assumptions and calculations are provided in Appendix B. As listed in Table 4.4-1, construction activities would generate approximately 1,950 MT of CO_{2e} during construction, but these emissions would be temporary and would occur before implementation of the Proposed Action.

Once the Proposed Action has been implemented, ongoing increased stationary source operations, Growler aircraft operations, and personnel commuting under Alternative 3 would generate an increase in GHG emissions compared to existing and No Action Alternative GHG emissions. Table 4.16-3 provides a summary of the annual GHG emissions under the five different scenarios.

Site-wide stationary source GHG emissions would increase by 3 percent, and site-wide mobile GHG emissions associated with the Proposed Action would increase by 25 percent to 40 percent. Regional GHG emissions inventories that include military aircraft emissions are not available; therefore, emissions have been compared to state sector totals (i.e., transportation and aircraft emissions) to provide a reference for the scale of emissions from the Proposed Action. The change in Growler emissions represents less than 1 percent of aircraft emissions within the State of Washington.

Table 4.16-3 NAS Whidbey Island Complex Annual GHG Emissions, Alternative 3

Emission Source	CO ₂ e Emissions (Metric TPY)					
	No Action	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E
Stationary Sources						
Site-wide Total GHG Emissions (2016 Reported)	11,575					
New Electricity Building Use (Indirect)	0	181	181	181	181	181
New Natural Gas Building Use (Direct)	0	276	276	276	276	276
Total Change in Stationary CO ₂ Emissions		456	456	456	456	456
% increase in Stationary CO ₂ Emissions		3%	3%	3%	3%	3%
Mobile Sources						
Aircraft Operations	87,730	125,813	119,164	112,008	123,588	114,259
GSE Emissions	134	169	164	158	167	160
Personnel Commute Emissions	9,091	9,846	9,846	9,846	9,846	9,846
Total Action Related Mobile CO ₂ Emissions	96,954	135,827	129,174	122,012	133,601	124,265
Change in Mobile CO ₂ Emissions		38,873	32,220	25,057	36,647	27,310
% increase in Mobile CO ₂ Emissions		40%	33%	25%	37%	28%
Total Change in Emissions (Stationary and Mobile)		39,295	32,646	25,490	37,070	27,741
2013 Total CO ₂ e from Transportation in Washington State ¹		40,400,000				
Change in Mobile Emissions as % of Total 2013 Transportation CO ₂ e Emissions in Washington State		0.10%	0.08%	0.06%	0.09%	0.07%
2013 Total CO ₂ e from Aircraft in Washington State ¹		6,570,000				
Change in Aircraft Emissions as % of Total 2013 Aircraft CO ₂ e Emissions in Washington State		0.59%	0.49%	0.38%	0.56%	0.42%

Note:

¹ Washington State Department of Ecology, 2016b

Key:

- CO₂ = carbon dioxide
- CO₂e = carbon dioxide equivalent
- GHG = greenhouse gas
- TPY = tons per year

Washington State has established GHG reduction targets to reduce overall emissions (RCW 70.235.020 Washington State Legislature, 2008), and increases in GHG emissions could affect the state's efforts to meet these targets. While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million MTCO₂e between 1990 and 2013, annual aircraft GHG emissions decreased from 9.1 to 6.57 million MTCO₂e (Washington State Department of Ecology, 2016b) over the same period. The change in GHG emissions from the Proposed Action would only result in a small percentage of total aircraft GHG emissions in the State of Washington. Therefore, the GHG emissions from the Proposed Action should not have a significant impact on Washington's GHG emission goals.

4.16.2.5 Greenhouse Gas Summary Conclusions, Alternatives 1 through 3

The Sabin Center for Climate Change Law at Columbia University conducts regular surveys examining how federal agencies have been implementing climate change analysis in National Environmental Policy Act (NEPA) reviews. The center reviewed 31 environmental impact statements (EISs) published in the fall of 2016, and noted that the NAS Whidbey Island Draft EIS was on the "most comprehensive end of the spectrum" in the specific quantification of GHG emissions (Sabin Center, 2017).

Potential changes in GHG emissions from implementation of the Proposed Action would be similar between all three alternatives and scenarios but greatest under Alternative 2, Scenario A (see Table 4.16-2). For air emissions, the difference in aircraft emissions between the scenarios within each alternative is more distinctive than the differences between the alternatives.

For all three alternatives, Scenario A, the option to conduct 80 percent of FCLPs at OLF Coupeville and 20 percent of FCLPs at Ault Field, would result in the greater increase in GHG emissions. Differences are less a result of the number of operations as they are due to the type of operations that change between the scenarios (e.g., more LTOs have been projected to occur at Ault Field if FCLPs are relocated to OLF Coupeville). A smaller increase is a result of the transit back and forth from the OLF.

As discussed in Chapter 3, based on average time-in-mode assumptions, each typical sortie with one full landing and take-off cycle (including all ground-level operations, such as taxiing and refueling operations), transit to OLF Coupeville, and eight T&G operations would take 95 minutes, or 1.6 hours, including an estimated 40 seconds total of AB use. Each such sortie would burn 1,480 gallons of jet fuel and produce 14.25 MTCO₂e, for an average fuel use of 937 gallons per hour and an average emission rate of 9.03 MTCO₂e per hour. This analysis has estimated the emissions that will be produced by VAQ OLF training over the course of a year. While there are a certain number of operations per year, they are not constant, and power settings vary based on the type of operation. The highest emission increases are predicted under Alternative 2, Scenario A, with a total of 126,132 MTCO₂e generated by all flight operations at Ault Field and OLF Coupeville from the 118 Growlers that would be stationed at NAS Whidbey Island under this alternative. The average annual GHG emissions per aircraft would be 1,069 MTCO₂e per year, which is equivalent to the combined average annual CO₂e emission of 205 cars, if each car emits an average of 4.7 MTCO₂e per year (USEPA, 2016l).

Washington State has established GHG reductions targets to reduce overall emissions (RCW 70.235.020 Washington State Legislature, 2008), and increases in GHG emissions could affect the state's efforts to meet these targets. While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million MTCO₂e between 1990 and 2012 (Refer to Table 3.16-1 in Section 3.16), annual aircraft GHG emissions decreased from 9.1 to 6.57 million MTCO₂e over

the same period (Washington State Department of Ecology, 2016b). The change in GHG emissions from the Proposed Action would only result in a small percentage of total aircraft GHG emissions in the State of Washington. Therefore, the GHG emissions from the Proposed Action should not have a significant impact on Washington’s GHG emission goals.

Chapter 173-442 of the Washington Administrative Code, The Clean Air Rule, was adopted in September 2016 and regulates the businesses that are responsible for about two-thirds of carbon pollution in Washington State. NAS Whidbey Island was not identified by the Washington State Department of Ecology as a potentially eligible party under the new clean air rule (Washington State Department of Ecology, 2016b) because the installation’s stationary emissions have historically been below 25 tons.

GHG emissions would also be higher under the high-tempo FCLP year conditions across all three alternatives (see Table 4.16-4 and Appendix B for details). High-tempo FCLP conditions would produce 4 to 6 percent more GHG emissions under Alternative 2 compared to the average conditions, and 1-4 percent more under Alternatives 1 and 3. This is a result of not only changes in the number of operations but also in the type of operations.

Table 4.16-4 Total Change in GHG Emissions, All Alternatives

<i>Alternative/Scenario</i>	<i>Average Operations</i>	<i>High-Tempo Operations</i>	<i>Percent Difference</i>
	<i>MTCO_{2e}</i>		
<i>Alternative 1</i>			
Scenario A	39,375	40,828	4%
Scenario B	31,899	32,770	3%
Scenario C	24,922	25,254	1%
Scenario D	37,016	38,254	3%
Scenario E	26,786	27,854	4%
<i>Alternative 2</i>			
Scenario A	40,250	42,538	6%
Scenario B	33,050	34,653	5%
Scenario C	26,356	27,407	4%
Scenario D	38,018	40,047	5%
Scenario E	28,627	29,889	4%
<i>Alternative 3</i>			
Scenario A	39,295	40,702	4%
Scenario B	32,646	33,690	3%
Scenario C	25,490	25,982	2%
Scenario D	37,070	38,209	3%
Scenario E	27,741	28,463	3%

Key:
 CO_{2e} = carbon dioxide equivalent
 MT = metric ton

As described in Chapter 3, the DoD, Navy, and NAS Whidbey Island have implemented many policies and programs to reduce GHG emissions. In the 2010 Navy Energy Vision (Navy, 2010b), the Secretary of the Navy set goals to reduce the reliance on petroleum by increasing energy efficiency and the use of alternative energy, which will reduce GHG emissions. NAS Whidbey Island has implemented strategies

and programs to reduce GHG emissions from the NAS Whidbey Island complex. Improved energy efficiency through implementation of several building renovation projects has reduced overall facility energy usage by 40 percent between 2003 and 2015. Recent improvements have resulted in a site-wide reduction of reported GHG emissions. Reported site-wide stationary GHG emissions from NAS Whidbey Island peaked at 15,947 MTCO₂e and were down to 11,371 MTCO₂e in 2014 (see Table 3.16-2). 2015 and 2016 saw an increase in GHG emissions attributed to increased vehicle fuel use (i.e., from storage and dispensing sources). (Stewart, 2017). NAS Whidbey Island will continue to work toward the achievement of the DoD's GHG reduction goals (NAS Whidbey Island, 2016).

4.16.3 Adaptation and Mitigation

4.16.3.1 Washington State

As discussed in Chapter 3, the State of Washington has implemented laws, regulations, and policies to continue to research and address climate change. Washington State's *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy* (Washington State Department of Ecology, 2012) was published to describe the risks of climate change to the state and identify the state's priorities in addressing these risks. The report identifies the following strategies:

1. Protect people and communities most vulnerable to climate impacts by increasing state and local public health capacity to monitor, detect, plan, and respond to emerging threats and climate-related emergencies. Also increase awareness of climate risks among the public and health-care providers.
2. Reduce risk of damage to buildings, transportation systems, and other infrastructure. Identify vulnerable areas and take proactive steps to reduce risks to infrastructure, avoid climate risks when siting new infrastructure and planning for growth, and enhance capacity to prepare for more frequent and severe flooding, rising sea levels, wildfires, and changes in energy supply and demand.
3. Reduce risks to the ocean and coastlines. Help communities prepare for rising sea levels and storm surges and protect people and property. Prevent the degradation of habitats and create opportunities for upland habitat creation. Reduce shellfish vulnerability by reducing land-based contributions of carbon and polluted runoff to the marine environment.
4. Improve water management by promoting integrated approaches that consider future water supply and address competing water demands for irrigated crops, fish, municipal and domestic water needs, and energy generation. Implement enhanced water conservation and efficiency programs and incorporate climate change realities into agency decision making.
5. Reduce forest and agriculture vulnerability by enhancing surveillance of pests and disease. Promote and transition to species that are resilient to changing climate conditions, conserve productive and adaptive forest and farmland, and reduce forest and wildland fire risk in vulnerable areas.
6. Safeguard fish, wildlife, habitat, and ecosystems and improve the ability of wildlife to migrate to more suitable habitat as the climate shifts. Protect and restore habitat and sensitive and vulnerable species. Reduce existing stresses from development, pollution, unsustainable harvest, and other factors.

7. Support the efforts of local communities and strengthen capacity to respond and engage the public. Identify existing and new funding mechanisms to support adaptation work at the local level, and ensure a coordinated and integrated approach among levels of government and society. Support research and monitoring and ensure scientific information is accessible and responds to needs of decision-makers (Washington State Department of Ecology, 2012).

Many Puget Sound communities, government agencies, and organizations are preparing for the effects of climate change on water resources. For example, King County has begun modifying its flood infrastructure in preparation for projected flooding increases (Climate Impacts Group, 2015).

4.16.3.2 Department of Defense

The DoD has identified the potential impacts of climate change and addressed the need to plan for the worsening of natural events that will result from climate change. As described in Chapter 3, the federal government, DoD, Navy, and NAS Whidbey Island are in the process of implementing programmatic solutions for the adaptation to and mitigation of climate change.

The DoD's progress toward achieving the federal sustainability goals is outlined in the annual Strategic Sustainability Performance Plan (DoD, 2015). Table 4.16-5 provides a summary of the DoD's objectives and specific goals.

The Navy implements these federal and DoD policies to reduce energy usage, GHG emissions, and energy vulnerability. In the 2010 Navy Energy Vision (Navy, 2010b), the Secretary of the Navy set goals to improve energy security, increase energy independence, and reduce the reliance on petroleum by increasing energy efficiency and the use of alternative energy. The strategic imperatives of this report include:

- Alternative Energy Afloat: By 2020, half of the Navy's total energy consumption afloat will come from alternative sources.
- "Great Green Fleet": The Navy operates a carrier strike group composed of nuclear ships, hybrid electric ships running on biofuel, and aircraft flying on biofuel.
- Increase Alternative Energy Ashore: By 2020, the Navy will produce at least 50 percent of shore-based energy requirements from alternative sources; 50 percent of Navy installations will be net-zero.
- Reduce Non-Tactical Petroleum Use: By 2015, the Navy will reduce petroleum use in the commercial Fleet by 50 percent through the use of hybrid, electric, and flex-fuel vehicles (Navy, 2010b).

The DoD and the Navy are actively engaging in improving their resiliency to climate change--from conducting screening surveys to assess vulnerability of DoD installations from severe weather and projected changes in climate, to developing tools to help installations assess how much water they need to satisfy mission requirements. As climate science advances, the DoD and Navy will regularly evaluate climate change risks and opportunities in order to develop policies and plans to manage its effects on the DoD operating environment, missions, and facilities.

Table 4.16-5 DoD Strategic Sustainability Performance Plan Objectives

Objective #1: The Continued Availability of Resources Critical to the DoD Mission is Ensured
GOAL #1: The Use of Fossil Fuels Reduced
1.1 - Reduction in Facility Energy Intensity
1.2 - Use of Renewable Energy [Title 10, United States Code §2911(e)(2)]
1.3 - Reduction in Fleet Petroleum Use (non-tactical)
GOAL #2: Water Resources Management Improved
2.1 - Reduction in Facility Potable Water Intensity
2.2 - Reduction in Facility Industrial and Irrigation Water
2.3 - Stormwater Runoff Managed to Maintain Pre-Development Hydrology
Objective #2: DoD Readiness Maintained in the Face of Climate Change
GOAL #3: Greenhouse Gas Emissions Associated with DoD Operations Reduced
3.1 - Reduction in Scope 1&2 GHG Emissions
3.2 - Reduction in Scope 3 GHG Emissions
3.3 - Increase in Teleworking by Eligible Employees
3.4 - Reduced Scope 3 GHG Emissions from Employee Air Travel
GOAL #4: DoD Climate Change Risks Assessed and Resiliency Improved
Objective #3: The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution
GOAL #5: Solid Waste Minimized and Optimally Managed
5.1 - Increase in DoD Employees Covered by Policies to Reduce the Use of Printing Paper
5.2 - Increase in Non-Hazardous Solid Waste Diverted from the Waste Stream
5.3 - Increase in Construction and Demolition Debris Diverted from the Waste Stream
GOAL #6: The Use and Release of Chemicals of Environmental Concern Minimized
6.1 - Reduction in On-Site Releases and Off-Site Transfers of Toxic Chemicals
6.2 - DoD Personnel and Contractors Who Apply Pesticides Are Properly Certified
6.3 - Integrated Pest Management Plans Prepared, Reviewed, and Updated Annually
Objective #4: Continuous Improvement in the DoD Mission Achieved through Management and Practices Built on Sustainability and Community
GOAL #7: Sustainability Practices Become the Norm
7.1 - 95% of Procurement Conducted Sustainably
7.2 - Electronic Stewardship and the Efficient Use of Data Centers
7.3 - Sustainable Buildings (Conforming to the Guiding Principles)
7.4 - Environmental Management Systems Effectively Implemented and Maintained

Source: DoD, 2015

Key:

DoD = U.S. Department of Defense

GHG = greenhouse gas

NAS Whidbey Island has implemented many sustainability strategies and programs at the NAS Whidbey Island complex. Improved energy efficiency through implementation of several building renovation projects has reduced overall facility energy usage by 40 percent between 2003 and 2015, and water-use efficiency projects have reduced water use by 48 percent between 2007 and 2015. Both improvements in water and energy use exceed the DoD’s interim sustainability goals for these resources (NAS Whidbey Island, 2016). Increased sea levels, storm surges, and risk of flooding may affect new and existing infrastructure and buildings, as well as Growler operations.

As discussed in Chapter 3, the Navy and the DoD continue to review and plan for the impacts of climate change on all Navy operations, adjusting strategies and programs as new information becomes available (DoD, 2014; Navy, 2010b).

4.17 Summary of Potential Impacts to Resources

A summary of the potential impacts associated with each of the action alternatives and the No Action Alternative is presented in Table 4.17-1. This EIS does not identify any new mitigation measures considering the degree of environmental impacts for the implementation of alternatives but does identify measures that could be taken to develop suggested mitigation techniques, including, but not limited to, stormwater retention practices. Appendix H (Noise Mitigation) provides an overview of existing, voluntary noise-mitigation measures that are in place at the NAS Whidbey Island complex. Appendix H also describes potential noise-mitigation measures that are being evaluated for potential future implementation as the Navy takes a proactive approach to noise mitigation and addressing community concerns. Under the Section 106 process, further consultation and development of a MoA to address adverse effects on historic resources is ongoing. The Navy is consulting with the Washington SHPO, the Advisory Council on Historic Preservation, tribes, and consulting parties regarding the MoA. If mitigation measures are identified during this process, they would be identified in the ROD. These measures would be funded, and efforts to ensure their successful completion or implementation would be treated as compliance requirements.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
Airspace and Airfield Operations					
<i>(No significant impact from projected increase in aircraft operations)</i>					
Airspace (Sections 4.1.1; 4.1.2.1; 4.1.3.1; 4.1.4.1)					
No Action Alternative	The Navy would not operate additional Growler aircraft at Ault Field, and therefore there would be no impact on airspace.				
Action Alternative 1	No change in operational procedures or changes in departure/arrival route, and therefore no modification required to the current airspace. Additional Growler aircraft would be operating within the same flight parameters currently used within the controlled airspace surrounding the Naval Air Station (NAS) Whidbey Island complex, and therefore no adverse effect on civil or commercial aviation airspace.				
Action Alternative 2	Impacts are similar to those depicted under Alternative 1, Scenario A.				
Action Alternative 3	Impacts are similar to those depicted under Alternative 1, Scenario A.				
Airfield Operations (annual) (Sections 4.1.1; 4.1.2.1; 4.1.3.1; 4.1.4.1)					
No Action Alternative	The Navy would not operate additional Growler aircraft at Ault Field, and there would be no increase in annual airfield operations: 6,500 operations at Outlying Land Field (OLF) Coupeville and 81,700 operations at Ault Field.				
Action Alternative 1	The Navy would add 35 additional Growler aircraft				
	Change in annual operations:				
	<ul style="list-style-type: none"> +9,100 at Ault Field +18,800 at OLF Coupeville 	<ul style="list-style-type: none"> +17,100 at Ault Field +9,400 at OLF Coupeville 	<ul style="list-style-type: none"> +25,000 at Ault Field +100 at OLF Coupeville 	<ul style="list-style-type: none"> +11,800 at Ault Field +15,700 at OLF Coupeville 	<ul style="list-style-type: none"> +22,200 at Ault Field +3,200 at OLF Coupeville
	Approximately 27,900 annual operations increase for the NAS Whidbey Island complex (33-percent increase over the No Action Alternative)	Approximately 26,500 annual operations increase for the NAS Whidbey Island complex (31-percent increase over the No Action Alternative)	Approximately 25,100 annual operations increase for the NAS Whidbey Island complex (30-percent increase over the No Action Alternative)	Approximately 27,500 annual operations increase for the NAS Whidbey Island complex (32-percent increase over the No Action Alternative)	Approximately 25,400 annual operations increase for the NAS Whidbey Island complex (30-percent increase over the No Action Alternative)
Action Alternative 2	The Navy would add 36 additional Growler aircraft				
	Change in annual operations:				
	<ul style="list-style-type: none"> +9,800 at Ault Field +17,600 at OLF Coupeville 	<ul style="list-style-type: none"> +17,300 at Ault Field +8,700 at OLF Coupeville 	<ul style="list-style-type: none"> +25,000 at Ault Field -200 at OLF Coupeville 	<ul style="list-style-type: none"> +12,400 at Ault Field +14,700 at OLF Coupeville 	<ul style="list-style-type: none"> +22,500 at Ault Field +2,800 at OLF Coupeville
	Approximately 27,400 total annual operations increase for the NAS	Approximately 26,000 total annual operations increase for the NAS	Approximately 24,800 total annual operations increase for the NAS Whidbey Island complex	Approximately 27,100 total annual operations increase for the NAS	Approximately 25,300 total annual operations increase for the NAS Whidbey

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
	Whidbey Island complex (32-percent increase over the No Action Alternative)	Whidbey Island complex (31-percent increase over the No Action Alternative)	(29-percent increase over the No Action Alternative)	Whidbey Island complex (32-percent increase over the No Action Alternative)	Island complex (30-percent increase over the No Action Alternative)
Action Alternative 3	The Navy would add 36 additional Growler Aircraft.				
	Change in annual operations:				
	<ul style="list-style-type: none"> +9,500 at Ault Field +17,600 at OLF Coupeville <p>Approximately 27,100 total annual operations increase for the NAS Whidbey Island complex (32 percent increase over the No Action Alternative)</p>	<ul style="list-style-type: none"> +17,100 at Ault Field +8,700 at OLF Coupeville <p>Approximately 25,800 total annual operations increase for the NAS Whidbey Island complex (30 percent increase over the No Action Alternative)</p>	<ul style="list-style-type: none"> +24,700 at Ault Field -200 at OLF Coupeville <p>Approximately 24,500 total annual operations increase for the NAS Whidbey Island complex (29 percent increase over the No Action Alternative)</p>	<ul style="list-style-type: none"> +12,100 at Ault Field +14,600 at OLF Coupeville <p>Approximately 26,700 total annual operations increase for the NAS Whidbey Island complex (32-percent increase over the No Action Alternative)</p>	<ul style="list-style-type: none"> +22,100 at Ault Field +2,800 at OLF Coupeville <p>Approximately 24,900 total annual operations increase for the NAS Whidbey Island complex (29-percent increase over the No Action Alternative)</p>
Noise Associated with Aircraft					
(Significant noise impact from proposed Growler operations at the NAS Whidbey Island complex)					
DNL Noise Contours (Sections 4.2.1, 4.2.2.1.1, 4.2.3.1.1; 4.2.4.1.1)					
No Action Alternative	No additional Growlers would be assigned to NAS Whidbey Island, and there would be no associated increase in aircraft operations; therefore, no change in DNL noise contours at the airfields. The population within the 65 dB DNL noise contour would be 8,941 people at Ault Field and 2,230 people at OLF Coupeville, for a total of 11,171.				
<i>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:</i>					
Action Alternative 1	169 people, Ault Field 1,236 people, OLF Coupeville Total increase of 1,405	914 people, Ault Field 904 people, OLF Coupeville Total increase of 1,818	1,312 people, Ault Field 538 people, OLF Coupeville Total increase of 1,850	621 people, Ault Field 1,143 people, OLF Coupeville Total increase of 1,764	1,178 people, Ault Field 701 people, OLF Coupeville Total increase of 1,879
Action Alternative 2	137 people, Ault Field 1,179 people, OLF Coupeville Total increase of 1,316	840 people, Ault Field 865 people, OLF Coupeville Total increase of 1,705	1,154 people, Ault Field 489 people, OLF Coupeville Total increase of 1,643	557 people, Ault Field 1,089 people, OLF Coupeville Total increase of 1,646	1,037 people, Ault Field 681 people, OLF Coupeville Total increase of 1,718

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
Action Alternative 3	109 people, Ault Field 1,203 people, OLF Coupeville Total increase of 1,312	821 people, Ault Field 888 people, OLF Coupeville Total increase of 1,709	1,136 people, Ault Field 517 people, OLF Coupeville Total increase of 1,653	533 people, Ault Field 1,113 people, OLF Coupeville Total increase of 1,646	1,019 people, Ault Field 694 people, OLF Coupeville Total increase of 1,713
Supplemental Metrics (Sections 4.2.1, 4.2.2.1.2, 4.2.3.1.2; 4.2.4.1.2)					
No Action Alternative	No additional Growlers would be assigned to NAS Whidbey Island, and there would be no associated increase in aircraft operations; therefore, no change in the noise environment.				
Action Alternative 1	The EIS analyzed the potential impacts of noise exposure as it relates to specific noise events at 48 points of interest (POIs). The following supplemental noise metrics were analyzed: single-event noise levels (sound exposure levels [SELs] and maximum noise levels [L _{max}]), indoor and outdoor speech interference, classroom/learning interference, sleep disturbance; and potential hearing loss for populations within the 80 dB DNL contour. The results of this analysis vary depending on the scenario and the annual operations modeled. To understand the full impact of these supplemental metrics, see Sections 4.2.2.1.2 (Alternative 1), 4.2.3.1.2 (Alternative 2), or 4.2.4.1.2 (Alternative 3).				
Action Alternative 2	Impacts are similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts are similar to those depicted under Alternative 1.				
Public Health and Safety (No significant impact from projected increase in aircraft operations)					
Flight Safety (Sections 4.3.1, 4.3.2.1)					
No Action Alternative	No additional Growler aircraft, so no impact on public health and safety with relation to flight safety at Ault Field or OLF Coupeville.				
Action Alternative 1	Increase of aircraft flying at Ault Field and OLF Coupeville would increase the risk of an incident; however, current risk management strategies in place at NAS Whidbey Island would minimize these risks. Therefore there would be no significant impact on flight safety.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Bird/Animal Aircraft Strike Hazard (BASH) (Sections 4.3.1, 4.3.2.1)					
No Action Alternative	No additional Growler aircraft, so no impact on public health and safety with relation to BASH at Ault Field or OLF Coupeville.				
Action Alternative 1	Increase in the volume of air operations; however, this would not change the installation’s ability to comply with military airfield safety procedures for aircraft arrival and departure flight tracks and for operations surrounding the airfield. Therefore, there would be no significant impact on BASH.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Clear Zones and Accident Potential Zones (APZs) (Sections 4.3.1, 4.3.2.1)					
No Action Alternative	No additional Growler aircraft, so no impact on public health and safety with relation to APZs or Clear Zones at Ault Field or OLF Coupeville.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
Action Alternative 1	It is not expected that the Clear Zones or APZs at Ault Field would change; however, this needs to be confirmed through the Navy’s Air Installation Compatible Use Zone (AICUZ) update process. The number of annual operations at OLF Coupeville may require the development of APZs (Clear Zones already exist) through the completion of the AICUZ Update process, which includes coordinating with the local community on land use recommendations.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on the development of APZs at Ault Field are similar to those depicted under Alternative 1, Scenario A. The number of annual operations at OLF Coupeville would not likely require the development of APZs (Clear Zones already exist); however, this needs to be confirmed through the Navy’s AICUZ Update process.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.
Action Alternative 2	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.
Action Alternative 3	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario A.	Conclusions on development of APZs at Ault Field and OLF Coupeville are similar to those depicted under Alternative 1, Scenario C.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Environmental Health Risks and Safety Risks to Children (Section 4.3.2.1)					
No Action Alternative	The number of children under the noise contour is: 2,799 – Average Year and 2,793 – High-tempo FCLP Year				
<i>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.</i>					
<i>The number of children impacted under the noise contours will increase as compared to the No Action Alternative in the average year by:</i>					
Action Alternative 1	252 – Average Year 118 – High-tempo FCLP Year	399 – Average Year 269 – High-tempo FCLP Year	440 – Average Year 330 – High-tempo FCLP Year	361 – Average Year 231 – High-tempo FCLP Year	433 – Average Year 316 – High-tempo FCLP Year
Action Alternative 2	233 – Average Year 93 – High-tempo FCLP Year	372 – Average Year 252 – High-tempo FCLP Year	388 – Average Year 269 – High-tempo FCLP Year	333 – Average Year 196 – High-tempo FCLP Year	391 – Average Year 260 – High-tempo FCLP Year
Action Alternative 3	230 – Average Year 89 – High-tempo FCLP Year	370 – Average Year 241 – High-tempo FCLP Year	388 – Average Year 253 – High-tempo FCLP Year	332 – Average Year 194 – High-tempo FCLP Year	388 – Average Year 276 – High-tempo FCLP Year
Air Quality (No significant impacts from construction or stationary emissions. Mobile operational emissions from additional Growler operations may impact ambient air quality)					
Construction Emissions (Sections 4.4.1, 4.4.2.1.1; 4.4.3.1.1; 4.4.4.1.1)					
No Action Alternative	No existing stationary sources would have an increase in emissions, and there would be no change in aircraft operations. Therefore, no impacts to air quality or air resources would occur.				
Action Alternative 1	Emissions from construction equipment and activities would be minor and temporary and would not result in any significant impacts.				
Action Alternative 2	Construction emissions are identical to those depicted under Alternative 1.				
Action Alternative 3	Construction emissions are identical to those depicted under Alternative 1.				
Operational Stationary Emissions (Sections 4.4.1, 4.4.2.1.2; 4.4.3.1.2; 4.4.4.1.2)					
No Action Alternative	No existing stationary sources would have an increase in emissions, and there would be no change in aircraft operations. Therefore, no impacts to air quality or air resources would occur.				
Action Alternative 1	Increases in direct and indirect stationary emissions from new buildings and maintenance and fueling of aircraft are minor and would be covered under the existing NAS Whidbey Island air operating permit.				
Action Alternative 2	Operational stationary emissions like in type and magnitude to those depicted under Alternative 1.				
Action Alternative 3	Operational stationary emissions like in type and magnitude to those depicted under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Mobile Emissions (Sections 4.4.1, 4.4.2.1.3; 4.4.3.1.3; 4.4.4.1.3)					
No Action Alternative	No existing stationary sources would have an increase in emissions, and there would be no change in aircraft operations. Therefore, no impacts to air quality or air resources would occur.				
Action Alternative 1 Total Increase in Criteria Pollutant Emissions	<i>NO_x</i> : 229.1 <i>VOC</i> : 190.3 <i>CO</i> : 638.1 <i>SO₂</i> : 18.0 <i>PM₁₀</i> : 90.8 <i>PM_{2.5}</i> : 84.4	<i>NO_x</i> : 183.3 <i>VOC</i> : 159.8 <i>CO</i> : 527.0 <i>SO₂</i> : 14.5 <i>PM₁₀</i> : 74.7 <i>PM_{2.5}</i> : 68.2	<i>NO_x</i> : 139.7 <i>VOC</i> : 135.9 <i>CO</i> : 433.5 <i>SO₂</i> : 11.3 <i>PM₁₀</i> : 59.9 <i>PM_{2.5}</i> : 53.5	<i>NO_x</i> : 214.3 <i>VOC</i> : 182.1 <i>CO</i> : 606.3 <i>SO₂</i> : 16.9 <i>PM₁₀</i> : 85.8 <i>PM_{2.5}</i> : 79.4	<i>NO_x</i> : 150.9 <i>VOC</i> : 144.2 <i>CO</i> : 465.7 <i>SO₂</i> : 12.1 <i>PM₁₀</i> : 64.0 <i>PM_{2.5}</i> : 57.5
Action Alternative 2 Total Increase in Criteria Pollutant Emissions	<i>NO_x</i> : 227.5 <i>VOC</i> : 209.0 <i>CO</i> : 691.2 <i>SO₂</i> : 18.1 <i>PM₁₀</i> : 98.6 <i>PM_{2.5}</i> : 86.6	<i>NO_x</i> : 183.4 <i>VOC</i> : 179.5 <i>CO</i> : 584.3 <i>SO₂</i> : 14.8 <i>PM₁₀</i> : 83.1 <i>PM_{2.5}</i> : 71.1	<i>NO_x</i> : 141.6 <i>VOC</i> : 156.2 <i>CO</i> : 493.8 <i>SO₂</i> : 11.7 <i>PM₁₀</i> : 68.9 <i>PM_{2.5}</i> : 56.9	<i>NO_x</i> : 213.5 <i>VOC</i> : 201.1 <i>CO</i> : 661.0 <i>SO₂</i> : 17.1 <i>PM₁₀</i> : 93.9 <i>PM_{2.5}</i> : 81.9	<i>NO_x</i> : 155.7 <i>VOC</i> : 164.2 <i>CO</i> : 524.8 <i>SO₂</i> : 12.7 <i>PM₁₀</i> : 73.8 <i>PM_{2.5}</i> : 61.7
Action Alternative 3 Total Increase in Criteria Pollutant Emissions	<i>NO_x</i> : 225.1 <i>VOC</i> : 206.4 <i>CO</i> : 679.3 <i>SO₂</i> : 17.9 <i>PM₁₀</i> : 91.7 <i>PM_{2.5}</i> : 85.1	<i>NO_x</i> : 183.6 <i>VOC</i> : 183.7 <i>CO</i> : 590.3 <i>SO₂</i> : 14.9 <i>PM₁₀</i> : 77.6 <i>PM_{2.5}</i> : 71.1	<i>NO_x</i> : 139.6 <i>VOC</i> : 154.5 <i>CO</i> : 484.3 <i>SO₂</i> : 11.5 <i>PM₁₀</i> : 62.2 <i>PM_{2.5}</i> : 55.7	<i>NO_x</i> : 211.2 <i>VOC</i> : 198.6 <i>CO</i> : 649.2 <i>SO₂</i> : 16.9 <i>PM₁₀</i> : 87.0 <i>PM_{2.5}</i> : 80.4	<i>NO_x</i> : 153.7 <i>VOC</i> : 162.4 <i>CO</i> : 514.9 <i>SO₂</i> : 12.6 <i>PM₁₀</i> : 67.0 <i>PM_{2.5}</i> : 60.4
Land Use (Increase in the land area within the projected greater than 65 dB DNL noise contours and some localized significant impacts on county and municipal parks)					
Land Use Analysis (Sections 4.5.1, 4.5.2)					
No Action Alternative	No new Growler operations, and therefore no change in land area impacted by DNL noise contours; therefore, no impact.				
Action Alternative 1	Due to larger DNL noise contours and noise exposure areas, land uses previously considered compatible may become incompatible per AICUZ recommendations.				
Action Alternative 2	Impacts on land use compatibility are similar to those under Alternative 1.				
Action Alternative 3	Impacts on land use compatibility are similar to those under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
<i>Increase in total land use within the greater than 65 dB DNL noise contour as compared to the No Action Alternative:</i>					
Action Alternative 1	7 percent (Ault Field) 38 percent (OLF Coupeville)	10 percent (Ault Field) 28 percent (OLF Coupeville)	12 percent (Ault Field) 9 percent (OLF Coupeville)	8 percent (Ault Field) 35 percent (OLF Coupeville)	11 percent (Ault Field) 19 percent (OLF Coupeville)
Action Alternative 2	6 percent (Ault Field) 36 percent (OLF Coupeville)	9 percent (Ault Field) 27 percent (OLF Coupeville)	11 percent (Ault Field) 6 percent (OLF Coupeville)	7 percent (Ault Field) 33 percent (OLF Coupeville)	10 percent (Ault Field) 18 percent (OLF Coupeville)
Action Alternative 3	6 percent (Ault Field) 37 percent (OLF Coupeville)	9 percent (Ault Field) 28 percent (OLF Coupeville)	11 percent (Ault Field) 8 percent (OLF Coupeville)	7 percent (Ault Field) 34 percent (OLF Coupeville)	10 percent (Ault Field) 18 percent (OLF Coupeville)
<i>Conceptual APZs at OLF Coupeville would impact:</i>					
Action Alternative 1	503 acres of residential land use, if developed.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.
Action Alternative 2	503 acres of residential land use, if developed.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.
Action Alternative 3	503 acres of residential land use, if developed.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.	503 acres of residential land use, if developed.	No conceptual APZs at OLF Coupeville would be required.
<i>Recreation and Wilderness (Sections 4.5.1, 4.5.2.2)</i>					
No Action Alternative	No new Growler operations, and no changes to noise environment at recreation and wilderness areas; therefore, no impact.				
Action Alternative 1	Long-term, intermittent, significant impacts to Ebey’s Landing National Historical Reserve, Rocky Point Public Beach Access, Driftwood Park, Patmore Pit, Ika Island, Coupeville Middle School, Coupeville High School, and other properties used for recreation.	Long-term, intermittent, significant impacts to Ebey’s Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville High	Long-term, intermittent, significant impacts to Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Ika Island, Hand-in-Hand Early Learning, and other properties used for recreation. Impacts to other parks and recreational areas would	Long-term, intermittent, significant impacts to Ebey’s Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, Coupeville	Long-term, intermittent, significant impacts to Ebey’s Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, and other

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
	Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	School, and other properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	Middle School, Coupeville High School, and other properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.	properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
Action Alternative 2	<p>Long-term, intermittent, significant impacts to Ebey’s Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Coupeville Middle School, Coupeville High School, and other properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent moderate impacts to Williamson Rocks, which are designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.</p>	<p>Long-term, intermittent, significant impacts to Ebey’s Landing National Historical Reserve, Clover Valley Ball Park and Off-Leash Dog Park, Rocky Point Public Beach Access, Driftwood Park, Rhododendron Park, Patmore Pit, Ika Island, Hand-in-Hand Early Learning, and other properties used for recreation. Impacts to other parks and recreational areas would range from long-term minor to long-term moderate. Long-term, intermittent, moderate impacts to Williamson Rocks, which is designated wilderness in the San Juan Islands NWR, as a result of reduced opportunities for visitors to experience solitude and primitive recreation and impacts to wilderness character.</p>	<p>Impacts similar to those depicted under Alternative 1, Scenario C.</p>	<p>Impacts similar to those depicted under Alternative 1, Scenario D.</p>	<p>Impacts similar to those depicted under Alternative 1, Scenario E.</p>

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
Action Alternative 3	Impacts similar to those depicted under Alternative 1, Scenario A.	Impacts similar to those depicted under Alternative 2, Scenario B.	Impacts similar to those depicted under Alternative 1, Scenario C.	Impacts similar to those depicted under Alternative 1, Scenario D.	Impacts similar to those depicted under Alternative 1, Scenario E.
<i>Cultural Resources (No significant impacts from construction activities or operation of new aircraft)</i>					
<i>Archaeological Resources (Sections 4.6.1, 4.6.2.1)</i>					
No Action Alternative	No new construction or operations, and therefore no impact.				
Action Alternative 1	As evaluated under NEPA, minimal to no impact will result to known or intact archaeological sites during construction and operation. Per its Section 106 responsibilities, the Navy has determined no adverse effect would occur to historic properties that are archaeological resources.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
<i>Architectural Resources (Sections 4.6.1, 4.6.2.1)</i>					
No Action Alternative	No new construction or operations, and therefore no impact.				
Action Alternative 1	As evaluated under NEPA, moderate to no direct and indirect impacts are anticipated to occur to on-station architectural resources during construction. Minimal indirect impacts are anticipated to occur during operations. Minimal to no impacts are anticipated to occur during construction to off-station resources because activities are limited to Ault Field. Minimal to moderate indirect impacts are anticipated to occur to off-station historic	Impacts similar to those depicted under Alternative 1, Scenario A, with the exception that resources that are proximate to both Ault Field and OLF Coupeville may experience a higher level of impact.	Impacts similar to those depicted under Alternative 1, Scenario A, with the exception that resources that are proximate to Ault Field (and not OLF Coupeville) may experience a higher level of impact and at OLF Coupeville a lower level of impact.	Impacts similar to those depicted under Alternative 1, Scenario A, with the exception that resources that are proximate to OLF Coupeville (and not Ault Field) may experience a higher level of impact and at Ault Field a lower level of impact.	Impacts similar to those depicted under Alternative 1, Scenario A, with the exception that resources that are proximate to Ault Field (and not OLF Coupeville) may experience a higher level of impact and at OLF Coupeville a lower level of impact.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
	<p>resources during operation.</p> <p>Resources that are closer to OLF Coupeville may experience a higher level of visual, auditory, and/or vibratory impact and more frequent occurrences of aircraft appearances, noise, and vibration than those located elsewhere due to the increased FCLPs at OLF Coupeville for this scenario as compared to Scenarios B, C, D, and E.</p> <p>Resources that are closer to Ault Field may experience a lower level of impact and less frequent occurrences than those located elsewhere due to the lower amount of FCLPs at Ault Field for this scenario as compared to Scenarios B, C, D, and E.</p> <p>Per its Section 106 responsibilities, the Navy has determined a finding of adverse effect to the Central Whidbey Island</p>				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
	<p>Historic District/Ebey’s Landing National Historic Reserve and a no adverse effect to individual historic properties that are architectural resources.</p> <p>The Navy is consulting with the Washington State Historic Preservation Officer, the Advisory Council on Historic Preservation, tribes, and consulting parties regarding the development of a Memorandum of Agreement as part of its National Historic Preservation Act Section 106 consultation to mitigate adverse effects to the perceptual qualities of five landscape features that contribute to the significance of the Central Whidbey Island Historic District/Ebey’s Landing National Historical Reserve.</p>				
Action Alternative 2	Impacts similar to those depicted under Alternative 1, Scenario A.	Impacts similar to those depicted under Alternative 1, Scenario B.	Impacts similar to those depicted under Alternative 1, Scenario C.	Impacts similar to those depicted under Alternative 1, Scenario D.	Impacts similar to those depicted under Alternative 1, Scenario E.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
Action Alternative 3	Impacts similar to those depicted under Alternative 1, Scenario A.	Impacts similar to those depicted under Alternative 1, Scenario B.	Impacts similar to those depicted under Alternative 1, Scenario C.	Impacts similar to those depicted under Alternative 1, Scenario D.	Impacts similar to those depicted under Alternative 1, Scenario E.
<i>Cemeteries (Sections 4.6.1, 4.6.2.1)</i>					
No Action Alternative	No new construction or operations, and therefore no impact.				
Action Alternative 1	As evaluated under NEPA, minimal to no impact will result to known cemeteries or burial grounds during construction and operation. Per its Section 106 responsibilities, the Navy has determined no adverse effect would occur to historic properties that are cemeteries or human burials.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
<i>Traditional Cultural Properties (Sections 4.6.1, 4.6.2.1)</i>					
No Action Alternative	No new construction or operations, and therefore no impact.				
Action Alternative 1	As evaluated under NEPA, no impact will result to Traditional Cultural Properties (TCPs) because no known TCPs have been identified. Per its Section 106 responsibilities, the Navy has determined no effect would occur because no known TCPs have been identified.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
<i>American Indian Traditional Resources (No significant impact to tribal rights, protected tribal resources)</i>					
<i>American Indian Traditional Resources (Section 4.7.1, 4.7.2)</i>					
No Action Alternative	No potential to significantly affect American Indian traditional resources since there would be no change to current tribal access and no additional potential to impact traditional resources in the study area.				
Action Alternative 1	No change to current access for tribes to the installation. Terrestrial and Marine Resources: There would be minor impacts during construction or operation on terrestrial and marine wildlife. Water Resources: Approximately 2 acres of impervious surface, but impacts to surface waters, would be minimized and avoided through implementation of best management practices (BMPs), low-impact development (LID), and green infrastructure and therefore would not be significant. Climate Change and Greenhouse Gases: Potential impacts in GHG emissions from the implementation of the Proposed Action would be similar but greatest under Alternative 2, Scenario A, and would not be significant.				
Action Alternative 2	Impacts are similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts are similar to those depicted under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
Biological Resources (No significant impacts from construction activities or operation of new aircraft)					
Terrestrial Wildlife (Sections 4.8.1, 4.8.2.1)					
Habitat Loss					
No Action Alternative	No new construction and no new Growler aircraft; therefore, no habitat loss and no impact on terrestrial wildlife.				
Action Alternative 1	Vegetation removal from construction activities would have negligible impacts on terrestrial wildlife at Ault Field and would not negatively affect habitat use by any special status species (e.g., MBTA-protected birds).				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Sensory Disturbance Effects (Terrestrial Wildlife, with the exception of Birds)					
No Action Alternative	No new construction and no new Growler aircraft; therefore, no impact on terrestrial mammals and/or reptiles, fish, and amphibians.				
Action Alternative 1	Terrestrial wildlife in the study area are already exposed to high levels of aircraft operations and other human disturbances; and the Proposed Action would result in some additional sensory disturbance impacts. Scenario C for both Ault Field and OLF Coupeville would be the most comparable scenario to the No Action Alternative and constitutes the smallest change in sensory disturbance impacts, whereas Scenario A at OLF Coupeville would result in the greatest change in sensory disturbance impacts overall.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
Sensory Disturbance Effects (Birds)					
No Action Alternative	No new construction and no new Growler aircraft; therefore, no impact on birds.				
Action Alternative 1	Birds in the study area are already exposed to high levels of aircraft operations and other human disturbances; and the Proposed Action would result in some additional sensory disturbance impacts. Under MBTA regulations applicable to military readiness activities, the impacts from aircraft operations would not result in a significant adverse effect on migratory bird populations.				
	Scenario A is the greatest change in sensory disturbance impacts compared to the No Action Alternative and would result in the greatest increase in sensory disturbance impacts of the five scenarios.	Scenario B is a greater change in the sensory disturbance impacts than Scenario C, but less change in the sensory disturbance impacts than Scenario A.	Scenario C for both Ault Field and OLF Coupeville would be the most comparable scenario to the No Action Alternative and constitutes the smallest change in sensory disturbance impacts.	Scenario D would result in sensory disturbance impacts similar to those under Scenario A.	Scenario E would result in sensory disturbance impacts similar to those under Scenario B.

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1, Scenario A.	Impacts would be similar to those depicted under Alternative 1, Scenario B.	Impacts would be similar to those depicted under Alternative 1, Scenario C.	Impacts would be similar to those depicted under Alternative 1, Scenario D.	Impacts would be similar to those depicted under Alternative 1, Scenario E.
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1, Scenario A.	Impacts would be similar to those depicted under Alternative 1, Scenario B.	Impacts would be similar to those depicted under Alternative 1, Scenario C.	Impacts would be similar to those depicted under Alternative 1, Scenario D.	Impacts would be similar to those depicted under Alternative 1, Scenario E.
<i>Bird/Animal Aircraft Strike Hazard Effects</i>					
No Action Alternative	No new construction and no new Growler aircraft; therefore, no risk of aircraft-wildlife strikes.				
Action Alternative 1	Increase of aircraft flying at Ault Field and OLF Coupeville increases the risk of an incident; however, no aspect of the action would create attractants with the potential to increase birds in the area, and current risk management strategies in place at NAS Whidbey Island minimize the likelihood of an incident. Therefore, aircraft-wildlife strikes would not have significant impacts on local wildlife populations, including special status species (e.g., MBTA-protected birds).				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
<i>Endangered Species Act (ESA)-listed Terrestrial Species (Marbled Murrelet)</i>					
No Action Alternative	No new construction and no new Growler aircraft flying over; therefore, no impact on protected species.				
Action Alternative 1	Increase of aircraft flying at Ault Field and OLF Coupeville increases the risk of a strike and increases noise and visual disturbances to the marbled murrelet. There have been no reported strikes of the marbled murrelet at NAS Whidbey Island, and the installation follows a detailed BASH management program. In addition, the local inhabitants of the species are already exposed to high levels level of noise and visual disturbances. The Navy, in consultation with the USFWS, has determined that, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, the marbled murrelet and is not likely to jeopardize the continued existence of the marbled murrelet.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
<i>Marine Species (Not Listed under ESA) (Sections 4.8.1, 4.8.2.2)</i>					
No Action Alternative	No new construction and no new Growler aircraft flying over marine species; therefore, no impact.				
Action Alternative 1	Increase in aircraft activity may cause sensory disturbance to marine animals. Harbor seals and other pinnipeds are common around NAS Whidbey Island and have not abandoned haul-out sites despite the existing long-term high level of disturbances. In addition, no breeding areas would be impacted. Marine species are already exposed to a high level of long-term air operations and other human-made disturbances and visual disturbances at NAS Whidbey Island. Therefore, there would be no significant impacts on marine species through behavioral disturbance or injury resulting from military readiness activities.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
<i>ESA-Listed Marine Species (Humpback Whale, Southern Resident Killer Whale, Bull Trout, Dolly Varden, Green Sturgeon, Eulachon, Chinook Salmon, Hood Canal summer-run chum, Steelhead, Bocaccio Rockfish, and Yelloweye Rockfish)</i>					
No Action Alternative	No new construction and no new Growler aircraft flying over; therefore, no impact on protected species.				
Action Alternative 1	Marine species are already exposed to a high level of long-term air operations and other human-made disturbances, so they have presumably habituated to the very high level of noise and visual disturbances at NAS Whidbey Island. There is the potential to affect humpback whales, Southern Resident killer whales, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, yelloweye rockfish, and bull trout, but those impacts would be “insignificant” in ESA terms in that they would not rise to the level of take. Therefore, pursuant to the ESA, the Proposed Action may affect, but is not likely to adversely affect, the humpback whale, Southern Resident killer whale, green sturgeon, eulachon, Chinook salmon, Hood Canal summer-run chum, steelhead, bocaccio rockfish, yelloweye rockfish, or bull trout.				
Action Alternative 2	Impacts would be similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts would be similar to those depicted under Alternative 1.				
<i>Water Resources (No significant impact from construction activities or operation of new aircraft)</i>					
<i>Groundwater (Sections 4.9.1, 4.9.2.1)</i>					
No Action Alternative	No new construction or increase in demand for groundwater resources; therefore, no impact.				
Action Alternative 1	No construction would extend to a depth that may impact groundwater resources, and minimal increase in demand for groundwater; therefore, no impact.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
<i>Surface Water/Wetlands/Floodplains/Marine Waters and Sediments (Sections 4.9.1, 4.9.2.1)</i>					
No Action Alternative	No new construction; therefore, no impact.				
Action Alternative 1	No direct impact, since construction would not be occurring within resource areas. Potential indirect impact due to 2 acres of new impervious surface at Ault Field (1% increase over existing), which would slightly increase stormwater flow. Any impacts would be minimized through BMPs.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
<i>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)</i>					
<i>Population (Sections 4.10.1, 4.10.2.1)</i>					
No Action Alternative	No new personnel or dependents; therefore, no impact.				
Action Alternative 1	Net increase of 794 people to the region would result in a minor impact.				
Action Alternative 2	Net increase of 1,488 people to the region would result in a minor impact.				
Action Alternative 3	Net increase of 808 people to the region would result in a minor impact.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
<i>Economy, Employment, and Income (Sections 4.10.1, 4.10.2.1)</i>					
No Action Alternative	No construction activities and no new personnel in the region; therefore, no impact.				
Action Alternative 1	Up to \$122.5 million in direct construction expenditures, which would be a short-term impact. Up to 839 projected short-term employment positions from construction activities. 335 personnel in the region spending money. Some minor to moderate impacts to noise-sensitive industries in the area.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1, with the exception of 628 personnel in the region spending money.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1, with the exception of 341 personnel in the region spending money.				
<i>Housing (Sections 4.10.1, 4.10.2.1)</i>					
No Action Alternative	No new personnel/households in the region; therefore, no impact.				
Action Alternative 1	Up to 335 households relocating to the area. Additional personnel would generate a deficit of adequate family housing units and unaccompanied personnel housing units				
Action Alternative 2	Up to 628 households relocating to the area. Additional personnel would generate a deficit of adequate family housing units and unaccompanied personnel housing units.				
Action Alternative 3	Up to 341 households relocating to the area. Additional personnel would generate a deficit of adequate family housing units and unaccompanied personnel housing units.				
<i>Local Government Revenue and Expenditures (Sections 4.10.1, 4.10.2.1)</i>					
No Action Alternative	No new personnel/dependents in the region; therefore, no impact.				
Action Alternative 1	Increase in annual tax receipts in Island County by \$222,000 and Skagit County by \$96,000.				
Action Alternative 2	Increase in annual tax receipts in Island County by \$415,000 and Skagit County by \$181,000.				
Action Alternative 3	Increase in annual tax receipts in Island County by \$226,000 and Skagit County by \$98,000.				
<i>Community Services (Sections 4.10.1, 4.10.2.1)</i>					
No Action Alternative	No new personnel/dependents in the region; therefore, no impact.				
Action Alternative 1	Education Projected 173 students in already overcrowded school districts would result in significant impacts on school districts in the region. Medical, Fire and Emergency, and Police Protection Services Minimal impacts from increase in personnel/dependents in the area.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1 with the exception of 324 students projected.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1 with the exception of 176 students projected.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
<i>Environmental Justice (Environmental justice communities exist, and impacts on housing affordability have the potential to be disproportionately high and adverse on these communities in the short term (Section 4.11))</i>					
No Action Alternative	No change in the aircraft or personnel loadings at the NAS Whidbey Island complex would occur; therefore, there would be no additional environmental or human health impacts.				
Action Alternative 1	The Navy has concluded that there are minority and low-income populations living within the affected area (environmental justice communities), and there are significant impacts outlined within the EIS to populations living within the affected area (noise impacts to those living within the 65 dB DNL noise contours and overcrowding at Oak Harbor School District schools). However, the Navy has determined that there will be no disproportionate high and adverse human health or environmental effects from noise, Clear Zones/Accident Potential Zones, or school overcrowding on minority populations or low-income populations. Impacts on housing availability and housing affordability could have the potential to have a disproportionately high and adverse impact on low-income communities. The Navy further acknowledges that the increase in the cost of housing and the decrease in available properties may have a negative impact on low-income residents, who typically spend a larger proportion of their income on housing than the general population.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
<i>Transportation (No significant impacts from construction activities or additional personnel and dependents)</i>					
<i>Renovation of Existing Facilities at NAS Whidbey Island (Sections 4.12.1, 4.12.2.1)</i>					
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.				
<i>Off Base Operations: Trip Generation and Level of Service (Sections 4.12.1, 4.12.2.1)</i>					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact.				
Action Alternative 1	Estimated 122 to 2,051 new trips per weekday on major roadways off base. Level of service (LOS) on State Route (SR) 20 east of Main Street would degrade from a LOS B to LOS C. LOS on SR 20 south of Swantown Road and north of Case Road would degrade from LOS C to LOS D. LOS on I-5 south of SR 20 would degrade from LOS C to LOS D. However, all segments would operate at or better than the LOS standard. Area of concern at intersection of SR 20 and Banta Road would see an increase of 238 daily trips; however, intersection improvements will be completed by 2019.				
Action Alternative 2	Estimated 229 to 3,845 new trips per weekday on major roadways off base. LOS on SR 20 east of Main Street would degrade from a LOS B to LOS C. LOS on SR 20 south of Swantown Road would degrade from a LOS C to LOS E. LOS on SR 20 north of Goldie Street and north of Case Road would degrade from LOS C to LOS D. LOS on I-5 south of SR 20 would degrade from LOS C to LOS D. However, these segments would operate at or better than the LOS standard. Area of concern at intersection of SR 20 and Banta Road would see an increase of 445 daily trips; however, intersection improvements will be completed by 2019.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
Action Alternative 3	Estimated 125 to 2,088 new trips per weekday on major roadways off base. Level of service (LOS) on State Route (SR) 20 east of Main Street would degrade from a LOS B to LOS C. LOS on SR 20 south of Swantown Road and north of Case Road would degrade from LOS C to LOS D. LOS on I-5 south of SR 20 would degrade from LOS C to LOS D. However, these segments would operate at or better than the LOS standard. Area of concern at intersection of SR 20 and Banta Road would see an increase of 242 daily trips; however, intersection improvements will be completed by 2019.				
<i>On Base Operations (Sections 4.12.1, 4.12.2.1)</i>					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact.				
Action Alternative 1	Gates at Ault Field could see an increase of 670 daily trips (approximately 3 percent over No Action Alternative traffic volumes entering and exiting the installation. Implementation of improvements identified in the NAS Whidbey Island Transportation Plan would help to alleviate traffic concerns.				
Action Alternative 2	Gates at Ault Field could see an increase of 1,256 daily trips (approximately 7 percent over No Action Alternative traffic volumes entering and exiting the installation. Implementation of improvements identified in the NAS Whidbey Island Transportation Plan would help to alleviate traffic concerns.				
Action Alternative 3	Gates at Ault Field could see an increase of 682 daily trips (approximately 4 percent over No Action Alternative traffic volumes entering and exiting the installation. Implementation of improvements identified in the NAS Whidbey Island Transportation Plan would help to alleviate traffic concerns.				
<i>Transit, Pedestrian, and Bicycle Facilities (Sections 4.12.1, 4.12.2.1)</i>					
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.				
<i>Infrastructure (No significant impact due to additional personnel and dependents)</i>					
<i>Potable Water (Sections 4.13.1, 4.13.2.1)</i>					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact				
<i>Towns have additional capacity to handle increase in demand; therefore, resource is impacted but not significantly impacted.</i>					
Action Alternative 1	Approximately 93,800 gallons per day of potable water needed to support 335 additional households in the region and 990 gallons per day to support new facilities.				
Action Alternative 2	Approximately 175,800 gallons per day of potable water needed to support 628 additional households in the region and 2,080 gallons per day to support new facilities.				
Action Alternative 3	Approximately 95,500 gallons per day of potable water needed to support 341 additional households in the region and 990 gallons per day to support new facilities.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Wastewater (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact				
Towns have additional capacity to handle increase in demand; therefore, resource is impacted but not significantly impacted.					
Action Alternative 1	Approximately 84,400 gallons per day of additional wastewater to support 335 additional households in the region and 750 gallons per day to support new facilities.				
Action Alternative 2	Approximately 158,300 gallons per day of additional wastewater to support 628 additional households in the region and 1,840 gallons per day to support new facilities.				
Action Alternative 3	Approximately 85,900 gallons per day of potable water needed to support 341 additional households in the region and 750 gallons per day to support new facilities.				
Stormwater (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction; therefore, no impact				
Action Alternative 1	Increase of 2.0 acres of impervious surfaces from new facilities, and no new houses are expected to be constructed. BMPs and compliance with stormwater permit requirements would minimize any potential impacts, and therefore the resource is impacted but not significantly impacted.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
Solid Waste Management (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact				
Regional landfills have additional capacity to handle increase in demand; therefore, resource is impacted but not significantly impacted.					
Action Alternative 1	Approximately 3,500 pounds of additional solid waste disposed of daily, and 1,200 pounds of additional waste recycled/composted daily.				
Action Alternative 2	Approximately 6,500 pounds of additional solid waste disposed of daily, and 2,200 pounds of additional waste recycled/composted daily.				
Action Alternative 3	Approximately 3,600 pounds of additional solid waste disposed of daily, and 1,200 pounds of additional waste recycled/composted daily.				
Energy (Sections 4.13.1, 4.13.2.1)					
No Action Alternative	No new construction or personnel/dependents in the region; therefore, no impact				
Projections anticipate sufficient energy supply for the foreseeable future; therefore, resource is impacted but not significantly impacted.					
Action Alternative 1	Increase of 1,390,200 kilowatt hour (kWh) of electricity per year and 25,100 million British Thermal Units (MMBTU) of additional natural gas needed per year to support 335 additional households throughout the region and 483,930 kWh of electricity and 1,550 MMBTU of additional natural gas per year needed to support new facilities.				
Action Alternative 2	Increase of 2,606,000 kWh of electricity per year and 47,000 MMBTU of additional natural gas needed to support 628 additional households throughout the region and 1,072,970 kWh of electricity and 3,770 MMBTU of additional natural gas per year needed to support new facilities.				
Action Alternative 3	Increase of 1,415,100 kWh of electricity per year and 25,500 MMBTU of additional natural gas needed to support 341 additional households throughout the region and 483,930 kWh of electricity and 1,710 MMBTU of additional natural gas per year needed to support new facilities.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
<i>Communications (Sections 4.13.1, 4.13.2.1)</i>					
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.				
<i>Facilities (Sections 4.13.1, 4.13.2.1)</i>					
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.				
<i>Geological Resources (No significant impacts due to construction activities)</i>					
<i>Topography/Geology (Sections 4.14.1, 4.14.2.1)</i>					
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.				
<i>Seismic Activity (Sections 4.14.1, 4.14.2.1)</i>					
No Action Alternative	No new construction; therefore, no impact.				
Action Alternative 1	In event of earthquake, seismic hazards may damage buildings. BMPs and emergency planning would minimize any potential impact.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				
<i>Soils (Sections 4.14.1, 4.14.2.1)</i>					
No Action Alternative	No new construction; therefore, no impact.				
Action Alternative 1	Direct impacts to soils may include grading, compaction, and rutting. Indirect impacts from increased quantity and velocity of stormwater. All potential impacts would be avoided and minimized utilizing BMPs.				
Action Alternative 2	Impacts similar to those depicted under Alternative 1.				
Action Alternative 3	Impacts similar to those depicted under Alternative 1.				

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
<i>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)</i>					
No Action Alternative	No change associated with hazardous materials and wastes; therefore, no impact.				
Action Alternative 1	Hazardous materials and waste would increase in quantity at NAS Whidbey Island but would be managed under existing law and Navy regulations and management practices; therefore, there would be no significant impact under Alternative 1 (35 aircraft).				
Action Alternative 2	Impacts similar to those depicted under Alternative 1, but would be negligibly higher (36 aircraft) than under Alternative 1 (35 aircraft).				
Action Alternative 3	Impacts similar to those depicted under Alternative 2.				
<i>Climate Change and Greenhouse Gases (No significant impact from the increase in aircraft operations)</i>					
<i>Climate Change (Sections 4.16.1.1; 4.16.1.2; 4.16.1.3)</i>					
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.				
<i>Greenhouse Gas (GHG) (Sections 4.16.2.1; 4.16.2.2; 4.16.2.3; 4.16.2.4; 4.16.2.5)</i>					
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.				
<i>Increase in mobile and stationary CO₂ emissions as compared to the No Action Alternative (Equates to less than 1 percent of all aircraft CO₂ emissions in Washington. GHG emissions from this action should not have significant impact on Washington’s GHG emission goals.)</i>					
Action Alternative 1	Stationary – 3 percent Mobile – 40 percent	Stationary – 3 percent Mobile – 32 percent	Stationary – 3 percent Mobile – 25 percent	Stationary – 3 percent Mobile – 37 percent	Stationary – 3 percent Mobile – 27 percent
	While the Washington GHG inventory has shown an increase in overall transportation GHG emissions from 37.5 to 40.4 million MTCO ₂ e from 1990 to 2013, annual aircraft GHG emissions decreased from 9.1 to 6.57 million MTCO ₂ e over the same time period (Washington State Department of Ecology, 2016b).				
Action Alternative 2	Stationary – 3 percent Mobile – 40 percent	Stationary – 3 percent Mobile – 33 percent	Stationary – 3 percent Mobile – 26 percent	Stationary – 3 percent Mobile – 38 percent	Stationary – 3 percent Mobile – 29 percent
Action Alternative 3	Stationary – 3 percent Mobile – 40 percent	Stationary – 3 percent Mobile – 33 percent	Stationary – 3 percent Mobile – 25 percent	Stationary – 3 percent Mobile – 37 percent	Stationary – 3 percent Mobile – 28 percent

Table 4.17-1 Summary of Potential Impacts to Resource Areas

	<i>Scenario A</i>	<i>Scenario B</i>	<i>Scenario C</i>	<i>Scenario D</i>	<i>Scenario E</i>
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Note: This table provides a summary of impacts of the Proposed Action under each alternative and each scenario. The impact conclusions in this table are based on detailed analysis provided in Chapter 4 of the EIS. Impact conclusions are based on average year conditions.

- KEY
- ACHP = Advisory Council on Historic Preservation
 - AICUZ = Air Installation Compatible Use Zone
 - APZ = Accident Potential Zone
 - BASH = Bird/Animal Aircraft Strike Hazard
 - BMP = Best Management Practice
 - dB = decibel
 - DNL = day-night average sound level
 - ESA = Endangered Species Act
 - FCLP = field carrier landing practice
 - GHG = greenhouse gas
 - IBA = Important Bird Area
 - kWh = kilowatt hour
 - LOS = level of service
 - MBTA = Migratory Bird Treaty Act
 - MMBTU = million British thermal units
 - MT = metric ton
 - MTCO_{2e} = metric tons of equivalent carbon dioxide
 - NAAQS = National Ambient Air Quality Standards
 - NAS = Naval Air Station
 - OLF = Outlying Landing Field
 - POI = Point of Interest
 - SR = State Route
 - TCP = Traditional Cultural Property

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