3 Affected Environment

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

3.1 Airspace and Airfield Operations

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

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

3.1.1 Airspace and Airfield Operations, Regulatory Setting

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

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

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

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

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

3.1.2 Airspace and Airfield Operations, Affected Environment

3.1.2.1 Airspace Classification and Flight Tracks

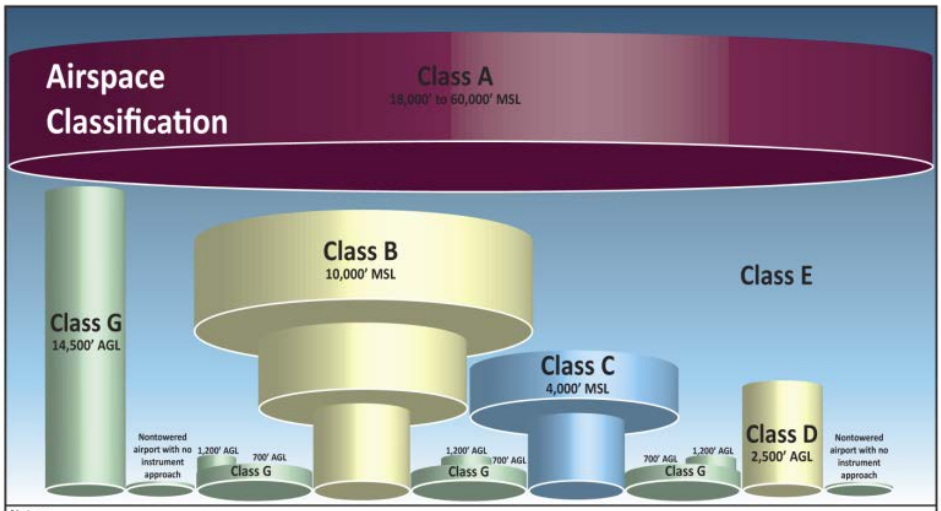
3.1.2.1.1 Ault Field

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

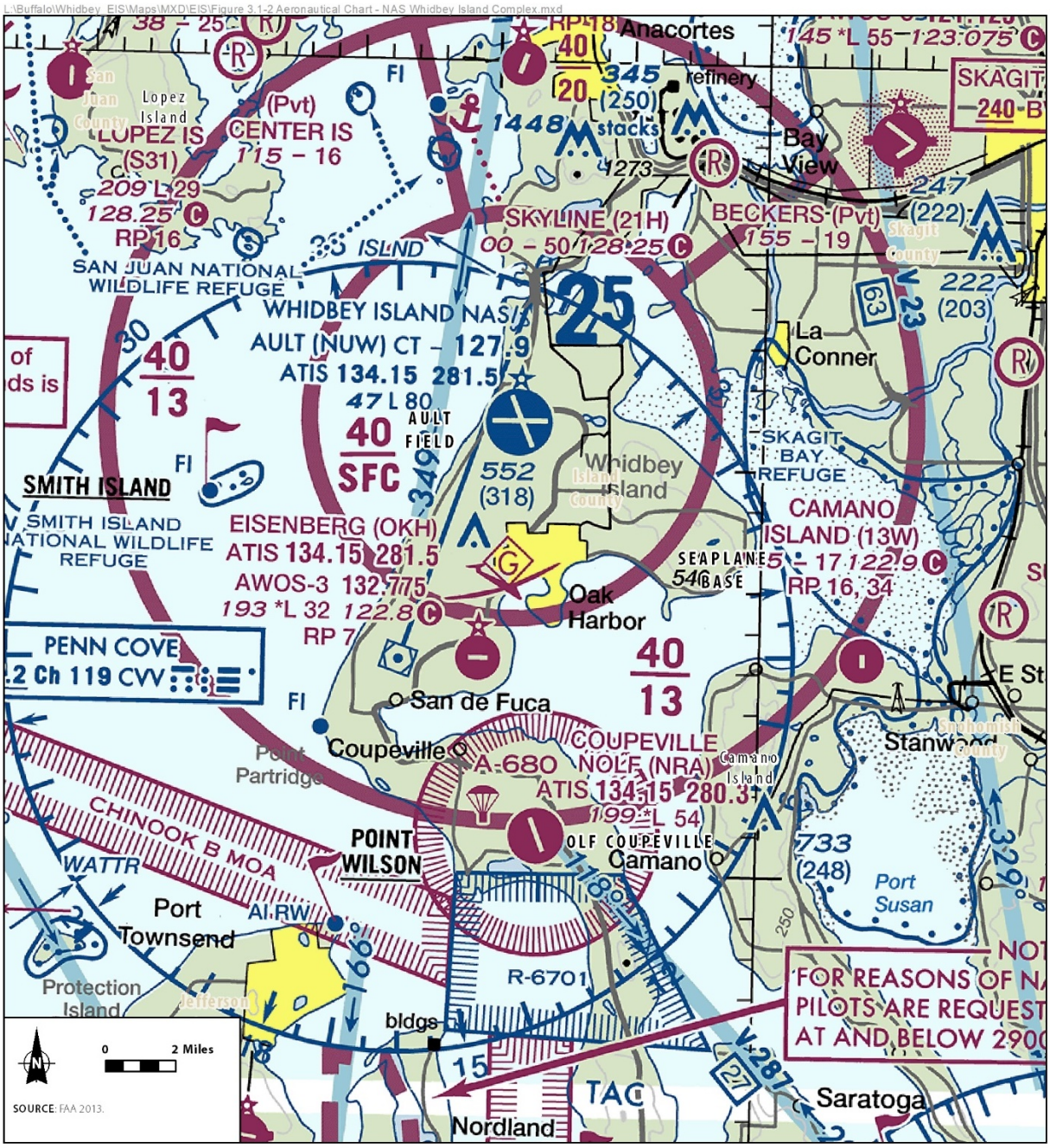
- airspace extending upward from the surface to 4,000 feet above MSL within a 5-nm radius of Ault Field
- airspace that extends upward from 1,300 feet above MSL to 4,000 feet above MSL within a 10-nm radius of the airport from the 050° bearing (toward Bay View in Skagit County) from the airport clockwise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

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

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



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



Additional Airport Information

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

Airports

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

Airport Traffic Service and Airspace Information

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

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

Intersection- Arrows are directed towards facilities with established intersections

Total mileage between NAVAIDs on direct Airways

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

3.1.2.1.2 OLF Coupeville

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

3.1.2.1.3 Military Operations Areas

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

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

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

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

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

3.1.2.1.4 Military Training Routes

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

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

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

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

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

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

Note:
[1] Estimated

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

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

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

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

3.1.2.2 Airfield Operations

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

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

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

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

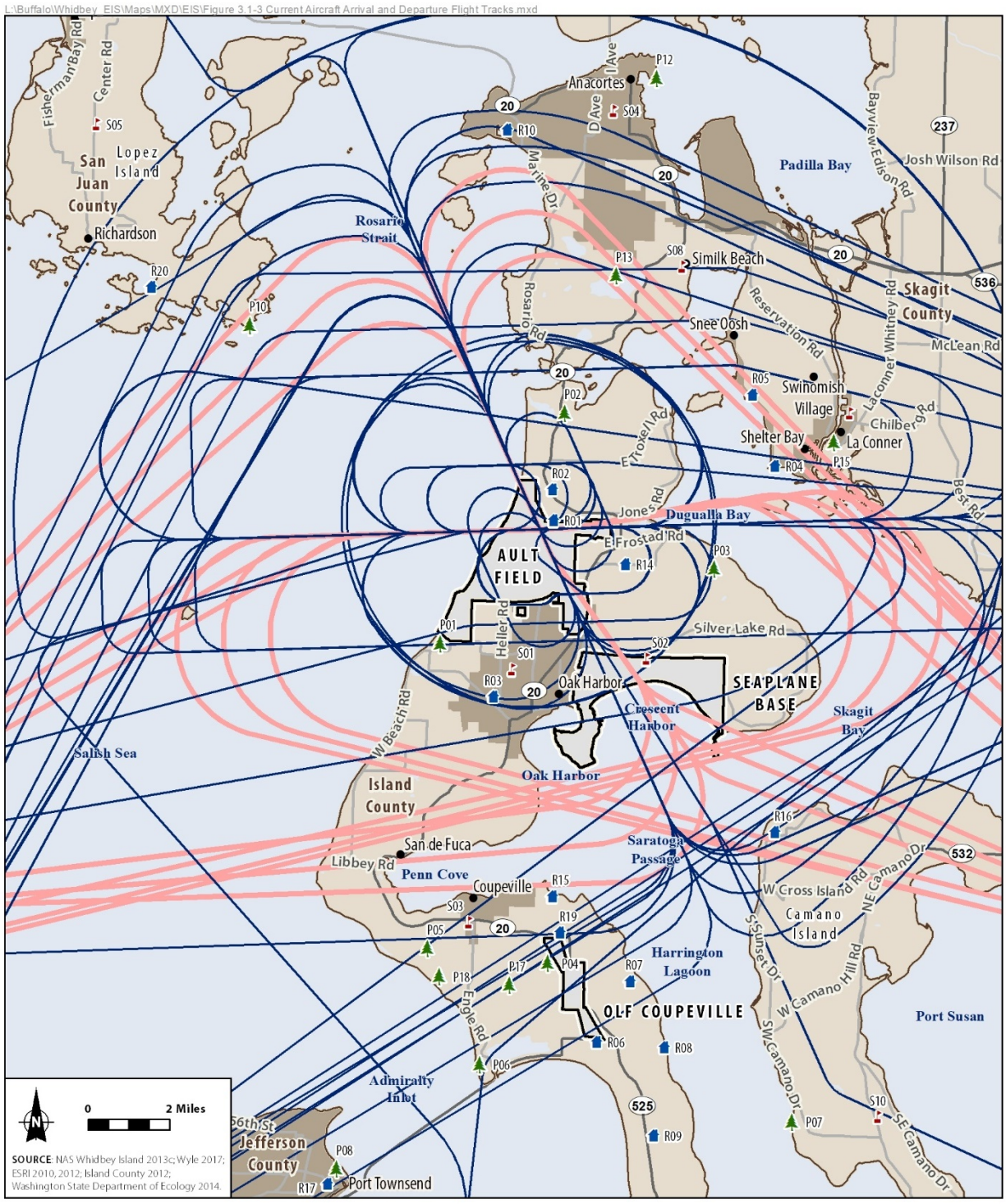


Figure 3.1-3
Current Aircraft Arrival and Departure Flight Tracks at NAS Whidbey Island Complex
Whidbey Island, Island County, WA

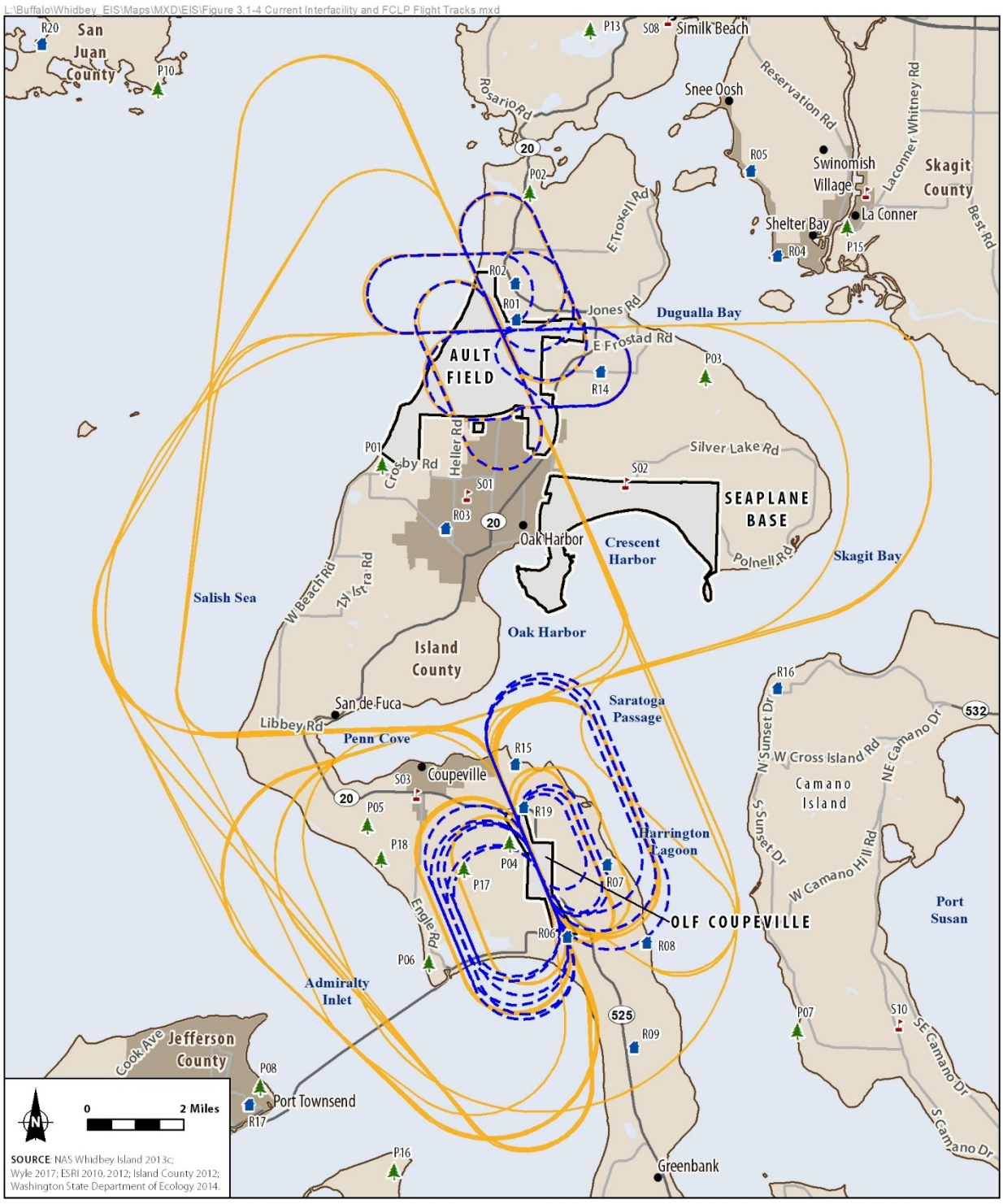


Figure 3.1-4
Current Interfacility and FCLP Flight Tracks
Whidbey Island, Island County, WA

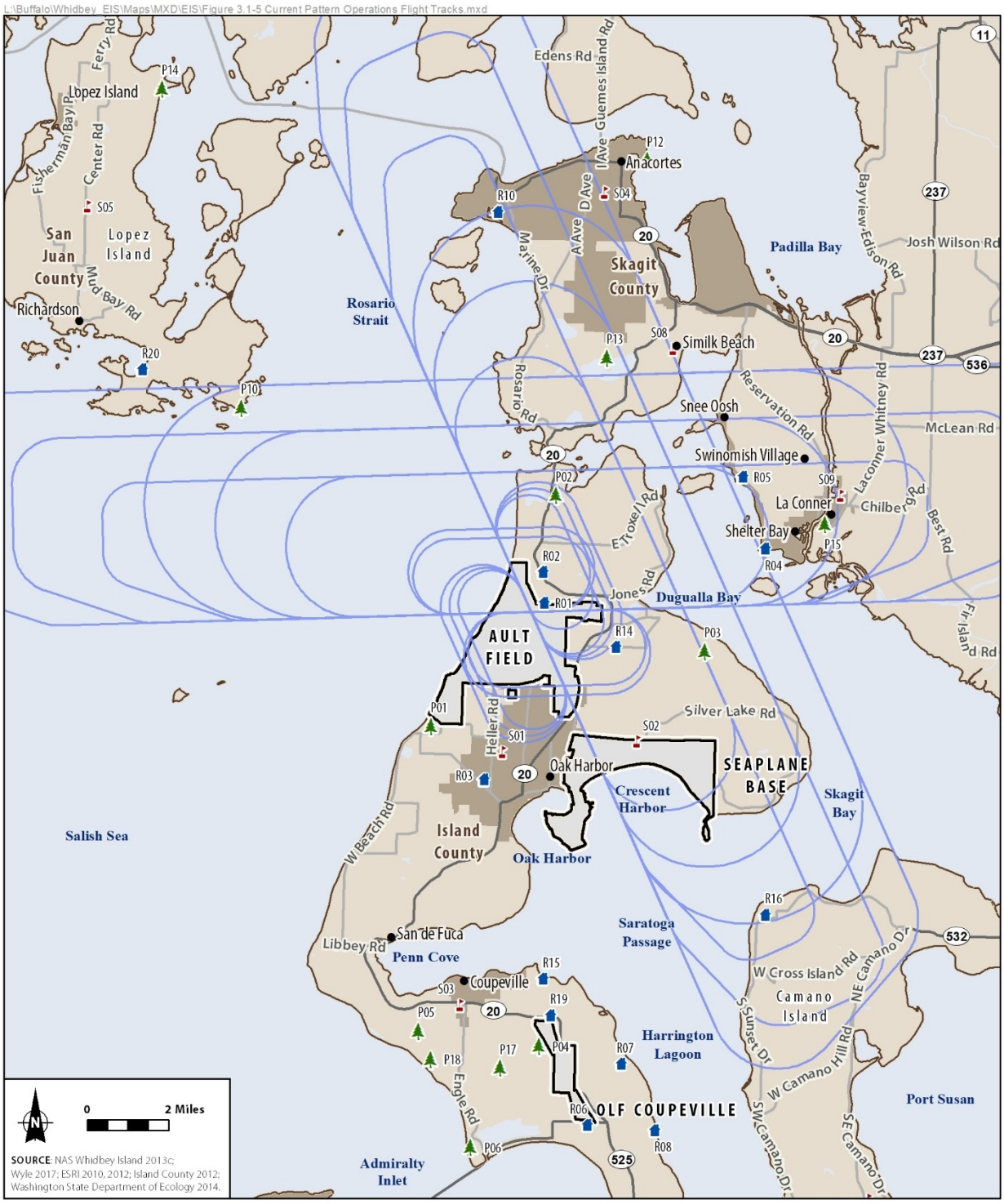


Figure 3.1-5
Current Pattern Operations Flight Tracks
Whidbey Island, Island County, WA

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

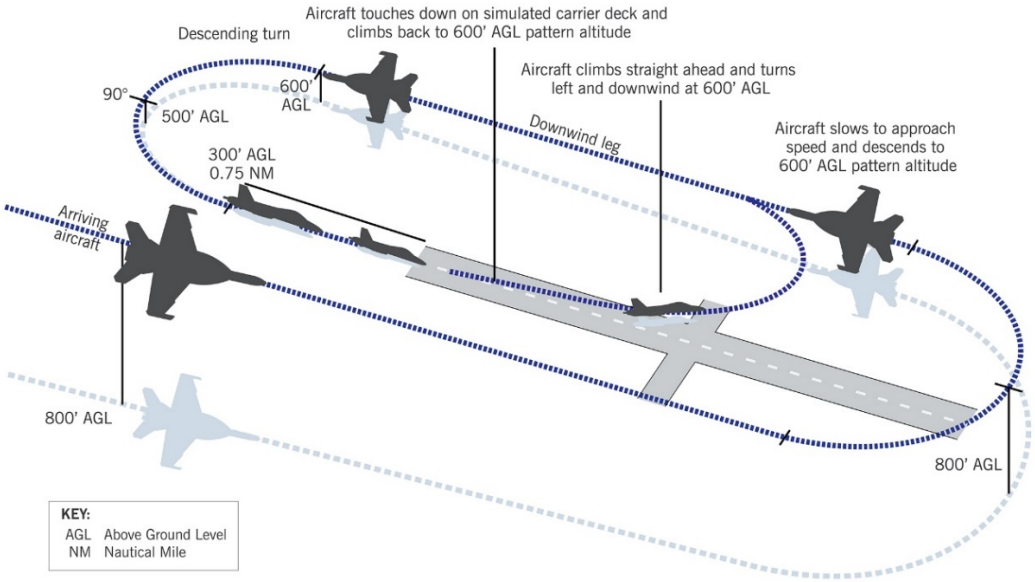
As squadrons prepare for deployment on an aircraft carrier, activity at both Ault Field and OLF Coupeville significantly increases, with periods of concentrated FCLP training followed by little to no FCLP training occurring for several days and weeks after deployment has occurred. A typical FCLP training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

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

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

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

Figure 3.1-6 Standard FCLP Pattern Altitudes (AGL)



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

3.1.2.2.1 Average Annual Airfield Operations

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

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

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

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

Source: Wyle, 2017

Notes:

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

2 Transient aircraft are not permanently stationed at Ault Field.

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

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

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

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

3.2 Noise Associated with Aircraft Operations

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

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

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

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

3.2.1 Basics of Sound and the A-weighted Sound Level

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

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

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

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

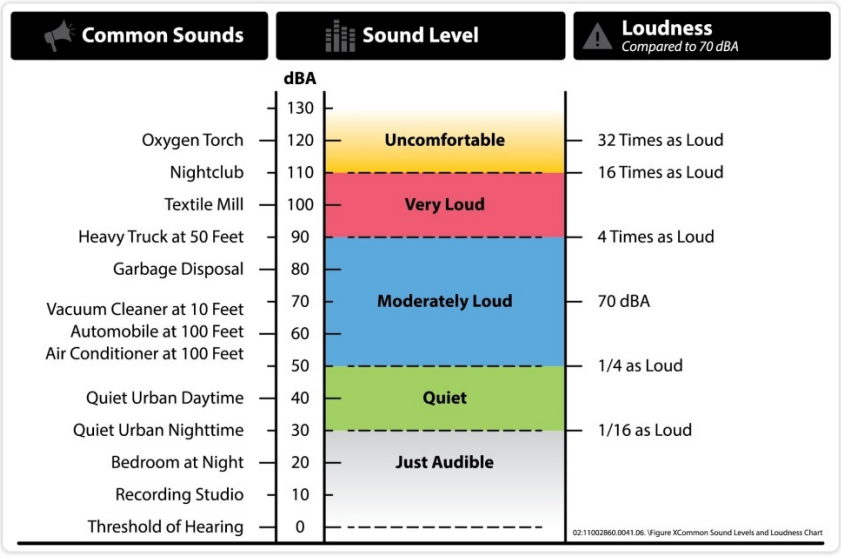
Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic: twice or half as loud
20 dB	Striking: a four-fold change

Key:
dB = decibel

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

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

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



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

3.2.2 Noise Metrics and Modeling

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

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

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

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

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

3.2.2.1 Day-night Average Sound Level

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

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

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

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

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

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

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

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

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

3.2.2.2 Equivalent Sound Level

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

3.2.2.3 Sound Exposure Level

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

3.2.2.4 Maximum Sound Level

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

3.2.2.5 Number of Events above a Threshold Level

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

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

3.2.3 Noise Effects

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

3.2.3.1 Annoyance

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

3.2.3.2 Speech Interference (Indoor)

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

3.2.3.3 Classroom/learning Interference

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

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

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

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

3.2.3.4 Sleep Disturbance

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

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

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

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

3.2.3.6 Potential Hearing Loss

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

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

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

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

3.2.3.7 Nonauditory Health Effects

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

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

3.2.3.8 Vibration Effects from Aircraft Operations

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

3.2.4 Noise, Affected Environment

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

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

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

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

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

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

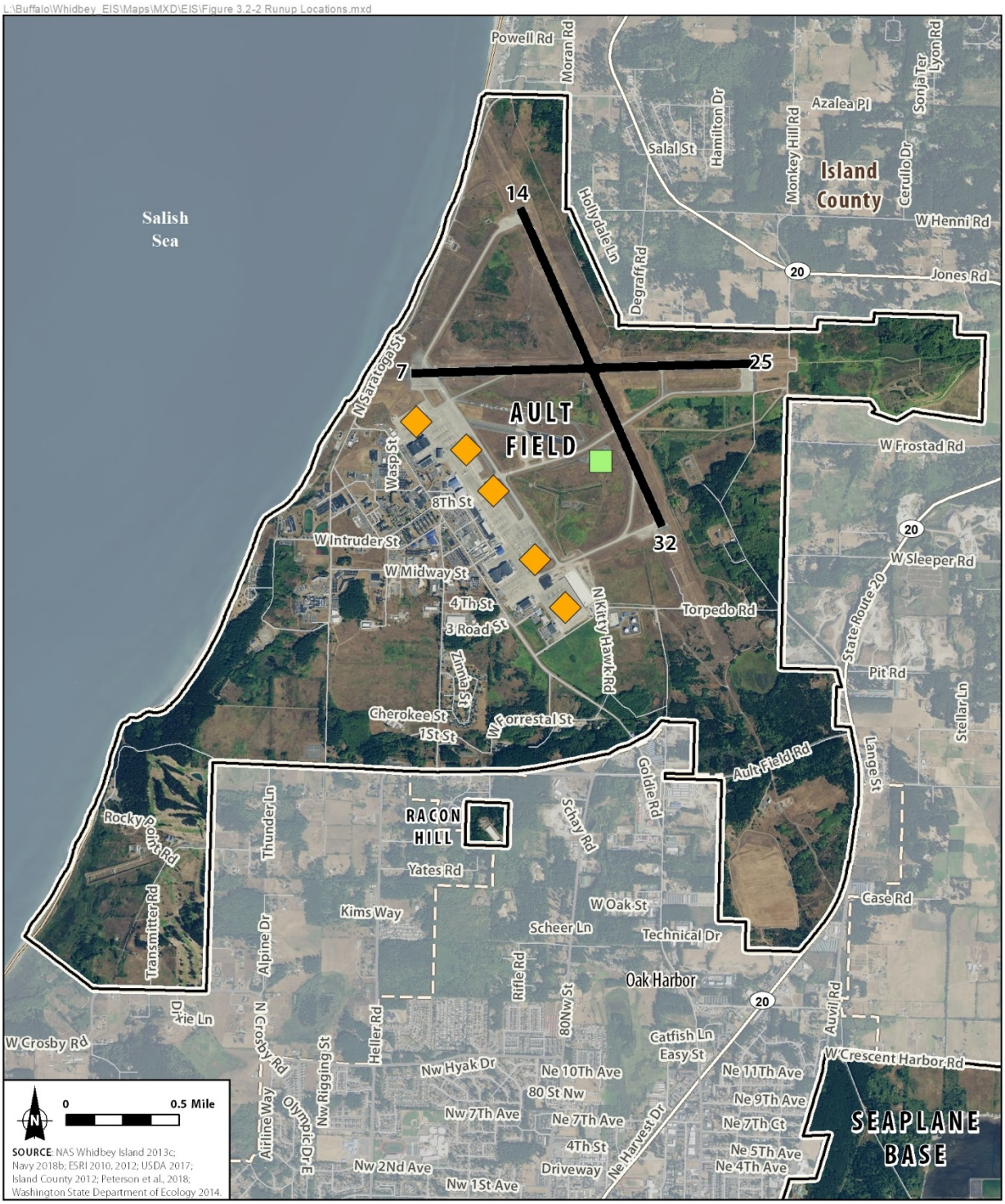


Figure 3.2-2
Engine Run-up Locations at Ault Field
Whidbey Island, Island County, WA

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

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

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

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

Applying Refinements to Certain Flight Profiles/Aircraft Operating Assumptions

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

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

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

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

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

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

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

3.2.4.1 DNL Noise Contours

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

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

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

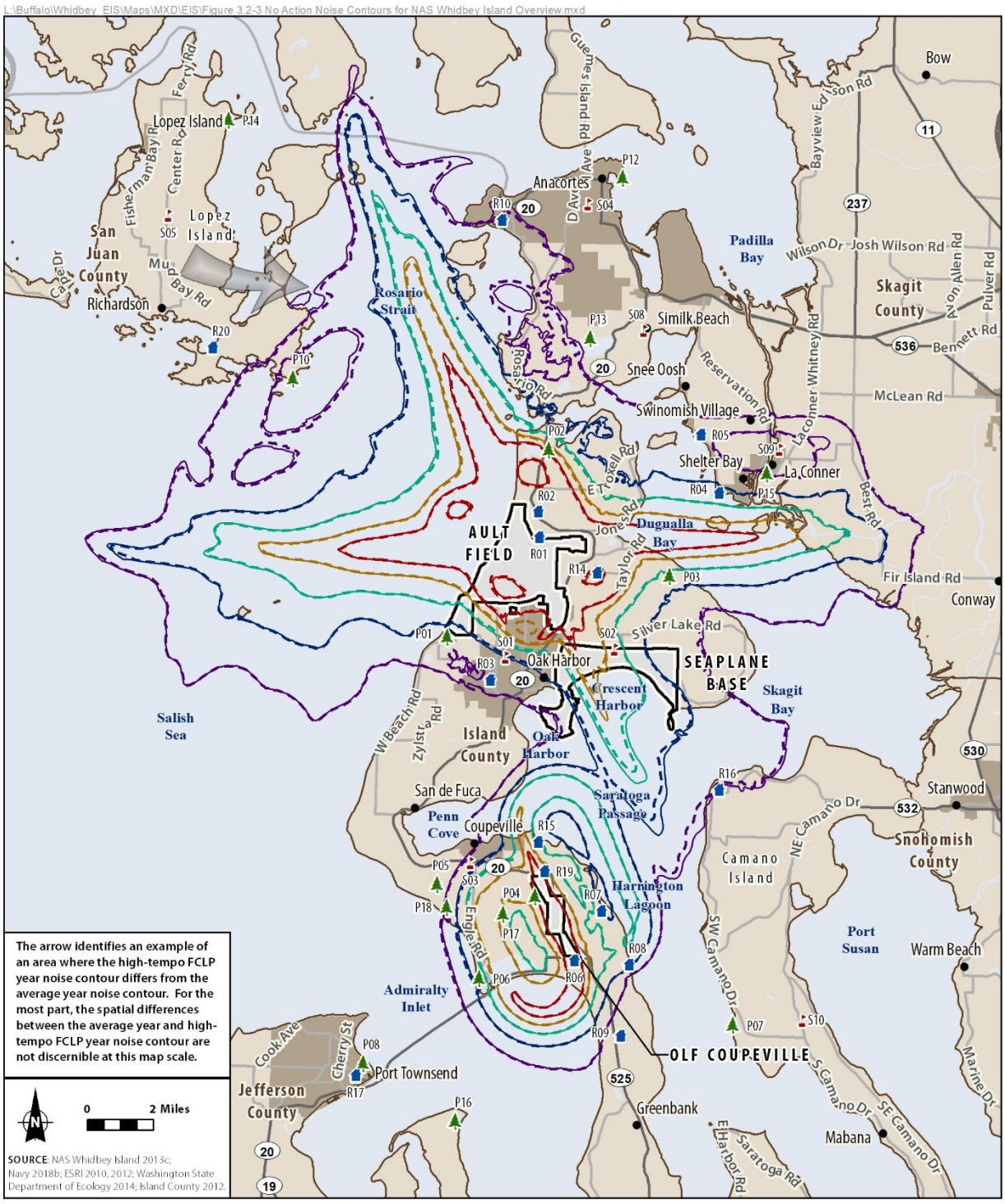


Figure 3.2-3
No Action Environment for NAS Whidbey Island Overview
Whidbey Island, Island County, WA

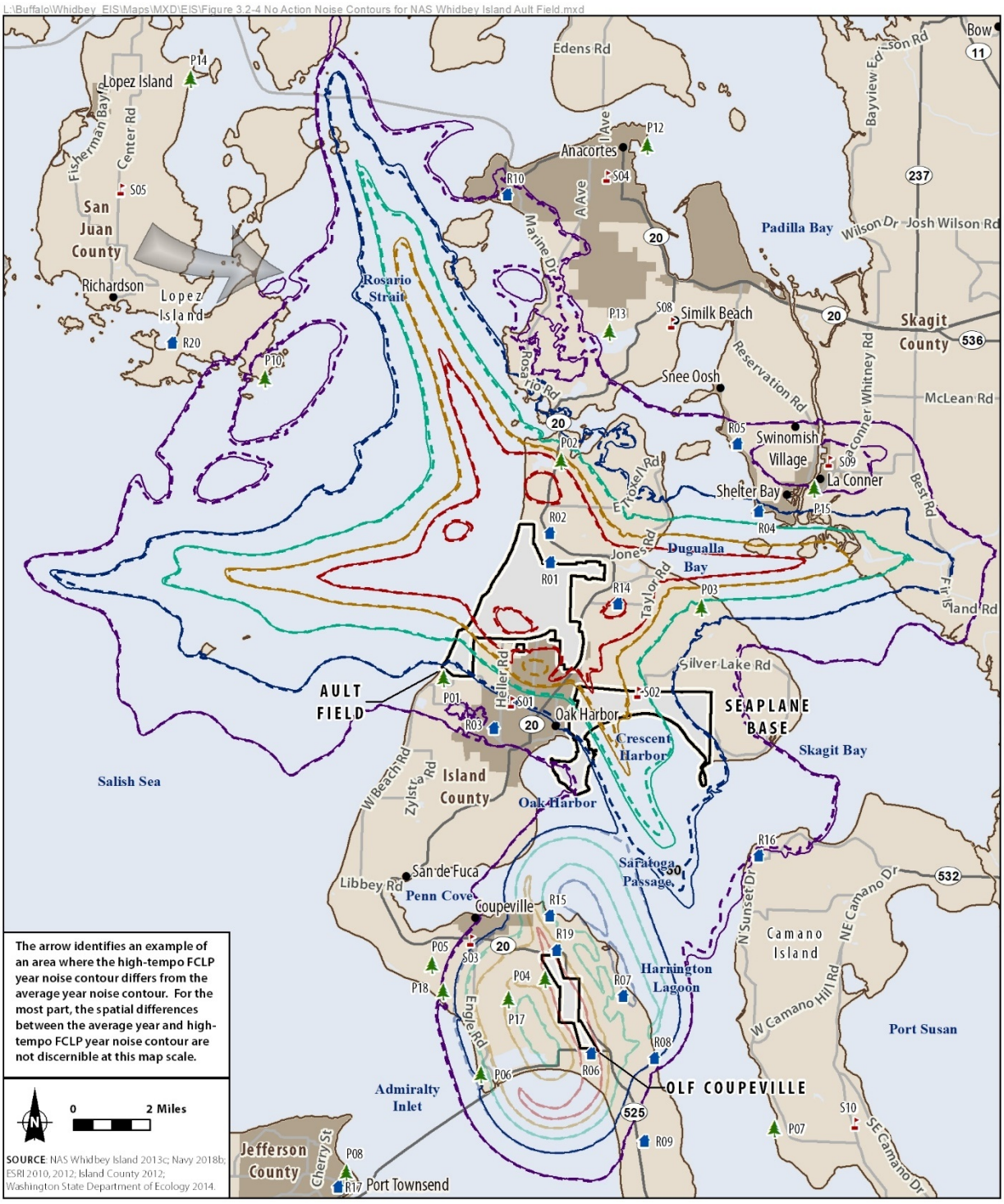


Figure 3.2-4
No Action Environment for Ault Field, NAS Whidbey Island Complex
Whidbey Island, Island County, WA

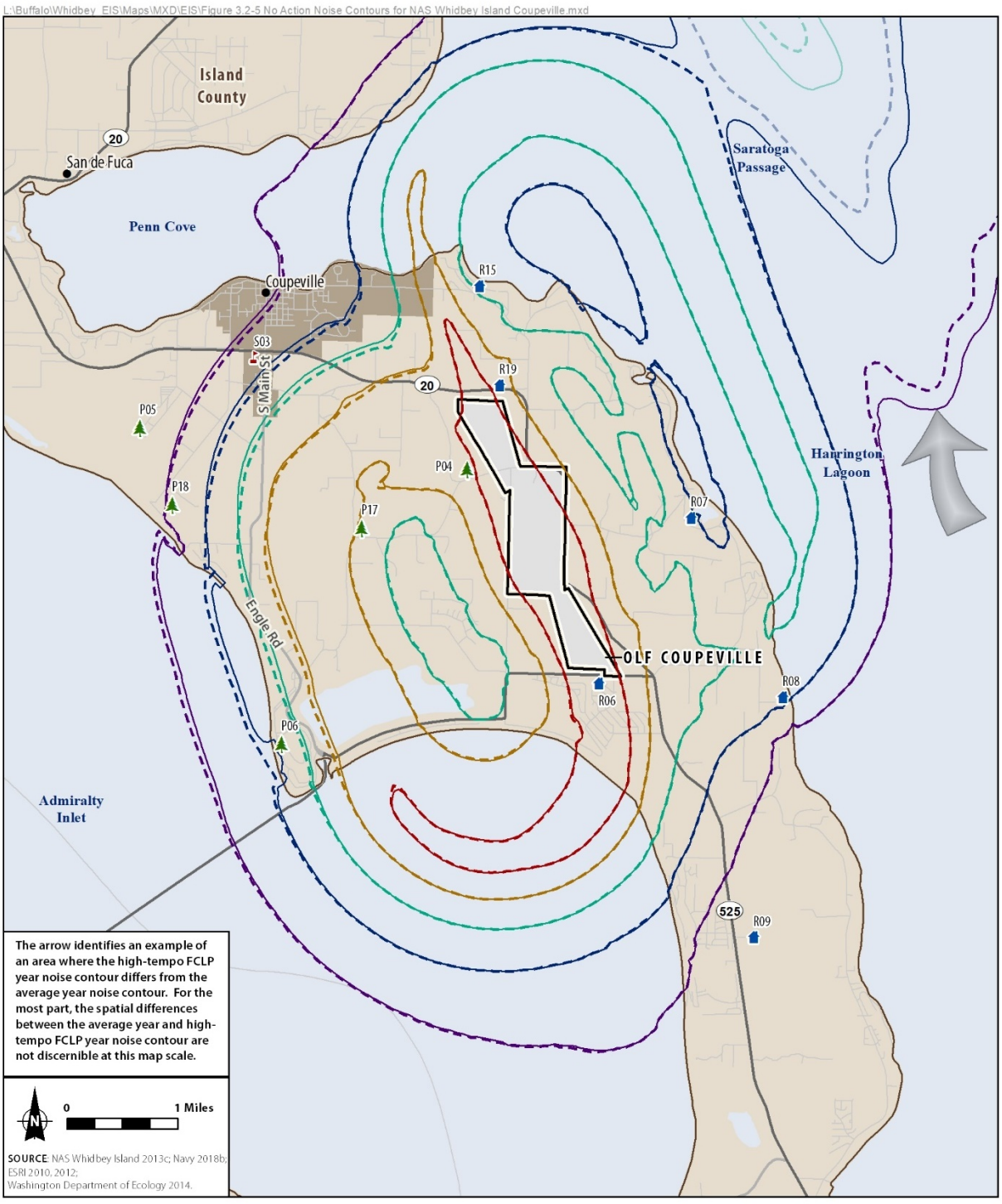


Figure 3.2-5
No Action Environment for
OLF Coupeville, NAS Whidbey Island Complex
Whidbey Island, Island County, WA

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

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

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

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

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

Notes:

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

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

3 Numbers have been rounded to ensure totals sum.

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

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

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

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

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

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

3.2.4.2 Existing Noise Mitigation

3.2.4.2.1 Noise Abatement Policy

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

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

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

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

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

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

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

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

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

3.2.4.2.2 Noise Complaint Process

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

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

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

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

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

3.2.4.2.3 Air Installations Compatible Use Zones Program

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

3.2.4.3 Supplemental Noise Analyses

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

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

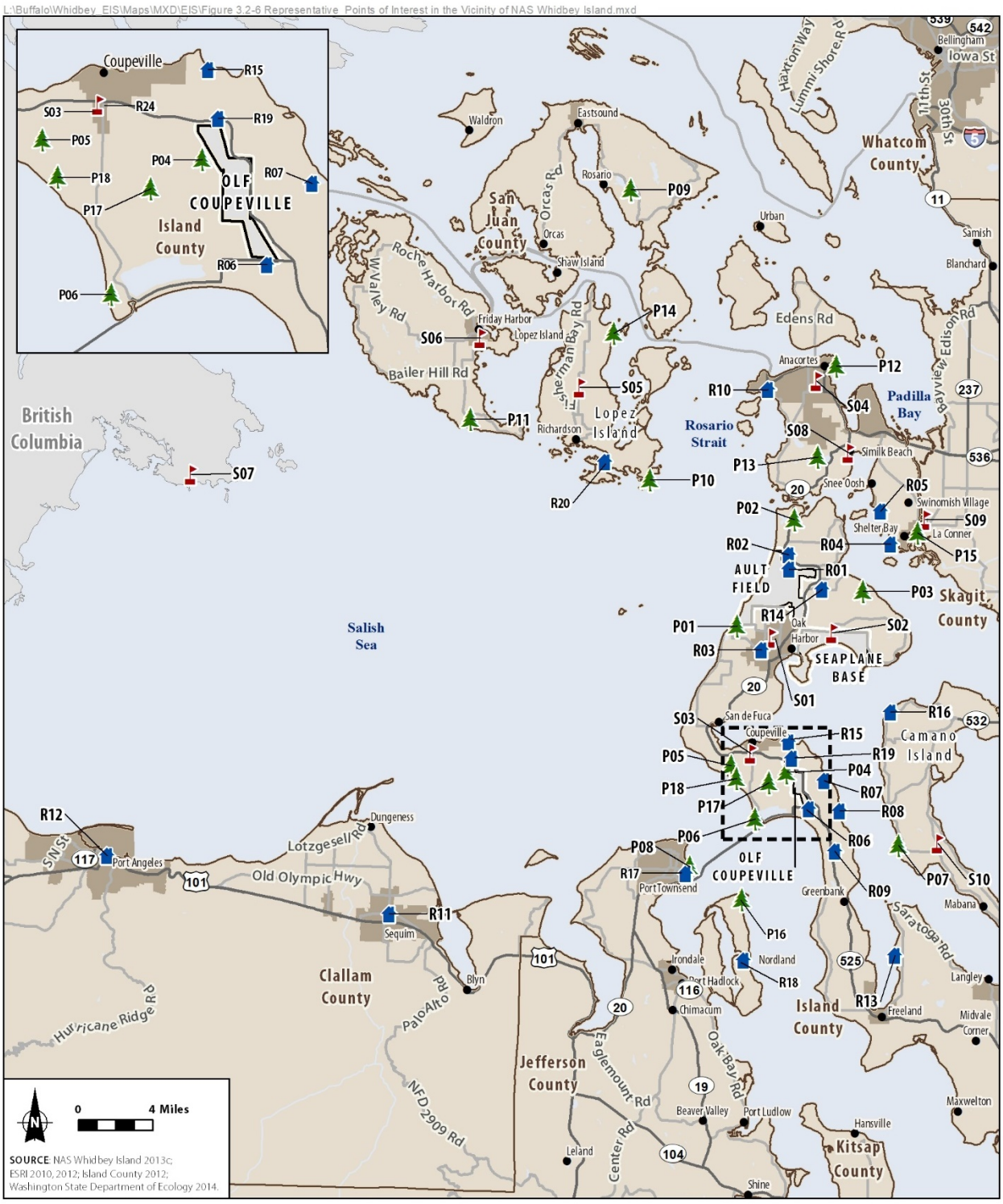


Figure 3.2-6
Representative Points of Interest in the Vicinity of NAS Whidbey Island Complex
Whidbey Island, Island County, WA

3.2.4.3.1 Single Event Noise and Number of Events Above

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

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

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

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

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

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

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

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

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

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

Notes:

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

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

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

Key:

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

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

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

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

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

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

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

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

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

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

3.2.4.3.2 Speech Interference (Indoor)

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

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

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

Notes:

1 Hyphens (-) indicate result equals zero.

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

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

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

3.2.4.3.3 Classroom/learning Interference

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

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

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

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

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

Notes:

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

2 Hyphens (-) indicate result equals zero.

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

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

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

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

3.2.4.3.4 Sleep Disturbance

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

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

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

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

Notes:

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

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

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

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

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

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

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

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

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

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

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

Notes:

1 Hyphens (-) indicate result equals zero.

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

Key:

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

3.2.4.3.6 Potential Hearing Loss

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

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

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

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

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

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

Notes:

[1] NIPTS values rounded to nearest 0.5 dB.

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

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

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

Key:

dB = decibel

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

NIPTS = Noise Induced Permanent Threshold Shift

OLF = outlying landing field

3.3 Public Health and Safety

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

3.3.1 Public Health and Safety, Regulatory Setting

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

3.3.1.1 Flight Safety

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

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

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

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

The NAS Whidbey Island complex has conducted EA-18G mishap drills every fiscal year (FY) since 2013. Starting in 2017, NAS Whidbey Island Navy Region Northwest Fire and Emergency Services (NRNW F&ES) led community response planning, to include a fact-gathering seminar with the installation's community partners. NRNW F&ES is building a plan for full community response, and the NAS Whidbey Island Complex Training Department is implementing a "Table Top Exercise". Additionally, "mass casualty training" is incorporated in all of the NAS Whidbey Island complex's annual operational exercises.

Electronic attack squadrons periodically perform mishap drills to simulate how to properly respond to an aircraft mishap. Each squadron may tailor its own scenario for the drill, but all electronic attack squadrons follow the Naval Air Force, U.S. Pacific Fleet and Electronic Attack Wing, U.S. Pacific Fleet Pre-Mishap Plan when executing the drill. A pre-mishap plan describes, in advance, the steps that must be taken when a mishap occurs. The plan also anticipates all reasonable eventualities and devises measures to cope with them. Deficiencies are identified through periodic drills designed to ensure the plan's smooth execution when a mishap occurs, focusing on the flow of information. A checklist of items to complete when executing the plan is standardized. While the contents of each squadron's pre-mishap plan may vary slightly, all plans attempt to be all-inclusive and address coordination with local commands, nearby military aviation facilities, local news media, area law enforcement officials, civil fire and rescue agencies, the USEPA, the FAA, and plans for medical services.

The Navy values safety and professionalism, and has adopted many measures to promote aviation safety within the naval aviation community. Specifically, all Navy pilots use state-of-the-art simulators for training purposes that include all facets of flight operations and comprehensive emergency (such as mechanical failure or bird strike) response procedures that minimize the mishap risks associated with pilot error. Highly trained maintenance crews are trained to perform preventative maintenance actions, maintenance repairs, diagnostic testing of the repair, and flight safety inspections on each aircraft in accordance with Navy regulations. Maintenance activities are monitored to ensure that aircraft are equipped to withstand the rigors of operational and training events, and to identify any maintenance trends that may require a more comprehensive solution. The Navy will periodically initiate "safety stand-downs" to promote aviation safety training along with personal discipline and responsibility. Safety stand-downs are an effective tool for reducing aviation safety risks by focusing on the human factor in aviation safety that complements the traditional skills-based training that Navy pilots and maintenance crews receive. In this EIS, potential impacts to flight safety at NAS Whidbey Island and OLF Coupeville are evaluated by considering the possible changes to risk as a result of the proposed alternatives.

3.3.1.2 Bird/Animal Aircraft Strike Hazard

Potential bird/animal aircraft strikes are another safety concern for aircraft operations. Aircraft strikes of birds or other animals (e.g., bats and deer) are a safety concern because of the potential for damage to aircraft or injury to pilots or local populations if an aircraft crash should occur in a populated area. The presence of resident and migratory birds at NAS Whidbey Island is attributable to both the installation's location within the Pacific Flyway and the occurrence of water-filled ditches, freshwater wetlands, marine shoreline, perch sites, tall brush, and short grass in the vicinity of the runways. All of these conditions attract numerous bird species, and their presence creates a potential BASH risk. Aircraft may encounter birds at altitudes of 30,000 feet above MSL or higher. However, most reported bird strikes occur at an elevation of less than 1,000 feet AGL. Birds, in particular, are drawn to the typical open, grassy areas and warm pavement of an airfield. Although most bird and animal strikes do not result in crashes, they may cause structural and mechanical damage to aircraft. Due to the speed of the aircraft, collisions with birds or other animals can happen with considerable force.

In accordance with OPNAVINST 3750.21 (Policy for Administering the Bird/Animal Aircraft Strike Hazard Program in the U.S. Navy, 23OCT2017), OPNAVINST 3750.6R (Naval Aviation Safety Program), CNIC Instruction 3750.1 (Navy Bird/Animal Aircraft Strike Hazard Program Implementing Guidance, 9AUG2017 [Navy, 2017c]), the CNIC BASH Program Manual, FAA Advisory Circular 150/5200-33 b (28Au07), and FAA Handbook 7110.65, BASH plans are developed for military airfields to reduce the potential for collisions between aircraft and birds or other animals. BASH plans account for seasonal migration patterns, when BASH risks to aircraft can increase. To reduce the potential for BASH, the FAA and the military recommend that land uses that attract birds (e.g., agricultural fields, landfills) be located at least 10,000 feet from an airfield. NAS Whidbey Island has a BASH instruction (August 2013) and has addressed BASH issues while using measures and management strategies from the NAS Whidbey Island Integrated Natural Resources Management Plan (INRMP) (NAS Whidbey Island, 2013a[10]). These measures and management strategies include:

- Monitoring bird activity: this includes making bird counts, maintaining current bird activity maps for the station, providing information on seasonal bird activities, and conducting wildlife hazard assessments.
- Monitoring bird aircraft strike incidences: this includes collecting and identifying dead birds and bird parts from the airfield and aircraft following strikes, reporting incidences, and compiling and reviewing data on incidences.
- Educating pilots and other personnel on BASH and methods of avoiding strikes: this includes efforts to raise pilot awareness of pre-flight and in-flight options.
- Eliminating bird attractants in the vicinity of the airfields: this includes maintaining taller grass height, controlling broad-leaved weeds, maintaining uniformity of cover, controlling invertebrate and rodent pests, eliminating standing water, removing roost and perch sites such as trees, and other techniques. Methods to accomplish this can include chemical application of herbicides and rodenticides, and mechanical habitat manipulation such as mowing, brush hogging, tree cutting, burning and, in some suitable instances, agricultural manipulation under an agricultural outlease.

[10] The INRMP was written in 2012 and finalized in 2013. The final signature was made to it in 2014.

- Implementing active bird control methods: this includes use of pyrotechnic equipment to disperse birds from airfields and the use of netting, shooting, and trapping to remove birds from an area.
- Modifying flight operational procedures: this includes watching for and reporting high hazard periods, modifying timing and formation of approaches and takeoffs under high bird hazard conditions, changing timing of more hazardous low-level routes to accommodate bird movement patterns, and other modifications. (NAS Whidbey Island, 2013a)

In this EIS, potential impacts attributable to changes in BASH potential are analyzed by primarily considering changes in the frequency of aircraft operations at NAS Whidbey Island and OLF Coupeville.

3.3.1.3 Accident Potential Zones

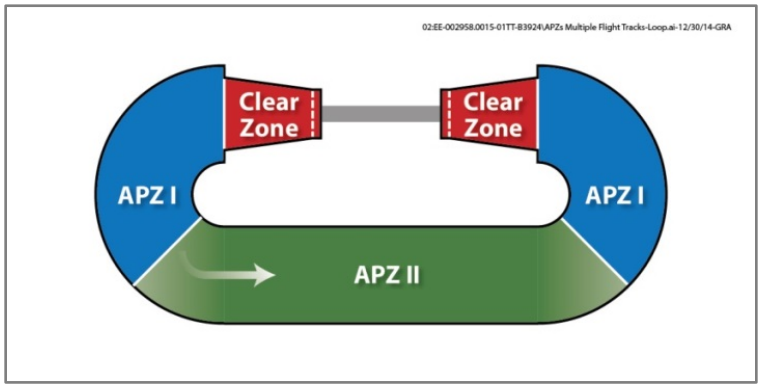
In the 1970s and 1980s, recognizing the need to identify areas of accident potential, the armed services conducted studies of historical aircraft accidents throughout the U.S. The studies showed that most aircraft mishaps occurred on or near the runway, with mishaps diminishing in likelihood with distance. Based on these studies, the Navy and other services have identified APZs. APZs do not predict the likelihood of an aircraft mishap, but they do predict the most likely location of an aircraft accident, if one were to occur. APZs follow departure, arrival, and pattern flight tracks and are based upon analysis of flight operations data and historical aircraft accident data and the location of accidents relative to the airfield. While the likelihood of a mishap is remote, the Navy recommends restricting people-intensive uses within these zones.

Airfield safety clearances and APZs are depicted at military airfields under the AICUZ program. The main goals of the AICUZ program are to protect the health, safety, and welfare of people living or working near military airfields while preserving the defense flying mission. The AICUZ program achieves these goals by promoting land use compatible with aircraft operations.

APZs are areas near airfield runways that are depicted on maps for planning purposes. The Navy recommends that the intensity and density of land uses within APZs be minimal or low to ensure the maximum protection of public health and property. The geometry and criteria for applying standard APZs for Class B runways are defined as follows (adapted from OPNAVINST 11010.36C, *Air Installations Compatible Use Zones [AICUZ] Program*):

- **Clear Zone**
  Extends 3,000 feet immediately beyond the runway and has the highest potential for accidents. It measures 1,500 feet wide at the end of the runway and 2,284 feet wide at its outer edge. A Clear Zone is required for all active runways and should remain undeveloped.
- **APZ-I**
  Extends 5,000 feet beyond the Clear Zone, with a width of 3,000 feet. An APZ-I is typically rectangular; however, when circumstances warrant, the APZ-I may be curved to correspond with predominant flight tracks (see Figure 3.3-1). An APZ-I area is provided for flight tracks that experience 5,000 or more annual operations (departures or arrivals).
- **APZ-II**
  Extends 7,000 feet beyond APZ-I, with a width of 3,000 feet. Similar to APZ-I, the geometric configuration of APZ-II may also be curved. When FCLP is an active aspect of aircraft operations at an installation, APZ-II extends for the entire FCLP track beyond APZ-I, resulting in a closed loop for the entire pattern (Figure 3.3-1).

Figure 3.3-1 Example of APZ-I and APZ-II for an FCLP Flight Track (with APZ-II extended)



Most land uses within the Clear Zone are incompatible with military aircraft operations. For this reason, the Navy's policy is to acquire sufficient real property interests in land within the Clear Zone to ensure that incompatible development does not occur. Within APZ-I and APZ-II, a variety of land uses are compatible; however, high-density residential and people-intensive uses (e.g., schools, apartments, etc.) should be restricted because of the greater risk in these areas.

In this EIS, potential impacts attributable to the number of operations conducted at NAS Whidbey Island and OLF Coupeville are analyzed in accordance with OPNAVINST 11010.36C, which sets APZ requirements for Navy airfields. The number and types of operations proposed under each alternative determine whether changes may be warranted under the AICUZ program.

3.3.1.4 Environmental Health Risks and Safety Risks to Children

President Clinton issued Executive Order (EO) 13045, Environmental Health Risks and Safety Risks to Children, on April 21, 1997. This order requires each federal agency to "make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and shall . . . ensure that its policies, programs, activities, and standards address disproportionate risks to children." This order was issued because a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks.

3.3.2 Public Health and Safety, Affected Environment

3.3.2.1 Flight Safety

The NAS Whidbey Island complex's course rules are designed to promote safety in air operations and to meet Fleet training requirements (Navy, 2014b). The mixture of turboprop aircraft, jet-powered aircraft, helicopters, and noise-abatement restrictions result in complex traffic patterns and procedures. Changes to existing course rules and operating procedures in SUA (e.g., the designation of Alert Areas or Restricted Areas) are communicated by the FAA's Notice to Airman process to inform aircrews of items that affect safety, local flight data, temporary flight restrictions, and special notices.

3.3.2.1.1 Potential for Aircraft Mishaps

The primary safety concern with regard to military aircraft training operations is the potential for aircraft mishaps to occur. Aircraft mishaps could be caused by mid-air collisions with other aircraft or objects,

weather, mechanical failures, pilot error, or BASH (See Sections 3.3.2.2 and 4.3.2.2). Although mishap rates from previous years cannot predict future mishap rates, reviewing mishap data from previous years is helpful in providing perspective. Aircraft mishaps are categorized based on the extent of property damage, loss of life, or disability they cause. Class A mishaps are the most severe, with total property damage of $2 million or more, or a fatality or permanent total disability. A Class A mishap does not necessarily equate to a crash and loss of aircraft. For instance, damage to an engine occurring during a flight could cost over $2 million to repair and be categorized as a Class A mishap even though the aircraft returned safely to an airfield. Mishap rates are calculated in terms of the number of mishap events per 100,000 flying hours, with combat hours excluded. Emergency and mishap response involves the procedures and equipment needed to react to mishaps on or off the installation. Elements of this response include rescue, fire suppression, security, and investigation.

From October 1, 2008, to September 30, 2017, the Growler community conducted approximately 187,642 flight hours of operations from land-based airfields. During that 9-year period, the Growler community experienced four Class A mishaps while operating from land, equivalent to a mishap rate of 2.13 per 100,000 flight hours, none of which involved a "crash." The primary safety concern relevant to this Proposed Action is the potential for Growler mishaps around Ault Field and OLF Coupeville. Two of these four Class A mishaps from land-based operations occurred at Ault Field, and both involved ground operations. The remaining two were flight-related mishaps that did not occur at the NAS Whidbey Island complex. Table 3.3-1 presents Growler Class A Mishap data from October 1, 2008, through September 30, 2017, from land-based operations.

Table 3.3-1 EA-18G Growler Mishap Data from FY 2009 through FY 2017 for Land-based Operations

Fiscal Year	*Growler (EA-18G) Class A Mishaps for Land-based Operations*
2009	1
2010	0
2011	0
2012	0
2013	0
2014	0
2015	1
2016	1[1]
2017	1[1]
Total	**4**[2]

Source: Naval Safety Center, 2017c

Notes:

1 Mishap occurred during ground operations at Ault Field.

2 Of the four Class A mishaps occurring during land-based operations within that nine-year period, two were flight-related mishaps that did not occur at the NAS Whidbey Island complex.

In the unlikely event of an aircraft emergency or mishap, NAS Whidbey Island maintains emergency and mishap response plans to guide responses to an aircraft incident (to include its own search and rescue plan), should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to mishaps, whether on or off the station. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation, which involves an array of organizations whose participation would be governed by the circumstances associated with the mishap and actions required to be performed.

3.3.2.1.2 Length of Runway at OLF Coupeville

High-performance jet aircraft have operated safely at OLF Coupeville for decades. The runway length at OLF Coupeville fully supports the operations conducted there—namely, FCLPs and helicopter operations. The runway of OLF Coupeville is 5,400 feet long and does not meet the recommended 8,000-foot length, as per unified facilities criteria (UFC 3-260-01), to conduct "full-stop" landings. However, since OLF Coupeville is specifically intended to support fixed-wing FCLPs, it is not intended to be utilized for aircraft to come to a complete stop. A full-stop landing would only occur at OLF Coupeville in the event of an aircraft emergency where no other airfield or runway was available. OLF Coupeville's runway length meets the Electronic Attack Wing's EA-18G SOP requirements for an emergency landing. See Appendix G for a civilian airfield analysis conducted for this EIS.

3.3.2.1.3 Potential for Natural Disasters

The potential for natural disasters is a fact of life in any location. Natural disasters such as earthquakes, volcanoes, tsunamis, and storms accompanied by high winds may have a potentially catastrophic impact on the facilities at NAS Whidbey Island and OLF Coupeville. With the exception of weather-related events, very little warning, if any, may accompany some of these naturally occurring phenomena. However, through the use of SOPs that have been developed over decades of flying and millions of flight hours of experience, the risks associated with operating in earthquake- and volcano-prone locations are significantly reduced. Furthermore, the Navy has collaborated with federal, state, and local agencies in emergency preparedness drills to rehearse potential scenarios and disasters, to test and improve emergency response plans, and to define cooperative aid agreements in order to better support the nation and the community during unexpected times of need or a catastrophic event. For example, air traffic controllers are trained in how to recognize the radar signature of volcanic plumes, thus enabling proper control of air traffic patterns in and around potentially hazardous volcanic activity. Significant earthquakes may cut off the power supply to radar facilities, but back-up facilities, such as power generators and secondary radar installations, can be utilized to ensure a safe flying environment is maintained. Additionally, virtually no geo-location within the U.S. is *not* adversely impacted by these types of naturally occurring events. Earthquakes, tornadoes, hurricanes, and severe isolated thunderstorms with associated downdrafts can and will have significant negative impacts on flight operations anywhere in the country. No place is immune from the impact of such natural events, but with proper procedures in place, the risks associated with operating in and around areas that may experience these events is significantly reduced.

3.3.2.2 Bird/Animal Aircraft Strike Hazard

NAS Whidbey Island contains diverse habitat. When habitat diversity increases, the number of species attracted to an airfield also increases. This diverse habitat structure is desirable for many avian species but can be hazardous to flight operations. The greatest potential BASH risk occurs at Ault Field due to the presence of water-filled ditches, freshwater wetlands, marine shoreline, perch sites, tall brush, and short grass in the vicinity of the runways, all of which attract numerous bird species.

To reduce the potential for collisions between aircraft and birds or other animals, NAS Whidbey Island has prepared and implemented a BASH plan (NAS Whidbey Island, 2013a). The BASH plan establishes a Bird Hazard Working Group and outlines roles and responsibilities for implementation of the plan, as well as provides guidance to minimize bird/animal strike hazards to military aircraft operating at NAS Whidbey Island, including OLF Coupeville. The plan includes procedures to decrease the attractiveness of the airfield to birds as well as operational procedures to avoid high-hazard situations. To reduce the attractiveness of the runway area to birds, the area is kept clear of most vegetation, except grasses. In addition, the grass is mowed periodically. Birds occurring in the runway area are dispersed from the flight line area by U.S. Department of Agriculture (USDA) Wildlife Services staff, under permits from the U.S. Fish and Wildlife Service (USFWS). See Section 4.8.2.1 for the impacts related to biological resources at the NAS Whidbey Island complex. The natural resources manager secures the appropriate permits from USFWS, and the NAS Whidbey Island airfield manager ensures compliance by USDA Wildlife Services staff.

From a wildlife management perspective at NAS Whidbey Island, diverse habitats provide all three of the essential items for birds: food, water, and shelter. Food is in the form of small mammals and/or fruit/seed-bearing vegetation. The existing shelter provides hiding, loafing, nesting, and thermal cover, as well as excellent habitat for a thriving prey base of insects, mice, voles, and rabbits. The prey base is the main attractant for many bird species, including several species of raptors, such as bald eagles (*Haliaeetus leucocephalus*), red-tailed hawks (*Buteo jamaicensis*), rough-legged hawks (*B. lagopus*), and northern harriers (*Circus cyaneus*), which can pose an airstrike hazard. Growler aircraft operating at NAS Whidbey Island have had 71 BASH incidents from November 2005 through December 2017, none of which resulted in a Class A mishap (Naval Safety Center, 2015a, 2015b, 2018).

3.3.2.3 Accident Potential Zones

Flight operations for military airfields are analyzed during the AICUZ process to determine whether APZs are warranted. This analysis includes arrival, departure, and pattern flight tracks. Generally, APZs are warranted for predominant flight tracks that have 5,000 or more operations per year.

Figure 3.3-2 and Figure 3.3-3 present the NAS Whidbey Island APZs and OLF Coupeville Clear Zones produced as part of the installation's 2005 AICUZ Study (Navy, 2005a). As shown, the majority of the Clear Zones for Ault Field are located on station or offshore in the Strait of Juan de Fuca. Nearly all of the lands associated with the Clear Zones at OLF Coupeville are Navy-owned property. The boundaries of APZ-I and APZ-II extend off station into the local community. Portions of the APZ-Is, and, to a larger extent, APZ-IIs, are located over non-Navy property, specifically to the east and southeast. See sections 3.5 and 4.5, Land Use, for background and impact analysis related to areas under the APZs. OLF Coupeville also had APZs recommended as part of the 1986 AICUZ process that reflected the FCLP patterns of the time; however, the recommended APZs were never adopted by the local municipality. During the 2005 AICUZ process, it was determined that additional APZ coverage was not warranted at that time because operational numbers were below the threshold (approximately 5,000 operations per approach or departure flight track) for the establishment of APZs at that location. Clear Zones, however, are established for all active runways regardless of the number of annual operations conducted on them.

Island County has designated the entire closed loop of the FCLP patterns at Ault Field under the same land use controls as APZ-II. In addition, the City of Oak Harbor extended the portion of the APZ that is within city limits to increase the margin of protection.

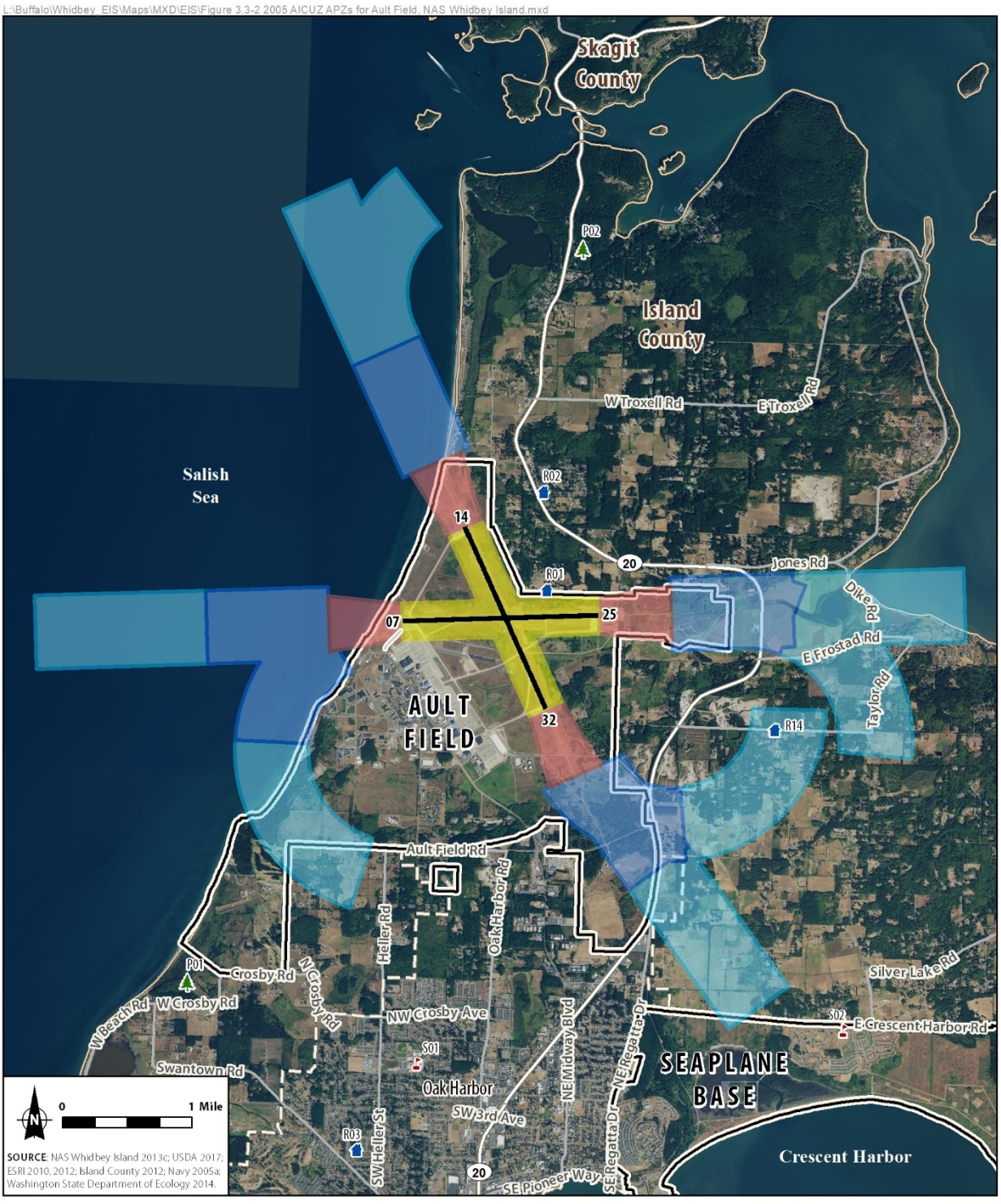


Figure 3.3-2
2005 AICUZ APZs for Ault Field, NAS Whidbey Island
Whidbey Island, Island County, WA

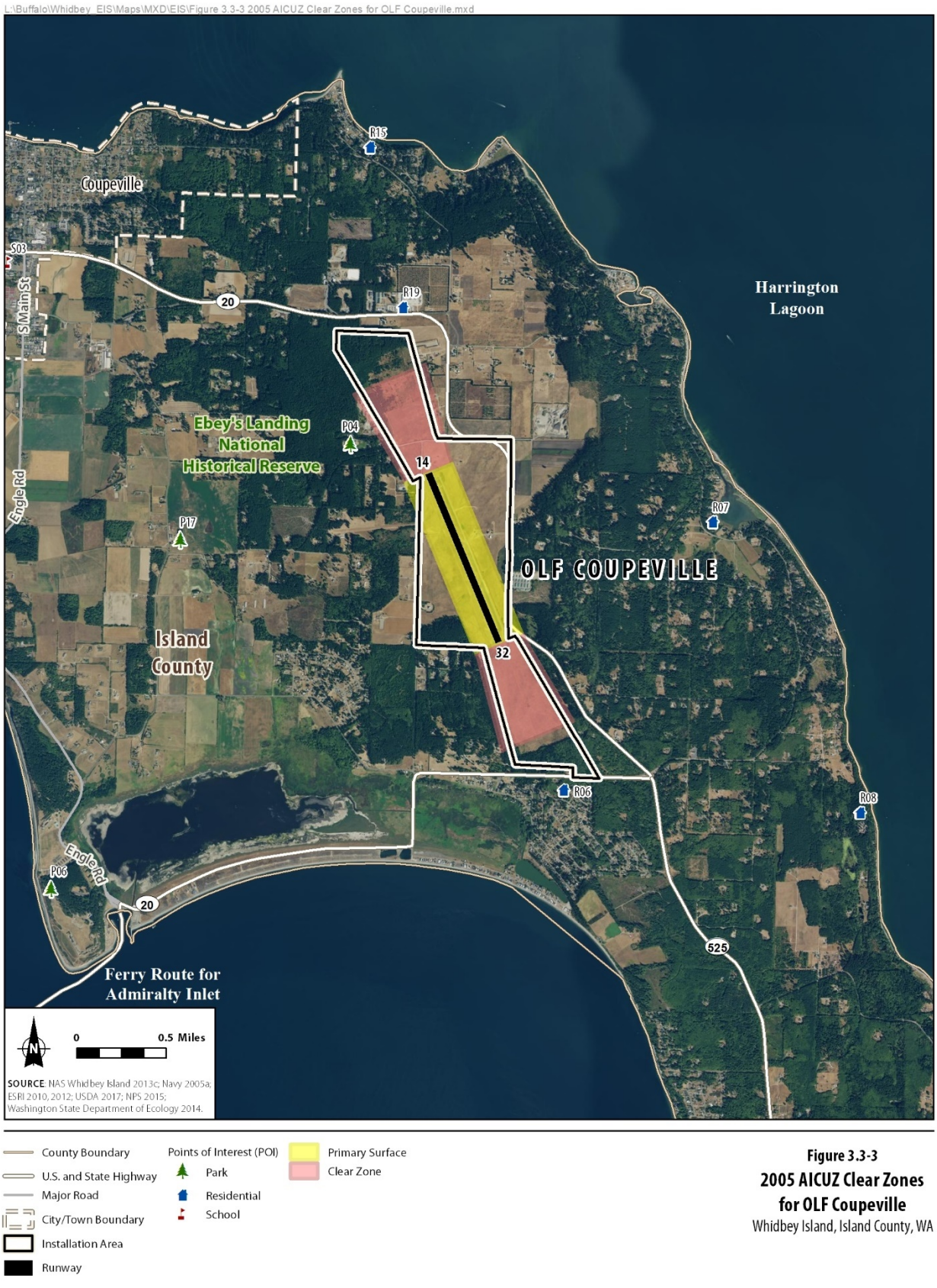


Figure 3.3-3
2005 AICUZ Clear Zones for OLF Coupeville
Whidbey Island, Island County, WA

3.3.2.4 Environmental Health Risks and Safety Risks to Children

According to EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (April 21, 1997), a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because children's neurological, immunological, digestive, and other bodily systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weight than adults; children's sizes and weight may diminish their protection from standard safety features; and children's behavior patterns may make them more susceptible to hazards because they are less able to protect themselves.

As a result, EO 13045 states:

> "[To] the extent permitted by law and appropriate, and consistent with the agency's mission, each Federal agency: (a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

EO 13045, Section 2-202, defines "covered regulatory action" as any substantive action in a rulemaking, initiated after the date of this order or for which a notice of proposed rulemaking is published 1 year after the date of this order, that is likely to result in a rule that may:

(a) be "economically significant" under EO 12866 (a rulemaking that has an annual effect on the economy of $100 million or more or would adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities); and

(b) concern an environmental health risk or safety risk that an agency has reason to believe may disproportionately affect children.

In summary, EO 13045 only applies to rules that:

- are initiated after April 21, 1997, or for which a notice of proposed rulemaking was published on or after April 21, 1998
- are economically significant
- concern health or safety risks that the agency has reason to believe may disproportionately affect children

If a rulemaking is not covered by EO 13045 but it discusses environmental health or safety, the USEPA's internal guidance indicates it is advisable to characterize children's risk to the extent the data are available.

The first step in analyzing impacts to children's health is to determine whether EO 13045 applies to the Proposed Action. The EO applies to rulemaking. The Proposed Action does not constitute a rulemaking as referenced in the EO. Therefore, the EO technically does not apply.

The second step (assuming the federal action is a rulemaking) is to determine whether the agency action is economically significant. EO 13045 adopts the definition of "economically significant" from EO 12866, "Regulatory Planning and Review," as any rulemaking that "may have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities.

With respect to the Proposed Action, the level of noise in the No Action Alternative (and Proposed Action) is likely considered adverse by the community, thus impacting the environment in an adversely material way.

The third step is to determine what constitutes a disproportionate risk or impact to children's health.

Section 2-203 defines "Environmental health risks and safety risks" as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breath (*sic*), the food we eat, the water we drink or use for recreation, the soil we live on, and the products we use or are exposed to)."

According to USEPA guidance (see 2006), disproportionate risks or impacts to children, in general, may occur when:

- children are more sensitive to a particular pollutant or agent being considered in the rulemaking, or
- children are more likely to be exposed or are likely to be exposed to higher levels of the pollutant or agent than adults are.

With regard to the Proposed Action, it is arguable that noise is not the type of health or safety risk contemplated by the EO. However, assuming it is, studies show that environments with sustained high background noise can have a variety of effects on children, including effects on learning and cognitive abilities and various noise-related physiological changes. The studies showed that there may be some relationship between noise and these health factors; however, the researchers noted that further study is needed in order to differentiate between the specific cause and effect to understand their relationship (DNWG, 2013). Children under the greater than 65 dB DNL noise contour are at a greater risk of experiencing these impacts (see Section 3.2).

Additionally, the risk of an aircraft mishap resulting from the number of aircraft operations, especially within designated Clear Zones and APZs, may create a potential disproportionate safety risk if children are more likely to be exposed, such as when a school or park falls within the Clear Zones or APZs. The potential safety risks are analyzed with respect to the populations of children within the Clear Zones and APZs, which also fall fully within the DNL noise contours. In an effort to comply with the spirit of the EO, the Navy identified the number of children potentially affected by the No Action Alternative and the Proposed Action. To determine whether children are potentially subjected to disproportionate risks or impacts, the Navy determined the number of children potentially impacted under the No Action Alternative (and later under the Proposed Action).

The baseline for analyzing health risks and safety risks to children is based on the census block groups that either fully or partially fall within the modeled No Action Alternative greater than 65 dB DNL noise contours. The analysis also considered schools and daycare centers located within the modeled No Action Alternative greater than 65 dB DNL noise contours.

Four schools and two licensed daycare centers are located within the greater than 65 dB DNL contours: the Coupeville Middle/High Schools, Crescent Harbor Elementary School, Home Connection School, Olympic View Elementary School, Regatta CDC, and Ebey Academy. Crescent Harbor Elementary school is part of the Oak Harbor School District and has 493 students enrolled in grades K through 4. Home Connection School and Olympic View Elementary School are also part of the Oak Harbor School District and, respectively, have 302 students enrolled in grades K through 12 and 456 students enrolled in grades K through 4. The Coupeville Middle School and High School are located in the same complex. Coupeville Middle School has 228 students in grades 6 through 8, while 276 students in grades 9 through 12 are enrolled in the High School (Washington State Office of the Superintendent of Public Instruction, 2018). Ebey Academy is a daycare center in Coupeville and has a licensed capacity of 54 children (Child Care Center, 2018a). Regatta CDC is a daycare facility in Oak Harbor and has a licensed capacity of 218 children (Child Care Center, 2018b). Only two of these schools (Crescent Harbor Elementary School and the Home Connection School) would be within the greater than 65 dB DNL contours under the No Action Alternative during the average year. Olympic View Elementary School would only be affected by the greater than 65 dB DNL contours under the No Action Alternative during a high-tempo FCLP year. Neither of the childcare centers discussed above would be affected by the 65 dB DNL contours under the No Action Alternative during either the average year or the high-tempo FCLP year.

Table 3.3-2 provides a list of census block groups impacted by the No Action Alternative greater than 65 dB DNL contours and includes information on the total population and the percentage of residents who are 19 years of age or younger living in each affected census block group. Table 3.3-3 presents 2010 data for residents 19 years of age and younger living in the greater than 65 dB DNL contours under the No Action Alternative and identifies the number of schools and daycare centers affected by the No Action Alternative. Figure 3.11-1 (in the Environmental Justice section) shows the location of the affected census block groups and the No Action Alternative DNL contours for Ault Field and OLF Coupeville. Populations on military properties within the DNL contours (NAS Whidbey Island [Ault Field] and the Seaplane Base) have been excluded from the analysis.

Assuming that the population affected by the No Action Alternative greater than 65 dB DNL contours has similar demographic characteristics to the population of its census block groups as a whole, an estimated 2,799 children 19 years of age and younger would reside in areas affected by noise within the No Action Alternative greater than 65 dB DNL contours in 2020. This figure equates to approximately 25.1 percent of the total population within the No Action Alternative greater than 65 dB DNL contours (see Table 3.3-3). Three schools are located within the modeled No Action Alternative greater than 65 dB DNL noise contours (see Table 3.3-3).

Table 3.3-4 shows the total population within the existing Clear Zones and APZs for Ault Field and Clear Zones for OLF Coupeville. As shown on the table, a total of 315 children reside within the APZs for Ault Field, and an additional 17 children reside within the Clear Zones for OLF Coupeville. As described in Section 3.3.1.3, Clear Zones and APZs represent areas of higher risk of incidents based on historical mishap data at multiple airfields. However, unless there is a place where children congregate within an APZ, such as a school, there is not a disproportionate safety risk to children. As shown on Figures 3.3-2 and 3.3-3, no schools are located within the existing Clear Zones and APZs at Ault Field and Clear Zones at OLF Coupeville. A small portion of Rhododendron Park, which is used for passive recreation, is located in the Clear Zone at OLF Coupeville. This area is not expected to be a place where children congregate.

Table 3.3-2 Percentage of Children Living in Census Block Groups Affected by the NAS Whidbey Island Complex under the No Action Alternative

Census Block Group/County	*Total Population*[1]	*Total Population of Persons 19 Years of Age and Younger*	*Percent Population Aged 19 or Younger*
Island County			
Block Group 1, Census Tract 9701	1,102	288	26.1%
Block Group 2, Census Tract 9701	1,502	318	21.2%
Block Group 1, Census Tract 9702	1,633	327	16.2%
Block Group 1, Census Tract 9703	791	208	26.3%
Block Group 2, Census Tract 9703	1,203	321	26.7%
Block Group 3, Census Tract 9703	1,044	231	22.1%
Block Group 4, Census Tract 9703	1,951	384	19.7%
Block Group 1, Census Tract 9704	951	288	30.3%
Block Group 2, Census Tract 9704	2,256	650	28.8%
Block Group 1, Census Tract 9706.01	1,299	372	27.9%
Block Group 1, Census Tract 9708	1,484	398	26.8%
Block Group 1, Census Tract 9710	1,470	257	17.5%
Block Group 1, Census Tract 9711	2,019	425	21.1%
Block Group 2, Census Tract 9711	1,270	212	16.7%
Block Group 3, Census Tract 9713	1,762	206	11.7%
Skagit County			
Block Group 2, Census Tract 9521	658	138	21.0%
Block Group 3, Census Tract 9527	906	220	24.3%

Source: USCB, 2012d

Notes:

[1] Total population is the total 2010 population for the entire census block group as reported by the U.S. Census Bureau. These figures may be greater than the total number of residents affected by noise within the day-night average sound level (DNL) contours because in most instances only a portion of the census block group falls under the DNL contours.
No Action Alternative DNL contours extend into portions of Jefferson and San Juan Counties. However, no permanent residences are located where the DNL contours extend into these counties; therefore, these counties have been excluded from further analysis.
Population on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have been excluded.

Table 3.3-3 Number and Percent of Children and Schools Affected by the NAS Whidbey Island Complex under the No Action Alternative

DNL Contours	*Total Population*[1]	*Total Population 19 Years of Age and Younger*	*Percent of Residents 19 Years of Age and Younger*	*Number of Schools and Licensed Daycares*
65-70 DNL	4,033	1,020	25.3%	2
70-75 DNL	3,010	762	25.3%	0
75+ DNL	3,859	956	24.8%	1
Total Affected Population/Schools	**10,902**	**2,738**	**25.1%**	**3**

Source: USCB, 2012d; Washington State Office of the Superintendent of Public Instruction, 2018; Child Care Center, 2018a; Child Care Center, 2018b.

Note:

[1] Total population is the estimated number of residents living within the Ault Field and the OLF Coupeville DNL contours. These estimates were computed by utilizing the U.S. Census Bureau's 2010 Census of Population and Housing data. The percent area of the census block covered by the DNL contour range was applied to the population of that census block to estimate the population within the DNL contour range. This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville). A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017).

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

Table 3.3-4 Number and Percent of Children Affected by the Clear Zones and APZs at Ault Field and Coupeville OLF under the No Action Alternative

APZs	*Total Affected Population*	*Total Affected Population 19 Years of Age or Younger*	*Percent of Affected Population 19 Years of Age and Younger*
Ault Field Existing Clear Zones and APZs	1,830	315	17.2%
OLF Coupeville Existing Clear Zones	95	17	17.9%

Source: USCB, 2012d.

3.4 Air Quality

This discussion of air quality includes criteria pollutants and Hazardous Air Pollutants (HAPs), including standards, permitting, and existing sources. Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors, including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. This section also discusses GHG emissions as they relate to air permitting conditions. The effects of GHG emissions and climate change are discussed in Section 3.16.

Most air pollutants originate from human-made sources, including mobile sources (e.g., aircraft, cars, trucks, buses) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., some building materials and cleaning solvents). Air pollutants are also released from natural sources such as volcanic eruptions and forest fires.

3.4.1 Air Quality, Regulatory Setting

3.4.1.1 Criteria Pollutants and National Ambient Air Quality Standards

The Clean Air Act (CAA) is the primary federal statute governing the control of air quality. The CAA designates six pollutants as "criteria pollutants" for which the USEPA has established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare (see Table 3.4-1). The criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone, suspended particulate matter less than or equal to 10 microns in diameter, fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead. CO, SO_2, NO_2, lead, and some particulates are emitted directly into the atmosphere from emissions sources. Ozone and some NO_2 and particulates are formed through atmospheric chemical reactions from other pollutant emissions (called precursors) that are influenced by weather, ultraviolet light, and other atmospheric processes.

NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards are designed to protect public welfare, such as prevent damage to farm crops, vegetation, and buildings. Some pollutants have long-term and short-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

States may also establish their own ambient air quality standards that are more stringent than those set by federal law. The Washington Administrative Code (WAC) Chapters 173-476 provides details regarding ambient air pollution standards in consideration of public health, safety, and welfare in the State of Washington, which has adopted the federal standards.

Areas that are in compliance with the NAAQS are designated as attainment areas. Areas that do not meet NAAQS for criteria pollutants are designated "nonattainment areas" for that pollutant.

Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are also required to adhere to maintenance plans to ensure continued attainment.

The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan for each non-attainment or maintenance pollutant (including the pollutant's precursor) to achieve (non-attainment) or maintain (maintenance) compliance with the appropriate NAAQS for that pollutant. These plans, known as State Implementation Plans (SIPs), are developed by state and local air quality management agencies and submitted to the USEPA for approval.

Table 3.4-1 National and State Ambient Air Quality Standards

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead (Pb)		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		Primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	Annual	53 ppb	Annual mean
Ozone (O_3)		Primary and Secondary	8-hour	0.070 ppm(2)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	Primary	Annual	12 µg/m^3	Annual mean, averaged over 3 years
		Secondary	Annual	15 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		Primary	1-hour	75 ppb(3)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Sources: USEPA, 2016a; Washington State Department of Ecology, 2015a

Notes:

1 In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

2 Final Rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

3 The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a State Implementation Plan call under the previous SO_2 standards (40 Code of Federal Regulations 50.4[3]). A State Implementation Plan call is a U.S. Environmental Protection Agency action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required National Ambient Air Quality Standards.

Key:

FR = *Federal Register*
µg/m^3 = micrograms per cubic meter
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
ppb = parts per billion
ppm = parts per million

3.4.1.2 General Conformity

The General Conformity Rule is part of the CAA promulgated by the USEPA to ensure that the actions of federal departments or agencies conform to the applicable SIP. The General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas.

The NAS Whidbey Island complex is in Island County, which is within the Olympic-Northwest Washington Intrastate Air Quality Control Region (AQCR). The Washington Department of Ecology is responsible for implementing and enforcing state and federal air quality regulations in Washington. The Northwest Clean Air Agency (NWCAA) is responsible for air quality management in Island, Whatcom, and Skagit Counties (NWCAA, 2018). Island County is classified by the USEPA as unclassified/attainment for all criteria pollutants (USEPA, 2018a). Therefore, a General Conformity evaluation is not required. The analysis of a Navy action under NEPA, however, must identify and evaluate any federal, state, or local air quality requirements that apply to the project.

3.4.1.3 Hazardous Air Pollutants

In addition to the NAAQS for criteria pollutants, national standards exist for HAPs, which are regulated under Section 112(b) of the 1990 CAA Amendments. The National Emission Standards for HAPs regulate HAP emissions from stationary sources (40 Code of Federal Regulations [CFR] part 61).

HAPs emitted from mobile sources are called Mobile Source Air Toxics (MSATs). MSATs are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. The USEPA identified six of the MSAT HAP compounds: benzene, butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter (USEPA, 2015a). Unlike the criteria pollutants, there are no NAAQS for benzene and other HAPs. The primary control methodologies for these pollutants for mobile sources involve reducing their content in fuel and altering the engine operating characteristics to reduce the volume of pollutant generated during combustion. The USEPA estimates that in 2030 the MSAT Rules would reduce total emissions of MSATs by 330,000 tons and volatile organic compound (VOC) emissions (precursors to ozone and $PM_{2.5}$) by over 1 million tons (USEPA, 2015a).

3.4.1.4 Permitting

New Source Review and Prevention of Significant Deterioration Review (Preconstruction Permit)

New major stationary sources and major modifications at existing major stationary sources are required by the CAA to have an air pollution permit before commencing construction. The review process for major stationary sources is required whether the major source or major modification is planned for nonattainment areas or attainment and unclassifiable areas. In general, permits for sources in attainment areas and for other pollutants regulated under the major source program are referred to as Prevention of Significant Deterioration (PSD) permits. Additional PSD permitting thresholds (250 tons per year per criteria pollutant, 25 tons per year for total HAPs, and 10 tons per year for any single HAP) apply to increases in stationary source GHG emissions. PSD permitting can also apply to a new major stationary source (or any net emissions increase associated with a modification to an existing major stationary source) that is constructed within 6.2 miles of a Class I area and which would increase the 24-hour average concentration of any regulated pollutant in that Class I area by 1 microgram per cubic meter or more. Navy installations comply with applicable permit requirements under the PSD program per 40 CFR section 51.166.

Title V (Operating Permit)

The Title V Operating Permit Program consolidates all CAA requirements applicable to the operation of a source, including requirements from the SIP, preconstruction permits, and the air toxics program. It applies to stationary sources of air pollution that exceed the major stationary source emission thresholds, as well as other non-major sources specified in a particular regulation. The program includes a requirement for payment of permit fees to finance the operating permit program whether implemented by the USEPA or a state or local regulator. Navy installations subject to Title V permitting shall comply with the requirements of the Title V Operating Permit Program, which are detailed in 40 CFR Part 70 and all specific requirements contained in their individual permits. Title V Permitting is covered by the WAC 173-401 and is managed by the NWCAA in the Northwest Washington Intrastate AQCR, which includes Island, Skagit, and Whatcom Counties (NWCAA, 2018).

Greenhouse Gases

GHGs are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

The USEPA has established permitting requirements for GHG emissions and issued the Final *Mandatory Reporting of Greenhouse Gases Rule* on September 22, 2009 (USEPA, 2009). GHGs covered under the Final *Mandatory Reporting of Greenhouse Gases Rule* are carbon dioxide (CO_2), methane, nitrogen oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. (USEPA, 2016b). Each GHG is assigned a global warming potential. The global warming potential is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of one. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons (MT) or more per year of GHG emissions as carbon dioxide equivalent (CO_2e) are required to submit annual reports to USEPA.

GHG emissions are also regulated under PSD and Title V permitting programs, and this regulation was initiated by a USEPA rulemaking issued on June 3, 2010, known as the GHG Tailoring Rule (USEPA, 2016c). While GHG emissions alone cannot be a basis for CAA permitting, sources that are already Title V major emission sources can be considered major GHG emission sources. GHG emissions thresholds for permitting of stationary sources are an increase of 75,000 tpy of CO_2e at existing major sources and facility-wide emissions of 100,000 tpy of CO_2e for a new source or a modification of an existing minor source. The 100,000 tpy of CO_2e threshold defines a major GHG source for both construction (PSD) and operating (Title V) permitting, respectively. GHG reporting is required in the State of Washington under WAC 173-401-200 (19) and (35) (9/10/11) (NWCAA, 2018).

3.4.2 Air Quality, Affected Environment

Air quality within the NWCAA jurisdiction is considered good. In 2016, Washington's Department of Ecology submitted recommended designation information for the 2015 8-hour ozone NAAQS (70 ppb), noting that 2013-2015 ambient air data collected at Anacortes established a design value of 42 ppb, the lowest level in the state and significantly lower than the standard (Bellon, 2016).

The most recent criteria pollutant emissions inventory data for Island, Skagit, and Whatcom Counties based on the 2014 National Emissions Inventory (USEPA, 2018a) are shown in Table 3.4-2. VOC and nitrogen oxide emissions are used to represent ozone generation because they are precursors of ozone. These emissions represent stationary and mobile emissions within each county; however, Navy aircraft emissions are not included in the inventory.[11] Refer to Section 3.16 for regional GHG inventory data.

Table 3.4-2 Northwest Clean Air Agency Jurisdiction Air Emissions Inventory, 2014

Location	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
Island County	2,764	4,959	14,286	849	1,222	707
Skagit County	9,675	24,481	36,050	1,009	3,020	1,572
Whatcom County	10,089	32,504	78,310	8,147	5,623	2,806
NWCAA Jurisdiction Total	**22,528**	**61,944**	**128,646**	**10,005**	**9,865**	**5,085**

Source: USEPA, 2018a

Note: Measurements in tons per year.

Key:
AQCR = Air Quality Control Region
CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide
VOC = volatile organic compound

3.4.2.1 NAS Whidbey Island Complex Stationary Source Emissions

Currently, the primary emission units at the NAS Whidbey Island complex are boilers and heaters, painting and depainting operations, gasoline dispensing stations, and stationary internal combustion engines. In addition, the following operations take place at the complex: training exercises at a fire training facility, use of ozone-depleting-compound-containing equipment, asbestos handling, activities at an explosive ordnance demolition unit, generation of fuel odors, and potentially other nuisance emissions. Four test cell locations, where aircraft engines removed from aircraft are mounted to stationary facilities for repair and maintenance, are considered stationary emission sources, with specific permitting requirements (NWCAA, 2016). Growler engines (F414-GE-400) are not tested at NAS Whidbey Island test cell facilities (NAS Whidbey Island Operations Command, 2016).

Ault Field at the NAS Whidbey Island complex is considered a designated major source under Title V of the CAA because the facility has the potential to emit more than 100 tons per year of CO, NO_X, sulfur oxides, and VOCs, and more than 25 tons per year of combined HAPs. These air pollutants are defined as regulated air pollutants in WAC 173-401 (NWCAA, 2016). Therefore, the NAS Whidbey Island complex has an Air Operating Permit (AOP) to comply with CAA Title V permitting requirements. The NAS Whidbey Island AOP requires semiannual and annual reports to be submitted to the NWCAA as part of the facility's ongoing compliance demonstration. Annually, the responsible corporate official certifies compliance with all applicable requirements in the AOP term by term and whether the facility was fully or intermittently in compliance with each term. Annual reporting has demonstrated that actual annual

[11] Navy aircraft and mobile emissions are not included in the Washington State inventory.

emissions historically have been below major source emission thresholds (See Table 3.4-3). NAS Whidbey Island also reports small amounts of stationary source HAPs totaling about 7 tons per year (NAS Whidbey Island, 2016).

Table 3.4-3 NAS Whidbey Island Complex Criteria Pollutant Air Emissions Inventory

Year	*NO_x*	*VOC*	*CO*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
2007	16	12	18	0	23	16
2008	14	9	16	0	21	14
2009	12	16	14	0	21	14
2010	12	14	14	0	21	13
2011	8	43	10	1	17	17
2012	8	23	11	0	18	16
2013	11.3	35.0	9.2	0.2	15.3	14.0
2014	7.7	29.4	8.6	0.2	13.8	12.8
2015	7.3	30.4	8.2	0.3	6.0	4.8
2016	9.4	51.7	9.2	0.4	5.3	4.6

Sources: NWCAA, 2013; NAS Whidbey Island, 2013b, 2017b; Stewart, 2017

Note: Measurements in tons per year.

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide
VOC = volatile organic compound

In addition to criteria pollutants and HAPs, the NAS Whidbey Island complex also reports GHG emissions from stationary sources, as required under WAC 173-401-200 (19) and (35) (9/10/11) (NWCAA, 2016). Recent annual GHG emissions reported for the NAS Whidbey Island complex are shown in Table 3.4-4.

NAS Whidbey Island has improved electricity efficiency through implementation of several building renovation projects, resulting in a decrease in energy use and stationary source GHG emissions (NAS Whidbey Island, 2016).

Table 3.4-4 NAS Whidbey Island Complex Reported Annual GHG Air Emissions Inventory, Required Stationary Sources Only

Year	*CO_2*	*CH_4[1]*	*N_2O[2]*	*MT of Total CO_2e Emissions*
2009	11,407	NR	NR	11,407
2010	11,129	5	21	11,155
2011	15,939	8	0	15,947
2012	17,843	8.4	13.6	17,864
2013	16,542	7.14	12.4	16,562
2014	11,357	5	6	11,371
2015	13,373	6.3	7.7	13,387
2016	13,560	6.5	8.0	13,575

Sources: NWCAA, 2013; NAS Whidbey Island, 2013b, 2017; Stewart, 2018

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

1 2010-2013 values calculated using global warming potential (GWP) of CH_4 = 21; 2014-2016 GWP for CH_4 = 25

2 2010-2013 GWP of N_2O = 310; 2014-2016 GWP for N_2O = 298

Key:
CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
GWP = global warming potential
N_2O = nitrous oxide
NR = not reported

3.4.2.2 NAS Whidbey Island Complex Mobile Source Emissions

The NAS Whidbey Island complex produces mobile source emissions from air station operations, including aircraft operations (flight operations at Ault Field and OLF Coupeville and maintenance at Ault Field), employee commuting, and use of other mobile equipment. Emissions of concern include criteria pollutants and the six priority HAPs identified in MSAT regulations. As noted above, mobile emissions are not covered by the existing air permit and are not subject to stationary source thresholds and requirements. Mobile emissions are not included in emission totals reported for the AOP, and aircraft emissions are not included in county emissions inventory totals from the National Emissions Inventory reported in Table 3.4-2.

Aircraft emissions are estimated based on fuel use; however, there is not a direct relationship between emissions and fuel burned. At different power settings, the aircraft will burn fuel at different rates and combustion efficiency, resulting in very different emission rates depending on the type of emission. VOCs (which include HAPs) are emitted at the highest rates when the aircraft is on the ground and idling at a low combustion efficiency. NO_x emissions are higher at high power settings and are correlated to combustion temperature, while CO emissions are higher at lower power settings and during AB mode, due to incomplete combustion. To account for these differences, various emission indexes are

established for different engine settings by the Navy's Aircraft Environmental Support Office (AESO) to determine total emission rates for each operation. To estimate these emission rates, AESO assumes power settings, time-in-mode, and fuel flow rates for all parts of each operation, including flight time and time on the ground. An unknown percentage of GCA box operations may occur just outside Island County, in Skagit, San Juan, and Snohomish Counties. GCA box operations account for approximately 5 percent of estimated emissions under this action. It has been conservatively assumed that all emissions occur within Island County

HAP emissions from aircraft are a subset of the VOC totals quantified in Table 3.4-5. The VOCs identified in MSAT regulations as having the greatest influence on health are benzene, butadiene, formaldehyde, acrolein, and acetaldehyde. The total of these HAP emissions represents 24 percent of the reported VOCs (FAA, 2009) and also one-third of a small percentage of personally owned vehicle (POV) VOC emissions (AWMA, 2017). Diesel particulate matter is not applicable to jet fuel use.

Emissions estimates were developed using the Navy's AESO emission factors for aircraft emissions (AESO, 2017a, 2017b, 2015) and the USEPA's Motor Vehicle Emission Simulator (MOVES2014) (USEPA, 2015c) emission factors for Island County for personnel commuting emissions. Ground support equipment emissions at NAS Whidbey Island were estimated using a ratio of aircraft landing and takeoff operations to reported ground support equipment at NAS Lemoore in Appendix 1D of the Navy's F-35C West Coast Homebasing EIS (Navy, 2014d). Refer to Appendix B for assumptions and calculations. Table 3.4-5 provides a summary of the existing mobile emissions associated with the Proposed Action.

As with aircraft emissions, HAPs from employee commuting and other mobile equipment are a small percentage of VOC emissions and are negligible. Airborne emissions of lead are not addressed in this EIS because no known significant lead emission sources are associated with the Proposed Action.

Table 3.4-5 NAS Whidbey Island Existing Criteria Pollutant Mobile Air Emissions, Growler Operations Only

Operations	*NO_x (tpy)*	*VOC (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
Ault Field EA-18G Aircraft	402.45	592.72	1,580.19	34.84	178.53	178.53
OLF EA-18G Aircraft	45.39	1.06	22.97	2.97	12.60	12.60
Maintenance Operations	33.35	101.63	447.59	7.09	20.01	20.01
Ground Support Equipment	0.31	0.01	0.19	0.00	0.01	0.01
POV (Personnel Commuting)	8.88	1.63	75.07	0.07	88.56	9.81
Total Existing Mobile Emissions	490.38	697.05	2,126.00	42.07	299.71	220.96

Note: Measurements in tons per year.

Key:
CO = carbon monoxide
NO_x = nitrogen oxides
OLF = outlying landing field
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
POV = personally owned vehicle
SO_2 = sulfur dioxide
tpy = tons per year
VOC = volatile organic compound

3.4.2.3 Chaff

Growler aircraft have the capability to deploy chaff, which consists of tiny, light, aluminum and glass fibers that when released from aircraft provide a cloud that will disrupt hostile targeting and missile guidance to defend the aircraft against attack. Chaff can be considered a large particulate matter emission; however, it is not under 10 micrometers in size, which would categorize it as a criteria pollutant. The particulate matter can remain airborne for anywhere from 10 minutes to 10 hours, becoming widely dispersed before it reaches land. Training with chaff is conducted not only to familiarize pilots with using its deployment strategy but also to train combat response to chaff use. While chaff is used in combat training exercises at designated training ranges outside this Proposed Action's study area (Navy, 2015d), it is not used during operations at Ault Field or OLF Coupeville; therefore, its use is not affected by the Proposed Action.

3.4.2.4 Fuel Dumping

Routine fuel dumping does not occur around the NAS Whidbey Island complex. In the event of an emergency, Growler aircraft may conduct fuel dumping. This is the practice of releasing jet fuel from the aircraft's fuel tank(s) to reduce the weight of the aircraft in order to provide a safe landing weight. As stated in OPNAV 3710.7V (Navy, 2016a), whenever practicable, fuel shall not be jettisoned (dumped) below an altitude of 6,000 feet above the terrain. The NAS Whidbey Island Air Ops Manual, NASWHIDBEYINST 3710.1AA, states fuel dumping is to be accomplished at or above 8,000 feet AGL and performed, except in an emergency, under radar control, over water adjacent to Smith Island. In the event of an emergency and conditions dictate jettisoning at a lower altitude, every effort shall be made to avoid populated areas. The resulting dumped fuel is dispersed into the atmosphere above the typical mixing height of 3,000 feet (AESO, 2017b); therefore, the dumped fuel is dispersed and would not fall to the ground in the immediate area. Because OLF training sorties are specifically planned operations, aircraft participating in them are provided with the proper amount of fuel and safety reserves to safely complete the operations; therefore, they do not carry excess fuel that would require dumping.

3.5 Land Use

This discussion of land use includes current and planned uses and the regulations, policies, or zoning that may control the proposed land use. The term land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. For instance, natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity; descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Zoning data for Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville were used to assess land use surrounding the NAS Whidbey Island complex. For the purposes of this study and in order to handle nomenclature differences, land use categories across Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville were standardized into broader, uniform land use categories to normalize different nomenclatures used between the municipalities. The

standardized categories correspond to the Standard Land Use Coding Manual land use categories, which are used in the Navy's AICUZ program (OPNAVINST 11010.36C, October 2008). The standardized categories are as follows: Agriculture, Commercial, Federal[12], Industrial, Open Space/Forest, Parks, Residential[13], Rural[14], and Transportation[15].

3.5.1 Land Use, Regulatory Setting

In many cases, land use descriptions are codified in installation master planning and local zoning laws. OPNAVINST 11010.40 establishes an encroachment management program to ensure operational sustainment by identifying encroachment impacts and requiring active engagement with the local community to help promote compatible land development. Additionally, OPNAVINST 11010.36C and Marine Corps Order 11010.16 provide guidance for administering the AICUZ program, which recommends land uses that are compatible with noise levels, accident potential, and obstruction clearance criteria for military airfield operations.

The Coastal Zone Management Act (CZMA) of 1972 establishes a federal-state partnership to provide for the comprehensive management of coastal resources. Coastal states and territories develop state-specific coastal management programs to balance resource protection and coastal development needs. The Washington Coastal Zone Management Program lays out the policy to guide the use, protection, and development of land and ocean resources within the state's coastal zone. Under the CZMA, federal activities that affect coastal uses or resources must be conducted in a manner consistent with enforceable policies of a state's coastal zone management plan to the maximum extent practicable. If the federal agency determines that the proposed action will result in effects to a state's coastal uses or resources, a Coastal Consistency Determination is prepared, which discusses how the action is fully consistent or consistent to the maximum extent practicable with the state's federally approved enforceable policies. If the federal agency determines that its actions will have no effect on the coastal uses and resources, then it may issue a Negative Determination. Federal lands, which are "lands the use of which is by law subject solely to the discretion of the Federal Government, its officers, or agents," are statutorily excluded from the state's "coastal zone." If, however, the proposed federal activity affects

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

[13] "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

[14] "Rural" is low density, which includes a variety of living and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

[15] Transportation includes gaps within zoning layers for each of the municipalities that appeared, through aerial photography, to be roads; however, this transportation category does not cover all streets within municipalities.

coastal resources or uses beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA federal consistency requirement applies.

3.5.2 Land Use, Affected Environment

The following discussions provide a description of the affected environment for each of the categories under land use resources for the NAS Whidbey Island complex and portions of the City of Oak Harbor, Town of Coupeville, Island County, and Skagit County. Existing land use conditions, plans, policies, and recommendations are provided in the following documents: the *2005 Air Installations Compatible Use Zones Study Update for Naval Air Station Whidbey Island and Outlying Landing Field Coupeville, Washington* (Navy, 2005a), the *Island County Comprehensive Plan (2011 Update)* (Board of Island County Commissioners, Island County Planning Commission, and Island County Department of Planning and Community Development, 1998), and the *City of Oak Harbor 2010 Comprehensive Plan and Zoning Code* (City of Oak Harbor, 2010). These and other land use planning documents are described below in Section 3.5.2.1 and Section 3.5.2.2.

Land use is interrelated with other resource areas including noise, socioeconomics, biological resources, and cultural resources, and their impacts are discussed in Section 4.5. The impact analysis in this EIS for land use focuses on those areas affected by proposed construction and airfield and airspace operations. This analysis relies not only on zoning designations but also on compatible land use recommendations in APZs and DNL noise contours as defined by the AICUZ program.

3.5.2.1 On-station Land Use and Land Use Controls at the NAS Whidbey Island Complex

Ault Field

Ault Field occupies 4,325 acres on the north end of Whidbey Island in Island County, Washington. The airfield is bordered on the south by the City of Oak Harbor and on the west by the Strait of Juan de Fuca. Approximately 1,040 acres (23 percent) of Ault Field has been developed. The remaining land area is undeveloped and supports various vegetation communities and runway Clear Zones. A fence surrounds all of Ault Field, except for the area along the Strait of Juan de Fuca shoreline. The airfield occupies the northeast portion of Ault Field and has two 8,000-foot intersecting runways, Runways 07/25 and 14/32. Aircraft operations areas are located south and west of the runways and include aircraft parking ramps, taxiways, aircraft maintenance hangars, a passenger terminal, an ATC tower, and various other support facilities. Other developed areas near Ault Field include housing and administration, operational support, personnel support, and recreational facilities. Access to the airfield is provided for authorized personnel only.

Construction projects associated with the Proposed Action are recommended in developed and adjacent undeveloped areas in the aircraft operations area south and west of the runways (Figure 2.3-1).

Outlying Landing Field Coupeville

OLF Coupeville occupies 677 acres approximately 10 nm south of Ault Field. The airfield has one 5,400-foot runway, Runway 14/32. Aircraft operations include FCLP, and due to the nature of this facility as an OLF, on-installation facilities consist of six buildings that are associated with airfield operations, logistics and supply, and training and utilities shore capability areas. There are no plans to construct any additional facilities at OLF Coupeville under the Proposed Action.

Seaplane Base

The Seaplane Base is located approximately 5 miles southeast of Ault Field and occupies 2,784 acres along 10 miles of Crescent Harbor shoreline. Approximately 23 percent of the land area is developed and is used for housing and community support facilities, jet fuel off-loading, ordnance storage, and training for the explosive ordnance disposal units and other Navy and military commands.

Development within Ault Field, OLF Coupeville, and the Seaplane Base is controlled, guided, or influenced by the following plans, programs, and policies:

- NAS Whidbey Island Activity Overview Plan (2004)
- NAS Whidbey Island INRMP (NAS Whidbey Island, 2013a)
- NAVFAC Land Use Controls Implementation Plan – NAS Whidbey Island (Navy, 2009)
- NAS Whidbey Island Integrated Cultural Resources Management Plan (ICRMP) (Navy, 2016c)
- NAS Whidbey Island Installation Development Plan (2016)

NAS Whidbey Island Activity Overview Plan (2004)

The Activity Overview Plan is a land use and facilities plan supporting the long-range vision (15 to 20 years) for the NAS Whidbey Island complex. Prepared in 2004, the Activity Overview Plan is a planning tool for the station and incorporates information from special studies, such as the NAS Whidbey Island Airfield Recapitalization Plan. It includes an analysis of the station's future aircraft and squadron-loading scenarios, including replacement of the P-3C Orion aircraft with the P-8A Poseidon; baseline conditions and future operational needs of the mission-critical, mission-support, and personnel-support departments; and analysis of development constraints and development opportunity areas.

The Activity Overview Plan also contains a strategic action plan that identifies land use policy, land-holdings strategy, and project recommendations. Among these recommendations is the protection of the NAS Whidbey Island complex as a critical Navy air operations asset. It recommends that siting new facilities be consistent with flight line expansion areas and land use restrictions to preserve operations.

NAS Whidbey Island Integrated Natural Resources Management Plan

The Sikes Act (16 U.S.C. 670a et seq., as amended) is the primary driver behind development and implementation of this INRMP. In addition to the Sikes Act, this INRMP has been prepared consistent with guidance and regulations provided in DoD Instruction 4715.03, OPNAVINST 5090.1D, OPNAV M-5090.1, associated Navy Guidance (Navy, 2014a), and a series of DoD and Navy guidance memoranda on the Sikes Act and INRMPs. The NAS Whidbey Island INRMP was completed by the installation in January 2012, finalized in December 2013, and approved by the Navy and partner agencies in January 2014 (NAS Whidbey Island, 2013a). The overall goal of the plan is to integrate management activities with all programs and mission requirements while sustaining, promoting, and restoring the health and integrity of the NAS Whidbey Island complex ecosystems. The INRMP identifies land, water, plant, fish, and wildlife resources on the installation. The document guides both short-term resource management activities and long-range planning.

The NAS Whidbey Island Environmental Division is responsible for programmatic oversight, management, and supervision of natural resources management at the station.

NAVFAC Land Use Controls Implementation Plan – NAS Whidbey Island

The Land Use Controls Implementation Plan describes the procedures for implementing the institutional and engineering controls required by Records of Decision issued pursuant to remediation conducted under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, for Operable Units (OUs) 1 through 5 on the NAS Whidbey Island complex (Navy, 2009). Four OUs are located at Ault Field, and one is located on the Seaplane Base. Since the 1940s, the station has generated a variety of hazardous wastes, contaminating soils, sediments, and groundwater (USEPA, 2016d). The Records of Decision were signed by the Navy, USEPA, and the Washington Department of Ecology. Remediation construction was completed in September 1997, human exposure and contaminated groundwater exposures are under control, and the OUs at Ault Field and the Seaplane Base are ready for anticipated use (USEPA, 2016d).

NAS Whidbey Island Integrated Cultural Resources Management Plan

The ICRMP describes policies, procedures, and responsibilities for meeting cultural resources compliance and management requirements at the NAS Whidbey Island complex. The ICRMP summarizes previous archaeological investigations and historic surveys that have been completed at the site and identifies management actions that should be completed in compliance with Section 106 and Section 110 of the National Historic Preservation Act (NHPA). The overall goal of the ICRMP is to assist the NAS Whidbey Island complex in meeting its statutory and regulatory requirements for identification and protection of cultural resources in a manner that is compatible with the station's mission (Navy, 2016c).

NAS Whidbey Island Installation Development Plan (2016)

The NAS Whidbey Island Installation Development Plan provides a comprehensive framework for the orderly physical development of the installation and reflects the NAS Whidbey Island complex's official direction on facility and site development planning. The Installation Development Plan establishes a vision for the installation's physical infrastructure and places intentional emphasis on mission requirements, developmental constraints and opportunities, and courses of action that will lead to the optimal use of lands, facilities, and resources that elevate the installation's long-range (25-year) performance. As such, the Installation Development Plan is intended to be a living document with the capacity to incorporate flexibility to account for changing conditions, priorities, and programs to guide short-, mid-, and long-range investment decisions. The Installation Development Plan addresses mission and facility requirements; natural, environmental, cultural, and operation constraints; transportation and circulation networks; climatic changes; utility networks; encroachment; and local community context. Goals and objectives of the Installation Development Plan include: enhance mission readiness; optimize real property assets; provide a secure and safe environment; enhance quality of life; and practice exemplary resource stewardship.

3.5.2.2 Regional Land Use and Land Use Controls

The majority of land surrounding Ault Field and OLF Coupeville is rural, with large tracts of undeveloped forestland, agricultural land, and scattered residential subdivisions at higher densities. Numerous state and federal park lands as well as areas of water also surround the NAS Whidbey Island complex.

Other land uses in the vicinity of Ault Field include:

- a mixture of residential, industrial/light manufacturing, commercial, parks, and agricultural development south of Ault Field in the City of Oak Harbor

- commercial, agricultural, residential, and industrial/light manufacturing uses along State Route (SR) 20, which extends along the eastern boundary of Ault Field
- rural, residential, agricultural, commercial, and parks, including Deception Pass State Park north of Ault Field and Hope Island State Park northeast of Ault Field
- Joseph Whidbey State Park to the southwest and various public, private, and Navy-owned marinas, boat launches, campgrounds, beaches, hiking trails, and golf courses

Portions of the airfield at OLF Coupeville lie within, and are bordered by Ebey's Landing National Historical Reserve, including forested and agricultural areas with low-density residential uses, and clustered residential development in a few neighborhoods. Other land uses in the vicinity of OLF Coupeville include:

- a mixture of residential, commercial, park, public building, and church uses north of OLF Coupeville in the Town of Coupeville
- Rhododendron Park, located northwest of the OLF, which includes three ball fields, picnic areas, playgrounds, and campsites, and Fort Casey State Park, located southwest of the installation along the coast of Admiralty Bay

Other land uses of interest include Admirals Cove Beach Club (south of OLF Coupeville) and Whidbey General Hospital (northwest of OLF Coupeville).

The Seaplane Base is bordered by Crescent Harbor to the south, and residential and commercial land uses within the City of Oak Harbor to the west. The majority of land to the north and east of the Seaplane Base is largely residential, interspersed with agricultural and rural land uses.

Development around Ault Field, OLF Coupeville, and the Seaplane Base is controlled, guided, or influenced by the following plans, programs, and policies:

- AICUZ Program
- NAS Whidbey Island AICUZ Update (2005)
- Washington Growth Management Act (1990, 2005) (WGMA)
- Island County Comprehensive Plan (2011, 2016 revision anticipated) and Zoning Ordinance (current)
- City of Oak Harbor Comprehensive Plan (2010, 2016 revision anticipated) and Zoning Ordinance (current)
- Town of Coupeville Comprehensive Plan (2003) and Zoning Ordinance (current)

The AICUZ program was established in the early 1970s by the DoD to analyze operational training requirements and to address communities' concerns about aircraft noise and accident potential. The primary goal of the AICUZ program is to protect the public's health, safety, and welfare and to maintain the operational capability of military airfield operations (see Section 3.3).

As part of the AICUZ process, noise zones, APZs, and recommendations to promote community development compatible with air operations are defined. The AICUZ document, and the noise zones, APZs, and recommendations, serve as a land use planning tool for local planning agencies. The Navy encourages land use development that is compatible with noise zones and APZs surrounding a military airfield (see Table 3.5-1). The key to the program's success is intergovernmental coordination. An active

local command effort to work with surrounding communities to prevent incompatible development in the vicinity of military airfields is the foundation of the program's success.

Table 3.5-1 AICUZ Land Use Recommendations

Land Use Category[2]	*DNL Noise Contours*[1]			*APZs*[1]		
	65-69 dB DNL	*70-74 dB DNL*	*>75 dB DNL*	*CZ*	*APZ-I*	*APZ-II*
Agriculture	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Commercial	Compatible	Compatible	Compatible	Incompatible	Compatible/ Incompatible[3]	Compatible
Federal[4]	Compatible	Compatible	Compatible	Incompatible	Compatible	Compatible
Industrial	Compatible	Compatible	Compatible	Incompatible	Compatible/ Incompatible[3]	Compatible
Open Space/Forest	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Parks	Compatible	Compatible	Compatible/ Incompatible[3]	Incompatible	Compatible	Compatible
Residential[5]	Incompatible[3]	Incompatible[3]	Incompatible[3]	Incompatible	Incompatible	Compatible/ Incompatible[6]
Rural[7]	Compatible	Compatible	Compatible	Incompatible	Incompatible	Compatible
Transportation[8]	Compatible	Compatible	Compatible	Incompatible	Compatible	Compatible

Source: OPNAVINST 11010.36C

Notes:

1 OPNAVINST 11010.36C and the AICUZ Program provide land use recommendations within DNL noise contours and APZs.

2 The recommended uses are generalized; for more detail on land use (per the 1965 Standard Land Use Coding Manual number) recommendations, see OPNAVINST 11010.36C.

3 As defined by OPNAVINST 11010.36C, some uses in this land use category are recommended compatible with restrictions, while others are recommended incompatible with exceptions, depending on the specific parameters of the development in question. For more detail regarding land use recommendations, see OPNAVINST 11010.36C

4 "Federal" land use includes federally zoned land. "Federal" does not include the Installation boundary.

5 "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

6 As defined by OPNAVINST 11010.36C, single detached units at a maximum density of two dwelling units/acre and cluster development to achieve this density are compatible within APZ-II. All other residential development is incompatible.

7 "Rural" is low density, which includes a variety of living (i.e., homes) and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

8 The "Transportation" class was created by identifying any gaps in the combined land use layer that appeared to be roads and categorizing them as "Transportation." This "Transportation" land use category does not cover all streets in the region.

Air installations and local government agencies with planning and zoning authority share the responsibility for preserving land use compatibility near an air installation. NAS Whidbey Island seeks to reduce aircraft noise impacts, to the extent practicable and without compromising flight safety or operational capability, through adherence to operational guidance and procedures (see Section 3.2.4.2.1 for noise mitigation). The installation command also works with state and local planning officials to implement the objectives of the AICUZ program and strives to educate and inform the local civilian community of the mutual benefits of an active AICUZ program.

Concurrently, local governments are responsible for protecting the health, safety, and welfare of their respective residents. The AICUZ program provides recommendations based on operations on base that can be used by local planning agencies to promote compatible land uses off base, surrounding the airfield. The desire is for the local governments to recognize the recommendations from the AICUZ study and regulate development around the airfield through zoning ordinances (i.e., noise disclosures and building codes). It is the responsibility of the local planning agencies to elect to implement or adopt the recommendations of the AICUZ program. The AICUZ program does not regulate land uses off base.

Operational and training requirements, aircraft mix, tempo of aviation activity, maintenance procedures, and community development seldom remain static. Therefore, to maintain accuracy, AICUZ studies are updated periodically. The Navy will perform an AICUZ Update upon completion of this EIS and share official recommendations with the community.

3.5.2.2.1 NAS Whidbey Island AICUZ Update (2005)

As part of the AICUZ Update, a noise study was conducted. The AICUZ Study Update for NAS Whidbey Island's Ault Field and OLF Coupeville, Washington (Navy, 2005a) analyzes Calendar Year 2003 (CY 03) and Calendar Year 2013 (CY 13) noise contours and APZs for aircraft operations. CY 03 represents existing conditions, and CY 13 represents projected conditions resulting from the transition from the EA-6B to the EA-18G aircraft. The 2005 AICUZ Study Update serves to examine land use planning and zoning parameters related to aircraft operations, noise, and safety and provide recommendations that can be used to further promote compatible land use surrounding Ault Field and OLF Coupeville. Land use compatibility within the noise zones around Ault Field and OLF Coupeville is evaluated in Section 4.5.2.1.

3.5.2.2.2 Washington State Growth Management Act (1990, 2005)

The WGMA was adopted in 1990 because the Washington state legislature found that uncoordinated and unplanned growth posed a threat to the environment, sustainable economic development, and the quality of life in Washington. The WGMA requires state and local governments to manage Washington's growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, and preparing comprehensive plans and implementing them through capital investments and development regulations. The WGMA has been amended several times, including in 2005, when provisions were added to address development around military installations. The 2005 amendment recognizes that military installations are of particular importance to the economic health of Washington's economy and quality of life. As such, the WGMA requires that county and city comprehensive plans restrict development in the vicinity of military installations that is incompatible with the installation's ability to carry out its mission requirements.

Furthermore, to build on direction and processes for compatible land use planning as a result of the WGMA, the Washington Department of Commerce released a civilian-military land use study in December 2016 that provided recommendations to improve compatible land use planning through partnerships, to clarify processes, to amend legislation, and to allocate funds (for the resolution of land incompatibility issues, protection of habitat, and conservation of rural areas) (The Spectrum Group, 2016).

3.5.2.2.3 Island County Comprehensive Plan (2011, 2016) and Zoning Ordinance (2016)

Washington state law requires every jurisdiction to have a comprehensive, long-term plan for its future development. The Island County Comprehensive Plan is a guide for the county on how to approach growth and development. The original Island County Comprehensive Plan was adopted in 1984. The Board of Island County Commissioners adopted a more comprehensive and integrated document in 1998 (Board of Island County Commissioners, Island County Planning Commission, and Island County Department of Planning and Community Development, 1998) consisting of 10 elements, or chapters; this was updated in 2008. More recent updates of the policy plan, land use and parks and recreation elements of the plan, were completed in 2011. The most recent revision to this plan was adopted in December 2016 (Island County, 2016d), and it most notably included updates to defined Urban Growth Areas and Joint Planning Areas.

The comprehensive plan acknowledges the county's association with the NAS Whidbey Island complex as well as the impacts associated with aircraft operations at Ault Field and OLF Coupeville. The plan designates an "Airport and Aviation Safety Overlay," which represents the high-noise areas of Island County where special land use controls are necessary to assure public health, welfare, and safety. This overlay recommends that future land use adjacent to Ault Field and OLF Coupeville be maintained as rural to encourage low-density development within the air station's DNL contours and APZs.

Island County adopted the APZs from the 2005 NAS Whidbey Island AICUZ, as well as a closed-loop APZ for FCLP pattern operations at Ault Field, to implement the airport and aviation safety overlay district through the county's zoning ordinance and other elements of the Island County Code (see Figure 3.5-1). The overlay applies additional standards to properties located within underlying zoning districts. These standards include noise-level reduction requirements ranging between 25 dB and 30 dB, depending on structure type, location within DNL contours, and disclosure. Island County designates airport noise zone 2 (60 to 70 DNL) and airport noise zone 3 (greater than 70 DNL). Further, as described in Section 3.5.2.2.3, Island County has implemented an airport and aviation safety overlay district that applies additional standards to properties located within underlying zoning districts. These standards include noise-level reduction requirements ranging between 25 dB and 30 dB, depending on structure type; location within DNL contours (greater than 60 DNL); and real estate disclosure. Additionally, all new structures, or alterations to existing structures, in airport noise zone 2 and 3 must achieve a minimum of 25 dBA and 30 dBA noise level reduction, respectively. "Alterations to existing structures" refers to "any construction which would result in a change in height or lateral dimensions of an existing structure" (Island County, 2016a). All building permits in airport noise zones 2 and 3 are reviewed for consistency with Island County Code 14.01B.050 – Building Construction (Island County, 2016a). Existing land uses and zoning are consistent with the Navy's recommendations for land uses within the APZs. The goals and policies in the county's comprehensive plan support the adoption of codes for compatible development within the APZs.

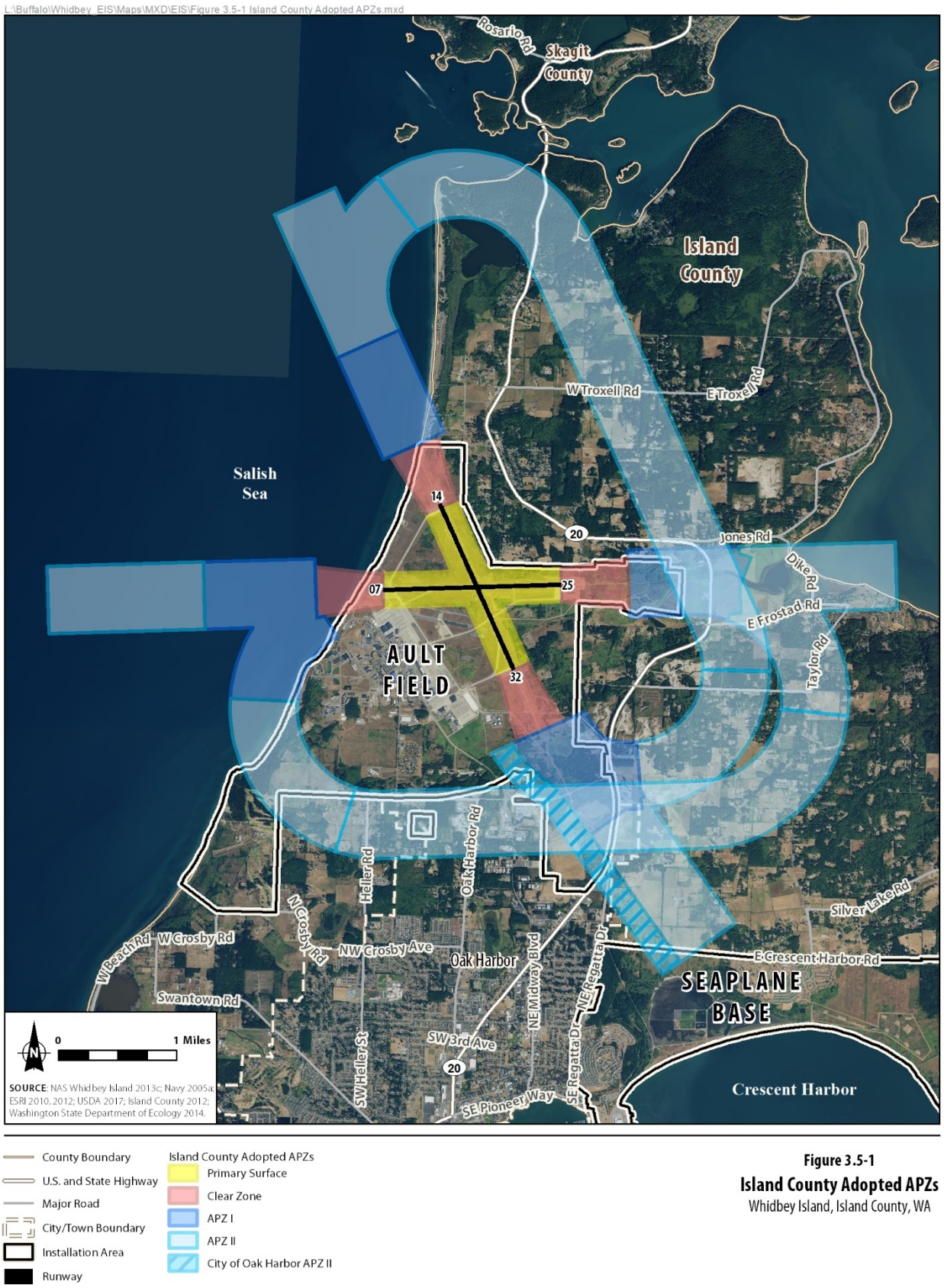


Figure 3.5-1
Island County Adopted APZs
Whidbey Island, Island County, WA

Island County adopted an Airport and Aircraft Operations Noise Disclosure Ordinance initially in the early 1990s and has adopted numerous updated ordinances, the most recent in 2015, for property sold, rented, or leased within the noise zones around the NAS Whidbey Island complex. The disclosure ordinance states "no person shall sell, lease, or offer sale or lease of any property within any airport environs mapped impacted areas unless the prospective buyer has been given notice substantially" (Island County, 2016a). Noise disclosure is the responsibility of property owners and their agents. Island County also enforces a separate Noise Level Reduction Ordinance, which sets minimum standards for building construction within the noise zones around Ault Field and OLF Coupeville.

Zoning is the primary land use control used by Island County to control development on non-federal land. The majority of parcels under county jurisdiction near Ault Field and OLF Coupeville and within the overlay district are zoned in the following categories:

- Rural, which permits one dwelling unit per 5 acres
- Rural Agriculture, which permits one dwelling unit per 10 acres
- Rural Forest, which permits one dwelling unit per 10 acres
- Urban Growth Area (south of Ault Field), where density is limited to three dwelling units per 5 acres; in addition, within the Urban Growth Area, the City of Oak Harbor has identified various future land uses, including industrial, planned industrial park, community commercial, open space, and planned business park
- Rural Residential areas west and southwest of OLF Coupeville where permitted density varies from one to three units per acre

Figures 3.5-2 and 3.5-3 show existing land uses in Island County with the No Action noise contours overlain.

3.5.2.2.4 City of Oak Harbor Comprehensive Plan (2010, 2016) and Zoning Ordinance (2016)

Maintaining land use compatibility with the NAS Whidbey Island complex is of paramount importance to the City of Oak Harbor (City of Oak Harbor, 2010). A stated goal/policy objective in the comprehensive plan is to prohibit residential development in any area within the 70 dB DNL or greater noise zone and to limit residential growth in the 60 to 70 dB DNL noise zone. Additionally, the plan promotes residential development to the southwest and away from Ault Field.

The City of Oak Harbor adopted the 1986 AICUZ noise contours to implement the Aviation Environs Overlay Zone through the city's zoning ordinance and other elements of the municipal code. Land within the Aviation Environs Overlay Zone is designated for low-density development. The overlay applies additional standards to properties located within underlying zoning districts. These standards include noise-level reduction requirements ranging between 25 dB and 30 dB, depending on structure type, location within DNL contours, and disclosure for real estate transactions. The City of Oak Harbor had also adopted a lighting and glare ordinance, helping to ensure the safety of aircraft operations by placing limitations on lighting that can impair a pilot's vision, especially at night.

Existing land use and zoning regulations in the Aviation Environs Overlay Zone are consistent with the Navy's recommendations for land use compatibility within the APZs. The goals and policies in the city's comprehensive plan support adoption of codes for compatible development within the APZs. Figures 3.5-2 and 3.5-3 show existing land uses in the City of Oak Harbor with the No Action noise contours overlain.

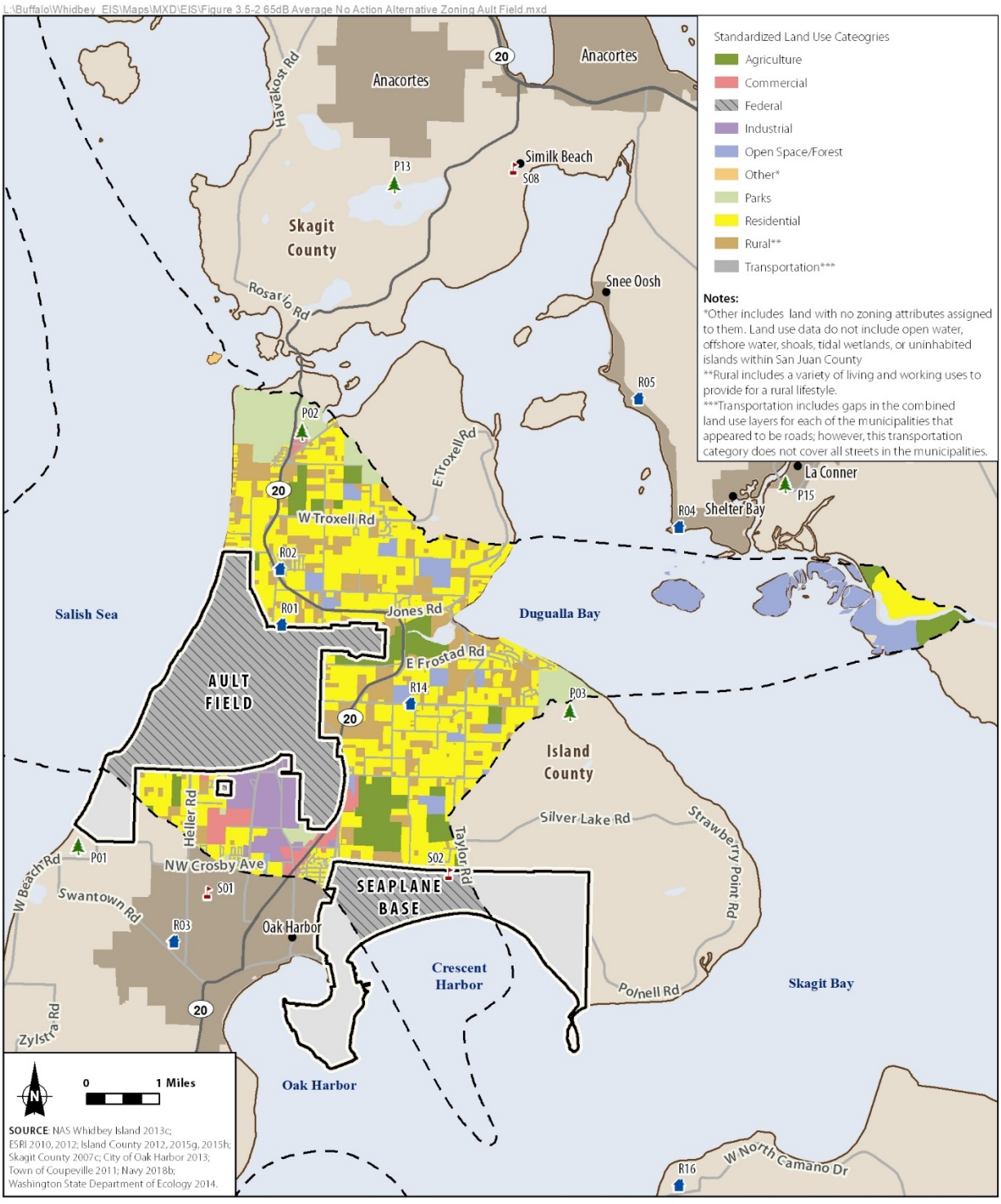


Figure 3.5-2
65 dB DNL Average Year No Action Alternative Land Use for Ault Field
Whidbey Island, Island County, WA

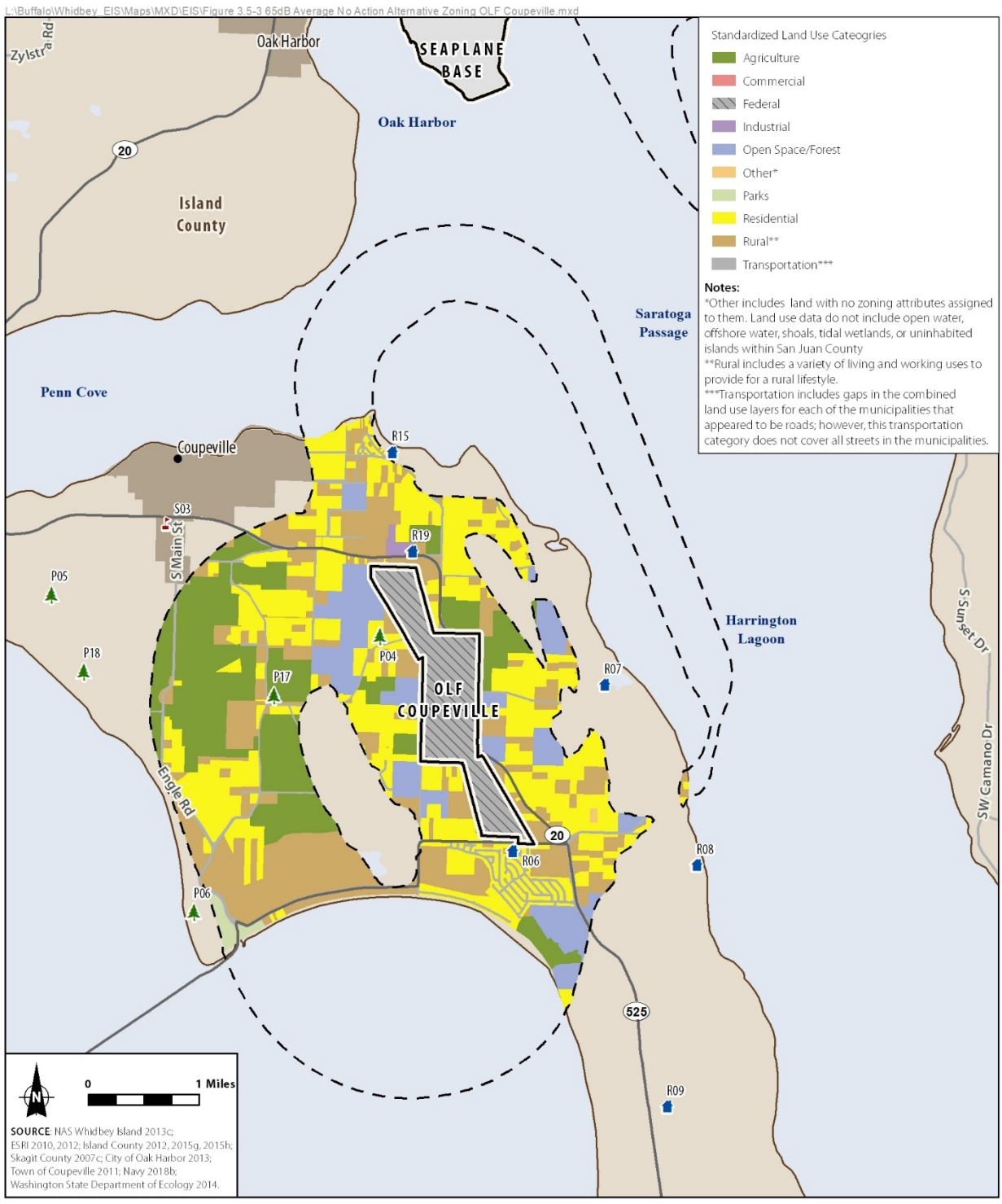


Figure 3.5-3
65 dB DNL Average Year No Action Alternative Land Use for OLF Coupeville
Whidbey Island, Island County, WA

The plan was revised and updated in June 2016 to comply with WGMA requirements. In addition, the noise zone construction standards defining minimum design requirements to safeguard life, health, property, and public welfare within noise-sensitive areas in the vicinity of Ault Field, ensure compatibility between Ault Field and surrounding land uses, and protect Ault Field from incompatible encroachment (Oak Harbor Municipal Code, 2015). Additionally, the City of Oak Harbor adopted a noise disclosure statement, which states "No person shall sell, lease, or offer the sale or lease of any property within the noise contours of 60 Ldn or above." Further, the city may impose a fine of up to $1,000 for violation of this requirement (Oak Harbor Municipal Code, 2015).

3.5.2.2.5 Town of Coupeville Comprehensive Plan (2003) and Zoning Ordinance (2016)

The Town of Coupeville adopted a comprehensive plan in October 1994. It has been updated several times, most recently in July 2003. The plan recognizes the economic relationship the town benefits from with Ault Field and OLF Coupeville. Figures 3.5-2 and 3.5-3 show existing land uses in Island County with the No Action noise contours overlain.

The Town of Coupeville does not have an established overlay district restricting development under the AICUZ noise contours or APZs and does not have a noise disclosure statement within its municipal code.

3.5.2.2.6 Additional Regional Land Use Controls

Additional land use requirements for compatibility may also result from state or local laws, or community-led joint land use study (JLUS) agreements. Whereas an AICUZ study represents the Navy's compatible land use recommendations to the community, a JLUS is a community document. The JLUS encourages collaborative planning and communication while encouraging compatible development near military facilities as those communities experience growth. The JLUS is produced in partnership with the DoD Office of Economic Adjustment. A JLUS has not yet been initiated at the NAS Whidbey Island complex, but it remains a tool for long-term consideration to address land use compatibility surrounding Ault Field and OLF Coupeville.

3.5.2.2.7 Readiness and Environmental Protection Integration Program, Conservation Easements, and Navigation Easements

The Navy has made positive changes to ensure conservation and minimize the potential for incompatibility. The DoD's Readiness and Environmental Protection Integration (REPI) program is a key tool for combating the airfield encroachment that can limit or restrict military training, testing, and operations. The REPI program protects these military missions by helping remove or avoid land use conflicts near installations and addressing regulatory restrictions that inhibit military activities. The REPI program is administered by the Office of the Secretary of Defense (OSD).

A key component of the REPI program is the use of buffer partnerships among the military services, private conservation groups, and state and local governments, authorized by 10 U.S.C., Section 2684a. These partnerships share the cost of acquisition of easements or other interests in land from willing sellers to preserve compatible land uses and natural habitats near military facilities that help sustain critical military mission capabilities that are at-risk from external encroachment pressures (DoD, 2017).

Through the REPI program, NAS Whidbey Island has been able to protect land uses under the primary flight corridors at both airfields within the NAS Whidbey Island complex. As of January 2018, the Navy has invested $13.8 million in direct payments to landowners willing to maintain compatible uses within the flight corridors. These easements protect local farms and endangered species, as well as prevent

incompatible uses within the most heavily used air space. Through this program, NAS Whidbey Island has protected 1,505 acres of open space and working farms (NAS Whidbey Island, 2018).

The Conservation Futures Funds program is operated by Island County to preserve and protect valuable and sensitive lands for future generations. Island County commissioners have the ability to establish specific goals for awarding these local grant contributions. In the most recent cycle, lands that also protected NAS Whidbey Island were awarded extra points as the local priority for grant awards. The Whidbey Camano Land Trust has been NAS Whidbey Island's most frequent partner in easement acquisitions around the NAS Whidbey Island complex, and the Conservation Futures Funds are often the source of local matching funds for the REPI easement acquisitions (NAS Whidbey Island, 2018).

The Navy has also purchased 18 navigation easements over 27 parcels scattered around OLF Coupeville. Navigation easements grant the Navy the right of passage in and through the airspace at various altitudes, depending upon the location of the parcel (Navy, 2005a).

3.5.2.3 Community Character

Municipalities define their community character through the comprehensive planning process. Comprehensive plans document existing community character, set out a vision for the future, and configure a road map for achieving that goal by guiding land use patterns and development. Ideally, comprehensive plan goals are implemented through land use regulations and other municipal actions.

Municipalities commonly define existing character through the connectivity of their natural and built environments. The natural environment may include such elements as a community's visual and scenic qualities, river corridors, open lands, farmlands, wetlands, woodlands, mountains, critical habitats, air quality, water quality, and noise levels. The built environment may include historic buildings, particular development patterns, and the visual character of the built landscape. Social and cultural environments and the economic environment are also part of the built environment. The social and cultural environment of a community includes such components as the crime rate, property maintenance, school quality, property values, and historic and cultural resources. The economic environment of a community includes types of jobs, their quantity and quality, commuting patterns, and the integrity of a downtown area.

Key characteristics can include the amount of noise in a community, traffic patterns/volume, and air quality. The following sections describe the community character of Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville.

3.5.2.3.1 Community Character, Island County

The 2016 update of the Island County comprehensive plan outlines the planning framework and goals of Island County through year 2036. The vision statement of the Island County comprehensive plan update is to "balance the goals of the Growth Management Act to ensure that Island County's rural character and natural beauty is protected, while meeting the housing and service needs of both existing and future County residents." Island County deeply values its rural character, stating it is essential to the quality of life within the county (Island County, 2016d). Forests, farmlands with crops and livestock, wildlife, flora, hiking and biking trails, beach access, and other open spaces for recreational use are highly valued assets in Island County, contributing to the rural character of the area. Generally, within Island County, Langley and Coupeville have remained more rural, while Oak Harbor has experienced more urban growth. As such, the county's comprehensive plan, through policy, zoning, and land use

decisions, aims to preserve open space, agriculture, and rural character while promoting urban growth in defined areas (Island County, 2016d).

3.5.2.3.2 Community Character, Skagit County

Skagit County values its rural community character and open space. The Skagit County 2016 comprehensive plan provides a sense of direction to where the county is going (trends and vision) and seeks to protect and retain the rural lifestyle in Skagit County. According to the Skagit County comprehensive plan, "Agriculture is the dominant factor in Skagit County's economy and community character." Farming, ranching, commercial forestry, and fishing have been a vital part of the county's culture since the early 1880s and continue to define the community today. Planning efforts for growth within the county reflect the desire to retain rural character while promoting an economy to compliment the county's agricultural and resource heritage (Skagit County, 2016).

3.5.2.3.3 Community Character, City of Oak Harbor

The City of Oak Harbor values its diverse community character and defines itself in two distinct areas: east and west of SR 20. The area west of SR 20 contains newer residential development, curvilinear streets, and cul-de-sacs. The area east of SR 20 contains a mix of predominantly post-war modern ranch homes within a gridded street pattern and a mix of commercial services.

Given the City of Oak Harbor's location within Whidbey Island, the connection between the urban environment and natural environment is highly valued. Through the City of Oak Harbor's comprehensive plan, the city seeks to preserve the native landscape and wildlife corridors, shorelines, waterfront trails and parks, and ease of access to outdoor recreation.

Additionally, the City of Oak Harbor contains areas of urban, commercial, rural residential, and agricultural development. Within downtown Oak Harbor and commercial areas, the city promotes pedestrian-friendly characteristics and cherishes its historic character. Urban growth areas have a rural residential character that the comprehensive plan seeks to preserve. In agricultural areas, the city preserves rural features, including farm buildings and structures of historic or architectural significance.

Of additional value to the city is maintaining its small-town character while respecting its "proud military heritage" (City of Oak Harbor, 2016).

3.5.2.3.4 Community Character, Town of Coupeville

The Town of Coupeville, through its comprehensive plan, aims to enhance its historic small-town community character, preserve its rural and agricultural heritage, and protect its significant natural landscape. Additionally, the Town of Coupeville contains 52 historic structures within its limits and identifies with a historical, unique seaside village character.

The historic Penn Cove shoreline area serves as the town's commercial core. Outside of this historic business district, the town's shoreline is primarily rural residential, with a few scattered farms. Due to undeveloped bluffs and the location of the town park and a boat launch, Coupeville has an open character shoreline. The town recognizes this as part of its environmental heritage that it seeks to preserve.

Open space characteristics provided by parks, vacant land, and the Penn Cove shoreline contribute to a low-density, small-town character for Coupeville.

3.5.2.4 Land Use Compatibility Assessment

The study area for the land use compatibility assessment is land within the projected DNL noise contours and existing APZs. This includes portions of Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville.

3.5.2.4.1 DNL Noise Contours

To assess the compatibility of surrounding land use with existing aircraft operations at the NAS Whidbey Island complex, maps of the affected environment DNL noise contours for the installation were overlaid on composite land use maps from Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville. Land use designations within each of these DNL noise contours were compared with the land use compatibility recommendations under the AICUZ program.

Portions of Island County, the City of Oak Harbor, and the Town of Coupeville are within the projected DNL noise contours for the NAS Whidbey Island complex. Table 3.5-2 provides the total area, by land use category, within the 65 to 69 dB DNL, 70 to 74 dB DNL, and the greater than or equal to 75 dB DNL noise contours around Ault Field and OLF Coupeville.

Residential land uses exist within each DNL noise contour around Ault Field and OLF Coupeville, and parks exist within the greater than or equal to 75 dB DNL noise contour around Ault Field. Per the AICUZ program, residential land use is not recommended within the 65 dB or greater noise contours (see Table 3.5-2). Additionally, parks are not recommended within the greater than or equal to 75 dB DNL noise contour. These land uses represent existing areas of potentially incompatible land use. As stated above in Section 3.5.2.2, land uses are regulated by the municipality and/or county.

Table 3.5-2 Existing Land Uses within Affected Environment[6] DNL Noise Contours Surrounding Ault Field and OLF Coupeville

Land Use	DNL Noise Contours (acres)			Total Acres (% of Total Land Use)[1]
	65 - <70 dB DNL	70 - <75 dB DNL	=75 dB DNL	
Ault Field				
Agriculture	315	310	506	1,131 (6%)
Commercial	78	170	90	338 (2%)
Federal[2]	1	0	12	13 (<1%)
Industrial	56	322	184	562 (3%)
Open Space/Forest	597	323	172	1,092 (6%)
Parks	471	185	245	901 (5%)
Residential	1,585	1,330	2,648	5,563 (28%)
Rural[3]	361	517	1,350	2,228 (11%)
Transportation[4]	121	112	342	575 (3%)
Other[5]	11	0	0	11 (<1%)
Subtotal	3,596	3,269	5,549	12,414 (63%)
OLF Coupeville				
Agriculture	837	705	30	1,572 (8%)
Commercial	1	0	0	1 (<1%)
Federal[2]	0	2	7	9 (<1%)
Industrial	0	15	12	27 (<1%)
Open Space/Forest	372	306	98	776 (4%)
Parks	47	7	0	54 (<1%)
Residential[3]	1,388	1,019	229	2,636 (13%)
Rural[4]	896	954	215	2,065 (10%)
Transportation[5]	135	80	47	262 (1%)
Other[6]	5	0	0	5 (<1%)
Subtotal	3,681	3,088	638	7,406 (36%)
TOTAL	**7,277**	**6,357**	**6,187**	**19,821**

Table 3.5-2 Existing Land Uses within Affected Environment[6] DNL Noise Contours Surrounding Ault Field and OLF Coupeville

Land Use	DNL Noise Contours (acres)			Total Acres (% of Total Land Use)[1]
	65 - <70 dB DNL	70 - <75 dB DNL	=75 dB DNL	

Notes:

1 Acreages have been rounded to ensure totals sum.

2 "Federal" land use includes federally zoned land. "Federal" does not include the Installation boundary.

3 "Residential" includes areas zoned as residential, as well as higher density areas zoned as "Rural" and having parcel properties that have use codes 11 (Household, single-family units), 111 (single section), 112 (double section), 113 (triple section), 114 (quad or greater), 12 (Household, 2-4 units), 13 (Household, multiunit 5 or more), 14 (residential condominiums), 15 (mobile home parks or courts), and 18 (all other residential not elsewhere coded).

4 "Rural" is low density, which includes a variety of living and working uses to provide for a rural lifestyle. In order to further delineate land categorized as "Rural," parcel property-use codes were examined. Per Island County Zoning Code, the lot/density requirements in "Rural" zoned areas are as follows: Minimum lot size shall be five (5) acres. Base density shall be one (1) dwelling unit per five (5) gross acres; lot size averaging may be permitted for subdivisions or short subdivisions that are ten (10) acres or larger in size, provided that no lot may be less than two and one-half (2½) acres in size; no more than three (3) lots may be created that are less than five (5) acres in size; and the average base density for the subdivision or short subdivision is not less than one (1) dwelling unit per five (5) gross acres.

5 The "Transportation" class was created by taking any gaps in the combined land use layer that appeared to be roads and identifying them as Transportation. This Transportation land use category does not cover all streets in the region.

6 "Other" includes land with no zoning attributes assigned to it. Land use data do not include open water, offshore water, shoals, tidal wetlands, or uninhabited islands within San Juan County.

7 "Affected Environment" refers to year 2021 because 2021 operations represent conditions and events at Ault Field for aircraft loading, facility and infrastructure assets, personnel levels, and number of aircraft expected to be fully implemented and complete. Affected environment is the same as the No Action Alternative.

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

3.5.2.4.2 Accident Potential Zones

To assess the compatibility of surrounding land use with existing aircraft operations at the NAS Whidbey Island complex, maps of the existing APZs for the installation were overlaid on composite land use maps from Island County, Skagit County, the City of Oak Harbor, and the Town of Coupeville. Land use designations within each APZ and Clear Zone were compared with land use compatibility recommendations under the AICUZ program.

Ault Field. Existing APZ-I and APZ-II at Ault Field cover approximately 1,700 and 3,400 acres, respectively. Land use within APZ-I and APZ-II is mostly agricultural, residential, and rural land. The Clear Zone covers approximately 500 acres, and land use within the zone is agricultural.

Per the AICUZ program, residential land uses are potentially incompatible within APZs (see Table 3.5-2). The residential land within the APZs therefore represents existing areas of potentially incompatible land use. As stated above in Section 3.5.2.2, land uses are regulated by the municipality and/or county.

OLF Coupeville. OLF Coupeville does not currently have formally defined APZs. The Clear Zone covers approximately 250 acres, and land use within the zone is designated as rural.

3.5.2.5 Recreation and Wilderness

This section discusses federal, state, and local parks and other recreational areas within the vicinity of the NAS Whidbey Island complex, including their facilities and features and relevant management measures. The study area for recreation and wilderness areas includes areas near the NAS Whidbey Island complex within the affected environment DNL noise contours out to the 65 dB DNL noise contour. Recommended land use compatibility guidelines developed under the AICUZ program state that outside of the greater than 65 dB DNL noise contours all land uses are generally considered compatible with military aircraft operations (see Table 3.5-1).

> "A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed to preserve its natural conditions and which…has outstanding opportunities for solitude or a primitive and unconfined type of recreation" (Public Law 88-577, section 2[c]).

3.5.2.5.1 Wilderness

The Wilderness Act of 1964 established the National Wilderness Preservation System, "composed of federally owned areas designated by the Congress as 'wilderness areas'." The act specifies that "these [areas] shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness" (Public Law 88-577). The definition of "wilderness" under the act is included in the text box on this page. Large complexes of wilderness are located in eastern Washington State and include:

- the Daniel J. Evans Wilderness in Olympic National Park and the Stephen Mather Wilderness in North Cascades National Park, both managed by the NPS
- the Mount Baker, Boulder River, Glacier Peak, Buckthorn, Brothers, and Mount Skokomish wilderness areas and others on the Olympic Peninsula and in the Cascades mountain range managed by the U.S. Forest Service (USFS)
- the San Juan Islands Wilderness and Washington Islands Wilderness, which encompass islands, rocks, and reefs offshore, managed by the USFWS. (Wilderness.net, 2017)

No Congressionally designated wilderness areas are located within the NAS Whidbey Island complex affected environment DNL noise contours. However, the Bureau of Land Management (BLM) has determined that BLM-owned and controlled lands in the San Juan Islands National Monument possess wilderness characteristics (i.e., "possess naturalness and outstanding opportunities for solitude or primitive and unconfined recreation") (BLM, n.d.[a]). The BLM currently is determining management measures for lands with wilderness characteristics in the national monument as part of its ongoing Resource Management Plan process; the San Juan Islands National Monument Resource Management Plan is expected to be complete in the spring of 2018 (BLM, n.d.[b]).

Williamson Rocks and Bird Rocks, which are exposed, uninhabited bedrock formations closed to the public that are included in the San Juan Islands Wilderness, part of the National Wilderness Preservation

System, also are located near the affected environment DNL noise contours (USFWS, 2010c). These rock formations are in proximity to a busy marina and Rosario Strait, which is a U.S. Coast Guard Regulated Navigation Area due to the amount of vessel traffic through this passage. In addition to noise from vessel traffic in the vicinity, these areas currently experience audible aircraft noise about 4 percent of the time based on the *NPS Acoustic Monitoring Report for Ebey's Landing National Historical Reserve* (NPS, 2016).

The San Juan Islands Wilderness, established in 1976, was designated "to secure for the American people of present and future generations the benefits of an enduring resource of wilderness" and encompasses approximately 355 acres of the Protection Island and San Juan Islands National Wildlife Refuge (NWRs), managed by the USFWS. The refuges include approximately 1,108 acres of rocks, reefs, and islands throughout the San Juan Archipelago in Island, San Juan, Skagit, and Whatcom Counties (USFWS, 2010c). The USFWS has prepared a Comprehensive Conservation Plan and Wilderness Stewardship Plan addressing the San Juan Islands Wilderness (USFWS, 2010c). The plan identifies planning issues, goals and objectives, and management strategies for the refuge and designated wilderness areas:

- The USFWS defines an issue as any matter that requires a management decision, including initiatives, opportunities, resource management problems, threats to resources of a refuge, conflicts in uses, public concerns, or presence of undesirable resource conditions. Issues identified in the plan that are pertinent to the Proposed Action include the potential for low-flying aircraft to disturb nesting colonies of seabirds and disturbance of wilderness character. The USFWS identifies the desired condition as "no aircraft, except by refuge authorization, within 1,000 feet of a nest during breeding season" (USFWS, 2010c).
- One goal identified in the plan is to promote the wilderness character and experience of the San Juan Islands Wilderness Area. Other goals noted in the plan relate to restoring, maintaining, and protecting the shorelines and ecosystems of islands included in the refuges and educating visitors and regional residents on the resources of Salish Sea ecosystems. An objective related to the goal of promoting wilderness character is to preserve visitors' experience of predominantly natural sights and sounds.
- Management strategies related to wilderness areas include actions meant to restore, maintain, and protect habitat as well as promotion of a 2,000-foot aircraft ceiling over wilderness islands (USFWS, 2010c).

Both Williamson Rocks and Bird Rocks are closed to public entry to protect sensitive wildlife species and habitat (USFWS, 2010c). Visitors are required to stay 600 feet (200 yards) or more offshore when observing wildlife, and recreational opportunities are limited to scenic and wildlife viewing from boats, other vessels, and aircraft offshore.

3.5.2.5.2 Parks and Recreation Areas

Land use analysis also considers the effects of noise on special management areas, such as national, state, and local parks and recreation areas. Federal and state special management areas in the vicinity of the NAS Whidbey Island complex are managed by different agencies, including the NPS, BLM, USFS, and Washington State Parks and Recreation Commission. Laws and regulations applicable to federal and state special management areas, discussed in the sections below, vary in scope and authority depending on the purposes for which these areas were designated.

Table 3.5-3 lists the federal, state, and local parks and public recreational areas that are located within or partially within the affected environment DNL noise contours associated with the NAS Whidbey Island complex and the agencies that own and/or manage these areas. Figure 3.5-4 shows parks within the study area (the area within the affected environment DNL noise contours out to the 65 dB DNL noise contour). The figure incorporates data from the Island County Parks Plan and U.S. Geological Survey Gap Analysis Program. Selected properties are described following the table and figure, and federal, state, and local policies related to parks and recreation areas that are relevant to the analysis in the EIS are described in the subsections following.

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

Tier of Government	*Managing Agency*	*Parks and Recreation Areas*
Federal	U.S. Department of the Interior, Bureau of Land Management	San Juan Islands National Monument[1]
	U.S. Department of the Interior, National Park Service	Ebey's Landing National Historical Reserve
	U.S. Department of the Interior, Fish and Wildlife Service	San Juan Islands National Wildlife Refuge
	U.S. Department of Agriculture, Forest Service	Pacific Northwest National Scenic Trail (in partnership with the Pacific Northwest Trail Association)
State	Washington State Parks	Deception Pass and Dugualla State Parks, Fort Casey State Park, James Island Marine State Park (San Juan County)[3]
County	Island County	Parks and Trails: Clover Valley Ball Park and Off-leash Dog Park, Moran Beach, Rocky Point public beach access[3], Long Point public beach access, low-tide trails (between Ebey's Landing Road and Keystone Jetty), Driftwood Park, Crockett Blockhouse, Rhododendron Park, and Patmore Pit
	Skagit County	Ika Island (designated Open Space of Regional and Statewide Importance), and the Skagit Wildlife Area, including Goat Island and Skagit Bay Estuary
Municipal	City of Oak Harbor	Parks: Technical Drive Off-leash Dog Park, Ridgewood Park Public Schools: Hand-in-Hand Early Learning, Crescent Harbor Elementary School[3], Olympic View Elementary School[3]
	Coupeville	Parks and Trails: Parker Road Trail Public Schools: Coupeville Middle School[3], Coupeville High School[3]

Sources: BLM Spokane District Office, n.d.; NPS, n.d.[a], n.d.[b]; USDA Forest Service, n.d.[a]; Washington State Parks, n.d.[a]; Deception Pass Park Foundation, 2015; Island County, 2015d, 2015e, 2006; Skagit County, 2007b, 2015; WDFW, 2016; City of Oak Harbor, n.d., 2012; Town of Coupeville, 2013

Notes:

1 No portions of the designated monument lands fall within the 65 dB DNL noise contour. However, the San Juan Islands National Monument is considered for inclusion in this analysis under "*Parks and Recreation Areas in the NAS Whidbey Island Complex Affected Environment DNL Noise Contour Footprint*" because water areas within the Conservation Area Boundary associated with the national monument are within the greater than 65 dB DNL noise contour.

2 Dugualla State Park is managed as a satellite unit of Deception Pass State Park.

3 No portions of these recreational areas fall within the greater than 65 dB DNL noise contour. They are introduced here because they would fall within the DNL noise contours under some of the alternatives. Those conditions are described in Section 4.5.

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

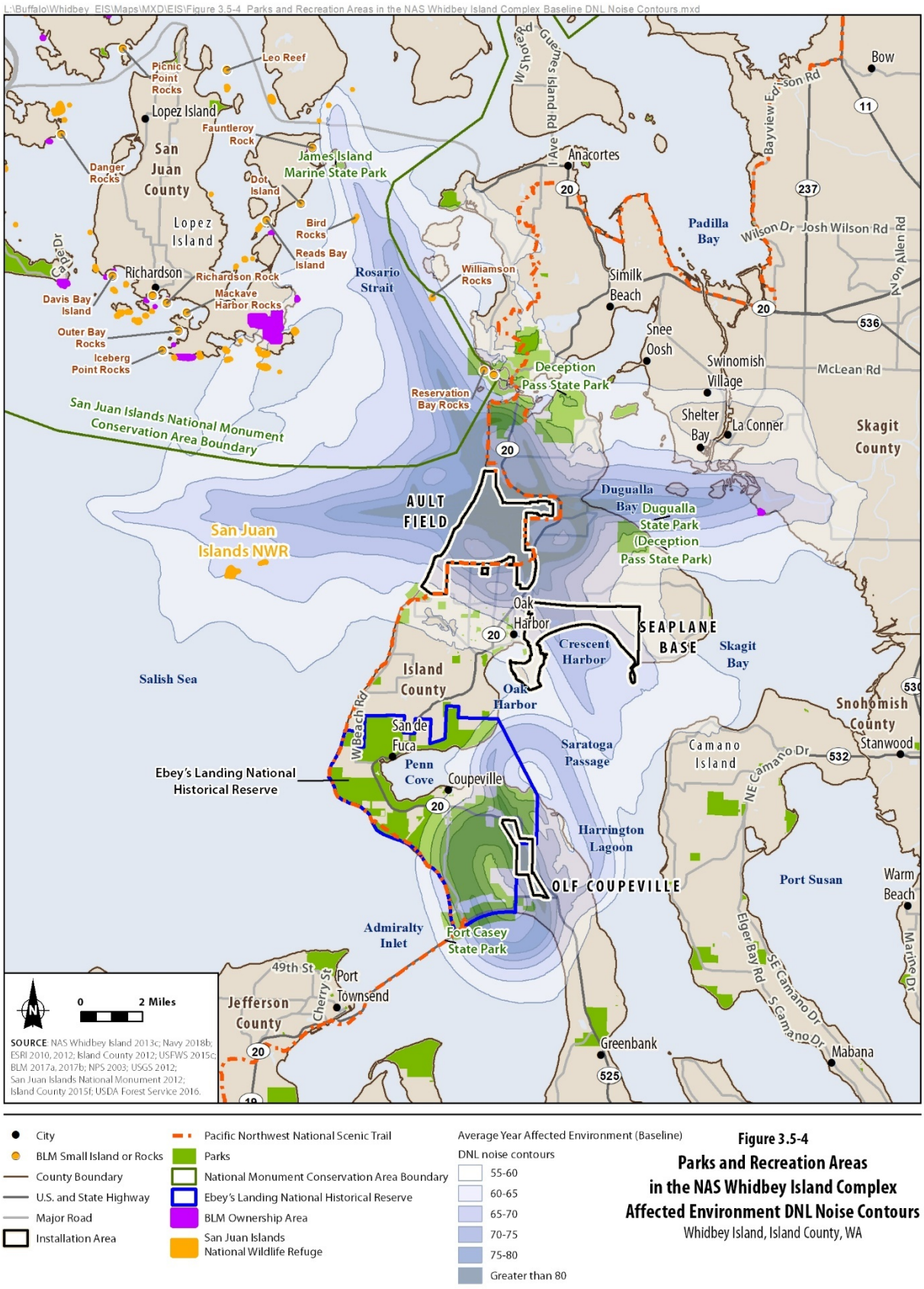


Figure 3.5-4
Parks and Recreation Areas in the NAS Whidbey Island Complex Affected Environment DNL Noise Contours
Whidbey Island, Island County, WA

3.5.2.5.2.1 San Juan Islands National Monument

BLM-owned lands in the San Juan Islands northwest of the NAS Whidbey Island complex have been designated the San Juan Islands National Monument by presidential proclamation (White House Office of the Press Secretary, 2013). Signed by President Barack Obama on March 25, 2013, the proclamation defines certain uses and activities that are allowed or restricted on lands included in the national monument; specifically, the proclamation states that safe and efficient aircraft operations by the Armed Forces are not restricted by the designation of the national monument (White House Office of the Press Secretary, 2013). National monuments are included in the National Landscape Conservation System established by the Omnibus Public Land Management Act of 2009 (Public Law 111-11), which directs the BLM to "conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values" (Section 2002).

The San Juan Islands National Monument includes BLM lands in the San Juan Islands archipelago, which includes over 450 islands, rocks, and pinnacles, the largest of which are San Juan Island, Orcas Island, and Lopez Island (White House Office of the Press Secretary, 2013). Recreational opportunities offered by the lands in the national monument and surrounding waters include wildlife viewing, fishing, kayaking, hiking, and camping (BLM Spokane District Office, n.d.). An estimated 500,000 people visit the San Juan Islands annually, but the number visiting the monument properties, specifically, is unknown (BLM, n.d.[d]). Visitation numbers are available for several Washington State Parks within the San Juan Islands. State parks within the vicinity of the 65 dB DNL noise contour include James Island, Spencer Spit on Lopez Island, and Turn Island. James Island Marine State Park is the only park in the San Juan Islands with territory inside the greater than 65 dB DNL noise contour. Visitation numbers from 1987 through 2016 for each of these parks are provided in Table 3.10-14 in Section 3.10.2.2, Economy, Employment, and Income, Affected Environment. Between 2011 and 2016, visitation numbers have ranged between 6,201 and 15,737 visitors at James Island Marine State Park; 50,430 and 90,156 visitors at Spencer Spit State Park; and 8,225 and 11,735 visitors at Turn Island State Park (Washington State Parks, n.d.[a]). Visitation numbers at each of these parks have varied during this short timeframe, with no clear trends of increases or decreases.

The proclamation establishing the national monument does not restrict "safe and efficient aircraft operations, including activities and exercises of the Armed Forces…in the vicinity of the monument" (White House Office of the Press Secretary, 2013). No BLM lands in the San Juan Islands National Monument are located within the greater than 65 dB DNL noise contours under affected environment conditions; however, portions of the waters around the monument are located within the greater than 65 dB DNL noise contours. The closest national monument lands to the NAS Whidbey Island complex are located a little over 3 miles north of NAS Whidbey Island. These are the Reservation Bay Rocks, located offshore of Deception Pass State Park (BLM Spokane District Office, n.d.). The rocks are located outside of the 65 dB DNL noise contour.

3.5.2.5.2.2 San Juan Islands National Wildlife Refuge

The San Juan Islands NWR consists mainly of rocks, reefs, and islands throughout the San Juan Archipelago that provide important breeding and haul-out habitats for waterfowl, seals, and sea lions. Two islands within the NWR, Smith and Minor, are located in the Strait of Juan de Fuca west of Whidbey Island. The NWR covers approximately 449 acres in Island, San Juan, Skagit, and Whatcom Counties. Islands and rocks within the NWR also provide important habitats for rare native plants. The USFWS provides opportunities for hiking, wildlife observing, and camping on two refuge islands. Many of the

rocks, reefs, and islands within the NWR are closed to public access to protect wildlife, habitat, and designated wilderness. Recreational opportunities around these areas are limited to viewing wildlife and scenery from ferries, commercial tour boats, private boats and kayaks, and aircraft (USFWS, 2010c).

Williamson and Bird Rocks, located near the affected environment DNL noise contours, are designated wilderness areas and subject to more restrictive management measures to preserve their wilderness resources and values, as described in the Wilderness Areas section above. These rock formations are closed to the public, and recreational opportunities associated with them are limited to wildlife and scenic viewing from boats, other vessels, and aircraft offshore.

3.5.2.5.2.3 Ebey's Landing National Historical Reserve

Under the National Park Service Organic Act of 1916 (Organic Act) (16 U.S.C. 1 *et seq.*), the NPS is responsible for managing national parks "by such means and measures as conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The Organic Act was reinforced by the Redwoods Act of 1978, which states that "the protection, management, and administration of [national parks] shall be conducted in light of the high value and integrity of the National Park System and shall not be exercised in [ways that harm] the values and purposes for which these various areas have been established, except as may have been or shall be directed and specifically provided by Congress."

The approximately 17,000-acre Ebey's Landing National Historical Reserve preserves the natural setting and cultural history of the Ebey's Landing area on Whidbey Island south of Penn Cove and southwest of the Town of Coupeville. Congress created Ebey's Landing National Historical Reserve in 1978 through passage of Public Law 95-625, Section 508, "in order to preserve and protect a rural community which provides an unbroken historical record from nineteenth century exploration and settlement in Puget Sound to the present time" (NPS, 2006a). The enabling legislation directs that "lands and interests [within the boundaries of the reserve acquired by the NPS] shall, so long as responsibility for management and administration remains with the United States, be administered [by the NPS in accordance with the Organic Act]" (NPS, 2006a). Ebey's Landing National Historical Reserve is unique in that it is managed by the Trust Board of Ebey's Landing National Historical Reserve, which includes representatives of the NPS, Washington State Parks, Island County, and the Town of Coupeville (NPS, n.d.[a]). The majority of the property within Ebey's Landing National Historical Reserve, including historic homes and farms, is privately owned and still occupied by farmers and other residents (NPS, n.d.[a], n.d.[b]).

OLF Coupeville, which began operating in 1943, is located partially within and along Ebey's Landing National Historical Reserve's southeastern boundary, southeast of Rhododendron Park and south of Smith Prairie, and partially within the reserve. As described in detail in Section 3.6.2.2, Architectural Resources, the Central Whidbey Island Historic District/Ebey's Landing National Historic Reserve were added to the National Register of Historic Places (NRHP) in 1973 for their importance to the 19th century for historic aboriginal, agricultural, architectural, commercial, and military qualities.

Estimating visitor trips to Ebey's Landing National Historical Reserve is difficult because of its varied attractions, numerous entrances and exits, and unique land management structure. According to the Trust Board of Ebey's Landing National Historical Reserve, there were more than 1 million visitors to the

reserve in 2016 (Bishop, 2017). This roughly reflects the visitors to the state parks within Ebey's Landing National Historical Reserve annually plus additional history-seeking visitors interested in the Town of Coupeville and surrounding historic cultural landscapes and others who travel to Ebey's Landing for summer camps and social events. Table 3.10-12 in Section 3.10.2.2, Economy, Employment, and Income, Affected Environment, provides visitation numbers for the state parks in Ebey's Landing National Historical Reserve from 1987 through 2016. The table shows that visitation numbers recorded for areas in Ebey's Landing National Historical Reserve between 2011 and 2016 have varied, with low visitation recorded in 2014 in particular, but have generally been within the range of visitation numbers recorded since 1987. Recreational opportunities in public and some private areas of Ebey's Landing National Historical Reserve include hiking, bicycling, boating, picnicking, camping, bird watching, historic tours, and other outdoor activities (NPS n.d.[b], n.d.[c]). Approximately 6,300 acres (or 37 percent) of Ebey's Landing National Historical Reserve is located within the affected environment DNL noise contours for the NAS Whidbey Island complex.

The NPS completed an acoustical monitoring study in the summer of 2015 to collect acoustic data on NPS property in Ebey's Landing National Historical Reserve in response to the Navy's proposal to continue and expand existing Growler operations at the NAS Whidbey Island complex. The study notes the importance of the acoustic environment to visitor experience and NPS management of Ebey's Landing National Historical Reserve:

> "Natural sounds are integral to ecosystem function and are one of the many resources and values that NPS managers are responsible for preserving and restoring. …The acoustic environment, like air, water or wildlife, is a valuable resource that can be substantially degraded by inappropriate sound levels and frequencies. Intrusive sounds (noise) are of concern to NPS managers because they can impede the ability to accomplish the NPS mission of resource protection and public enjoyment. …People visit national parks to see, hear and experience myriad phenomena associated with specific natural and cultural environments. Yet, in many cases, those environments are being increasingly impacted by anthropogenic noise altering their experience" (NPS, 2016).

The NPS installed two acoustic monitoring systems to record data for 31 days, between June 19, 2015, and July 21, 2015. Site 1 is located at the Reuble Farmstead (which includes offices, a conference room, transient quarters, and workshops) and is under low-elevation flight paths associated with OLF Coupeville. Site 2 is located adjacent to Ebey's Landing and Ebey's Prairie at the Ferry House and is situated closer to arrival and departure flight tracks associated with Ault Field. NPS recorded sound levels continuously throughout the 31-day monitoring period (over 730 hours of audio recording). The NPS's acoustic monitoring study documents SEL values for Sites 1 and 2 of 96 and 117 dB (C-weighted), respectively. The L_{max} values ranged from 85 to 113 dB. Over the duration of monitoring, audible aircraft noise occurred less than 4 percent of the time, and noise above 60 dB occurred only 1 percent of the time (NPS, 2016).

The acoustic monitoring study also calculated the DNL recorded over the 33-day monitoring period at each site. The calculated DNL at Site 1 was 73.6, and the calculated DNL at Site 2 was 54.7. Based on the modeled baseline (2021) noise contours considered in this EIS (see Figure 3.2-3), Site 1 is within the 65 to 70 dB DNL noise contours, and Site 2 is outside of the greater than 65 dB DNL contours, consistent with NPS's calculated DNL. Noise above 60 dBA occurred less than 1 percent of the total audio-collection

time (over 730 hours) at either recording location and measured an L_{max} of 113 dB at Site 1 and 85 dB at Site 2 (see Section 1.12 for additional discussion).

The NPS has established park management policies to conserve park resources and values, avoid or minimize impairment of these resources and values, and provide for public enjoyment. NPS has identified resources and values that national parks provide, which include natural soundscapes and appropriate opportunities for public enjoyment of parks. The NPS manages sound sources in national parks to the degree possible to preserve the natural soundscapes of parks. The process of managing unnatural sounds in parks requires identifying the types and levels of unnatural sounds that result in unacceptable impacts on natural soundscapes, monitoring sources of unnatural sounds, and creating and enforcing park policies and rules to address unacceptable noise impacts (NPS, 2006b). The NPS has stated that noise from existing overflights of military aircraft "significantly impacts the natural soundscape" at Ebey's Landing National Historical Reserve on a regular basis and presents "significant mitigation challenges" (O'Brien, 2017). However, the reserve was established after military aircraft operations began at OLF Coupeville and military aircraft noise was already part of the soundscape when the reserve was created. Section 3.6, Cultural Resources, provides more information on Ebey's Landing National Historical Reserve in the context of the region's military history.

3.5.2.5.2.4 Pacific Northwest National Scenic Trail

National scenic trails, such as the Pacific Northwest National Scenic Trail that crosses the northern part of Whidbey Island, are established under the National Trails System Act to "provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass" (16 U.S.C. 1242 §3(a)[2]). Managing agencies are directed to develop comprehensive plans for the acquisition, management, development, and use of designated trails. These plans address management issues specific to each trail but in general address occurrences of overuse of the trail or conflicting uses and identify areas where protection of the trail environment is needed (USDA Forest Service, Pacific Northwest Region, 1982). The USFS is currently developing a comprehensive plan for the Pacific Northwest National Scenic Trail (USDA Forest Service, n.d.[a]).

The Pacific Northwest National Scenic Trail extends approximately 1,200 miles from Glacier National Park to Cape Alava on the Olympic Peninsula. The trail was originally created by the Pacific Northwest Trail Association in 1977, and several portions of the trail received federal designation beginning in 2000. The Public Lands Omnibus Act of 2009 placed the trail under the management of the Department of Agriculture, with the USFS serving as the trail administrator. The USFS is in the process of preparing a comprehensive plan to guide management of the trail corridor; this plan in part will address measures the USFS should take to preserve natural resources in the corridor and the visitor experience (USDA Forest Service, n.d.[a]). A portion of the trail crosses Whidbey Island from Deception Pass State Park, along county roads and shoreline bluffs near Ebey's Landing National Historical Reserve and Fort Casey State Park to the Port Townsend Keystone Ferry landing (Island County, 2006; USDA Forest Service, n.d.[b]). An estimated 10.7-mile portion of the trail on Whidbey Island falls within the NAS Whidbey Island complex affected environment DNL noise contours. Visitor numbers for the portion of the trail on Whidbey Island are not publicly available.

3.5.2.5.2.5 State Parks and Recreation Areas

The Washington State Parks and Recreation Commission has the authority to adopt and enforce policies and rules related to the use and administration of state parks and use modern conservation practices to maintain and enhance park aesthetic, recreational, and ecological resources (Revised Code of Washington [RCW] 79A.05.030 and 79A.05.035). The commission recently completed the Centennial 2013 Plan, which outlines broad goals for state parks, including improving and upgrading existing state parks and creating new parks and trails (Washington State Parks and Recreation Commission, 2009).

State parks within the study area near the NAS Whidbey Island complex, including Deception Pass (established [est.] in 1923) and Dugualla (a satellite unit of Deception Pass State Park, est. 1992) State Parks, Fort Casey State Park (est. 1980), and James Island Marine State Park (est. 1974), offer a variety of recreational activities such as hiking, biking, horseback riding, picnicking, field games, boating, shellfish harvesting and fishing, beachcombing, kayaking, diving, wildlife watching, and other outdoor activities (Washington State Parks, n.d.[b], n.d.[c], n.d.[d], n.d.[e]; Deception Pass Park Foundation, 2015 and 2017). Fort Casey State Park provides sports fields that are used for field games such as soccer. Deception Pass and Fort Casey State Parks offer interpretive and educational programs from May through the beginning of September (Washington State Parks, n.d.[a], n.d.[b]). Deception Pass, Fort Casey, and James Island offer a variety of camping facilities, including tent sites, utility-served sites, cabins, and overnight mooring sites (Washington State Parks, n.d.[a], n.d.[b], n.d.[c]). Most of James Island Marine State Park is "designated a Natural Forest Area and is closed to public access except for designated recreational areas and trails" (Washington State Parks, n.d.[e]).

Two state parks in the study area, Deception Pass State Park and James Island Marine State Park, are also camping and day-use sites on the Cascadia Marine Trail, a designated National Recreation Trail managed by a partnership of agencies. The trail provides opportunities for water recreation between 66 campsites and 160 day-use sites in the Puget Sound region. No other camping or day-use sites along the trail are within the study area (Washington Water Trails Association, 2017; NPS, 2016).

Deception Pass State Park, located approximately 1.3 miles north of Ault Field, "is the busiest state park in Washington state," with an estimated 2 million visitors per year since 2011 (Beahm, 2014). In 2011, Washington State Parks established the Discover Pass system. Under this system, visitors to state parks must purchase a day pass or an annual Discover Pass. After 2011, recorded visitor numbers at many state parks decreased; however, visitors to Deception Pass State Park increased (Beahm, 2014). Table 3.5-4 provides visitation numbers at state parks within the study area, including numbers of overnight campers at Deception Pass, Fort Casey, and James Island Marine State Parks. Since 2011, total numbers of visitors and campers at Deception Pass State Park have generally increased. Visits to Fort Casey and James Island Marine State Parks have not followed a clear trend but have remained within the range of historical visit numbers since 1990, with the exception of a notable one-year increase in total visits to Fort Casey State Park in 2012.

Table 3.5-4 Estimated Total Visitors to State Parks in the Study Area, 1987-2011 (Every Third Year) and 2011-2016[1]

	Deception Pass		*Fort Casey*		*James Island*	
Year	*Total*	*Campers*	*Total*	*Campers*	*Total*	*Campers*
1987	2,909,187	101,051	475,722	18,582	16,040	360
1990	3,410,562	91,906	514,429	20,330	12,416	282
1993	4,286,155	87,634	597,886	20,285	13,738	237
1996	4,337,141	88,431	483,858	21,325	15,349	1,768
1999	2,200,477	97,701	785,857	17,770	15,247	1,049
2002	2,702,673	93,352	741,519	17,075	18,701	1,022
2005	2,535,061	99,654	693,104	16,970	8,583	2,152
2008	1,673,605	114,142	726,331	15,520	Not available	Not available
2011	1,436,938	95,291	667,789	11,607	6,201	3,885
2012	2,239,079	116,914	914,548	18,893	15,036	5,507
2013	2,447,072	119,639	725,119	18,569	15,737	5,899
2014	2,610,178	120,002	480,858	17,846	10,753	2,164
2015	2,633,240	119,915	609,849	17,901	10,825	2,174
2016	2,860,751	120,684	624,778	18,874	10,854	2,141

Source: Washington State Parks, n.d.[a]; Thrasher, 2017a

Note:
[1] Visitor numbers are not available for Dugualla State Park (Thrasher, 2017b).

3.5.2.5.2.6 County and Municipal Parks and Recreation Areas

County and municipally owned parks and recreational facilities, including public school facilities, are located within the affected environment DNL noise contours (Table 3.5-2). These parks and recreational facilities offer a variety of outdoor and indoor recreational activities to local residents and visitors.

Public school facilities in Oak Harbor and Coupeville within the study area are identified in Table 3.5-2. Recreational facilities at public schools include playgrounds, outdoor tracks and sports fields, and open space. School recreational facilities are used daily during the school year and are available for community use outside of school operating hours. Middle school and high school sports occur throughout the year, with outdoor sports seasons in the fall and spring. Fall sports include football, volleyball, cross country, swimming, tennis, soccer, and cheerleading (Oak Harbor Public Schools, 2017a). Spring sports include golf, soccer, baseball, softball, track and field, and tennis (Oak Harbor Public Schools, 2017b; Coupeville School District No. 204, 2017). Youth sporting events are also held at other community ball fields, such as those at Rhododendron Park, located less than 0.5 mile northwest of OLF Coupeville, and Clover Valley Ball Park, located approximately 1 mile south of Ault Field.

In addition to operating recreational facilities, Oak Harbor, Coupeville, other municipalities on Whidbey Island, and other community groups hold outdoor events and festivals during the spring, summer, and fall. A few of north Whidbey Island's major festivals include the following (WhidbeyIsland.us, 2017; Penncovewaterfestival.com, 2017):

- Penn Cove Mussel Festival (March, Coupeville)
- Whidbey Island Marathon (April, Oak Harbor/North Whidbey)
- Holland Happening (April/May, Oak Harbor)

- Penn Cove Water Festival (May, Coupeville)
- Oak Harbor 4th of July Fireworks, Fair, and Parade
- Whidbey Island Race Week (July; Oak Harbor, Penn Cove, and Saratoga Passage)
- Coupeville Arts and Crafts Festival (August)
- Jets over Whidbey (August, OLF Coupeville)
- Oak Harbor Music Festival (September)
- Tour de Whidbey (August, Whidbey Island)
- Whidbey Island Kite Festival (September, Fort Casey State Park)
- Autumn on Whidbey Wine, Spirits, and Art Tour (Fall, Whidbey Island)

One of the ways the Navy mitigates noise impacts on surrounding communities is to avoid scheduling training operations during major community events when possible. Current noise mitigation measures are discussed in Section F below, Section 3.2, and Appendix H.

Island and Skagit Counties and municipalities in these counties determine needs for parks and other recreational facilities based on public input and other measures of service. Island County determines unmet recreation needs in part based on a park or recreational facility's service area compared to areas and residential populations that are not served or are underserved (MIG, Inc., 2010, 2011). Skagit County and the Town of Coupeville use a level of service (LOS) standard based on park/facility acreage per 1,000 people compared to reference standards (Skagit County Parks and Recreation, 2013; Town of Coupeville, 2003). The City of Oak Harbor uses a combination of these two approaches (City of Oak Harbor, 2009). Unmet recreation needs identified in each locality are listed below:

- Island County: Additional nature and specialty (equestrian and mountain biking) trails, beach access points, boat launches, dog parks, campsites, and lands open to hunting (MIG, Inc., 2011)
- Skagit County: Additional trails, shoreline access points, regional park and picnic areas, indoor recreation facilities and pools, camping facilities, sports fields, natural areas/fishing ponds, and open space (Skagit County Parks and Recreation, 2013)
- Town of Coupeville: Additional open space and trails/walkways (Town of Coupeville, 2003)
- City of Oak Harbor: Winter recreation activities/indoor recreation facilities, community parks, additional trails, natural forest areas, tennis courts, softball/baseball fields (City of Oak Harbor, 2009)

3.5.2.5.2.7 Privately Owned and Other Recreation Areas

In addition to the public parks and recreation areas discussed above, many commercial or privately owned recreational facilities, such as golf courses, horse stables, fitness centers, private community centers, campgrounds and RV parks, and other facilities, are located in the communities surrounding the NAS Whidbey Island complex and may be within the affected environment DNL noise contours. Privately owned recreational facilities include community gathering places such as:

- The Whidbey Island Nordic Lodge Hall, located approximately 1 mile northwest of OLF Coupeville. The Nordic Lodge holds regular indoor and outdoor community events, including monthly meetings, celebrations of Nordic holidays, monthly crafters' days, game days, and trekking events (Whidbey Island Nordic Lodge, 2017).

- Camp Casey Conference Center, affiliated with Seattle Pacific University, located approximately 2.5 miles southwest of the OLF. The conference center offers retreats, lodging, and outdoor recreation and educational programs and activities, including an outdoor pool (Seattle Pacific University, 2017).
- The Island County Historical Society Museum, located on the Coupeville waterfront, approximately 3 miles northwest of the OLF and outside of the affected environment DNL noise contours. The Island County Historical Society Museum holds regular outdoor historical interpretive activities and walking tours in and around Coupeville that may occur in parts of the study area (Castellano, 2017).

Residents and visitors to Whidbey Island have opportunities to engage in a wide variety of recreational activities at and outside the parks and recreation areas noted in this section. Recreational activities may include walking and running, hiking, fishing, hunting, road- and off-road biking, kayaking, bird and wildlife watching, picnicking, beachcombing, gardening, and swimming, along with other outdoor leisure activities. In addition to the locations noted in this section, private property, bike paths and lanes, rural roads, and wildlife viewing and hunting areas are used for recreation. These recreational areas occur throughout the study area.

3.5.2.5.3 Noise Effects on Recreation

Military aircraft operations at the NAS Whidbey Island complex currently impact recreation in north and central Whidbey Island. The Navy received comments during public review of the Draft EIS noting that aircraft are visible and audible in parks and recreational areas in the study area, and the frequency of intrusive aircraft noise events has resulted in reported annoyance by residents, visitors to Whidbey Island parks, and park staff (see Appendix M). Users of parks and recreational areas in northern and central Whidbey Island have reported changes in their use of these areas, such as leaving or choosing not to go to parks when aircraft operations are occurring, spending more time indoors on private property, or wearing hearing protection while outdoors during sporting events or other activities. Park managers and event organizers have reported disruptions to interpretive programs or other social events as a result of intrusive noise levels from Growler operations. Intrusive noise caused by Growler operations is highly intermittent, occurring only when aircraft are operating in the vicinity of a park or other recreational area. The *NPS Acoustic Monitoring Report for Ebey's Landing National Historical Reserve* (2016) found that audible aircraft noise occurred less than 4 percent of the time during the more than 730 hours of monitoring, and noise above 60 dB occurred approximately 1 percent of the time. The annoyance of hearing aircraft either off in the distance or nearby is reportedly negatively affecting people's perception, use, and enjoyment of recreational areas within the study area.

Section 3.2, Noise, includes a discussion of general noise impacts and existing noise effects on recreation from aircraft operations at the NAS Whidbey Island complex. The analysis is based on the number of noise events at 11 regional parks or recreational areas per daytime hour that are greater than the maximum sound level of 50 dB outdoors (to capture outdoor speech interference). Table 3.2-9 presents the results of this analysis. Section 3.2 also discusses existing noise mitigation employed by aircrews flying out of NAS Whidbey Island. When flying in compliance with traffic or approach patterns or when directed by ATC, planes may fly below 3,000 feet AGL. Otherwise, aircrews are required, to the maximum extent possible, avoid flying over noise-sensitive areas, including the San Juan Islands National Monument, downtown Oak Harbor and Coupeville, and Fort Casey.

3.6 Cultural Resources

This discussion of cultural resources includes prehistoric and historic archaeological sites; historic buildings, structures, objects, sites, and districts; and physical entities and human-made or natural features and viewsheds important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources can be divided into four major categories:

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.
- Cemeteries include formal burial grounds, as well as known sites of burials of human remains.
- Traditional cultural properties (TCPs) may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that American Indian tribes and nations (herein after referred to as "tribes") or other groups consider essential for the preservation of traditional culture.

3.6.1 Cultural Resources, Regulatory Setting

Federal laws that regulate cultural resources include the following:

- **National Historic Preservation Act of 1966, as amended**
  This act established a program for the preservation of historic properties and created the NRHP, State Historic Preservation Offices (SHPOs), the Section 106 Review Process, and the Section 110 programs for identification, evaluation, and protection of historic properties.
- **Archeological and Historic Preservation Act of 1974**
  This act was established to provide for the protection of historic American sites, buildings, objects, and antiquities of national significance that might otherwise be lost as a result of any federal construction project or federally licensed activity or program.
- **American Indian Religious Freedom Act of 1978**
  This act provides for protection and preservation for American Indian access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.
- **Archaeological Resources Protection Act of 1979**
  This act requires federal permits for the excavation or removal of archaeological sites on federal lands and sets penalties for violators.
- **Native American Graves Protection and Repatriation Act of 1990**
  This act gives ownership and control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on federal land to federally recognized tribes or Native Hawaiian organizations.

In addition to these, EO 13007, Indian Sacred Sites, also provides for the protection of access to and ceremonial use of Indian sacred sites by Indian practitioners, as well as calling upon federal agencies to avoid adversely affecting the physical integrity of those sacred sites.

Cultural resources also may be covered by state, local, and territorial laws. These types of cultural resources are considered as part of a NEPA assessment. Pertinent to the Proposed Action, the State of Washington cultural resource laws are as follows:

- **Indian Graves and Records (RCW 27.44)**
  This act provides protection to graves and records of Native Americans. It largely pertains to cairns and graves, as well as glyptic or painted records of Native American tribes or peoples.
- **Archaeological Sites and Resources (RCW 27.53)**
  This regulation pertains to archaeological resources that are located in, on, or under the surface of any lands or waters owned by or under the possession, custody, or control of the State of Washington or any county, city, or political subdivision of the state.
- **Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60)**
  This regulation sets forth the requirements for the preservation and protection of cemeteries and historic graves.
- **Archaeological Site Public Disclosure Exemption (RCW 42.56.300)**
  This allows for the protection of archaeological site information in order to avoid looting or depredation of a site.
- **Discovery of Human Remains (RCW 27.44)**
  This regulation establishes procedures to ensure the protection of human remains, especially for those of Native American descent.

3.6.1.1 Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) and as implemented by 36 CFR Part 800, requires federal agencies to consider the effects of their actions on historic properties before undertaking a project that uses federal funds or is located on federal lands. Cultural resources that are listed in the NRHP or eligible for listing in the NRHP are "historic properties" as defined by the NHPA. The NRHP was established under the NHPA and is administered by the NPS on behalf of the Secretary of the Interior. The NRHP includes properties on public and private land, as well as National Historic Landmarks. Properties can be determined eligible for listing in the NRHP by the Secretary of the Interior or by a federal agency official with concurrence from the applicable SHPO. An NRHP-eligible property has the same protections as a property listed in the NRHP.

A historic property is defined as "…any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria" (36 CFR Section 800.16). To qualify for listing on the NRHP, a cultural resource must meet, at minimum, one of the following four criteria:

- **Criterion A**
  properties that are associated with the events that have made a significant contribution to the broad patterns of American history; or
- **Criterion B**
  properties that are associated with the lives of persons significant in our past; or

- **Criterion C**
  properties that embody the distinctive characteristic of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant or distinguishable entity whose components may lack individual distinction; or
- **Criterion D**
  properties that have yielded or may likely yield information important in prehistory or history. (Andrus, 2002).

For cultural resources qualifying as historic properties, consideration for potential effects is afforded under the NHPA.

If a cultural resource can be demonstrated to meet the criteria for listing on the NRHP and retains its integrity (i.e., location, design, setting, materials, workmanship, feeling, and association), it qualifies as a historic property, and adverse effects, either direct or indirect, to that historic property must be avoided, minimized, or mitigated appropriately. Direct effects physically alter the historic property in some way; indirect effects diminish some significant aspect of the historic property but do not physically alter it.

Historic properties can include archaeological sites. Archaeological sites are defined as the location in which evidence of a past activity is preserved, sometimes below the ground surface. Historic properties also can include elements of the built environment. Buildings, structures, objects, sites, or districts can be considered historic properties. These resources typically are over 50 years in age. While archaeological sites often are recommended as eligible under Criterion D, built structures can be considered eligible for the NRHP based upon any of the four criteria.

Types of Effects

Direct Effects: physically alter the historic property in some way.

Indirect Effects: diminish some significant aspect of the historic property but do not physically alter it.

Another type of cultural resource that, if present, also warrants consideration as a historic property is a TCP. A TCP must consist of a tangible property, such as a district, site, building, structure, or object, and must meet the criteria listed above to be considered a historic property under the NHPA. For natural resources to qualify for protection under the NHPA, they would have to constitute a definable TCP—that is, a specific site or district associated with traditional events, activities, or observances of a significance warranting inclusion on the NRHP (Parker and King, 1998).

Federal agencies are required to consult with the SHPO, Indian tribes, representatives of local governments, and the public in a manner appropriate to the agency planning process for the planned actions (undertakings), and to the nature of the undertaking, and to its potential to cause effects on historic properties. The methodology for identifying, evaluating, and mitigating impacts to cultural resources has been established through federal laws and regulations including the NHPA, Archaeological Resources Protection Act of 1979, Native American Graves Protection and Repatriation Act of 1990, and American Indian Religious Freedom Act of 1978.

As part of its responsibilities under Section 106, the Navy is consulting with the Advisory Council on Historic Preservation (ACHP); the Washington SHPO; tribes; federal, state, and local

agencies/representatives; and individual organizations. Further, the Navy is continuing consultation on the development of a Memorandum of Agreement (MoA) (see Section 3.6.2.6).

The four steps of the Section 106 consultation conducted by the Navy for this effort were outlined in a letter dated August 31, 2016. These steps included the following: determining the undertaking, defining the area of potential effects (APE), identifying and evaluating historic properties within the APE, and determining effect (i.e., no effect, no adverse effect, or adverse effect). A copy of the Section 106 implementing regulations (36 CFR Part 800) was included as an attachment to the August 31 letter for reference to the procedures used to comply with this federal law (Appendix C, Section 106 Documentation).

3.6.1.2 Area of Potential Effects

The affected environment for cultural resources is also referred to as the APE. An APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist (36 CFR 800.16[d]).

In accordance with Section 106, the Navy has determined that the APE includes the area encompassed by the 65 dB DNL noise contour that would exist in 2021 as represented by an aggregate noise contour and those lands that are a part of Ebey's Landing National Historical Reserve. The aggregate noise contour combines the land encompassed by the 65 dB DNL contour extending the largest distance from NAS Whidbey Island and OLF Coupeville for each alternative. This thereby incorporates the largest overall area within the 65 dB DNL noise contours that is also inclusive of Ebey's Landing National Historical Reserve for use as the APE (see Figure 3.6-1).

The APE is comprised of the following four components:

- On-installation Direct Effect Areas: Areas on the installation where historic properties could be directly affected (i.e., by ground disturbance, demolition, or alteration) (see Figure 3.6-2).
- On-installation Indirect Effect Areas: Areas within the installation bounded by the 65 dB DNL noise contours where historic properties could remain physically undisturbed but potentially subject to effects from the introduction of visual, atmospheric, or audible elements that occur when aircraft are seen or heard flying in the vicinity.
- Off-installation Indirect Effect Areas: Areas off the installation within operational areas bounded by the 65 dB DNL noise contours and potentially subject to effects from the introduction of visual, atmospheric, or audible elements to the setting that occur when aircraft are seen or heard flying in the vicinity.
- Ebey's Landing National Historical Reserve.

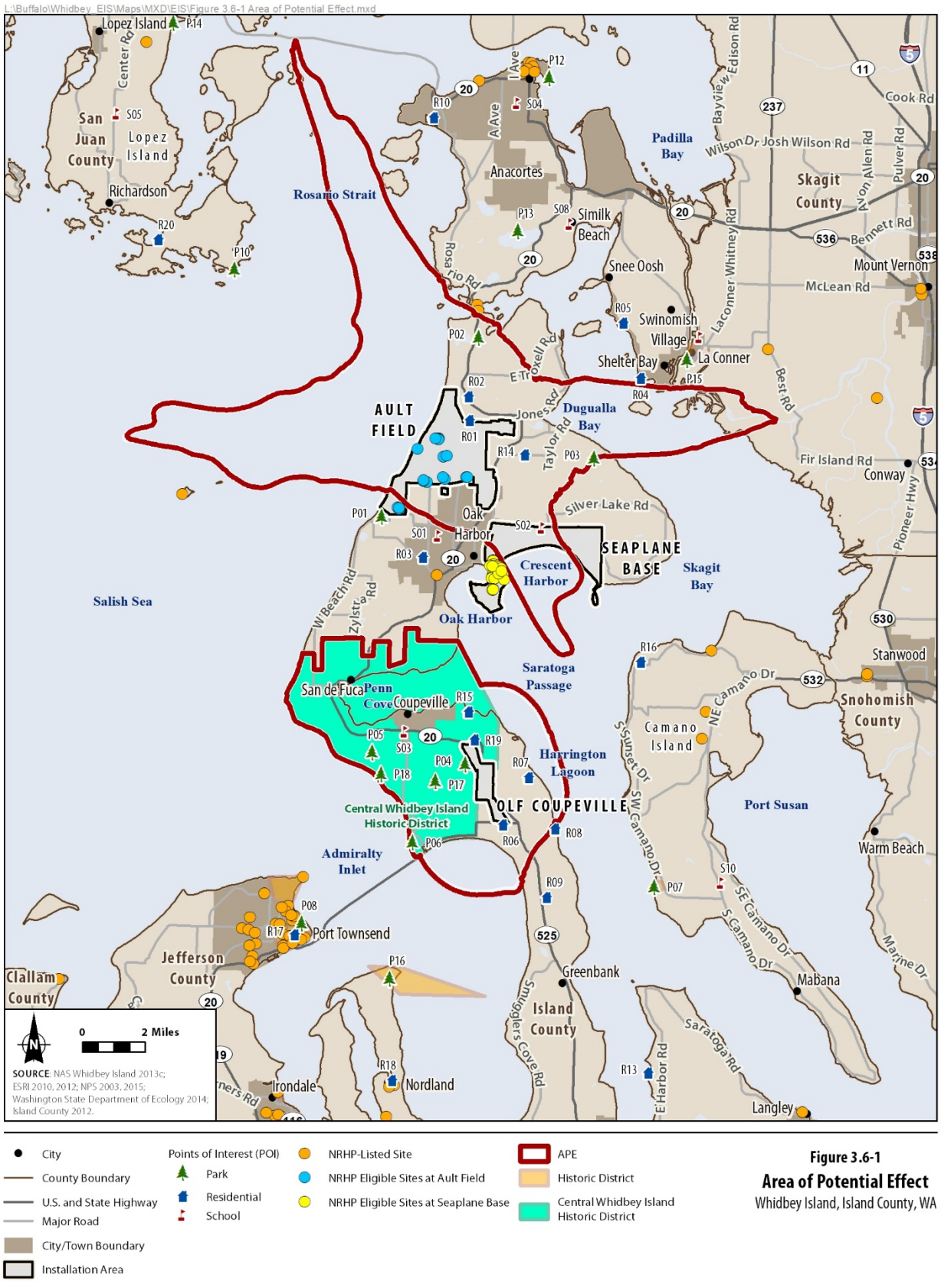


Figure 3.6-1
Area of Potential Effect
Whidbey Island, Island County, WA

Figure 3.6-2
On Installation Direct Effect Areas
Whidbey Island, Island County, WA

65 dB DNL is generally accepted for the evaluation of historic properties near airports and is consistent with environmental documentation previously completed for Navy operations at NAS Whidbey Island.[16] The APE has been refined through consultation with the SHPO, consulting parties, tribes, and other interested parties to include all of Ebey's Landing National Historical Reserve (see Section 3.6.2.6). Consistent with the implementing regulations and in consideration of comments received, the Navy has determined that the APE is appropriate for the scope and scale of the undertaking. Additional information regarding the development of the APE is provided in the correspondence to consulting parties dated May 1, 2017; July 14 and 19, 2017; October 2, 2017; and June 25, 2018 (see Appendix C).

Existing conditions related to cultural resources were identified based on the results of earlier cultural resources investigations and the results of the Navy's consultation for the Proposed Action in accordance with Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800. For the purposes of assessing the existing environment for cultural resources, the Navy considered the cultural resources and historic properties identified within the APE for the Proposed Action. Cultural resources, including those that are historic properties, located outside of the APE are not considered in this evaluation.

3.6.2 Cultural Resources, Affected Environment

3.6.2.1 Background

Whidbey Island is located within the ethnographic territory of the Southern Coast Salish, a large native group consisting of speakers of two distinct Coast Salish languages: Twana or Lushootseed. Twana was spoken by the people of Hood Canal and its drainage. Lushootseed territory extended from Samish Bay in the north and south to the head of Puget Sound; it was further divided into the Northern Lushootseed and Southern Lushootseed by differences in dialect. Before the treaties of 1854-1855, as many as 50 named groups were known to have lived in the Southern Coast Salish traditional cultural area (Suttles and Lane, 1990). Whidbey Island is located in the southwestern part of Northern Lushootseed territory and was home to several Southern Coast Salish tribes for numerous generations (Navy, 2016c).

The northern portion of the island is within the ethnographic territory of the Lower Skagit, speakers of a northern Lushootseed dialect. The Kikiallus and Squiuamish, divisions of the Swinomish, also occupied the northern portion of Whidbey Island, including the area of Deception Pass (Snyder, 1974). Additionally, the K'lallam reportedly utilized natural resources along the west coast of Whidbey Island in the early historic period (Gibbs, 1855).

The waters of northern Puget Sound were used by the Coastal Salish people, and their subsistence practices centered on the exploitation of marine resources, although terrestrial resources were also heavily used. The most important food of the Southern Coast Salish was salmon; however, a number of shellfish species including clams, cockles, oysters, saltwater snails, barnacles, crab, chitons, and mussels also were gathered and eaten. Important terrestrial resources included blacktail deer and elk. Important plant resources collected during ethnographic times included camas, bracken, wapato, salmonberry,

[16] The use of 65 dB DNL is consistent with existing federal regulations, including the FAA's Airport Noise Compatibility Planning (14 CFR Part 150), which indicates that, in general, all land uses are considered to be compatible with noise levels less than 65 dB DNL. Areas of significant noise exposure are those in which noise levels are 65 dB DNL or higher (FICUN, 1980). The use of this residential noise standard has been extrapolated for use in evaluating noise impacts to historic resources.

thimbleberry, trailing blackberry, blackcap, serviceberry, salal berry, red huckleberry, blueberry, and red and blue elderberry (Navy, 2016c; Suttles and Lane, 1990).

Forest resources also were used for wooden canoes, boxes, bowls, and spoons. Wood fibers were used to make basketry, cordage, mats, nets, blankets, and garments. Cattail and tule mats were made, along with robes of a variety of materials including woven mountain goat wool, deer hides, bear skins, and duck skins (Navy, 2016c). In the vicinity of Crescent Harbor and Oak Harbor, the Lower Skagit primarily fished for flounder and salmon and harvested a variety of shellfish (Snyder, 1974). In general, resources on the island were exploited in the spring, summer, and fall when groups would travel to various sites on the island where resources could be easily obtained as they became seasonally available.

By the 1790s, the first non-native groups entered Puget Sound. Captain George Vancouver of the Royal British Navy was one of the first to arrive, in 1792 (Suttles and Lane, 1990). At first, the settlers made little contact with the Southern Coast Salish due to the needs of the fur trade, which was their initial interest. However, by 1818, the U.S. and Great Britain opened up the territory, including lands within Puget Sound. Thirty years later, a treaty was signed between the U.S. and Great Britain to divide the territory, with the lands south of the boundary at the Strait of Juan de Fuca going to the U.S. (Navy, 2016c).

During the mid-1800s, the number of Euro-American settlements increased in the Washington Territory, which caused some conflict with the local tribes. As a result, Isaac Stevens, the first governor and superintendent of Indian Affairs of the Washington Territory, was authorized by the U.S. to negotiate with Washington tribes for the settlement of their traditional lands. Stevens negotiated eight treaties. As part of these treaties, the tribes reserved their rights to continue traditional activities on these lands. Reservations also were established from the lands retained, after tribal lands were ceded to the U.S. Treaty rights, however, were reserved on lands beyond the reservations.

Industries, such as timber and commercial fishing, developed during the second half of the 19th century, as tribal members slowly moved onto reservations, and white settlement grew. In 1850, the Donation Land Law was passed to give legal status to claims already made to promote settlement. Isaac N. Ebey was the first permanent white settler to file a claim as a result of this act. Settlement in the areas of Oak Harbor and Crescent Harbor also occurred at this time, with brothers Samuel and Thomas Maylor arriving in 1852, followed soon after by Edward Barrington (although none filed claims until the 1860s) (NPS, 1980).

In 1883, the Town of Coupeville was platted on Captain Thomas Coupe's 320-acre claim. One year later, the town had stores, hotels, a school, a church, and numerous dwellings. Today's Front Street is representative of this early 19th century development. Due to the time of its founding, Coupeville is the second oldest city within the State of Washington (NPS, 2006a).

In addition to the Town of Coupeville, continued growth allowed for the construction of Fort Casey in the late 1890s; it served as part of a defense system to guard Puget Sound (NPS, 1980). Much of the infrastructure associated with Fort Casey has been in place since 1906 (NPS, 2006a). Starting in 1895, Dutch homesteaders began to arrive and settle in the Oak Harbor area. By 1897, more than 200 Dutch had settled in north Whidbey, particularly in the area of Clover Valley, which is today Ault Field (Neil, 1989). This community of Dutch settlers began potato and dairy farms on Whidbey Island (Navy, 2016c). By the turn of the 19th century, the Puget Sound basin was established as the urban center of the northwest, and Whidbey Island became a vacation spot for the mainlanders (Navy, 2016c).

3.6.2.1.1 NAS Whidbey Island

Naval buildup in the U.S. during the late 1930s required expansion of existing facilities and construction of new facilities on the West Coast. After the adoption of the Two Ocean Navy Bill, in January of 1941, the Chief of Naval Operations requested a list of potential locations for a new Pacific Coast base that could accommodate seaplanes, allow for expansion into land-based planes, and provide the necessary support services for ammunitions, fuel, and personnel. Clover Valley and Crescent Harbor were selected due in large part to the weather, described as a "sunshine oasis in the fog belt of Puget Sound" (Command History, 1945). An appropriation of $3.79 million was made for the construction of NAS Whidbey Island in August of 1941, and construction began following the events at Pearl Harbor. The mission of the two new bases on Whidbey Island was to provide facilities to operate and maintain two off-shore patrol squadrons, one inshore patrol squadron, and facilities for operating four additional squadrons. NAS Whidbey Island was formally commissioned on September 21, 1942 (Navy, 2016c).

Prior to the Navy's acquisition of land for the Seaplane Base and Ault Field (originally Clover Valley Field) in 1942, and for OLF Coupeville in 1944, the lands on Whidbey Island were rural, with open pasture land, dirt roads, and second-growth forested areas. Farms and their accompanying structures dominated the landscape, as the community of Oak Harbor had a population of fewer than 400 people. Before the early 1940s, these rural areas were subdivided into numerous lots ranging in size from 10 to nearly 180 acres. Ault Field contained approximately 120 such lots as of 1941, and roughly 85 rural or farm lots were located at the Seaplane Base (Hampton and Burkett, 2010; Navy, 2016c).

The outbreak of World War II brought more activity to Whidbey Island. Patrol planes based on NAS Whidbey Island flew long-range navigation training missions over the north Pacific. Buildings continued to be added to the original complex throughout World War II (Hampton and Burkett, 2010).

In 1949, NAS Whidbey Island became a major Fleet support station and the only major station north of San Francisco and west of Chicago. This decision and the rising tensions of the Cold War, in connection with the outbreak of the Korean War, resulted in the development of additional facilities and rehabilitation of existing structures in the early 1950s (Dames and Moore, 1994). This development centered on Ault Field, with the Seaplane Base taking a supporting role.

The 1950s also were characterized by the first operations of modern jet aircraft. In 1951, NAS Whidbey Island was designated a Master Jet Station. In order to provide long-range, nuclear-capable, strategic bombers from forward-based Pacific Fleet aircraft carriers, the Navy assigned heavy attack squadrons to NAS Whidbey Island beginning in 1956. In the latter half of the 1950s, NAS Whidbey Island also became the center of anti-submarine warfare in the Pacific Northwest (Navy, 2016c).

Between 1965 and 1969, NAS Whidbey Island received the A-6 Intruder squadrons, which transformed it into the sole training and operation center for these squadrons for use in the Pacific. The A-6A Intruder training program included celestial and other navigational training, radar navigation, special weapons employment, bombing, and day/night carrier qualifications. This action increased air operations at Ault Field.

By 1971, NAS Whidbey Island became the home base of tactical electronic warfare squadrons for naval aviation forces, a role that continues today (Navy, 2016c). Two years later, in 1973, NAS Whidbey Island was formally established as a Functional Specialty Center responsible for the training and operations of all medium attack squadrons of the Pacific Fleet and all of the Navy's tactical electronic warfare squadrons.

By 1980, aviation units based at NAS Whidbey Island included six medium attack squadrons, nine tactical electronic warfare squadrons, and three Naval Air Reserve squadrons (Navy, 2016c). During the 1980s, NAS Whidbey Island squadrons provided electronic warfare support to U.S. naval forces operating around the world. NAS Whidbey Island was considered by the Base Realignment and Closure Commission for closure in the early 1990s, but it ultimately remained open due to its strategic importance in the Pacific Northwest.

During the 1990s and 2000s, NAS Whidbey Island functioned as the main home base for the Pacific Fleet of Prowler squadrons, which began the transition to Growler aircraft in 2008.

3.6.2.1.1.1 Ault Field

Construction of Ault Field began in 1942, when the field was referred to as Clover Valley Field. On August 28, 1942, the first military plane landed at Clover Valley. Once the field was fully operational, the first air squadrons, consisting of Grumman F4F Wildcats, the primary Navy and Marine fighter planes during World War II, arrived. During the construction of Ault Field in 1942, much of the land consisted of peat bogs and marshes, which required stabilization. As a result, the peat was removed to a depth of approximately 5 feet below grade and then replaced with gravel (Navy, 2016c). Clover Valley Field was renamed Ault Field on September 25, 1943, in memory of Commander William B. Ault (Navy, 2016c).

In the post-World War II era, NAS Whidbey Island naval operations began to expand, especially at Ault Field. In the mid-1950s, for example, the Navy acquired 973 acres of land adjacent to Ault Field to grade and construct overruns for its two runways. World War II dormitories, administrative buildings, and hangars continued to be used at Ault Field in the 1950s. Air operations at Ault Field increased 31 percent from 1966 to 1967 (Navy, 2016c).

In the 1970s, excess land was disposed of at Ault Field. Operations continued through the 1980s and 1990s. However, Ault Field has not experienced large amounts of construction since the end of the Cold War.

Today, approximately 23 percent of Ault Field is developed (Navy, 2013). In addition to housing, Ault Field includes two runways and associated apron and taxiways plus hangars, administrative and support buildings, and roads for the installation. The undeveloped area of the installation contains open grassland, forest, and agricultural land (EDAW, 1997; Stell, 2013).

3.6.2.1.1.2 OLF Coupeville

OLF Coupeville is located on a relatively wide area of the central portion of Whidbey Island on the south side of Penn Cove, 3 miles south of Coupeville, Washington. It is located approximately 10 miles south of Ault Field and is used primarily for FCLP. In addition to its 5,400-foot-long landing strip, small operations tower, taxiways, and a few access roads, most of the installation is grass-covered and still maintains the character of its original agricultural usage (Stell, 2013).

In 1937, OLF Coupeville was split between 16 landowners before its acquisition by the Navy in 1943 (Navy, 2016c). For instance, the Kineth and Smith families had obtained large homestead tracts through the Homestead Act in the 1850s. The homesteads around OLF Coupeville contained fertile prairie lands, and farmers like the Kineth and Smith families prospered growing some of the best wheat crops on the island (Navy, 2017a).

Construction for the Navy use at OLF Coupeville was completed in 1944. The field was originally used for emergency and practice landings until 1946. Navy use of the OLF continued through 1963, when the Navy had made plans to sell the facility. However, in 1967, the Navy reactivated the OLF to accommodate training and operational demands for the Vietnam War (124 F. 3d 1277) (Navy, 2016c).

Since 1967, the Navy has continuously used OLF Coupeville for FCLP, with a peak of use between 1967 and 1971 and another peak in the late 1980s and early 1990s (*Argent* v. *United States*, 124 F.3d 1277) (see Section 1.4 for additional information). Operations at OLF Coupeville, like those at Ault Field, have continued since that time, with periods of high and low activity dependent upon Navy mission requirements related to global events and national defense requirements.

Today, northern portions of OLF Coupeville are located within Ebey's Landing National Historical Reserve. Due to the previous agricultural occupation in OLF Coupeville, the most common resources found from previous occupations included concrete foundations, gravel pads, and footings associated with outbuildings (Navy, 2016c).

3.6.2.1.1.3 Seaplane Base

The survey for construction of the Seaplane Base began in August of 1941. At the time, approximately 85 rural or farm lots were located there, totaling nearly 2,670 acres. The Navy expanded its holdings by filling nearly 120 acres of tidal flats, bringing the total to 2,791 acres. The first seaplane landed in December 1942 (Navy, 2016c).

During the early 1960s, the Seaplane Base operated as an active facility, but it was placed on standby status by 1966. In 1970, the Seaplane Base patrol operations were ended.

The Seaplane Base consists of a former seaplane base that is now a mixture of ordnance, retail, and public works facilities, as well as Navy family housing. A fuel pier and the Survival Training Area also are present. As part of the 2010 Phase 1 architectural survey of the Seaplane Base, 96 architectural resources were documented, along with two historic districts: the Seaplane Plane Base Historic District (SPBHD) and the Victory Homes Historic District.

The SPBHD is eligible for listing in the NRHP. The boundaries of the SPBHD include a collection of contributing and individually eligible buildings, structures, and landscape features that are related to the Seaplane Base's historic military mission and operations (WDAHP [Washington Department of Archaeology and Historic Preservation], 2010; Navy, 2016b).

At the national level, the SPBHD is significant for its role in U.S. naval aviation history and the rapid development of defense installations prior to and during World War II. During this period, the Seaplane Base played an important role in the Navy's war effort by providing both training and armaments for military missions in the Pacific. At the state level, the Seaplane Base has made a significant contribution to the Navy's expanding role in the Puget Sound region. At the local level, the Seaplane Base played a key role in the establishment of NAS Whidbey Island and has had a significant impact in the socioeconomic development of Oak Harbor and Whidbey Island (EDAW, 1997; Hampton and Burkett, 2010).

The Victory Homes were constructed in 1942 by the Austin Company during the original development of the Seaplane Base. The Victory Homes Historic District contains only two representative structures (Buildings 613 and 614) because the remainder of the district was demolished in the 1990s. These structures were retained in compliance with the Memorandum of Agreement Regarding the Victory Homes Replacement Project with the Washington SHPO (Hampton and Burkett, 2010; Navy, 2016c).

Today, the Seaplane Base has continued as a support facility to Ault Field. It is currently home to ordnance operations, the Navy Exchange, public works shops and storage facilities, and some housing facilities (Navy, 2016c).

3.6.2.1.2 Island County

Island County, the eighth-oldest county in Washington, was created on January 6, 1853. At that time, it included what is today Whatcom, Snohomish, Skagit, and San Juan Counties. The first five claims in the newly created Island County were filed that same year. The first three were in the vicinity of present day Bellingham; Ebey's claim, which later surveyed out to be 641 acres, was the fourth; and Richard H. Lansdale's claim of 320 acres to the north, at the west end of Penn Cove, was the fifth claim. Island County became known as “a place of old settlers and longtime residents” (Cook, 1972).

In the early years of Island County, farming was one of the primary activities. Beginning in the 1890s, farmers in Island County began planting orchards to supplement potato and grain crops. Island County's population doubled between 1900 and 1910, and continued to increase during the 1920s; the number of farms in the county tripled between 1900 and 1920 (Cook, 1972). While the county remained essentially rural, it became more accessible via roads and water. Today, the county hosts a number of residents within cities and towns, but a majority live in unincorporated areas.

The county seat of Island County is the Town of Coupeville, which is one of Washington’s oldest towns. Coupeville is located within a NRHP-listed historic district called the Central Whidbey Island Historic District (Section 3.6.2.1.3). It is a 19th century seaport town, established in 1853, set on the southern edge of Penn Cove. The town was founded by Captain Thomas Coupe. The original plat of the town, recorded in 1883, includes most of the central part of the town east of North Main Street. Today, Coupeville hosts the greatest concentration of historic buildings in Washington (NPS, 2010; Town of Coupeville, 2003).

3.6.2.1.3 Central Whidbey Island Historic District and the Ebey’s Landing National Historical Reserve

The Central Whidbey Island Historic District (NRHP #73001869) was listed on the NRHP on December 12, 1973. The original nomination form noted its state significance, a period of significance for the 19th century, and areas of significance including aboriginal (historic), agriculture, architecture, commerce, and military. According to the 2006 *Ebey’s Landing National Historical Reserve, the Final General Management Plan and Environmental Impact Statement*, the district has the same boundaries as the Ebey’s Landing National Historical Reserve (NRHP #01000229), which also is listed in the NRHP. In this manner, the boundaries of Ebey’s Landing National Historical Reserve coincide with those established in the original nomination of the Central Whidbey Island Historic District.

Ebey’s Landing National Historical Reserve was established under Section 508 of the Parks and Recreation Act of 1978.

Its purpose is “to preserve and protect the cultural landscape and to commemorate the history of a rural community, which provides a continuous record of exploration and American settlement in Puget Sound

from the nineteenth century to the present" (NPS, 2010). The events associated with its establishment as a reserve include the exploration of Puget Sound, the settlement by Colonel Ebey, the settlement of the Donation Land Law beginning in 1850, and the growth of the Town of Coupeville in the 19th century (NPS, 2006a). Part of the cultural landscape of Ebey's Landing National Historical Reserve also was influenced by the military history of Fort Casey and Fort Ebey, which protected the mouth of Puget Sound (NPS, 2010).

Ebey's Landing National Historical Reserve is unique because it is the first "historical reserve" in the National Park System (NPS, 2006a). As stated in its general management plan, one of the reasons for establishing Ebey's Landing National Historical Reserve was to preserve open space and at the same time allow for federal assistance (NPS, 2006a). Ebey's Landing National Historical Reserve represents a broad spectrum of Northwest history (NPS, 2006a). As a historic district, it "possess[es] a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (Andrus, 2002).

As indicated in the NRHP nomination form for the Central Whidbey Island Historic District, the Island County Commissioners established the district on October 16, 1972, for its importance to the 19th century. The original district contained approximately 8,000 acres surrounding Penn Cove and included original Donation Land Claims, 18 places listed in the Historic American Building Survey (15 of which were still standing), Fort Casey, and numerous structures portraying a cross section of domestic architecture (Cook, 1972). Portions of the district were documented in a 1935 Historic American Building Survey. Coupeville was noted as the civic and social center district due to its mixture of old and new (Cook, 1972).

Per updates to the nomination form, the Central Whidbey Island Historic District/Historical Reserve now is listed as nationally significant under three criteria (A, B, and C) (Gilbert and Luxenberg, 1997). The use of Criterion A is due to the association with its areas of significance, which include the following: Agriculture; Architecture; Commerce; Recreation/Tourism; Ethnic Heritage; Exploration/Settlement; Education; Religion; Military; and Politics and Government. Persons associated with the property include Captain George Vancouver, Master Joseph Whidbey, the Ebey family, Captain Coupe, and Judge Still; for these connections, the property is listed under Criterion B. The property also is listed under Criterion C because it includes structures and objects that are associated with distinctive types, styles, and periods of construction dating from the mid-19th century to the present and that represent the areas of significance. It also is culturally affiliated with the Salish tribe and has its period of significance between 1300 and 1945 (Gilbert and Luxenberg, 1997). The original NRHP nomination for the Central Whidbey Island Historic District (Cook, 1972) focused primarily on the area's mid- to late-19th century development, while the later nomination "amends and supplements the existing nomination to fully reflect the range of landscape and architectural features that contribute to the special character of the Reserve, which Congress has sought to preserve" (Gilbert and Luxenberg, 1997).

In partnership with the Town of Coupeville, Island County, and Washington State Parks, the NPS manages Ebey's Landing National Historical Reserve, which comprises an area of approximately 17,572 acres: 13,617 acres of land and 3,955 surface-acres of water (Penn Cove). Approximately 2,023 acres are protected with NPS-held conservation easements, and 684 acres are NPS owned in fee. Most of the land (approximately 85 percent) is privately owned, with the rest under a combination of local, state, and federal ownership (NPS, 2006a).

The base of the NPS operation is located at the Reuble Farmstead, which is located to the west of OLF Coupeville. This site was used as a noise monitoring location in the 2016 NPS acoustical monitoring activities, along with the Ferry House, a focal point within Ebey's Landing National Historical Reserve. The Reuble Farmstead is located under the low-elevation flight path for operations at OLF Coupeville, while the Ferry House is exposed to aircraft operations from both Ault Field and OLF Coupeville (Pipkin, 2016).

3.6.2.2 Archaeological Resources

Prehistoric archaeological sites within the Puget Sound region have largely been recognized in two settings: shell middens along the Strait of Juan de Fuca and terrestrial sites located near rivers. Whidbey Island is located at the north end of Puget Sound. Shell midden sites are the most abundant site type in Island County and are usually highly linear shoreline sites. Shell middens typically contain abundant faunal remains and, very infrequently, tools. Few shell middens contain features or obvious internal structures (Wessen, 1988).

Historic archaeological sites within the region largely consist of structure foundations and debris scatters (Navy, 2016c). In Washington State, historic archaeological remains are associated with fur trade camps, military forts, logging and mining camps, railroads, and religious centers. Many of the early towns grew up around military or fur trade forts (Stilson, Meatte, and Whitlam, 2003). The presence of the military was in part a reason for the settlements within the area surrounding NAS Whidbey Island.

Within the APE, 151 archaeological sites are present. Among these, seven archaeological sites have been determined eligible for the NRHP, two have been determined not eligible for the NRHP, and 142 either have no determination or are potentially eligible for the NRHP. None of the known archaeological sites are located within the on-installation direct effect areas.

In addition, an archaeological district, the Sqwikwikwab (Fish Town), is present outside of NAS Whidbey Island. This district includes four archaeological sites and a nearby burial site. As noted within the Washington Department of Archaeology and Historic Preservation (DAHP) records, the Sqwikwikwab is an eligible historic and archaeological district. It is listed on the Washington Heritage Register. The district is located off station near the mouth of the north fork of the Skagit River.

3.6.2.3 Architectural Resources

The Navy defines buildings and structures according to the definitions provided in National Register Bulletin 16A: How to Complete the National Register Registration Form. A building is a construction "...created principally to shelter any form of human activity." "Structures are...those functional constructions made usually for purposes other than creating human shelter" (NPS, 1997).

Approximately 2,308 architectural resources are present within the APE (Table 3.6-1). The number of resources is based on records gathered by the Navy from the Washington DAHP geographic information systems (GIS) data set, the NRHP, NAS Whidbey Island records, and the 2016 Ebey's Landing National Historical Reserve Historic Building Inventory Update.[17]

[17] The 2016 Ebey's Landing National Historical Reserve Historic Building Inventory Update includes only those resources that are within the boundary of the reserve and that have been formally evaluated to determine whether they contribute to the historic significance of the reserve.

Table 3.6-1 Architectural Resources within the APE

Resource Type	*Eligible/Listed for the NRHP*	*Not Eligible for the NRHP*	*Status Not Determined for the NRHP*	*Total Number*
Buildings and Structures (50 years and older)	28	182	1,779	1,989
Washington Heritage Barn Register Listed	23	Not applicable	Not applicable	23
Historic Districts	2	0	0	2
Washington Heritage Register Listed	4	Not applicable	Not applicable	4
NRHP	2	Not applicable	Not applicable	2
ELNHR 2016 Inventory	203	85	Not applicable	288
TOTAL:	262	267	1,779	2,308[1]

Source: Appendix C – June 25, 2018, consultation letter attachment.

Notes:
[1] The total number of resources may not represent the actual number of resources due to double-counting; some resources are included in multiple registers and inventories.

Key:
ELNHR = Ebey's Landing National Historical Reserve
NRHP = National Register of Historic Places

A full listing of the resources within the APE is provided in Appendix C as an attachment to the June 25, 2018, letter to consulting parties.

3.6.2.3.1 On-installation Direct Effect Areas

The on-installation direct effect areas of the APE consist of the portions of Ault Field that would be directly impacted by construction and demolition activities. This area of the APE includes over 160 historic buildings and structures, although no historic districts are present. Among the 160 resources, only four are considered to be eligible for listing on the NRHP. They include the following:

- **Building 112 (Hangar 1)**
  Hangar 1 is the only remaining hangar of four structures of its type constructed at the beginning of World War II. This hangar was instrumental to aerial patrols and crew training during the war. Hangar 1 has undergone minor alterations but has retained its integrity. This structure is eligible for NRHP listing under Criterion A, based on its association with naval aviation during World War II, and under Criterion C as a distinctive example of a military structure quickly erected to fulfill war needs (Hampton and Burkett, 2010). According to the Installation Cultural Resources Management Plan (ICRMP) and a 2010 Environmental Assessment, this building is planned for demolition. The Navy has consulted with the SHPO and has completed stipulations from the MoA, signed May 24, 2010, by the Commander, Navy Region Northwest and the SHPO on June 2, 2010 (Navy, 2010a; Navy, 2016c). Building 112 will be demolished as part of the military construction for the P-8A operations prior to the initiation of the Proposed Action.
- **Building 386 (Hangar 5)**
  This structure dates to the early Cold War (between 1953 and 1957). Hangar 5 is recommended as eligible under Criterion C. It is an example of a Miramar type of hangar and of a reinforced

concrete frame hangar construction. The SHPO concurred with the Navy's finding of eligibility (Hampton and Burkett, 2010). This hangar has undergone renovations per stipulations within a MoA with the Washington SHPO.

- **Buildings 457 and 458 (Ready Lockers)**
  These structures have been used for storage of munitions. Due to their association with Hangar 1, Buildings 457 and 458 are eligible for NRHP listing under Criterion A, based on their association with naval aviation during World War II, and under Criterion C as a distinctive example of a military structure quickly erected to fulfill war needs (Hampton and Burkett, 2010). These structures are considered outbuildings to Hangar 1 and are part of the determined-eligible property (Navy, 2016c). They are planned for demolition per the 2010 Environmental Assessment and are noted in the MoA, signed May 24, 2010, by the Commander, Navy Region Northwest and the SHPO on June 2, 2010 (Navy, 2010a).

In addition to the resources that are eligible for the NRHP, other facilities are located within areas that would be subject to activities associated with the three action alternatives. Among the other resources within this portion of the APE, Building 115 (Armament Storage), Building 2737 (Hangar 12), and Taxiway Juliet are present. These resources have been determined not eligible for the NRHP, and the SHPO has concurred with that determination. Building 115 is located on Midway Street. It was built in 1942 as an ordnance shop and continues today as an aviation armament shop. Building 2737 was built in 1989 as a maintenance hangar; it is located proximate to Building 386 (Hangar 5), Building 112 (Hangar 1), and Buildings 457 and 458 (Ready Lockers), near North Charles Porter Avenue. Taxiway Juliet was constructed in the early 1950s as part of the conversion from World War II activities to the Master Jet Station. Five of these taxiways, most of which are about 100 feet wide, were added to the Ault Field runway complex in 1952 and 1958 (Navy, 2016c).

3.6.2.3.2 On-installation Indirect Effect Areas

According to the ICRMP, a total of 1,859 buildings and structures are present at NAS Whidbey Island. Among these, 1,830 buildings and structures are located within Ault Field and the Seaplane Base, while a total of 29 buildings and structures are located within OLF Coupeville (Navy, 2016c). Several architectural surveys have been conducted at NAS Whidbey Island, resulting in the identification of over 30 buildings that have been determined eligible for listing in the NRHP (Navy, 2016b). Table 3.6-2 provides a listing of the NRHP-eligible resources located within the on-installation indirect effect areas of the APE at Ault Field. No NRHP-eligible resources are located at OLF Coupeville, and while NRHP-eligible resources are located at the Seaplane Base, none of them are located within the APE.

Table 3.6-2 NRHP-Eligible Buildings at Ault Field

Building Number	Name/Function	Date built
112[1]	Hangar 12	1942
118	Skywarrior Theater	1942
386	Hangar 5	1953-1957
410	Hangar 6	1957
457[2]	Ready Locker	1943
458[2]	Ready Locker	1943
920[3]	Quarters O/920 West First Street	1900
1140[3]	Quarters P/1140 W. Clover Valley	1900
2700	Naval Ocean Processing Facility	1986
3220[3]	Quarters R/3220 N. Saratoga Street	1930
3230[3]	Quarters G/3230 N. Saratoga Street	1935
3295[3]	Quarters E/3295 N. Goldie Road	1935
3305[3]	Quarters F/3305 N. Goldie Road	1935

Sources: Navy, 2016c

Notes:

[1] The Navy has consulted with the SHPO and has completed stipulations from a MoA, signed May 24, 2010, by the Commander, Navy Region Northwest and the SHPO on June 2, 2010 (Navy, 2010a; Navy, 2016c). Building 112 will be demolished as part of the military construction for the P-8A operations prior to the initiation of the Proposed Action.

[2] These resources are planned for demolition per a 2010 Environmental Assessment and are noted in a MoA, signed May 24, 2010, by the Commander, Navy Region Northwest and the SHPO on June 2, 2010.

[3] These resources are anticipated to be demolished because they were not divested in accordance with Stipulation I.C. of a MoA that was signed on October 6, 2017; the Navy consulted with the Washington SHPO on the MoA. Stipulation I.C. of the MoA describes the farmhouses' disposition. It states that prior to demolition, the PNC, LLC would offer the buildings as-is to the public. The stipulation sets forth the need to develop an advertising/marketing strategy to notify individuals/groups of the farmhouses. Three months' time for the notice of availability was to be made to allow for three sets of applicants: Group A – descendant family members; Group B – historical societies; and Group C – the general public. The stipulation provides for the procedures for reserving a farmhouse and then the procedures for acquiring the farmhouse. Demolition was to occur if the farmhouses were not divested (Stipulation I.D.).

Key:

MoA = Memorandum of Agreement
NRHP = National Register of Historic Places
SHPO = State Historic Preservation Office

3.6.2.3.3 Off-Installation Indirect Effect Areas

As shown in Figure 3.6-1, the off-installation indirect effect areas includes geographic areas surrounding Ault Field and OLF Coupeville. The APE includes areas that are located within Island and Skagit Counties, including those portions within Ebey's Landing National Historical Reserve.

3.6.2.3.3.1 Off-Installation Non-Ebey's Landing National Historical Reserve

As shown in Table 3.6-1, 2,308 resources are located within the APE. These include a number of resources located outside of the installation (i.e., Ault Field, the Seaplane Base, and OLF Coupeville) and Ebey's Landing National Historical Reserve. These resources include houses, barns, outbuildings, and structures. Within the Washington DAHP records, these include those resources recorded as part of real estate tax assessor's records, through surveys, and via official listings, such as the Washington Heritage Barn Register or the Washington Heritage Register. A full listing of these resources is included in Appendix C as part of the attachment to the June 25, 2018, letter to consulting parties. Figures 8 and 9 of this document show the location of these resources and the NRHP status associated with them.

3.6.2.3.3.2 Central Whidbey Island Historic District and the Ebey's Landing National Historical Reserve

The entire Ebey's Landing National Historical Reserve, and thereby the Central Whidbey Island Historic District, is included in the APE. The Ebey's Landing National Historical Reserve inventory was updated in 2016. The updated inventory includes 288 total recorded buildings and structures. Among these are 85 non-contributing buildings and structures and 203 contributing buildings and structures. The contributing resources include 21 roads, 10 landscape areas, and 15 views, amongst the other types of resources.

Ten landscape character areas (referred to as "landscape areas" within the Section 106 documentation in Appendix C) were included as part of the 1998 amendment in order to represent four primary landforms and the Town of Coupeville. These landscape character areas are depicted in Figure 3.6-3 and include the Ebey's Prairie, Crockett Prairie, Smith Prairie, San de Fuca Uplands, Fort Casey Uplands, East Woodlands, West Woodlands, Penn Cove, Coastal Strip, and Coupeville. These landscape character areas contain elements of the past related to the following:

- patterns of spatial organization
- response to the natural environment
- land use categories and activities
- vegetation related to land use
- circulation
- structures
- cluster arrangement
- archaeological resources
- views and other perceptual qualities

Historical land use patterns within Ebey's Landing National Historical Reserve retain a high degree of integrity and represent the dominant values of agricultural lands, recreation and natural resource values of the shorelines, and community stability for the Town of Coupeville.

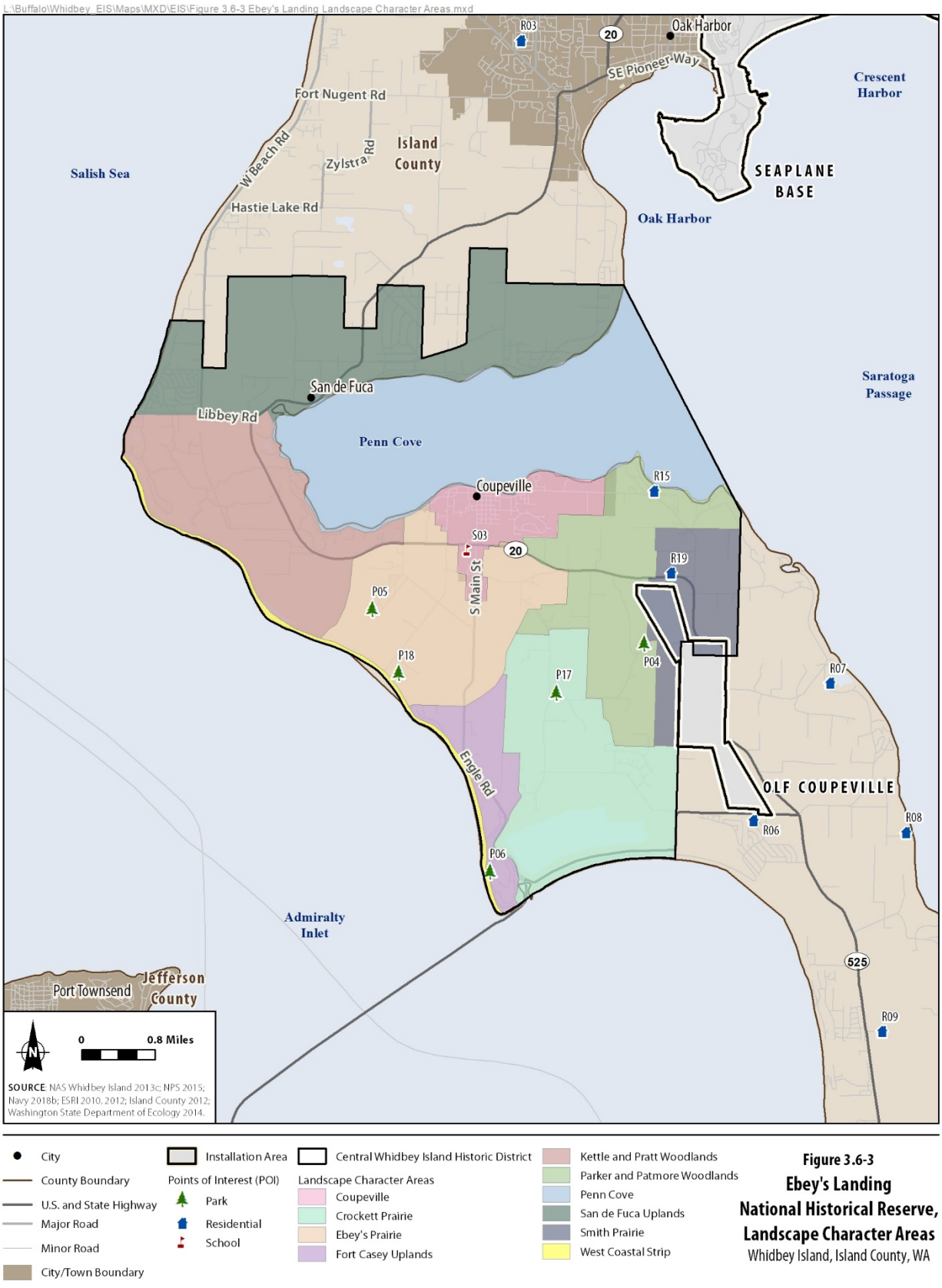


Figure 3.6-3
Ebey's Landing National Historical Reserve, Landscape Character Areas
Whidbey Island, Island County, WA

In addition, 15 character views (referred to as "landscape areas/landscape locations" within the Section 106 documentation in Appendix C) are noted within the 1998 nomination form; "these views are treated as tangible resources and are identified using the historical record and are based on character defining features of the cultural landscape" (Gilbert and Luxenberg, 1997). These views include the following:

1. Ebey's Prairie from the cemetery, and from Engle Road
2. Entry to Coupeville (from Ebey's Prairie into Prairie Center, and along Main Street) and Front Street in Coupeville
3. View from Front Street and the Wharf, across Penn Cove
4. View to Crockett Prairie and Camp Casey from Wanamaker Road
5. View to Crockett Prairie and uplands from the top of Patmore Road
6. View to Crockett Prairie and uplands from Keystone Spit I
7. View to Grasser's Lagoon from Highway 20
8. Views to and across Penn Cove along Madrona Way
9. Views from the bluff trail to Ebey's Prairie and Coastal Strip
10. View of Smith Prairie from Highway 20, entering the reserve
11. Views from Monroe's Landing across the cove to Coupeville
12. Views from Fort Casey across Keystone Spit and Crockett Lake
13. View from Highway 20 across Ebey's Prairie
14. Engle Road to Uplands and west coast
15. Views to Grasser's Hill from Madrona Way. (Gilbert and Luxenberg, 1997).

While these locations are noted as "views," they serve as representative locations within each of the landscape character areas because they convey the characteristics of the Central Whidbey Island Historic District/Ebey's Landing National Historical Reserve that contribute to the listing on the NRHP.

3.6.2.4 Cemeteries

Twenty-seven cemeteries are located within the APE. Among these are five historic-era cemeteries or monuments and 22 prehistoric archaeological sites that contained multiple burials. No known cemeteries or human burial grounds are located within Ault Field (the on-installation direct effect areas).

One of the monuments identified in this count is noted in the NPS management plan as culturally important to tribes and tribal members with traditional associations to Ebey's Landing National Historical Reserve (NPS, 2006a). This is noted as the Snaklin Monument, a 5-foot-tall stone obelisk, located within a small chainlink-fenced enclosure on private land near Parker Road in the northeast section of Ebey's Landing National Historical Reserve[18] (NPS, 2006a).

[18] An area shown on a plat map as a "USA Indian Cemetery" was identified within the NPS Management Plan (2006a). The noted location is on a wooded hillside approximately 0.25 mile northwest of the Snaklin Monument (NPS, 2006a). The inclusion of this cemetery within the Washington DAHP records is unclear, and, therefore, it is not necessarily included among the 27 cemeteries presented as being within the APE.

3.6.2.5 Traditional Cultural Properties

TCPs are places of traditional religious and cultural importance. They often are associated with tribes, but they can be attributed to other cultural groups. A TCP is eligible for or listed on the NRHP.

To date, no studies of TCPs (or Properties of Traditional Religious and Cultural Importance) have been completed within NAS Whidbey Island, although a 2000 study of the Victory Homes area did include a portion devoted to TCPs (Navy, 2016c). Consultation with the tribes, the SHPO, and consulting parties has resulted in no new TCPs identified within the APE (see Appendix C). Therefore, no known TCPs have been identified in the APE.

3.6.2.6 Section 106 Consultation

The Navy initiated Section 106 consultation in October 2014 with the Washington SHPO regarding the Proposed Action and its effects on historic properties at NAS Whidbey Island. The SHPO acknowledged the invitation on October 23, 2014.

In 2014, additional consultation was initiated with the following communities and organizations:

- Advisory Council on Historic Preservation: A letter was sent to the ACHP requesting its participation within the Section 106 process. The ACHP verbally agreed to serve as a consulting party for the Section 106 discussions.
- Town of Coupeville: On October 23, 2014, the mayor responded to the request sent on October 20, 2014, to serve as a consulting party for the Section 106 process.
- Citizens of Ebey's Reserve (COER): The COER requested consulting party status from the Navy on February 22, 2014. The Navy responded to this initial request on May 20, 2014, and indicated that it would contact the COER when Section 106 initiation would begin. Various members of COER responded to the Navy's invitation with letters on October 23, 28, and 30, 2014, and November 8 and 30, 2014, to indicate their acceptance of participating as a consulting party in the Section 106 review.
- Trust Board of Ebey's Landing National Historical Reserve: A response was received on November 4, 2014, to accept the invitation to serve as a consulting party within the Section 106 review.
- Island County Commissioners: A response was received on November 4 and 5, 2014, from two of the commissioners, from Districts 1 and 2, to serve as a consulting party for the Section 106 review.
- Island County Historical Society: No response has been received to date.
- National Park Service: The NPS responded on November 3, 2014, to accept the invitation to serve as a consulting party in the Section 106 review.
- City of Oak Harbor: No response has been received to date.
- PBY Naval Air Museum: No response has been received to date.
- Seattle Pacific University (Camp Casey): Seattle Pacific University responded on November 25, 2014, that it was accepting the invitation to serve as a consulting party within the Section 106 review.
- Washington State Parks Northwest Region Office: No response has been received to date.

The Navy sent a second letter to the SHPO and consulting parties on June 30, 2016. The letter provided information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours. The SHPO acknowledged receipt of this second letter in a response dated July 6, 2016 (please note in Appendix C, the letter shows a date of July 7, 2016. The letter, however, was transmitted to the Navy via email on July 6, 2016).

Letters also were sent to the Mayor of Port Townsend, the Island County Commissioner for District 3, and the Jefferson County Historical Society on July 12, 2016. These parties are additions to the original mailing list for which letters were sent in October 2014. The letters requested comments on the proposed definition of the APE and included information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours.

In response to the request for comments on the proposed definition of the APE, letters and emails were received from the following parties:

- ACHP – The ACHP responded on August 10, 2016, indicating its comments regarding the proposed definition of the APE and its recommendations to provide information on the APE to consulting parties for review.
- City of Port Townsend – Between July 5, 2016 and August 6, 2016, the City of Port Townsend provided correspondence via email regarding the proposed definition of the APE and the noise study. The City of Port Townsend also provided a letter to the Navy on August 16, 2016, indicating its comments on the proposed definition of the APE and the use of the noise data.
- Citizens of Ebey's Reserve – In a letter dated July 22, 2016, the COER requested information regarding the comment deadline, an explanation of expanded operations at Ault Field and OLF Coupeville, and additional input on the noise modeling study and files from the 2005 environmental assessment.
- Town of Coupeville – In a letter dated August 25, 2016, the Town of Coupeville provided comments on the use of particular noise data and the potential to impact historic resources, agriculture, and businesses.

The Navy sent a third letter to the consulting parties on August 31, 2016. This letter provided clarification of the Section 106 process. It included three enclosures, consisting of information on the process and strategy for the Section 106 process for the continuation and increase of Growler operations, a flow chart, and a copy of the implementing regulations for Section 106 codified at 36 CFR Part 800.

Responses were received on September 1, 2016, from the COER concerning the noise data and the initial findings; on September 28, 2016, from the Trust Board of Ebey's Landing National Historical Reserve, indicating its comments on the proposed definition of the APE and the use of noise data; and on September 30, 2016, from the Washington SHPO regarding the Section 106 process, the proposed definition of the APE, the development of a public involvement plan, tribal consultation, the distinction between NEPA and the NHPA, the determination of effect, and the potential for drafting resolution documentation.

A fourth letter was sent by the Navy on November 10, 2016, indicating the use of the Draft EIS public meetings to fulfill the Section 106 requirements for public notification and consultation. The letter

provided information on the dates and times of the meetings. The NPS responded to this letter on January 3, 2017, noting its concern for the use of the 65 dB DNL contour to delineate the APE, as well as its concern for evaluating impacts to the cultural landscape. The SHPO responded to information presented in the Draft EIS on January 25, 2017. The SHPO noted its concern with the APE and the potential for adverse effects, especially as it pertains to long-term and cumulative effects of increased flight operations on the character and qualities of historic places and communities.

The Navy sent a fifth letter to the consulting parties on May 1, 2017. This letter provided information regarding the Navy's rationale for the use of the 65 dB DNL noise contour for the APE. The Navy also provided background information on historic flight operations. The letter contained five enclosures, including the location of NAS Whidbey Island and OLF Coupeville, a map of flight tracks to depict airfield operations, a depiction of the aggregate noise contour, a map showing the portions of the APE evaluated for potential direct effects, and a map showing the portions of the APE evaluated for potential indirect effects.

The Navy and the SHPO continued discussions regarding the APE. The Navy met with the SHPO on May 10, 2017, and received a letter of the same date. The letter notes the SHPO's disagreement with the definition of the APE and provides recommendations for the submittal of forms for when a survey is completed. The Navy provided a response on July 14, 2017, showing additional information on the use of the 65 dB DNL contour and its intention to incorporate the whole of Ebey's Landing National Historical Reserve. The SHPO response on July 14, 2017, provides concurrence with the methodology for identifying historic properties and offers recommendations to completing the task.

An additional letter was sent by the Navy to all consulting parties on July 19, 2017. It provided an update on the Navy's effort to identify historic properties and to offer another opportunity to provide comments. Five enclosures were provided. The first four included information noting known historic properties within the 65 dB DNL contour line, the historic buildings identified in the Ebey's Landing National Historical Reserve 2016 Inventory Update, known historic properties within the 2016 Inventory Update, and all listed historic properties in the NRHP. A bibliography also was included to help provide information on the historic context.

The Navy notified the ACHP, SHPO, and consulting parties on October 2, 2017, that the Navy was updating the noise analysis to incorporate changes to the Navy's training requirements and would consult on changes to the APE and inventory once the update was complete. The letter notified the various parties of the change in the scale and scope of the undertaking due to the inclusion of two new scenarios (Scenarios D and E), a decrease in the number of pilots required in each squadron, and the updated noise analysis.

A letter continuing the Section 106 consultation was provided to the ACHP, SHPO, and consulting parties on June 25, 2018. The letter noted the Navy's adverse effect finding for the Central Whidbey Island Historic District as a result of more frequent aircraft operations affecting certain landscape components of the district. Specifically, the Navy found that the increased frequentness of noise exposure would have an adverse indirect effect on five representative locations within the district. The Navy further requested comments on this finding. An attachment documenting the finding of effects determination was included as part of the correspondence.

The SHPO responded to the Navy's letter on June 27, 2018. The SHPO acknowledged the receipt of the materials and concurred with the Navy's determination of adverse effect. The SHPO noted its

anticipation of further consultation and the development of a MoA to address the adverse effect. The SHPO also requested correspondence or comments received from concerned tribes or other consulting parties.

The Navy is consulting with the Washington SHPO, the ACHP, tribes, and consulting parties regarding the MoA to mitigate adverse effects as part of its NHPA Section 106 consultation. Documentation of the correspondence with the SHPO and other consulting parties is provided in Appendix C.

The Navy began Section 106 consultation with the eight federally recognized tribes regarding the Proposed Action and its effects on historic properties at NAS Whidbey Island on October 10, 2014, with the Navy's invitation for government-to-government consultation (see Section 3.7.1.3).

The following tribes were contacted:

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

The Samish Indian Nation responded on October 28, 2014, indicating that the Samish Indian Nation was not interested in consulting for cultural resources at this time.

The Navy sent a second letter to the tribes on June 30, 2016. The letter provided information on the proposed definition of the APE, as well as enclosures identifying the NAS Whidbey Island site locations, Ault Field, the Seaplane Base, and the 2005 and 2013 Navy Noise Study DNL contours.

The Jamestown S'Klallam Tribe responded on August 1, 2016, indicating that with respect to cultural resources, the tribe has no comments regarding the EA-18G flight operations. The tribe requested future consultation on projects regarding renovation, demolition, and construction of facilities at NAS Whidbey Island.

The Navy sent a third letter to the tribes on August 31, 2016. This letter was intended to provide clarification of the Section 106 process. It included three enclosures, consisting of information on the process and strategy for the Section 106 process for the continuation and increase of Growler operations, a flow chart, and a copy of the implementing regulations for Section 106 codified at 36 CFR Part 800.

A fourth letter was sent by the Navy on November 10, 2016, indicating the use of the Draft EIS public meetings to fulfill the Section 106 requirements for public notification and consultation. The letter provided information on the dates and times of the meetings.

The Navy sent a fifth letter to the tribes on May 1, 2017. This letter provided information regarding the Navy's rationale for the use of the 65 dB DNL noise contour for the APE. The Navy also provided background information on historical flight operations. The letter contained five enclosures, including the location of NAS Whidbey Island and OLF Coupeville, a map of flight tracks to depict airfield

operations, a depiction of the aggregate noise contour, a map showing the portions of the APE evaluated for potential direct effects, and a map showing the portions of the APE evaluated for potential indirect effects.

An additional letter was sent by the Navy to all tribes on July 19, 2017. It provided an update on the Navy's effort to identify historic properties and to offer another opportunity to provide comments. Five enclosures were provided. The first four included information noting known historic properties within the 65 dB DNL contour line, the historic buildings identified in the Ebey's Landing National Historical Reserve 2016 Inventory Update, known historic properties within the 2016 Inventory Update, and all listed historic properties in the NRHP. A bibliography also was included to help provide information on the historic context.

The Navy notified the tribes on October 2, 2017, that it was updating the noise analysis to incorporate changes to the Navy's training requirements and would consult on changes to the APE and inventory once the update was complete. The letter notified the tribes of the change in the scale and scope of the undertaking due to the inclusion of two new scenarios (Scenarios D and E), a decrease in the number of pilots required in each squadron, and the updated noise analysis.

A letter continuing the Section 106 consultation was provided to the tribes on June 25, 2018. The letter noted the Navy's adverse effect finding for the Central Whidbey Island Historic District as a result of more frequent aircraft operations affecting certain landscape components of the district. Specifically, the Navy found that the increased frequentness of noise exposure would have an adverse indirect effect on five representative locations within the district. The Navy further indicated its assurance of confidentiality for any sensitive information and requested comments on this finding. An attachment documenting the finding of effects determination was included as part of the correspondence.

No other responses have been received to date from the tribes.

Documentation of the correspondence with the tribes is provided in Appendix C.

3.7 American Indian Traditional Resources

Protected tribal resources, as defined in DoDI 4710.02, DoD Interactions with Federally Recognized Tribes (DoD, 2006), are "those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by or reserved by or for Indian tribes through treaties, statutes, judicial decisions, or EOs, including tribal trust resources." Tribal trust resources are defined as "Indian lands or treaty rights to certain resources." These resources include plants, animals, and locations associated with hunting, fishing, and gathering activities for subsistence or ceremonial use. For the purposes of the analysis in this section, the term "traditional resources" will be used to encompass protected tribal resources.

The Navy has determined that the study area for American Indian traditional resources includes the area encompassed by: (1) the construction locations at Ault Field (see Figure 2.3-1), and (2) the 65 dB DNL noise contour areas for 2021 conditions (see Figure 3.2-3). Noise levels below 65 dB DNL are considered to be equivalent to background noise or conversational speech.[19] Within this study area, several types of

[19] The use of the 65 dB DNL is consistent with federal governance, including Airport Noise Compatibility Planning (14 CFR Part 150), which indicates that, in general, all land uses are considered to be compatible with noise levels less than 65 dB DNL.

traditional resources are present: within the 65 dB DNL noise contour areas, there are federally secured off-reservation fishing, usual and accustomed (U&A) grounds and stations for eight federally recognized tribes. There are no known traditional resources at the proposed construction areas at Ault Field as these sites are located on previously disturbed areas and on manmade structures.

American Indian properties of traditional cultural and religious importance, including TCPs (i.e., a specific site or district associated with traditional events, activities, or observances) are discussed in Section 3.6 (Cultural Resources).

3.7.1 Policy and Regulatory Setting

The Navy consults with federally recognized tribes on actions with the potential to significantly affect protected tribal resources, tribal rights, or American Indian lands. Seven tribes have federally secured off-reservation treaty fishing rights in the study area: the Jamestown S'Klallam Tribe, the Lummi Tribe of the Lummi Reservation, the Stillaguamish Tribe of Indians of Washington, the Suquamish Indian Tribe of the Port Madison Reservation, the Swinomish Indian Tribal Community, the Tulalip Tribes of Washington, and the Upper Skagit Indian Tribe. Additionally, while the Samish Indian Nation is a federally recognized tribe, it currently does not have adjudicated federally secured off-reservation treaty fishing rights in the study area.

3.7.1.1 DoD and Navy Policies Regarding Consultation

In October 1998, the DoD promulgated its American Indian and Alaska Native Policy, emphasizing the importance of respecting and consulting with tribal governments on a government-to-government basis (explanatory text was added on November 21, 1999). The policy requires an assessment, through consultation, of the effects of proposed DoD actions that may have the potential to significantly affect traditional resources (including traditional subsistence resources such as shellfish), tribal rights (such as access to adjudicated treaty fishing areas), and Indian lands before decisions are made by the agencies.

In 2005, the Navy updated its policy for consultation with federally recognized tribes. The Secretary of the Navy Instruction 11010.14A, *Department of the Navy Policy for Consultation with Federally Recognized Indian Tribes* (October 11, 2005), implements DoD policy within the Navy and encourages ongoing consultation and communications.

Commander, Navy Region Northwest Instruction 11010.14, *Policy for Consultation with Federally-Recognized American Indian and Alaska Native Tribes* (November 10, 2009), sets forth policy, procedures, and responsibilities for consultations with federally recognized tribes and Alaska Native tribes. The goal of the policy is to establish permanent government-to-government working relationships built upon respect, trust, and openness with tribal governments.

Under these policies, the Navy is required to consider tribal comments and concerns prior to making a final Navy decision on a proposed action. However, reaching formal agreement with a tribe or obtaining tribal approval prior to a Navy final decision is not required.

3.7.1.2 Laws, Executive Orders, and Memoranda Mandating Consultation

EOs and memoranda requiring consultation with tribes include the following:

- EO 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000). This EO requires that federal agencies consider tribal rights in the development of their regulatory policies and that they establish accountable processes for consultation. Policies that

have tribal implications are defined as those regulations, legislative comments, or proposed legislation and other policy statements or actions that have substantial direct effects on one or more tribes (EO 13175, 2000). President Clinton's statement on signing the EO (also dated November 6, 2006) indicates that the intent of the EO was to ensure not only that all federal agencies consult with tribes but that they also respect tribal sovereignty (Clinton, 2000).

- Presidential Memorandum dated November 5, 2009. This memorandum emphasizes federal agencies' need to comply with EO 13175 by requiring the submittal of plans for how consultation will be conducted.
- Presidential Memorandum dated April 29, 1994, Government-to-Government Relations with Native American Governments. This memorandum establishes that federal agencies should undertake activities affecting tribal rights or trust resources in a manner that is knowledgeable, sensitive, and respectful of tribal sovereignty. In this manner, it requests that federal agencies ensure a government-to-government relationship with federally recognized tribal governments (Clinton, 1994).

Other laws and EOs requiring consultation with tribes include the NHPA, as amended in 2006; the American Indian Religious Freedom Act of 1978; the Archaeological Resources Protection Act of 1979; the Native American Graves Protection and Repatriation Act of 1990; and EO 13007, Indian Sacred Sites, all of which are discussed in Section 3.6 (Cultural Resources).

3.7.1.3 Government-to-Government Consultation

In accordance with DoD policies and Navy instructions, the Navy invites government-to-government consultation with federally recognized tribes when proposed actions may have the potential to significantly affect protected tribal resources, tribal rights, or Indian lands.

In October 2014, the Commanding Officer of NAS Whidbey Island invited the following eight federally recognized tribes with traditional resources in the study area to evaluate the Navy's Proposed Action and to consider whether there may be a potential for significant impacts to tribal rights and protected tribal resources:

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

The Navy sent a second letter to the eight federally recognized tribes on November 30, 2016.

Government-to-government consultation on this Proposed Action was requested by the Swinomish Indian Tribal Community on December 13, 2016. The Navy responded to the Swinomish Indian Tribal Community via email on December 20, 2016, and via letter on December 21, 2016. Additional correspondence occurred in June of 2017. The Swinomish Indian Tribal Community subsequently withdrew its request on September 27, 2017. Appendix C includes a record of this correspondence. No

other tribes have requested or initiated government-to-government consultation. The Navy will consult with all tribes regarding their concerns for tribal resources related to the Proposed Action.

For informational purposes, the Navy also sent a letter on November 30, 2016, to the following tribes (noted in alphabetical order):

- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Chehalis Reservation
- Confederated Tribes of the Colville Reservation
- Cowlitz Indian Tribe
- Hoh Indian Tribe
- Kalispel Tribe
- Lower Elwha Klallam Tribe
- Makah Tribe
- Muckleshoot Indian Tribe
- Nisqually Indian Tribe
- Nooksack Indian Tribe
- Port Gamble S'Klallam Tribe
- Puyallup Tribe
- Quileute Nation
- Quinault Nation
- Sauk-Suiattle Indian Tribe
- Shoalwater Bay Tribe
- Skokomish Indian Tribe
- Snoqualmie Tribe
- Spokane Tribe of Indians
- Squaxin Island Tribe

This letter provided information regarding the release of the Draft EIS. It included a short description of the Proposed Action and noted where additional information could be found. Appendix C includes a record of this correspondence.

3.7.2 Affected Environment

The history of Native Americans in Puget Sound and their use of the vicinity of the NAS Whidbey Island complex are presented in Section 3.6 (Cultural Resources).

3.7.3 Tribal Treaty Rights and Federal Trust Responsibilities; Reservation of Rights by American Indians

Treaties with tribes are considered government-to-government agreements and preempt state laws. Tribal treaty rights are not affected by later federal laws (unless Congress clearly abrogates treaty rights). Treaty language securing fishing and hunting rights is not a "grant of rights (from the federal government to the Indians), but a grant of rights from them—a reservation of those not granted"

(*United States v. Winans,* 25 S. Ct. 662, 1905). This means that the tribes retain rights not specifically surrendered to the U.S.

Furthermore, the U.S. has a trust or special relationship with tribes. This trust relationship provides the basis for legislation, treaties, and EOs that clarify the unique rights or privileges of American Indians. The trust responsibility has been interpreted to require federal agencies to carry out their activities in a manner that is protective of tribal treaty rights. EO 13175, Consultation and Coordination with Indian Tribal Governments, affirms the trust responsibility of the U.S. and directs agencies to consult with tribes and respect tribal sovereignty when taking actions affecting such rights. The Navy complies with this trust responsibility by complying with laws and regulations, such as NEPA and the NHPA.

3.7.3.1 Treaties of Point No Point and Point Elliot

In 1855, Territorial Governor and Superintendent of Indian Affairs Isaac I. Stevens negotiated treaties (commonly referred to as the "Stevens Treaties") with 24 of the 29 modern-day federally recognized tribes located in Washington State. The treaties included language pronouncing that:

> "[T] he right of taking fish at usual and accustomed (U&A) grounds and stations is further secured to said Indians in common with all citizens of the Territory . . . together with the privilege of hunting and gathering roots and berries on open and unclaimed lands."

The Point Elliot Treaty was signed on January 22, 1855. The present-day tribes who are signatory to this treaty include, among other tribes, the Lummi Tribe of the Lummi Reservation, the Samish Indian Nation, the Stillaguamish Tribe of Indians of Washington, the Swinomish Indian Tribal Community, the Suquamish Indian Tribe of the Port Madison Reservation, the Tulalip Tribes of Washington, and the Upper Skagit Indian Tribe.

The Point No Point Treaty was signed on January 26, 1855. This treaty provided for the establishment of the villages of S'Klallams, including the present day Jamestown S'Klallam Tribe. The terms of this treaty were similar to those in the Point Elliot Treaty and other Stevens Treaties and secured off-reservation fishing rights.

United States v. Washington State

Known as the "Boldt Decision," after the presiding U.S. District Court Judge George Boldt, *United States v. Washington* (384 F. Supp. 312 [W.D. Wash. 1974], aff'd, 520 F.2d 676 [9th Cir. 1975]) affirmed the rights of federally recognized Washington tribes (i.e., those that were party to the various treaties) to harvest fish in their U&A places, identified the U&A locations of various tribes, and also allocated 50 percent of the salmon and steelhead fishery to treaty tribes.

The decision and subsequent court decisions established that the following tribes have U&A fishing grounds and stations located in the vicinity of the study area.

Vicinity of Ault Field (waters and shoreline northwest of Ault Field):

- Jamestown S'Klallam Tribe
- Lummi Tribe of the Lummi Reservation
- Samish Indian Nation
- Suquamish Indian Tribe of the Port Madison Reservation

- Swinomish Indian Tribal Community
- Tulalip Tribes of Washington

Vicinity of the 65 dB DNL noise contour areas:

- The six tribes listed above for the vicinity of Ault Field
- Stillaguamish Tribe of Indians of Washington
- Upper Skagit Indian Tribe

3.7.3.2 American Indian Access and Use at NAS Whidbey Island

Within the study area, there is no tribal access to Navy controlled property to exercise off-reservation reserved rights for hunting. Ault Field, the Seaplane Base, and OLF Coupeville are military installations and are not open and unclaimed land.[20]

At the proposed construction sites at Ault Field (See Figure 2.3-1), there are no known traditional resources because these sites are located on previously disturbed areas and on manmade structures. Tribes do not currently access or use the vicinity of the construction sites.

Within the 65 dB DNL noise contour areas, Navy-managed land and waters exist (see Figures 3.2-3 to 3.2-5) at Ault Field, the Seaplane Base, and OLF Coupeville.

In the co-use waters west and north of Ault Field, five tribes exercise treaty fishing activities waters: the Jamestown S'Klallam Tribe, the Lummi Tribe of the Lummi Reservation, the Suquamish Indian Tribe of the Port Madison Reservation, the Swinomish Indian Tribal Community, and the Tulalip Tribes of Washington. Of these tribes, the Suquamish Tribe has a 2013 Memorandum of Agreement with the Navy that provides safe and coordinated access to waters located within the designated Surface Danger Zone (established and described in 33 CFR Part 334) that extends from the NAS Whidbey Island Small Arms Range. Tribes do not currently have access to the shorelines west of Ault Field for treaty fishing due to safety and security requirements associated with Navy flight operations. These same five tribes have treaty fishing rights in the co-use waters east of Ault field in Dugualla Bay.

Tribes do not currently have access to the shorelines at the Seaplane Base due to safety and security requirements associated with Navy operations. In the co-use waters of Crescent Harbor, four tribes exercise treaty fishing (including shellfishing) activities: the Stillaguamish Tribe of Indians of Washington, Swinomish Indian Tribal Community, Tulalip Tribes of Washington, and the Upper Skagit Indian Tribe.

Tribes do not currently have access to or use of Navy land at OLF Coupeville due to safety and security requirements associated with Navy flight operations.

[20] The 1855 Treaty of Point No Point preserves the "privilege of hunting and gathering roots and berries on open and unclaimed lands" (Navy 2010c). At the time of the treaty, the term "open and unclaimed lands" applied to public domain lands held by the United States that had not been fenced or claimed through a land settlement act. Today, "open and unclaimed lands" applies to lands remaining in the public domain (for the purposes of hunting, gathering foods, and grazing livestock or trapping). Public land used in a manner inconsistent with hunting, however, may not be "open and unclaimed" (WDFW, n.d.).

3.8 Biological Resources

Biological resources include living, native, or naturalized animal species and the habitats within which they occur. Animal species are referred to generally as wildlife. Habitat can be defined as the resources and conditions present in an area that result in occupancy by organisms (Hall, Krausman, and Morrison, 1997). Although the existence and preservation of biological resources are intrinsically valuable, these resources also provide aesthetic, recreational, and socioeconomic values to society. This analysis focuses on species or vegetation types that are important to the function of the ecosystem, of special societal importance, or protected under federal or state law or statute.

Biological resources are divided into two major categories in this EIS: terrestrial wildlife and marine wildlife. Special status species are those listed by and protected under the federal, state, and county regulations discussed below in Section 3.8.1, Biological Resources, Regulatory Setting.

3.8.1 Biological Resources, Regulatory Setting

This section summarizes the federal and state regulations applicable to the wildlife species that could be affected by the Proposed Action. Analyses, conclusions, and consultations (as applicable) pursuant to each of the federal regulations are provided in Section 4.8.

3.8.1.1 Federal Regulations

3.8.1.1.1 Endangered Species Act

The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.), provides a program for the conservation of threatened and endangered species of animals and plants and the habitats in which they are found. Under the ESA, species may be listed as either endangered or threatened based upon the species' biological status and threats to their existence (USFWS, 2013a). Once listed under the ESA, threatened and endangered species and designated critical habitat are protected because the ESA prohibits the take of any listed species except under federal permit. As defined in the ESA, "take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."

Section 7 of the ESA directs federal action proponents to consult with the USFWS and/or the National Marine Fisheries Service (NMFS) when their activities "may affect" a species listed pursuant to the ESA or its designated or proposed critical habitat. Critical habitat is not designated on any areas owned, controlled, or designated for use by the DoD where an approved INRMP, as determined by the Department of Interior or Department of Commerce Secretary, provides a benefit to the species subject to critical habitat designation. NAS Whidbey Island has an approved INRMP (NAS Whidbey Island, 2013a), and, pursuant to the Sikes Act (16 U.S.C. 670a-670o), no critical habitat has been designated on the installation. However, critical habitat has been designated within the region (i.e., the study area) and is described in subsequent sections.

3.8.1.1.2 Migratory Bird Treaty Act and Executive Order 13186

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations (USFWS, 2015a). Per the MBTA, "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10.12). Migratory birds, as defined by the MBTA, include nearly all species (1,026 in total) that may occur in the U.S., with the exceptions of some upland game birds (e.g., California quail [*Callipepla*

californica]) and non-native species (e.g., European starling [*Sturnus vulgaris*]) that occur in the U.S. by way of human introduction (USFWS, 2013b). The MBTA does not explicitly include provisions for permits to authorize the incidental take of migratory birds that results from an otherwise legal activity but is not the purpose of the activity. Instead, the USFWS encourages individuals, companies, industries, and agencies to use best practices established to help reduce and avoid the unpermitted take of MBTA-protected species.

EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (January 10, 2001), requires that all federal agencies undertaking activities that may negatively impact migratory birds take a prescribed set of actions to further implement the MBTA. EO 13186 directs federal agencies to develop a Memorandum of Understanding with the USFWS that promotes the conservation of migratory birds. On September 5, 2014, the DoD signed a 5-year Memorandum of Understanding with the USFWS. In accordance with the Memorandum of Understanding, and to the extent possible as per law and budgetary considerations, EO 13186 encourages agencies to implement a series of conservation measures aimed at reinforcing and strengthening the MBTA.

Section 315 of the 2003 National Defense Authorization Act and the Military Readiness Rule (50 CFR Part 21) gave the Secretary of the Interior authority to prescribe regulations to exempt the armed forces from the incidental taking of migratory birds during authorized military readiness activities. Congress defined military readiness activities as all training and operations of the U.S. armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. The Final Rule authorizing the DoD incidental take of migratory birds during authorized military readiness activities requires that the armed forces confer with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate adverse effects of the Proposed Action if the action will have a significant negative effect on the sustainability of a population of a migratory bird species. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem.

3.8.1.1.3 Bald and Golden Eagle Protection Act

Bald eagles and golden eagles (*Aquila chrysaetos*) are protected by the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c). The BGEPA prohibits anyone without a federal permit to “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle . . . [or any golden eagle], alive or dead, or any part, nest, or egg thereof.” “Take” is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." “Disturb” is further defined as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle, a decrease in productivity by substantially interfering with the eagle’s normal breeding, feeding or sheltering behavior, or nest abandonment by substantially interfering with the eagle’s normal breeding, feeding or sheltering behavior.” In addition to immediate impacts, this definition also covers “impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle’s return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.” Under the BGEPA, a federal permit may be issued to authorize specific activities including the take, possession, and transportation of specimens for scientific or

exhibition purposes, for the religious purposes of Indian tribes, or when a take is necessary to protect wildlife or agriculture in a particular area (USFWS, 2012).

3.8.1.1.4 Marine Mammal Protection Act

All marine mammals are protected under the provisions of the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C Chapter 31). Marine mammals include cetaceans (whales, dolphins, and porpoises), pinnipeds (seals, sea lions, and walruses [*Odobenus rosmarus*]), manatees (*Trichechus* spp.), dugongs (*Dugong dugon*), marine otters (*Lutra felina*) and sea otters (*Enhydra lutris*), and polar bears (*Ursus maritimus*). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. “Take” is defined as “to hunt, harass, capture, or kill” any marine mammal or attempt to do so. The NMFS administers the MMPA in protecting whales, dolphins, porpoises, seals, and sea lions, while the USFWS protects walruses, manatees, dugongs, otters, and polar bears (NMFS, 2014a).

The National Defense Authorization Act of 2004 amended definitions in the MMPA related to “military readiness activity.” This is defined as “all training and operations of the Armed Forces that relate to combat” and “the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use.” For military readiness activities, the relevant definition of harassment is any act that:

- injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (“Level A harassment”), or
- disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered (“Level B harassment”)

3.8.1.2 State Regulations

3.8.1.2.1 Species of Concern

The Washington Department of Fish and Wildlife (WDFW) administers the protection of wildlife species listed by the State of Washington as endangered, threatened, and sensitive. Refer to Special Status Terrestrial Wildlife below for a discussion of species protected by state regulations. Washington’s listing procedures are defined in WAC 232-12-297, endangered species are designated under WAC 232-12-014, and threatened and sensitive species are designated under WAC 232-12-011 (WDFW, 2013). State-listed species’ statuses are defined as follows:

- **Endangered**
  species native to the State of Washington that are seriously threatened with extinction throughout all or a significant portion of their range within the state

- **Threatened**
  species native to the State of Washington that are likely to become an endangered species within the foreseeable future throughout a significant portion of their range within the state without cooperative management or removal of threats
- **Sensitive**
  species native to the State of Washington that are vulnerable or declining and are likely to become endangered or threatened in a significant portion of their range within the state without cooperative management or removal of threats (WDFW, 2013)

3.8.1.3 Local Regulations

3.8.1.3.1 Island County Critical Areas Ordinance

The Island County Critical Areas Ordinance (17.02) provides for the protection of habitat for deserving flora and fauna, as recognized by Island County. Protected species include those listed by the federal government or the State of Washington as endangered, threatened, or sensitive. Protected species also include species of local importance, which are not listed by federal or state regulation, but are designated by Island County for their uniqueness in the county and worthiness of protection.

3.8.1.3.2 Skagit County Critical Areas Ordinance

The Skagit County Critical Areas Ordinance (14.24) provides for the protection of habitat considered to be critical areas, including Fish and Wildlife Habitat Conservation Areas (FWHCAs) (SCC 14.24.500). The purpose of FWHCAs is to protect fish and wildlife populations and their associated habitats and provide special consideration on conservation or protection measures necessary to preserve or enhance anadromous species. The Skagit Wildlife Area was also designated under this ordinance.

3.8.1.3.3 San Juan County Critical Areas Ordinance

The San Juan County Critical Areas Ordinance (18.35) provides for protection of function and values of habitat, including FWHCAs (Ordinance 1-2015 Section 1). FWHCAs in San Juan County are described in Ordinance 18.35.119, with map information provided in Ordinance 18.35.120. Critical areas include but are not limited to areas in which federal and state-listed species and species of local importance have primary association; shellfish areas; kelp and eelgrass beds; herring, smelt, sand lance, and other forage-fish spawning areas; and habitats of local importance. The study area overlap with San Juan County is limited to offshore waters of Puget Sound, with the exception of the 113-acre James Island Marine State Park and other small, rocky islands.

3.8.2 Biological Resources, Affected Environment

The following discussions provide a description of the existing conditions for terrestrial wildlife and marine wildlife in the Proposed Action's biological resources study area.

The study area for the affected environment and the analyses of effects on biological resources associated with the action alternatives are presented in Figure 3.8-1. The study area includes all areas where biological resources may be affected directly or indirectly by the Proposed Action, including those that may occur beyond the immediate area involved in the Proposed Action (see Chapter 4). There are two types of activities under the Proposed Action that would affect biological resources: construction at Ault Field and air operations at the NAS Whidbey Island complex. Under the Proposed Action, the greatest potential for impacts on biological resources would occur during aircraft operations, when noise and collision impacts could occur. Research shows that some animals begin to respond to aircraft noise at as little as 60 dB (Black et al., 1984). Dolbeer et al. (2014) found that most wildlife-aircraft collisions (hereafter referred to as "strikes") occur below an altitude of 3,500 feet. Based on these findings, the Navy defined the study area as all areas where modeled average noise levels under the Proposed Action would be equal to or greater than 60 dB at ground/surface level and all areas where aircraft operations would occur at or below an altitude of 3,500 feet (Figure 3.8-1).

Figure 3.8-1
Biological Resource Study Area
Whidbey Island, Island County, WA

3.8.2.1 Terrestrial Wildlife and Vegetation

Terrestrial wildlife includes all vegetation, invertebrates, reptiles, amphibians, birds, and mammals that are associated primarily with terrestrial habitats. Anadromous and marine fish species are included in the marine section of this chapter. This section summarizes the terrestrial wildlife communities that inhabit the study area, with a more detailed discussion of the special status species and habitats.

3.8.2.1.1 Vegetation

Non-native grassland and landscaped vegetation occupy the proposed construction areas at Ault Field. This vegetation is regularly maintained as part of the airfield management program. No unique or regionally significant vegetation communities occur in these areas, and all areas are previously disturbed.

3.8.2.1.2 Reptiles and Amphibians

Within the study area, there are six reptile and nine amphibian species that potentially occur (Table 3.8-1) (NAVFAC, 2015). The American bullfrog (*Lithobates catesbeianus*) is a non-native species (Washington Herp Atlas, 2005, 2013; NatureServe, 2015). The NAS Whidbey Island complex provides potentially suitable habitat for all reptiles and amphibians found in the study area (Table 3.8-1) (NAS Whidbey Island, 2013a). Refer to Special Status Terrestrial Wildlife below for a discussion of reptile and amphibian species protected by state and federal regulations.

Table 3.8-1 Reptiles and Amphibians Potentially Occurring within the Study Area

Common Name	*Scientific Name*
Reptiles	
Common garter snake	*Thamnophis sirtalis*
Northern alligator lizard	*Elgaria coerulea*
Northwestern garter snake	*Thamnophis ordinoides*
Terrestrial garter snake	*Thamnophis elegans*
Western fence lizard	*Sceloporus occidentalis*
Western pond turtle	*Clemmys (Actinemys) marmorata*
Amphibians	
American bullfrog	*Lithobates catesbeianus*
Ensatina	*Ensatina eschscholtzii*
Long-toed salamander	*Ambystoma macrodactylum*
Northern Pacific chorus frog	*Pseudacris regilla*
Northern red-legged frog	*Rana aurora*
Northwestern salamander	*Ambystoma gracile*
Rough-skinned newt	*Taricha granulosa*
Western redback salamander	*Plethodon vehiculum*
Western toad	*Anaxyrus boreas*

Source: NAVFAC, 2015

3.8.2.1.3 Birds

Most bird species that occur in the study area are protected under the MBTA and are discussed in Section 3.8.2.2., Special Status Terrestrial Wildlife, below. However, six common, year-round resident species are not protected by the MBTA and may occur in the study area. Five of the six species are not native to the U.S., including the ring-necked pheasant (*Phasianus colchicus*), rock pigeon (*Columba livia*),

Eurasian collared-dove (*Streptopelia decaocto*), European starling, and house sparrow (*Passer domesticus*) (NAS Whidbey Island, 2013a; eBird, 2015a). The California quail, a game species, is the only species native to the U.S. that occurs in the study area and that is not protected under the MBTA.

3.8.2.1.4 Mammals

Within the study area, 36 species of terrestrial mammals potentially occur (NAS Whidbey Island, 2013a; Burke Museum of Natural History and Culture, 2013). Terrestrial mammal species include six non-native species. Large mammals that regularly occur are the Columbian black-tailed deer (*Odocoileus hemionus columbianus*) and the coyote (*Canis latrans*), which occur in the mixed forest, alder forest, and freshwater marsh habitat types, as well as in grasslands. The eastern cottontail (*Sylvilagus floridanus*), European rabbit (*Oryctolagus cuniculus*), river otter (*Lontra canadensis*), mink (*Mustella vison*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), Douglas squirrel (*Tamiasciurus douglasii*), Townsend's vole (*Microtus townsendii*), masked shrew (*Sorex cinereus*), and deer mouse (*Peromyscus maniculatus*) also are among the most commonly occurring mammals within the study area. Twenty-five percent of the mammal species (nine species) that occur within the study area are bats. Refer to Section 3.8.2.2., Special Status Terrestrial Species, below for a discussion of species protected by state and federal regulations.

3.8.2.2 Special Status Terrestrial Species

3.8.2.2.1 Federal Threatened and Endangered Terrestrial Species

The USFWS Information for Planning and Conservation (IPaC) tool was used to identify all terrestrial species protected under the ESA that could potentially occur in the study area (USFWS, 2017). Nine terrestrial wildlife species were identified by IPaC (Table 3.8-2) and are discussed individually below.

Table 3.8-2 Federally Listed[21] Terrestrial Species and Critical Habitats Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Federal Status*	*Critical Habitat Present?*	*Occurrence*
Plants				
Golden paintbrush	*Castilleja levisecta*	Threatened	No	Highly Unlikely: species occurs within study area, but no suitable habitat exists within the proposed construction areas, and there would be no impact to species.
Invertebrates				
Island marble butterfly	*Euchloe ausonides insulanus*	Candidate	No	Highly Unlikely: species is currently only known from one population on San Juan Island, outside of the study area.

[21] Federally listed species are those designated as threatened, endangered, or candidate species by the ESA. These species were determined based on the USFWS IPaC tool (USFWS, 2017).

Table 3.8-2 Federally Listed[21] Terrestrial Species and Critical Habitats Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Federal Status*	*Critical Habitat Present?*	*Occurrence*
Taylor's checkerspot butterfly	*Euphydryas editha taylori*	Endangered	Yes	Highly Unlikely: species believed to be extirpated from Island County (WDFW, 2013); however, unoccupied critical habitat has been designated on Whidbey Island.
Reptiles and Amphibians				
Oregon spotted frog	*Rana pretiosa*	Threatened	No	Highly Unlikely: no known occurrences within study area. Closest extant population and critical habitat are more than 10 miles to the northwest, on mainland Washington outside the study area.
Birds				
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	No	Confirmed: known to occur year-round in the marine waters within the study area.
Northern spotted owl	*Strix occidentalis caurina*	Threatened	No	Highly Unlikely: range not known within the study area.
Streaked horned lark	*Eremophila alpestris strigata*	Threatened	No	Highly Unlikely: not known within the study area.
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	No	Highly Unlikely: No longer breeds in Washington. Only four individuals have been recorded in western Washington since 1950.
Mammals				
North American wolverine	*Gulo gulo luscus*	Proposed Threatened	No	Highly Unlikely: there are no records of this species' occurring within the study area, and no suitable habitat is present.

Sources: USFWS, 2017; WDFW, 2015; Hallock, 2013

3.8.2.2.1.1 Golden Paintbrush

The golden paintbrush (*Castilleja levisecta*) was listed as threatened under the ESA in 1997. The species inhabits generally flat, upland prairies on soils derived from glacial origins. Low, deciduous shrubs are commonly present as small to large thickets (USFWS, 2015b).

Historically, golden paintbrush was reported in more than 30 sites in the Puget Trough of British Columbia and Washington and the Willamette Valley in Oregon. Eleven known populations remain, including two in British Columbia and nine in Washington. Five populations of golden paintbrush occur on the northern half of Whidbey Island (USFWS, 2007). One known population of golden paintbrush occurs on NAS Whidbey Island at Forbes Point on the Seaplane Base, approximately 4 miles southeast of Ault Field (NAS Whidbey Island, 2013a). The species has not been documented at Ault Field or OLF Coupeville. There is no designated critical habitat for this species.

Furthermore, no suitable habitat to support this species occurs within the proposed construction areas. Therefore, there would be no measurable impacts to vegetation or the golden paintbrush specifically, and they will not be discussed in Chapter 4.

3.8.2.2.1.2 Taylor's Checkerspot Butterfly

The Taylor's checkerspot butterfly (*Euphydryas editha taylori*), a subspecies of Edith's checkerspot butterfly (*Euphydryas editha*), was listed as endangered under the ESA in 2013 (USFWS, 2013c). This subspecies historically occurred in grasslands throughout the San Juan Islands and Puget Trough, but only eight populations were reported in Washington in 2016 (USFWS, 2013c; WDFW, 2013; Potter, 2016). The species is believed extirpated from the study area; no Taylor's checkerspot butterflies have been found within counties inside the study area since 2009 (WDFW, 2013; Potter, 2016). Critical habitat has been designated within the study area, including on Whidbey Island; however, it is unoccupied (Figure 3.8-2; USFWS, 2013c; USFWS, 2017). There is no designated critical habitat within the NAS Whidbey Island complex; the nearest critical habitat to the proposed construction site at Ault Field is situated approximately 1.5 miles north of Ault Field (USFWS, 2017). Critical habitat also occurs in two additional locations within the study area, one about 0.25 mile northeast of OLF Coupeville and another along the coast, due west of OLF Coupeville. For the Taylor's checkerspot butterfly, critical habitat (USFWS final rule 78 FR 61505) was not designated on the NAS Whidbey Island complex because the primary constituent elements were not present there. Given that the species is believed to be extirpated from the study area, critical habitat within the study area is unoccupied, and designated critical habitat does not occur on the NAS Whidbey Island complex near the proposed construction, the Proposed Action would have no effect on this subspecies and would otherwise not affect critical habitat. Therefore, the Taylor's checkerspot butterfly will not be discussed in Chapter 4.

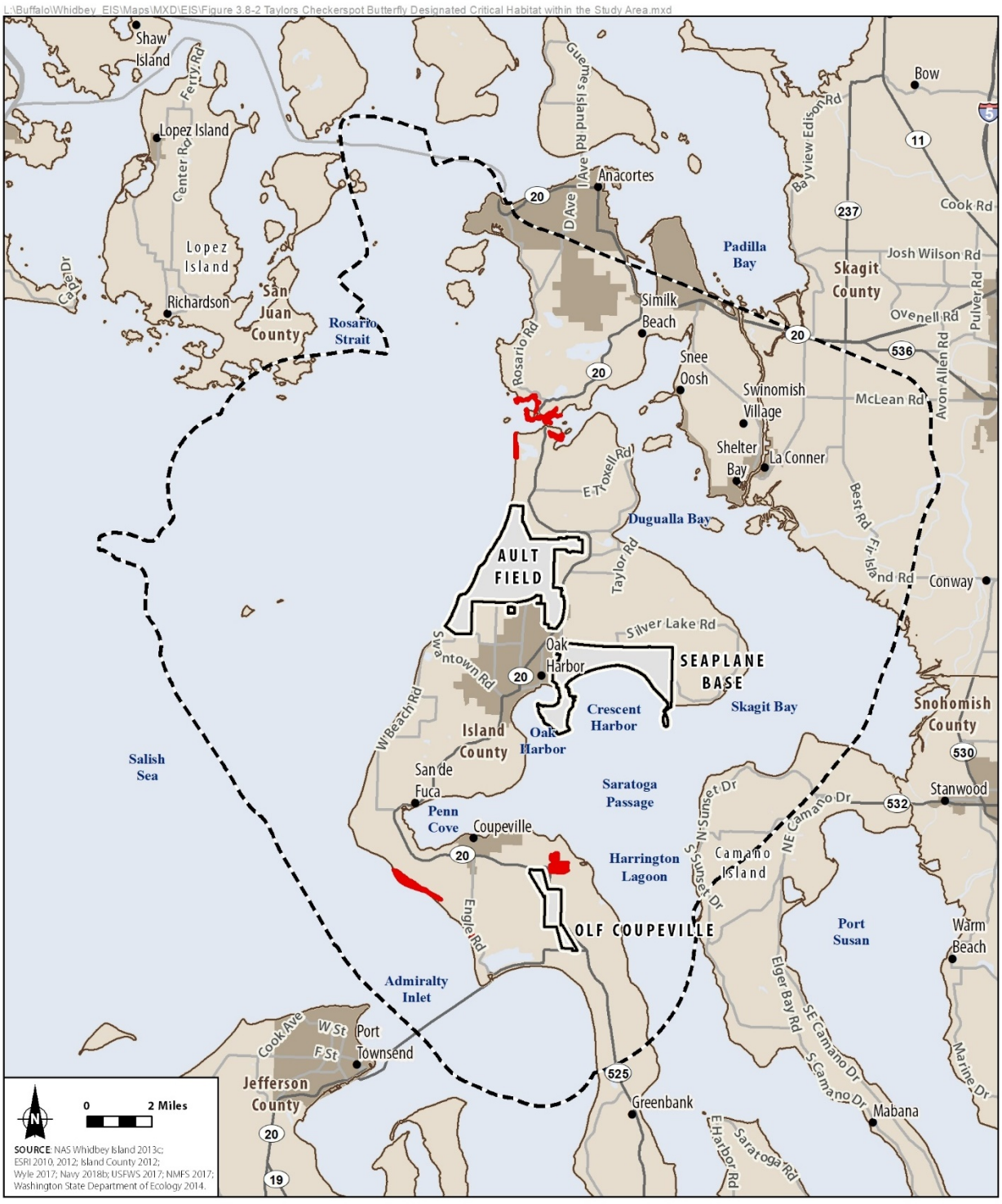


Figure 3.8-2
Taylor's Checkerspot Butterfly Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

3.8.2.2.1.3 Marbled Murrelet

The USFWS listed the Washington, Oregon, and California population of the marbled murrelet (*Brachyramphus marmoratus*) as threatened in 1992 (USFWS, 1992). There are currently about 3.7 million acres of designated critical habitat for the Washington, Oregon, and California population of the marbled murrelet (USFWS, 2016b). The nearest marbled murrelet designated critical habitat occurs approximately 15 miles to the southwest of the furthest extent of the study area (USFWS, 2016b).

Marbled murrelets breed from Alaska south along the Pacific Coast to central California (Santa Cruz County) (Nelson, 1997; WDFW, 2013). Their winter range largely overlaps their summer range, as marbled murrelets exhibit limited seasonal movement, but they may inhabit nearshore waters as far south as northern Baja, Mexico, in winter (Nelson, 1997; eBird, 2015b). Marbled murrelets are seabirds that nest on large branches or other suitable, large platforms in mature or old growth conifers (Hamer and Nelson, 1995a; Hamer, 1995; WDFW, 2013). Key nesting habitat components in Washington include the number of potential nest platforms, percent moss on dominant trees (i.e., those greater than or equal to 32 inches in diameter), percent slope, density of dominant trees, and mean diameter of western hemlock (Hamer, 1995; Nelson, 1997). Marbled murrelet nests have been found primarily in mature and old-growth habitat and, in a few cases in Oregon, in younger (60- to 80-year-old) forests that have trees with dwarf mistletoe or other deformations or structures that provide a nest platform (Nelson, 1997; Nelson and Wilson, 2002). Hamer (1995) also found that the presence of marbled murrelets decreased with increasing stand elevation, distance inland, lichen cover, and canopy cover (Hamer, 1995). The species shows high fidelity to nesting areas and is faithful to nest trees (Nelson, 1997).

Marbled murrelets do not build nests but rather lay one egg on moss or duff on branches or platforms (Nelson, 1997). Hamer and Nelson (1995b) estimated that egg laying and incubation occur from late April to late July in Washington (Hamer and Nelson, 1995b). Both adults share responsibility for incubation, which lasts 28 to 30 days, with one adult remaining at the nest while the other flies to marine areas to forage (Nelson, 1997; WDFW, 2013). The adults typically exchange incubation/foraging duties every 24 hours, usually prior to official sunrise, but timing varies due to weather and latitude (Nelson, 1997).

During the breeding season (April 1 to September 23), marbled murrelets prey on small schooling fish underwater in nearshore and protected coastal waters (Nelson, 1997; Livezey and Flotlin, 2012; WDFW, 2013). They pursue prey underwater, and that prey more commonly includes the Pacific sand lance (*Ammodytes hexapterus*), northern anchovy (*Engraulis mordax*), Pacific herring (*Clupea pallasii*), and capelin (*Mallotus villosus*). Marbled murrelets often forage within 3 miles of shore, usually closer on exposed outer coasts, and generally prefer shallow waters less than 200 feet deep (Nelson, 1997). The availability of prey contributes to the locations of at-sea foraging hotspots, but hotspots are primarily associated with proximity to suitable inland nesting habitat (Raphael et al., 2015). They return to known feeding sites and move into and out of them primarily between dawn and mid-morning. Nest sites may be quite distant from marine foraging areas, with nesting behavior having been recorded as far as 55 miles inland in Washington (WDFW, 2013).

Adults brood their chick for only 1 to 2 days after hatching, but both adults feed their chick until it fledges (i.e., leaves the nest) (Nelson and Hamer, 1995; Nelson, 1997). Chicks are fed one to eight times daily, typically around sunrise, midday, and sunset. Chicks fledge between 27 and 40 days after hatching, departing at dusk and presumably flying directly to the ocean. Parents do not continue to care for young after their departure from the nest (Nelson, 1997).

During non-breeding periods, marbled murrelets are typically found in stratified, nearshore waters similar to their summer foraging areas (Nelson, 1997). Seasonal migrations are generally limited to small-scale movements from outer coastal areas to protected waters or south from breeding areas. Movements may follow prey availability throughout the winter. Marine environments change seasonally, and marbled murrelets are opportunistic foragers, so their diets differ between non-breeding periods and the breeding season (Burkett, 1995). Small schooling fish are still a key part of their diet, but they also consume marine invertebrates like krill, mysids, and amphipods (Burkett, 1995; Nelson, 1997). Marbled murrelets spend most of their time at sea foraging or loafing (e.g., resting and preening) (Nelson, 1997).

Some marbled murrelets, presumably local breeders, also use forested habitats during the winter (Naslund, 1993; Nelson, 1997). They may be making trips to find nesting sites or to maintain sites, territories, or pair bonds. Forest site attendance during the winter is variable but is less than during the breeding season (Nelson, 1997). Sanzenbacher et al. (2014) found that passage rates between marine areas and forested nesting areas were 11 percent to 47 percent lower in winter than in summer at three sites in northern California. Flights below the tree canopy are rare during winter visits (Nelson, 1997).

Marbled murrelets fly at speeds of 25 to 100 miles per hour (mph) at altitudes that may exceed 3,000 feet (Nelson, 1997). Stumpf et al. (2011) reported the mean flight height of marbled murrelets on the Olympic Peninsula in Washington to be approximately 800 feet AGL, while ranging from 200 to more than 2,000 feet AGL. In the study, 50 percent of marbled murrelets flew between 643 and 938 feet AGL over inland habitats. Sanzenbacher et al. (2014) found that flight heights vary greatly between coastal areas and inland areas. Mean flight heights were nearly three times higher inland. Their flight paths from marine foraging sites to nest sites consistently follow ridges and river corridors (Nelson, 1997).

The Washington, Oregon, and California marbled murrelet population is split into six monitoring areas, or conservation zones, from the Canadian border to approximately San Francisco Bay. Two of these zones are in Washington: Conservation Zone 1, which includes the Strait of Juan de Fuca, Hood Canal, and the San Juan Islands; and Conservation Zone 2, which includes the outer Washington coast (Lance and Pearson, 2015). The Washington, Oregon, and California breeding season population was most recently estimated at 24,100 individuals in 2015[22]. The population trended downward between 2001 and 2015 by 0.13 percent annually. In Washington, the estimated 2015 breeding season population was 7,494 individuals. The annual rate of decline in Washington between 2001 and 2015 was -4.40 percent. The study area lies within Conservation Zone 1, which had an estimated 2016 population of 4,614 individuals. The annual rate of decline in Conservation Zone 1 between 2001 and 2016 was -4.90 percent (Lynch et al., 2017).

[22] The Northwest Forest Plan Effectiveness Monitoring Program is now only collecting a complete sampling data set every other year, so rangewide population and trend information will no longer be available on an annual basis as in prior years.

The WDFW began surveying at-sea marbled murrelets in the state outside of the breeding season (September to April) in 2012. The most recently reported study results (September 2014 to April 2015) estimated 1,384 (95-percent confidence interval (CI) = 904 – 2,117) marbled murrelets in their Puget Sound study strata. The most populated survey stratum included the nearshore waters west of Whidbey Island, with an estimated 990 birds (95-percent CI = 566 – 1,733) in 2014/2015. The second-most-populated survey stratum included the nearshore waters east of Whidbey Island, with an estimated 263 birds (95-percent CI = 165 – 421) in 2014/2015 (Pearson and Lance, 2014).

Around Ault Field and OLF Coupeville, population density from 2001 through 2012 was estimated to be from less than 2.6 to 2.6–7.8 birds per square mile (Falxa et al., 2013). Marbled murrelets are found in the highest densities in the nearshore waters of the San Juan Islands and Rosario Strait, both located to the northwest and outside of the action area; the Strait of Juan de Fuca, west of the action area; Admiralty Inlet, bordering Whidbey Island to the southwest; and Hood Canal, located to the southwest of Admiralty Inlet and outside of the study area (USFWS, 2016c).

Marbled murrelet nesting has not been documented in Island County (Opperman et al., 2006; WDFW, 2013), and the study area and NAS Whidbey Island complex offer only a few scattered old growth trees in forested areas that are dominated by second-growth mixed conifer forest (NAS Whidbey Island, 2013a). In the 1990s, it was the general conclusion that small amounts of suitable habitat occur on Whidbey Island within Deception Pass State Park; however, the winds in the area largely prevent the moss-covered defective limbs that create platforms for nesting murrelets (Milner, 2016). No habitat or nesting surveys have been conducted on Whidbey Island in recent years. During consultations for the 2012 *Environmental Assessment for the Transition of Expeditionary EA-6B Prowler Squadrons to EA-18G Growler Aircraft at Naval Air Station Whidbey Island, Oak Harbor, Washington*, the USFWS confirmed the project was more than 0.25 mile from suitable marbled murrelet nesting habitat (Navy, 2012). More recently, the Navy contacted the WDFW to ensure it had obtained the most up-to-date information on marbled murrelet nesting occurrence in the study area. The WDFW responded that patches in the study area could be considered suitable nesting habitat, but none of these areas have been identified as supporting marbled murrelet nesting, and no nesting birds have been found on Whidbey Island (Milner, 2016).

Marbled murrelets are present in the marine waters surrounding Whidbey Island year-round (Seattle Audubon Society, 2015). According to the WDFW Wildlife Science Division, observations of marbled murrelets were reported to be relatively consistent throughout the year (Pearson and Lance, 2017).

WDFW, along with researchers from Pacific Northwest and Pacific Southwest Research Stations of the USFS, USFWS, and Crescent Coastal Research, have been estimating marbled murrelet population size and trends using at-sea line transects within 8 kilometers of the Washington, Oregon, and northern California coastline from year 2000 to 2016. The population estimate for Puget Sound and the Strait of Juan de Fuca in 2016 was 4,600 birds, with a 4.9-percent average annual rate of decline for the 2001 to 2016 period, assuming a constant rate of decline (Lynch et al., 2017; Pearson and Lance, 2017). The at-sea murrelet density estimates for areas sampled in 2016 were 1.32 birds per km^2 in Puget Sound and the Strait of Juan de Fuca (Lynch et al., 2017).

Marbled murrelet populations have suffered significant declines in the Pacific Northwest, caused primarily by the removal of essential habitat by logging and coastal development (USFWS, 1997). Other threats contributing to the decline in marbled murrelets include chemical/oil spills and bioaccumulation, fishing bycatch, collisions with man-made objects, anthropogenic disturbances, and changes in prey

availability due to climate and overfishing (Nelson, 1997; USFWS, 1997, 2009; Bellefleur, Lee, and Ronconi, 2009; WDFW, 2013).

The potential effects of the Proposed Action on marbled murrelets are discussed in Chapter 4.

3.8.2.2.1.4 Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*), a subspecies of the spotted owl (*Strix occidentalis*), was listed as threatened under the ESA in 1990 (WDFW, 2013). The species is associated with structurally complex, typically old growth, forests. The northern spotted owl's occurrence within the study area is unlikely, and no critical habitat has been designated with the study area; therefore, the Proposed Action would have no effect on the subspecies (eBird, 2015a, 2015b; Seattle Audubon Society, 2015; WDFW, 2013). This subspecies will not be discussed in Chapter 4.

3.8.2.2.1.5 Streaked Horned Lark

The streaked horned lark (*Eremophila alpestris strigata*), a subspecies of the horned lark (*Eremophila alpestris*), was listed as threatened under the ESA in 2013 (USFWS, 2013c). Streaked horned larks nest on grasslands and sparsely vegetated areas at airports, sandy islands, and coastal spits in Washington (WDFW, 2013). Their winter habitats are similar to their nesting habitats (USFWS, 2013c). The subspecies was historically abundant on Puget Sound prairies, but it is now extirpated at northern Puget Trough breeding sites due to habitat loss (WDFW, 2013). Likewise, more than 90 percent of grasslands in the southern Puget Sound region have been lost. Streaked horned lark nesting sites are now restricted to 13 locations in Washington. The nearest known occurrences to the study area are over 40 miles to the south (Anderson and Pearson, 2015).

There are no current or historical nesting records in the study area and Island County (WDFW, 2013). Records of horned larks sighted on Whidbey Island are limited to nine observations of 23 individuals during spring and fall migration periods from 1993 to 2015 (eBird, 2015a). These observations were not identified to the subspecies level (i.e., streaked horned lark), so it is possible that some or all of these observations were of migrants of the listed subspecies. However, based on recent occurrence records for the streaked horned lark, it is not likely these observations were the listed subspecies (WDFW, 2013; Anderson and Pearson, 2015). Additionally, no critical habitat is designated within the study area. The Proposed Action would have no effect on this subspecies because it is not known to occur in the study area, and no critical habitat is present; therefore, the streaked horned lark will not be discussed in Chapter 4.

3.8.2.2.1.6 Yellow-billed Cuckoo

The western U.S. Distinct Population Segment (DPS) of the yellow-billed cuckoo (*Coccyzus americanus*) was listed as threatened under the ESA in 2014 (USFWS, 2015d). The western DPS prefers large, continuous tracts of riparian woodlands with cottonwoods (*Populus* spp.) and willows (*Salix* spp.) (WDFW, 2013). Yellow-billed cuckoos no longer breed in Washington, and only four individuals have been recorded in western Washington since 1950. Because they are highly unlikely to occur in Washington, the Proposed Action would have no effect on the western U.S. DPS of the yellow-billed cuckoo; therefore, it will not be discussed in Chapter 4.

3.8.2.2.1.7 North American Wolverine

As of 2016, the North American wolverine (*Gulo gulo luscus*) is proposed for listing as threatened. North American wolverines rely on remote, high-elevation montane habitat with heavy snowfall (Copeland et al., 2010). In Washington, North American wolverines are rare and primarily found in the northern Cascade mountains (WDFW, 2012a). The study area does not contain any occurrences of the North American wolverine, and there is no suitable habitat for the species. The Proposed Action would have no effect on the North American wolverine; therefore, it will not be discussed in Chapter 4.

3.8.2.2.2 Migratory Birds

The term "migratory birds" hereafter refers to species that are protected under the MBTA, which includes both migrating and non-migrating species. About 230 migratory bird species occur annually within the study area (NAS Whidbey Island, 2013a; eBird, 2015a; Seattle Audubon Society, 2015). Although all of these species occur annually, their relative abundances may vary widely. Likewise, some species are year-round residents, while others may only occur seasonally during spring and/or fall migrations, the breeding season, and/or winter. All major taxonomic groups are represented on this list.

In the breeding season, successful reproduction is the primary focus of adult birds. During this period, birds will be engaged in courtship, nest-building, parental care, foraging, and nest/territory defense to increase the chances of survival for themselves and their young. About 120 migratory bird species breed annually on Whidbey Island (Opperman et al., 2006; eBird, 2015a). These species represent many major bird taxa, including, but not limited to, raptors, waterbirds[23], woodpeckers, and passerines (i.e., songbirds). Breeding migratory birds within the study area and at the NAS Whidbey Island complex are composed of year-round residents and summer-only breeding residents. Some common year-round residents include mallards (*Anas platyrhynchos*), great blue herons (*Ardea herodias*), bald eagles, northern flickers (*Colaptes auratus*), and song sparrows (*Melospiza melodia*) (NAS Whidbey Island, 2013a; eBird, 2015a). Rufous hummingbirds (*Selasphorus rufus*), barn swallows (*Hirundo rustica*), Swainson's thrushes (*Catharus ustulatus*), and black-headed grosbeaks (*Pheucticus melanocephalus*) are among the more common summer-only breeding residents.

During the winter, birds are primarily focused on finding food and shelter. More than 120 migratory bird species overwinter within the study area and on Whidbey Island (NAS Whidbey Island, 2013a; eBird, 2015a; Seattle Audubon Society, 2015). Some more common winter-only residents include buffleheads (*Bucephala albeola*), horned grebes (*Podiceps auritus*), ruby-crowned kinglets (*Regulus calendula*), and golden-crowned sparrows (*Zonotrichia atricapilla*) (eBird, 2015a). Mallards, bald eagles, glaucous-winged gulls (*Larus glaucescens*), Pacific wrens (*Troglodytes pacificus*), and dark-eyed juncos (*Junco hyemalis*) are among the year-round residents most common during the winter.

[23] Waterbirds includes a variety of taxa that are largely dependent on aquatic environments, including but not limited to waterfowl, loons, herons, rails, shorebirds, gulls, terns, and alcids.

During spring and fall migrations, birds travel from areas of low or decreasing resources (i.e., nesting sites and/or food) to areas of high or increasing resources (Cornell Lab of Ornithology, 2007). Migrating birds, especially long-distance migrants, may stop over at various locations en route to their breeding or wintering grounds to forage and rest. More than 200 migratory bird species regularly occur on Whidbey Island during the spring and/or fall migration periods (NAS Whidbey Island, 2013a; eBird, 2015a; Seattle Audubon Society, 2015). Migrating birds may be arriving to breed (spring) or to overwinter (fall), or they may be passing through on their way to other breeding or wintering grounds. Some species will be departing for breeding grounds further north or at higher elevations in the spring, or to wintering grounds further south or at lower elevations in the fall. Year-round residents also will be present during spring and fall migrations. Pectoral sandpipers (*Calidris melanotos*), short-billed dowitchers (*Limnodromus griseus*), Heermann's gulls (*Larus heermanni*), and American pipits (*Anthus rubescens*) are among the species that typically only occur within the study area and on Whidbey Island during spring and/or fall migrations (eBird, 2015a).

MBTA-protected species that are listed as Birds of Conservation Concern (BCC) and habitat areas that are important to MBTA-protected species are further detailed in the sections below.

3.8.2.2.2.1 Birds of Conservation Concern

BCCs are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. BCCs have been identified at three geographic scales: National, USFWS Regions, and Bird Conservation Regions (BCRs). BCRs are the smallest geographic scale at which BCCs have been identified, and the lists of BCC species at this scale are expected to be the most useful for governmental agencies to consider in complying with the MBTA and EO 13186 (USFWS, 2008). The Proposed Action would be located in BCR 5 (Northern Pacific Forest). Twenty-one BCCs for BCR 5 occur annually within the study area (Table 3.8-3) (USFWS, 2008; NAS Whidbey Island, 2013a; eBird, 2015a; Seattle Audubon Society, 2015).

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

Common Name	*Scientific Name*	*Seasonal Occurrence*	*Habitat*
Arctic tern[1]	*Sterna paradisaea*	Breeder	From 1977 to 1995, nested on gravel islands and parking lots of Everett, WA (Snohomish County). Breeding probably no longer occurs in WA.
Bald eagle	*Haliaeetus leucocephalus*	Year-round	Forested areas adjacent to large bodies of water
Black oystercatcher	*Haematopus bachmani*	Year-round	Rocky shorelines
Black swift	*Cypseloides niger*	Migrant	Coastal lowlands
Caspian tern	*Hydroprogne caspia*	Breeder and migrant	Coastal estuaries, salt marshes, and barrier islands
Lesser yellowlegs[2]	*Tringa flavipes*	Migrant	Wide range of wetland habitats
Marbled godwit[1,2]	*Limosa fedoa*	Winter resident and migrant	Coastal habitats
Marbled murrelet	*Brachyramphus marmoratus*	Year-round	Calm, shallow, coastal waters and bays
Northern goshawk[1]	*Accipiter gentilis*	Year-round	Mature coniferous forests
Olive-sided flycatcher	*Contopus cooperi*	Breeder and migrant	Coniferous forest
Pelagic cormorant	*Phalacrocorax pelagicus*	Year-round	Exclusively marine; found in bays and sounds and along the coast, close to shore
Peregrine falcon	*Falco peregrinus*	Year-round	Broad range of natural and artificial habitats
Purple finch	*Haemorhous purpureus*	Year-round	Breeds in coniferous and mixed forests; winters in a wider variety of habitats
Red knot (*roselaari* subspecies)[1,2]	*Calidris canutus roselaari*	Migrant	Sandy coastal habitats
Rufous hummingbird	*Selasphorus rufus*	Breeder and migrant	Broad range of habitats, including secondary succession communities and openings, mature forests, parks, and residential areas
Short-billed dowitcher[2]	*Limnodromus griseus*	Migrant	Tidal flats, beaches, salt marshes, sewage ponds, and flooded agricultural fields
Solitary sandpiper	*Tringa solitaria*	Migrant	Banks of wooded streams, narrow marsh channels, and edges of mudflats
Western grebe[2]	*Aechmophorus occidentalis*	Year-round	Large, open waterbodies; marshes with open water
Whimbrel[2]	*Numenius phaeopus*	Migrant	Wide range of open terrestrial and coastal habitats
Willow flycatcher	*Empidonax traillii*	Breeder and migrant	Moist, shrubby areas
Yellow-billed loon[2]	*Gavia adamsii*	Winter resident and migrant	Nearshore marine waters

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

Notes:
1 Indicates species that is very rare in the study area.
2 Indicates species is non-breeding in Bird Conservation Region 5.

3.8.2.2.2.2 Important Bird Areas

The Important Bird Area (IBA) program is a global bird conservation initiative of BirdLife International and is implemented in the U.S. by the National Audubon Society and its local partners. Its purpose is to identify and conserve sites that provide essential habitats for breeding, wintering, and/or migrating birds, particularly species that are MBTA protected. IBAs vary in size and may occur on public or private lands. Sites designated as IBAs must support one or more of the following: 1) special-status species, 2) restricted-range species, 3) species that are vulnerable because their populations are concentrated in one general habitat type or biome, and/or 4) species, or groups of similar species that are vulnerable because they congregate at high densities. While all IBAs are recognized for their importance to birds, some are of greater significance than others. IBAs may be prioritized hierarchically as Global, Continental, or State, based on their significance (National Audubon Society, 2010).

Audubon Washington has been identifying IBAs with the assistance of the WDFW since 1998 and to date has designated 74 IBAs in the state (National Audubon Society, 2015a). Five recognized IBAs are entirely or significantly contained within the study area, including one Global IBA and four State IBAs (discussed individually below) (Figure 3.8-3[24]). A number of other IBAs are outside of the study area but within 10 miles of Whidbey Island, including Samish/Padilla Bays (Global)[25], Protection Island (Global), Point No Point (Global), Indian-Marrowstone Island/Oak Bay (State), Deer Lagoon (State), and Port Susan Bay (State) (National Audubon Society, 2015b).

The Skagit Bay IBA (Global) is nearly 70,000 acres and includes the bay for which it is named along the northeastern side of Whidbey Island as well as adjacent lands along the bay to the east of Oak Harbor and the Seaplane Base. Ault Field is approximately 4 miles west of this IBA. This site provides important wintering grounds for dunlins (*Calidris alpina*) and waterfowl, particularly tundra swans (*Cygnus columbianus*), trumpeter swans (*Cygnus buccinator*), and snow geese (*Chen caerulescens*). It is an important migration stopover site for shorebirds, songbirds, and raptors. The Skagit Bay IBA is also a key breeding area for many species of birds, including bald eagles, great blue herons (*Ardea herodias*), and purple martins (*Progne subis*). This IBA contains at least 28 bald eagle territories and provides foraging areas for two great blue heron nesting colonies totaling about 1,000 breeding pairs. The site is also an important recreational area for hunters and birdwatchers (National Audubon Society, 2013a). A total of 281 bird species have been documented at Skagit Bay (eBird, 2015c).

The Deception Pass IBA (State) is 741 acres of marine waters, small islands, and rocky shorelines off the northern end of Whidbey Island, approximately 2 miles north of Ault Field. This site is an important wintering area (November to April) for large numbers of diving birds, such as loons, cormorants, grebes, mergansers, and alcids. The rocky outcrops and cliffs in the IBA provide nesting areas for black oystercatchers (*Haematopus bachmani*) and pigeon guillemots (*Cepphus columba*) (National Audubon Society, 2013b). A total of 173 bird species have been documented at Deception Pass (eBird, 2015d).

[24] The upland boundary of the Crescent Harbor Marshes IBA is not accurately depicted in Figure 3.8-3 and is based on best available information from the National Audubon Society.

[25] A very small portion of Samish/Padilla Bays IBA lies within the study area.

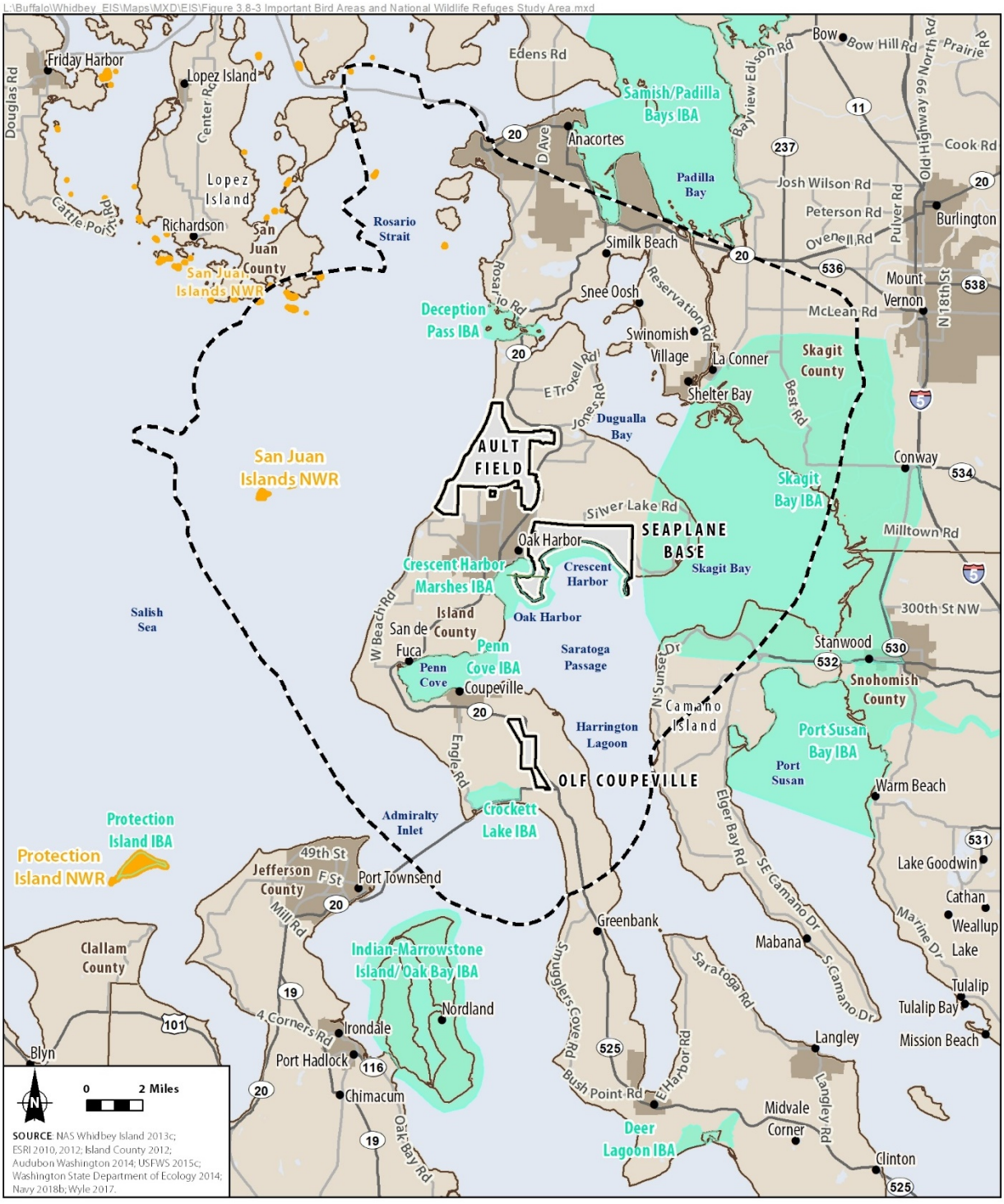


Figure 3.8-3
Important Bird Areas and National Wildlife Refuges in the Study Area
Whidbey Island, Island County, WA

The Crescent Harbor Marshes IBA (State) lies east of Oak Harbor and includes 2,768 acres of shoreline, nearshore marine waters, and uplands on the Seaplane Base. The site is about 2 miles south of Ault Field and about 4 miles north of OLF Coupeville. The upland habitats support the highest nesting densities of northern harriers in Washington. The marshes, shorelines, and marine waters support moderately sized concentrations of wintering waterfowl. The shorelines provide habitat for high concentrations of black oystercatchers, surfbirds (*Calidris virgata*), and black turnstones (*Arenaria melanocephala*). A total of 105 species have been recorded at this site (National Audubon Society, 2013c; Bayard, 2016).

The Penn Cove IBA (State) is 3,361 acres of marine waters and shoreline habitats immediately north of the Town of Coupeville. It lies approximately 2 miles north of OLF Coupeville and 6 miles south of Ault Field. Penn Cove's primary importance is as a wintering foraging area for aquatic birds, including 26 species of ducks, loons, and grebes; black turnstones; surfbirds; peregrine falcons; and merlins (*Falco columbarius*). It also supports nesting bald eagles and great blue herons (National Audubon Society, 2013d). A total of 140 bird species have been documented at Penn Cove (eBird, 2015e).

The Crockett Lake IBA (State) is a 655-acre site consisting of the lake, surrounding wetlands, and adjacent upland habitats (National Audubon Society, 2013e; Whidbey Camano Land Trust, 2015). The upland habitats include remnant prairie, coastal bluffs, and old growth forest (Whidbey Camano Land Trust, 2015). This IBA is about 0.5 mile west of the southern end of OLF Coupeville. According to eBird, 191 bird species have been documented at Crockett Lake (eBird, 2015f).

Each of the previously mentioned IBAs supports different bird species during some part of their life cycle. To summarize the birds supported by a particular IBA, bird species were categorized into groups such as waterfowl, wading birds, seabirds, shorebirds, raptors, and passerines. Each category is defined below, and Table 3.8-4 lists the presence of each category at a given IBA.

Waterfowl comprise geese, swans, and ducks (family Anatidae) and are mostly gregarious birds that spend much of their time swimming (Kaufman, 2001). Despite their shared traits, waterfowl species can exhibit great variability in size, appearance, habitat use, and behavior. For the purposes of this EIS, wading birds are those that wade in shallow waters when hunting for food; they include species such as egrets, herons, cranes, ibises, and rails. Seabirds are a diverse group of birds that are adapted to marine environments and, for the purposes of this EIS, constitute loons, grebes, cormorants, pelicans, jaegers, alcids, gulls, and terns. In general, shorebirds have relatively long legs and thin bills, and most forage for invertebrates in open, shoreline habitats (USFWS, n.d.). Shorebirds comprise four families of the order Charadriiformes in the United States: Recurvirostridae (stilts and avocets), Haematopodidae (oystercatchers), Charadriidae (plovers), and Scolopacidae (sandpipers and allies). Raptors are birds of prey represented by vultures (family Cathartidae); ospreys (family Pandionidae); hawks, eagles, and allies (family Accipitridae); Owls (families Tytonidae and Stigidae); and falcons (family Falconidae). Passerines (and songbirds) are perching birds. Roughly 60 percent of all bird species are passerines (Ehrlich et al., 1988). For the purposes of this EIS, other bird orders include quails and turkeys (Galliformes); pigeons and doves (Columbiformes); nightjars, swifts, and hummingbirds (Caprimulgiformes); kingfishers (Coraciiformes); and woodpeckers (Piciformes).

Table 3.8-4 Categories of Birds in Important Bird Areas[1]

Important Bird Area	Bird Category[1]					
	Waterfowl	Wading Birds	Seabirds	Shorebirds	Raptors	Passerines and Other Bird Orders
Skagit Bay IBA (Global)	X	X		X	X	X
Deception Pass IBA (State)	X		X	X		
Crescent Harbor IBA (State)	X	X	X	X	X	
Penn Cove IBA (State)	X	X	X	X	X	
Crocket Lake IBA (State)	X					X

Source: eBird, 2015a-f.

[1] The bird category for which each IBA is known to be important in supporting some portion of its species' life cycle.

3.8.2.2.2.3 eBird Hotspots

eBird is the world's largest repository for bird observation data, currently housing more than 260 million bird observations, with millions more arriving each month (eBird, 2015g). eBird has designated many birding areas as hotspots and summarizes data for these locations. These hotspots represent locations that are important to birds, particularly MBTA-protected species. There are more than 75 eBird hotspots designated within the study area. Over 20 eBird hotspots have at least 100 documented species, and five hotspots have at least 150 documented species. Skagit Flats and Crockett Lake hotspots have the most documented species, with 191 species each. No eBird hotspots are on Ault Field; however, hotspots are in proximity to Ault Field. Ault Field abuts Joseph Whidbey State Park (119 species) at its southeast border. eBird hotspots also include some of the IBAs discussed above (e.g., Crockett Lake), as well as county, state, and federal natural or recreation areas.

3.8.2.2.2.4 National Wildlife Refuges

NWRs in the study area provide important habitat to wildlife, particularly MBTA-protected species. The USFWS-managed San Juan Islands NWR contains multiple islands within the study area, including Bird Rocks, Williamson Rocks, Smith Island, and Minor Island. The San Juan Islands NWR is composed of a number of small rocks, reefs, and islands in northern Puget Sound. San Juan Islands NWR was established to protect colonies of nesting seabirds, including black oystercatchers, pigeon guillemots, Brandt's cormorants (*Phalacrocorax penicillatus*), and rhinoceros auklets (*Cerorhinca monocerata*) (USFWS, 2014a). San Juan Islands NWR also provides habitat for other wildlife, perhaps most notably harbor seals and elephant seals, both of which have been documented giving birth at the properties (Jeffries et al., 2000; USFWS, 2014a, 2014b). The nearest portion of San Juan Islands NWR to Ault Field is approximately 6 miles to the west.

3.8.2.2.3 Bald and Golden Eagles

Bald eagles occur year-round within the study area and on Whidbey Island, including permanent breeding residents and winter-only residents (NAS Whidbey Island, 2013a; eBird, 2015a; NAVFAC

Northwest, 2014). Bald eagles are one of the most commonly reported bird species on eBird for Island County (eBird, 2015a). Bald eagles prefer forested areas in proximity to large bodies of water, and, in Washington, their nests are most abundant near marine shorelines (WDFW, 2013; Rodewald, 2015). Proximity to water is important, as their primary food source is fish, although they also commonly prey on birds, such as waterfowl, gulls, and seabirds (WDFW, 2013). Bald eagles breed at Ault Field and use many habitats on the property for foraging, roosting, and perching (NAS Whidbey Island, 2013a; NAVFAC Northwest, 2014). The nearest known bald eagle nest at Ault Field is approximately 0.75 mile from the proposed construction area. There are no known nests or potential nesting habitats on OLF Coupeville, and bald eagle use of the property is limited to intermittent foraging and flyovers.

Golden eagles are rare, transient visitors to the study area and Whidbey Island during migration (NAS Whidbey Island, 2013a; eBird, 2015a). During migration, golden eagles hunt over wetlands, agricultural areas, and grasslands for small to medium-sized reptiles, mammals, and birds (Kochert et al., 2002; WDFW, 2013). Within the study area, suitable migration foraging habitats are plentiful (NAS Whidbey Island, 2013a); however, observations are limited. There are seven eBird records of golden eagles within the study area, all of which are on mainland portions of Skagit County (eBird, 2015h).

3.8.2.2.4 State Threatened and Endangered Species

Ten species of birds, one amphibian, and two butterfly species with the potential to occur within the study area are listed as endangered, threatened, candidate, or sensitive by the State of Washington (Table 3.8-5). Five of these species are also federally listed under the ESA and are discussed above under "Federal Threatened and Endangered Species." Bald eagles are discussed above under "Bald and Golden Eagles." The preferred habitats and likelihood of occurrence within the study area for the remaining five species are presented in Table 3.8-5.

Three state-listed plant species were identified as potentially occurring within the study area (Table 3.8-5). No state-listed plant populations or individual occurrences of those species have been previously identified at Ault Field. Furthermore, no suitable habitat to support these species occurs within Ault Field. Therefore, there would be no measurable impacts to vegetation or special status plant species.

Table 3.8-5 State-listed[1] Terrestrial Wildlife Species, Their Preferred Habitats, and Their Likelihood of Occurrence within the Study Area

Common Name	*Scientific Name*	*State Listing Status*	*Preferred Habitat*	*Likelihood of Occurrence*
Plants				
Golden paintbrush	*Castilleja levisecta*	Endangered	See text under "Federal Threatened and Endangered Species"	
White meconella	*Meconella oregana*	Endangered	Open grasslands	Rare
White-top aster	*Sericocarpus rigidus*	Sensitive	Open areas with gravelly, glacial soils	Rare
Invertebrates				
Island marble butterfly	*Euchloe ausonides insulanus*	Candidate	See text under "Federal Threatened and Endangered Species" in Table 3.8-2	
Taylor's checkerspot butterfly	*Euphydryas editha taylori*	Endangered	See text under "Federal Threatened and Endangered Species"	
Amphibians				
Oregon spotted frog	*Rana pretiosa*	Endangered	See text under "Federal Threatened and Endangered Species" in Table 3.8-2	
Birds				
American white pelican	*Pelecanus erythrorhynchos*	Endangered	Open water, shores	Rare year-round
Bald eagle	*Haliaeetus leucocephalus*	Sensitive	See text in "Bald and Golden Eagles"	
Brown pelican	*Pelecanus occidentalis*	Endangered	Open water, shores	Rare in fall/early winter
Common loon	*Gavia immer*	Sensitive	Open water	Common year-round
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	See text under "Federal Threatened and Endangered Species"	
Northern spotted owl	*Strix occidentalis caurina*	Endangered	See text under "Federal Threatened and Endangered Species"	
Peregrine falcon	*Falco peregrinus*	Sensitive	Nests in urban areas, forages in open areas	Uncommon year-round
Sandhill crane	*Grus canadensis*	Endangered	Meadows, wetlands, open grasslands, agricultural fields	Uncommon in fall
Streaked horned lark	*Eremophila alpestris strigata*	Endangered	See text under "Federal Threatened and Endangered Species"	
Tufted puffin	*Fratercula cirrhata*	Endangered	Offshore islands, open marine water	Uncommon in summer

Sources: WDFW, 2013, 2015a; eBird, 2015a; Seattle Audubon Society, 2015; Naval Facilities Engineering Command Northwest, 2014

Note:
[1] Excludes species also listed under Endangered Species Act or Bald and Golden Eagle Protection Act

3.8.2.2.5 Species of Local Importance

3.8.2.2.5.1 Island County Species of Local Importance

In addition to species listed by federal or state regulation as endangered, threatened, or sensitive (see Tables 3.8-2 and 3.8-5), the Island County Critical Areas Ordinance's (17.02) Protected Species list also includes four birds designated as Species of Local Importance. These species include the great blue heron, osprey (*Pandion haliaetus*), pileated woodpecker (*Dryocopus pileatus*), and trumpeter swan. The nesting sites of the great blue heron, osprey, and pileated woodpecker are protected under the ordinance, while the trumpeter swan's foraging habitats are protected.

3.8.2.2.5.2 Skagit County Species of Local Importance

In addition to species listed by federal or state regulation as endangered, threatened, or sensitive (see Tables 3.8-2 and 3.8-5), the Skagit County's Critical Areas Ordinance (14.24) Habitats and Species of Importance includes breeding and/or roosting sites for the great blue heron, Vaux's swift (*Chaetura vauxi*), pileated woodpecker, osprey, Townsend's big-eared bat (*Corynorhinus townsendii*), cavity-nesting ducks, and harlequin duck (*Histrionicus histrionicus*). Trumpeter swan and waterfowl concentrations are also Species of Importance.

The study area overlaps with portions of the county's Skagit Wildlife Area in the following areas: Telegraph Slough, Goat Island, and Skagit Bay Estuary.

3.8.2.2.5.3 San Juan County Species of Local Importance

In addition to species listed by federal or state regulation as endangered, threatened, or sensitive (see Tables 3.8-2 and 3.8-5), San Juan County's Critical Areas Ordinance (18.35) Species of Importance that have the potential to occur within the study area include the black oystercatcher, great blue heron, pigeon guillemot, Townsend's big-eared bat, northern flying squirrel (*Glaucomys sabrinus*), and western toad (*Anaxyrus boreas*). Species of Importance that have the potential to occur within the study area also include bat roosting concentrations and nest sites for the northern harrier, merlin (*Falco columbarius*), Wilson's snipe (*Gallinago delicate*), short-eared owl (*Asio flammeus*), long-eared owl (*Asio otus*), northern pygmy owl (*Glaucidium gnoma*), sooty grouse (*Dendragapus fuliginosus*), common nighthawk (*Chordeiles minor*), American dipper (*Cinclus mexicanus*), western bluebird (*Sialia mexicana*), chipping sparrow (*Spizella passerine*), vesper sparrow (*Pooecetes gramineus*), horned lark, western meadowlark (*Sturnella neglecta*), western screech owl (*Megascops kennicottii*), lazuli bunting (*Passerina amoena*), and American kestrel (*Falco sparverius*).

James Island Marine State Park is a Fish and Wildlife Habitat Conservation Area, pursuant to the county's Critical Areas Ordinance.

3.8.2.2.5.4 Jefferson County Species of Local Importance

The overlap of the study area and Jefferson County is limited to offshore waters in Puget Sound; therefore, there are no additional terrestrial Species of Local Importance.

3.8.2.2.5.5 Snohomish County Species of Local Importance

Due to the small portion of offshore waters in Snohomish County that overlap with the study area, there are no additional terrestrial Species of Local Importance.

3.8.2.3 Marine Species

Marine species include fish and marine mammals. A brief description of their potential occurrence in the study area is provided below.

3.8.2.3.1 Marine Fish

The Salish Sea is home to over 250 marine fish species (Pietsch and Orr, 2015). In the study area, marine fish may occupy a variety of near and offshore habitats and at different sea depths. A summary of fish that may occur in the study area, by group, is provided in Table 3.8-6. Federally listed marine fish are discussed separately in Section 3.8.2.4, below.

Table 3.8-6 Marine Fishes by Taxonomic Group that Have the Potential to Occur in the Study Area

Taxonomic Group[1]	*Description and Example Species*	*Marine Inland Waters Habitat*
Hagfish (order Myxiniformes)	Primitive and jawless with an eel-like body shape that primarily feed on dead fishes. • Pacific hagfish (*Eptatretus stoutii*)	Occupy seafloor and muddy substrates in deep waters.
Lamprey (order Petromyzontiformes)	Primitive, jawless, and eel-like. Anadromous; breed in freshwater streams and mature in ocean. • Pacific lamprey (*Entosphenus tridentatus*)	Found in marine deep waters and freshwater streams. Data suggests use bottom habitats in both ocean and streams.
Sharks, Rays, and Chimaeras (class Chondrichthyes)	Cartilaginous (non-bony) fishes, some of which are open-ocean predators. • Spotted ratfish (*Hydrolagus colliei*), • Big skate (*Beringraja binoculata*) • Bluntnose sixgill shark (*Hexanchus griseus*)	This class uses a variety of surface, water column, and seafloor marine habitats, both near and offshore.
Eels and Spiny Eels (orders Anguilliformes and Elopiformes)	Undergo a unique larval stage with a small head and elongated body; different from other fishes. • Snipe eel (*Nemichthys scolopaceus*)	Surface, water column, seafloor. Most commonly deepwater habitats, but juvenile fish are found in more shallow waters.
Sturgeons (order Acipenseriformes)	Anadromous and long lived. • White sturgeon (*Acipenser transmontanus*) • Green sturgeon (*Acipenser medirostris*)	Marine water column and seafloors; freshwater rivers and streams.
Herring, Eulachon, and Salmonids (orders Clupeiformes, Osmeriformes, Esociformes, and Salmoniformes)	Most are anadromous species and are important to commercial and recreational fisheries. • Pacific herring (*Clupea pallasii*), • Longfin smelt (*Spirinchus thaleichthys*), • Pink salmon (*Oncorhynchus gorbuscha*)	This class uses a variety of surface and water column marine habitats, both near and offshore. Spawn in estuarine and freshwaters.

Table 3.8-6 Marine Fishes by Taxonomic Group that Have the Potential to Occur in the Study Area

Taxonomic Group[1]	*Description and Example Species*	*Marine Inland Waters Habitat*
Lizardfishes and Lancetfishes (order Aulopiformes)	Primarily found in warmer ocean waters to the south. • California lizardfish (*Synodus lucioceps*), • Longnose lancetfish (*Alepisaurus ferox*)	Lizardfishes may be found on seafloors in shallow to deep waters. Lancetfishes are primarily deepwater fishes that use seafloors.
Cods, Hakes, and Brotulas (orders Gadiformes and Ophidiiformes)	Important commercial fishery resources. • Pacific cod (*Gadus macrocephalus*), • Pacific hake (*Merluccius productus*)	Primarily seafloor and water bottom marine habitats, but known to occur at or near water surface.
Toadfishes (order Batrachoidiformes)	A lie-in-wait predator, common in the Salish Sea. • Plainfin midshipman (*Porichthys notatus*)	Common on sandy and muddy seafloors, both nearshore and offshore.
Sauries and Silversides (orders Atheriniformes and Beloniformes)	Small-sized nearshore/coastal fishes, primarily feed in large schools on organic debris. • Pacific saury (*Cololabis saira*)	Primarily found on surface and within water column.
Opahs and Ribbonfishes (order Lampridiformes)	Rare in the Salish Sea, but known to occur. • Opah (*Lampris guttatus*), • King-of-the-salmon (*Trachipterus altivelis*)	Primarily open ocean (pelagic) or deepwater fishes but can be found in surface waters.
Pipefish (order Gasterosteiformes)	Small mouth with tubular snout and armor like scales. • Threespine stickleback (*Gasterosteus aculeatus*), • Tubesnout (*Aulorhynchus flavidus*), • Bay pipefish (*Syngnathus leptorhynchus*)	Surface and shallow waters near shore, often in eelgrass and protected bays.
Rockfishes (order Scorpaeniformes)	Bottom dwelling with modified pectoral fins to rest on the bottom. • Brown rockfish (*Sebastes auriculatus*)	Typically deep waters with rocky seafloors, both nearshore and offshore.
Gobies (order Perciformes; family Gobiidae)	Large and diverse family of marine fishes. • Bay goby (*Lepidogobius lepidus*)	Primarily surface and shallow waters near shore.
Jacks, Tunas, and Mackerals, (order Perciformes; families Carangidae and Scombridae)	Highly migratory predators; they make up a major component of commercial fisheries. • Shiner perch (*Cymatogaster aggregata*), • Striped seaperch (*Embiotoca lateralis*)	Surface, column, and seafloors near shore and intertidal zones.

Table 3.8-6 Marine Fishes by Taxonomic Group that Have the Potential to Occur in the Study Area

Taxonomic Group[1]	*Description and Example Species*	*Marine Inland Waters Habitat*
Flounders (order Pleuronectiformes)	"Flatfishes" that are generally highly camouflaged. Important commercial fisheries. • Pacific sanddab (*Citharichthys sordidus*), • Flathead sole (*Hippoglossoides elassodon*), • Pacific halibut (*Hippoglossus stenolepis*)	Generally deep seafloors, often with sandy or silty bottoms, both near and off shore.
Ocean Sunfish (molas) (order Tetraodontiformes)	Unique body shape and characteristics, rare in Salish Sea. • Ocean sunfish (*Mola mola*)	Primarily a pelagic, offshore species. Located at surface and in water column.

Note:

[1] Taxonomic groups are based on the following commonly accepted references: Hart, 1973; Helfman, Collette, and Facey, 1997; Moyle and Cech, 1996; Nelson, 2006. Species information gathered from Pietsch and Orr, 2015.

3.8.2.3.2 Marine Mammals

Twelve species of marine mammals potentially occur within the study area (Table 3.8-7) (NAS Whidbey Island, 2013a; Burke Museum of Natural History and Culture, 2013; WDFW, 2013; Carretta et al., 2016).

Table 3.8-7 MMPA-protected Marine Mammals Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Occurrence*
Pinnipeds (sea lions, seals)		
Steller sea lion	*Eumetopias jubatus*	Seasonal (unlikely June to September)
California sea lion	*Zalophus californianus*	Seasonal (unlikely in July)
Northern elephant seal	*Mirounga angustirostris*	Likely in the Strait of Juan de Fuca; infrequent in Puget Sound
Harbor seal	*Phoca vitulina*	Likely
Cetaceans (whales, dolphins, porpoises)		
Minke whale	*Balaenoptera acutorostrata*	Seasonal, more likely spring to fall, rare in Puget Sound
Humpback whale	*Megaptera novaengliae*	Seasonal to rare in some areas with highest likelihood spring to fall
Gray whale	*Eschrictius robustus*	Seasonal to rare, more likely winter to spring
Pacific white-sided dolphin	*Lagenorynchus obliquidens*	Rare but more likely summer and fall, extralimital in Puget Sound
Bottlenose dolphin	*Tursiops truncatus*	Extralimital
Killer whale (resident and transient populations)	*Orcinus orca*	Residents and transient stocks likely to rare, depending on waterbody
Harbor porpoise	*Phocoena phocoena*	Likely to rare
Dall's porpoise	*Phocoenoides dalli*	Likely to rare

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

3.8.2.3.2.1 Pinnipeds

Pinnipeds are carnivorous, fin-footed, semiaquatic marine mammals. Two families of pinniped occur in the study area: Otariidae (eared seals, i.e., sea lions and fur seals) and Phocidae (earless, or true seals). Four species of pinniped may occur in the study area: the California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), harbor seal (*Phoca vitulina*), and northern elephant seal (*Mirounga angustirostris*). All four species are protected under the MMPA but are not listed under the ESA.

Of these, the most abundant and widely distributed species is the harbor seal, which is present year-round in the study area. Harbor seals use a variety of habitats for haul-out sites, including intertidal and subtidal rock outcrops, sandbars, sandy beaches, peat banks in salt marshes, and manmade structures such as log booms, docks, and recreational floats (Wilson, 1978; Prescott, 1982; Schneider and Payne, 1983; Gilbert and Guldager, 1998; Jeffries et al., 2000; Lambourn, Jeffries, and Huber, 2010; London et al., 2012). Harbor seals are the only marine mammal known to use beaches and rocks on the NAS Whidbey Island complex as haul-out sites (Jeffries et al., 2000). Harbor seals are the only known marine mammal to breed in Washington waters, and pupping does occur in the study area, typically between June through August (Jeffries et al., 2000). There are no known harbor seal pupping sites at the NAS Whidbey Island complex; however, harbor seal pups have been documented on NAS Whidbey Island complex beaches during the pupping season (June through August).

Northern elephant seals are also present in the study area year-round, primarily in the Strait of Juan de Fuca waters including the waters west of Whidbey Island. Smith and Minor Islands are within the study area, and both are documented haul-out sites for the Northern elephant seal (Jeffries et al., 2000). Pups have been born at both sites (Jeffries et al., 2000). Northern elephant seals have also been documented south of the study area on sandy beaches in Puget Sound during molting season.

Steller sea lions and California sea lions are seasonally present in the study area. They are typically absent during the summer months (mid-June through August) when they are at their Oregon and California breeding rookeries, respectively. During the late summer and early fall, both species return to the study area and may opportunistically haul out near shore on navigation buoys, piers, and jetties (Navy, 2015d). They move throughout the study area in response to foraging opportunities of various fish species. There are no rookeries in the study area for either the California sea lion or the Steller sea lion because such pups would not be present in the study area.

3.8.2.3.2.2 Cetaceans

Cetaceans are finned marine mammals including whales, dolphins, and porpoises. Eight species of cetaceans may occur in the study area; all eight are protected under the MMPA, and two, the humpback whale and Southern Resident killer whale, are listed under the ESA. Transient killer whales, minke whales, gray whales, Pacific white-sided dolphins, bottlenose dolphins, harbor porpoises, and Dall's porpoises are discussed below; humpback whales and Southern Resident killer whales are discussed under Section 3.8.2.4.

Killer whales in the Pacific Northwest are divided into three eco-types and corresponding DPSs: Southern Resident killer whales, transients, and offshore. These populations are noticeably different from one another in their morphology, ecology, behavior, and genetics. Both the Southern Resident killer whale and transient killer whales are present in the study area, with their occurrence and distribution varying seasonally. Offshore killer whales have been documented entering the far western

waters of the Strait of Juan de Fuca, which is outside the study area. As such, offshore killer whales are not expected to be present in the study area at any time.

West Coast Transient killer whales may be present in the study area. Transient killer whales in the Pacific Northwest spend most of their time along the outer coast of British Columbia and Washington but visit inland waters in search of harbor seals, sea lions, and other prey. According to the Orca Network, a citizen science organization, transients may occur in inland waters in any month (Orca Network, 2017), but several studies have shown peaks in occurrences: Morton (1990) found bimodal peaks in spring (March) and fall (September–November) for transients on the northeastern coast of British Columbia. Baird and Dill (1995) found some transient groups frequenting the vicinity of harbor seal haul-out sites around southern Vancouver Island during August and September, which is the peak period for pupping through post-weaning of harbor seal pups. However, not all transient groups were seasonal in these studies, and their movements appear to be unpredictable. Transient killer whale occurrences inside marine waters have increased between 1987 and 2010, possibly because the abundance of some prey species (e.g., seals, sea lions, and porpoises) has increased (Houghton et al., 2015). While transient killer whales are frequently sighted in the main basin of Puget Sound, their presence near Navy installations varies from not present at all to infrequent sightings, depending on the season (Orca Network, 2017; Whale Museum, 2012). Transients have been observed in Saratoga Passage near NAS Whidbey Island.

Minke whales appear to have established home ranges in the inland waters of Washington, including areas within the study area (Dorsey, 1983; Dorsey et al., 1990). Minke whales are reported in the inland waters year-round, although the majority of records are from March through November (Calambokidis and Baird, 1994). The species is primarily sighted in the San Juan Islands and Strait of Juan de Fuca (Stern, 2005; Orca Network, 2017). Three feeding grounds have been identified in the Strait of Juan de Fuca and San Juan Islands area. There is year-to-year variation in the use of these feeding areas, and other feeding areas probably exist (Osborne et al., 1988; Hoelzel et al., 1989; Dorsey et al., 1990; Stern, 2005). There were 74 sightings of the Minke whale in Admiralty Inlet and six sightings within the Saratoga Passage area between January 2005 and July 2017 (Orca Network, 2017).

Gray whales have the potential to occur within the study area. As this species migrates between feeding and breeding grounds, a few enter the Strait of Juan de Fuca to feed in inland waters. Gray whales are observed in Washington inland waters during all months of the year (Calambokidis et al., 2010; WDFW, 2012b), with peak abundance from March through June (Calambokidis et al., 2010). NMFS has identified a Gray whale “Potential Presence” area extending into and including all U.S. waters from the entrance of the Strait of Juan de Fuca landward (Calambokidis et al., 2015). This portion of the Potential Presence area therefore overlaps all of the study area. This Potential Presence area is identified as seasonally important from January through July, and October through December--approximately 10 months of the year. Observed feeding areas are located in Saratoga Passage between Whidbey and Camano Islands, including Crescent Harbor.

Pacific white-sided dolphins are known to enter the inshore pass of British Columbia and Washington, and they have been documented in the Strait of Juan de Fuca and the Strait of Georgia (Stacey and Baird, 1991; Norman et al., 2004). Small groups have also been seen in Haro Strait off San Juan Island. This species is extremely rare in Puget Sound, with only one stranding in southern Puget Sound recorded in the 1980s (Osborne et al., 1988). Though sightings have increased slightly in recent years, Pacific white-sided dolphin occurrence in the Inland Waters, including the study area, is considered extremely

rare with the exception of southern Puget Sound, where occurrence is considered extralimital (Orca Network, 2017).

Bottlenose dolphins are considered extralimital in Washington inland waters; only three sightings and one stranding of bottlenose dolphins have been documented in Puget Sound since 2004 (Cascadia Research, 2011). Orca Network recorded a sighting of a bottlenose dolphin in Puget Sound in 2011 and multiple sightings in Puget Sound in 2017 (Orca Network, 2017). The anecdotal data from Orca Network are not consistently validated, and they vary in level of credibility. It is highly unlikely that any individual bottlenose dolphins will occur within the study area.

Harbor porpoise are known to occur in the Strait of Juan de Fuca and the San Juan Island area year-round (Calambokidis and Baird, 1994; Osmek et al., 1995; Carretta et al., 2014). Harbor porpoises were historically one of the most commonly observed marine mammals in Puget Sound (Scheffer and Slipp, 1948); however, there was a significant decline in sighting beginning in the 1940s (Everitt et al., 1979; Calambokidis et al., 1992), but recent increased sightings may indicate their return to the area. From 2003 to 2013, the Northwest Marine Mammal Stranding network documented 255 harbor porpoise strandings in Washington Inland Waters (Barre, 2014). There were no sightings in Saratoga Passage near NAS Whidbey Island, but the potential does exist for this species to occur within the study area.

The Dall's porpoise occurs in the inland waters year-round, but abundance and distribution varies between summer and winter (Calambokidis, 2006). They are most frequently observed in the Strait of Juan de Fuca and Haro Strait between San Juan Island and Vancouver Island (Nysewander et al., 2005). Dall's porpoises have been documented in Saratoga Passage, with all but one sighting occurring in the winter (WDFW, 2008; Nysewander et al., 2005).

3.8.2.4 Special Status Marine Wildlife

3.8.2.4.1 Federal Threatened and Endangered Marine Species

Federally endangered and threatened marine species are managed by the NMFS and USFWS. Eight marine fishes and two marine mammal species (the humpback whale and Southern Resident killer whale) were identified as potentially occurring within the study area and are discussed further below (NMFS, 2016d) (Table 3.8-8).

Table 3.8-8 NMFS/USFWS-managed Federally Endangered and Threatened Species and Critical Habitats Identified by IPaC as Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Federal Status*	*Critical Habitat Present?*	*Occurrence*
Fish				
Green sturgeon (Southern DPS)	*Acipenser medirostris*	Threatened	Yes	Confirmed: Primarily expected to be found on seafloor habitats, but individual fish may occur at the surface on rare occasion.
Eulachon (Southern DPS)	*Thaleichthys pacificus*	Threatened	No	Confirmed: Non-breeding eulachon may be present in Puget Sound.

Table 3.8-8 NMFS/USFWS-managed Federally Endangered and Threatened Species and Critical Habitats Identified by IPaC as Potentially Occurring within the Study Area

Common Name	*Scientific Name*	*Federal Status*	*Critical Habitat Present?*	*Occurrence*
Bull trout	*Salvelinus confluentus*	Threatened	Yes	Confirmed: Study area does not overlap with suitable spawning streams, but the species is found along the marine shoreline.
Dolly Varden	*Salvelinus malma*	Proposed Similarity of Appearance (Threatened)	No	Under the "Similarity in Appearance" provision of the ESA, the occurrence is the same as bull trout
Chinook salmon (Puget Sound Evolutionarily Significant Unit [ESU])	*Oncorhynchus tshawytscha*	Threatened	Yes	Confirmed: May occur in the marine waters and freshwater streams and rivers around Whidbey Island and within the study area.
Hood Canal summer-run chum	*Oncorhynchus keta*	Threatened	Yes	Confirmed: May occur in the marine waters around Whidbey Island and within the study area.
Steelhead (Puget Sound DPS)	*Oncorhynchus mykiss*	Threatened	Yes	Confirmed: May occur in the marine waters and freshwater streams and rivers around Whidbey Island and the within study area.
Bocaccio rockfish (Puget Sound/Georgia Basin DPS)	*Sebastes paucispinis*	Endangered	Yes	Confirmed: Expected to use deepwater habitats and may use nearshore habitats.
Yelloweye rockfish (Puget Sound/Georgia Basin DPS)	*Sebastes ruberrimus*	Threatened	Yes	Confirmed: Expected to use deepwater habitats and may use nearshore habitats.
Mammals				
Humpback whale (Mexico DPS)	*Megaptera novaengliae*	Threatened	No	Seasonal to rare in some areas, with highest likelihood spring to fall
Humpback whale (Central America DPS)	*Megaptera novaengliae*	Endangered	No	Seasonal to rare in some areas, with highest likelihood spring to fall
Killer Whale (Southern Resident)	*Orcinus orca*	Endangered	Yes	Confirmed: May occur in Puget Sound. Likely to rare, depending on water body

Sources: USFWS, 2017; NMFS, 2017; Carretta et al., 2016.

3.8.2.4.1.1 Green Sturgeon

The green sturgeon is an anadromous fish that is widely distributed from coastal Mexico to the Bering Sea, Alaska. Green sturgeon are comprised of two distinct populations: the Northern DPS and Southern DPS (Adams et al., 2002). Fish originating south of (and not including) the Eel River of northern California and to the south belong to the Southern DPS, and fish originating from the Eel River and to the north belong to the Northern DPS. The Southern DPS was listed as threatened under the ESA in 2006, and a Northern DPS listing was "not warranted" under the ESA but as a Species of Concern. Critical habitat for the green sturgeon Southern DPS was designed in 2009 (74 FR 52300) and includes waters off the western shore of the NAS Whidbey Island complex. During the designation of the critical habitat, the physical and biological features that were determined essential for the conservation of the Green Sturgeon Southern DPS in freshwater riverine systems included:

- abundant food resources important for larval, juvenile, subadult, and adult life stages
- substrates suitable for egg deposition and development, larval development, and subadults and adults (e.g., substrates for holding and spawning)
- water flow regime necessary for normal behavior, growth, and survival of all life stages
- water quality, including temperature, salinity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages
- a migratory pathway necessary for the safe and timely passage of Southern DPS fish within riverine habitats and between riverine and estuarine habitats (e.g., an unobstructed river or dammed river that still allows for safe and timely passage)
- water depth of deep (more than 16 feet) holding pools for both upstream and downstream holding of adult or subadult fish, with adequate water quality and flow and with high associated turbulence and upwelling that are critical for adult green sturgeon spawning
- sediment quality necessary for normal behavior, growth, and viability of all life stages

During the designation of the critical habitat, the physical and biological features that were determined essential for the conservation of the Southern DPS in estuarine areas included:

- specific benthic species critical for the rearing, foraging, growth, and development of juvenile, subadult, and adult green sturgeon within bays and estuaries
- sufficient water flow into the bay estuary to allow adults to successfully orient to the incoming flow and migrate upstream to spawning grounds
- water quality, including temperature, salinity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages (same as Green Sturgeon Southern DPS in freshwater riverine systems)
- a migratory pathway necessary for the safe and timely passage of Southern DPS fish within estuarine habitats and estuarine and marine habitats
- a diversity of water depths necessary for shelter, foraging, and migration of juvenile, subadult, and adult life stages. Subadult and adult green sturgeon occupy a variety of depths with bays and estuaries for feeding and migration.
- sediment quality necessary for normal behavior, growth, and viability of all life stages (same as Green Sturgeon Southern DPS in freshwater riverine systems)

During the designation of the critical habitat, the physical and biological features that were determined essential for the conservation of the Southern DPS in coastal marine areas include:

- abundant food resources for subadults and adults, which may include benthic invertebrates and fish
- coastal marine waters with adequate dissolved oxygen levels and acceptably low levels of contaminants (e.g., pesticides, polyaromatic hydrocarbons, and heavy metals that may disrupt the normal behavior, growth, and viability of subadult and adult green sturgeon)
- a migratory pathway necessary for the safe and timely passage of Southern DPS fish within marine habitats and marine and estuarine habitats

Green sturgeon spawn in freshwater, inland rivers. Reproductive males and females range from 15 to 28 years old and 19 to 34 years old, respectively (Van Eenennaam et al., 2006). Green sturgeon are believed to spawn every 3 to 5 years from March through July (Moyle, Foley, and Yoshiyama, 1992). Within the study area and region of Whidbey Island, there are no known spawning sites. The only known active spawning sites for Southern DPS green sturgeon in the U.S. are from the Sacramento River in California (Moyle, Foley, and Yoshiyama, 1992; NMFS, 2005a). Northern DPS green sturgeon are known from the Klamath Rivers of California and Rouge River of Oregon (Moyle, Foley, and Yoshiyama, 1992; Erickson et al., 2002; Rien et al., 2001).

Juvenile green sturgeon spend 1 to 3 years in their natal river and then return to the ocean as adults, where they widely disperse, generally to northern regions (Nakamoto, Kisanuki, and Goldsmith, 1995; Moyle, Foley, and Yoshiyama, 1992; Erickson et al., 2002). The feeding and behavior of adults is not well studied, but adults from the Sacramento River feed along the ocean bottom on crustaceans, mollusks, and fish (Moyle, Foley, and Yoshiyama, 1992; Houston, 1988). In a study of green sturgeon originating from the Rouge River, Oregon, fish were found at depths up to 490 feet and spent most of their time at depths of 131 to 328 feet (Erickson and Hightower, 2007). However, rapid ascents to the ocean surface were noted several times per month in individual fish.

The Northern and Southern DPSs are distinct in their natal rivers, but as the fish enter their ocean habitat as adults, green sturgeon from both DPSs may co-occur and be of “mixed stock” (Israel and May, 2007; Lindley et al., 2011). There have not been any studies on the population structure of green sturgeon in Puget Sound, but fish in other portions of Washington (i.e., Willapa Bay, Grays Harbor, and the Columbia River) were comprised of both Southern and Northern DPSs (Lindley et al., 2011).

While there are no spawning rivers near to Puget Sound, green sturgeon are known to occur in Puget Sound, and critical habitat has been designated near the study area and Whidbey Island (Figure 3.8-4). Green sturgeon are primarily expected to be found on ocean-bottom habitats, but individual fish may occur at the surface on rare occasion.

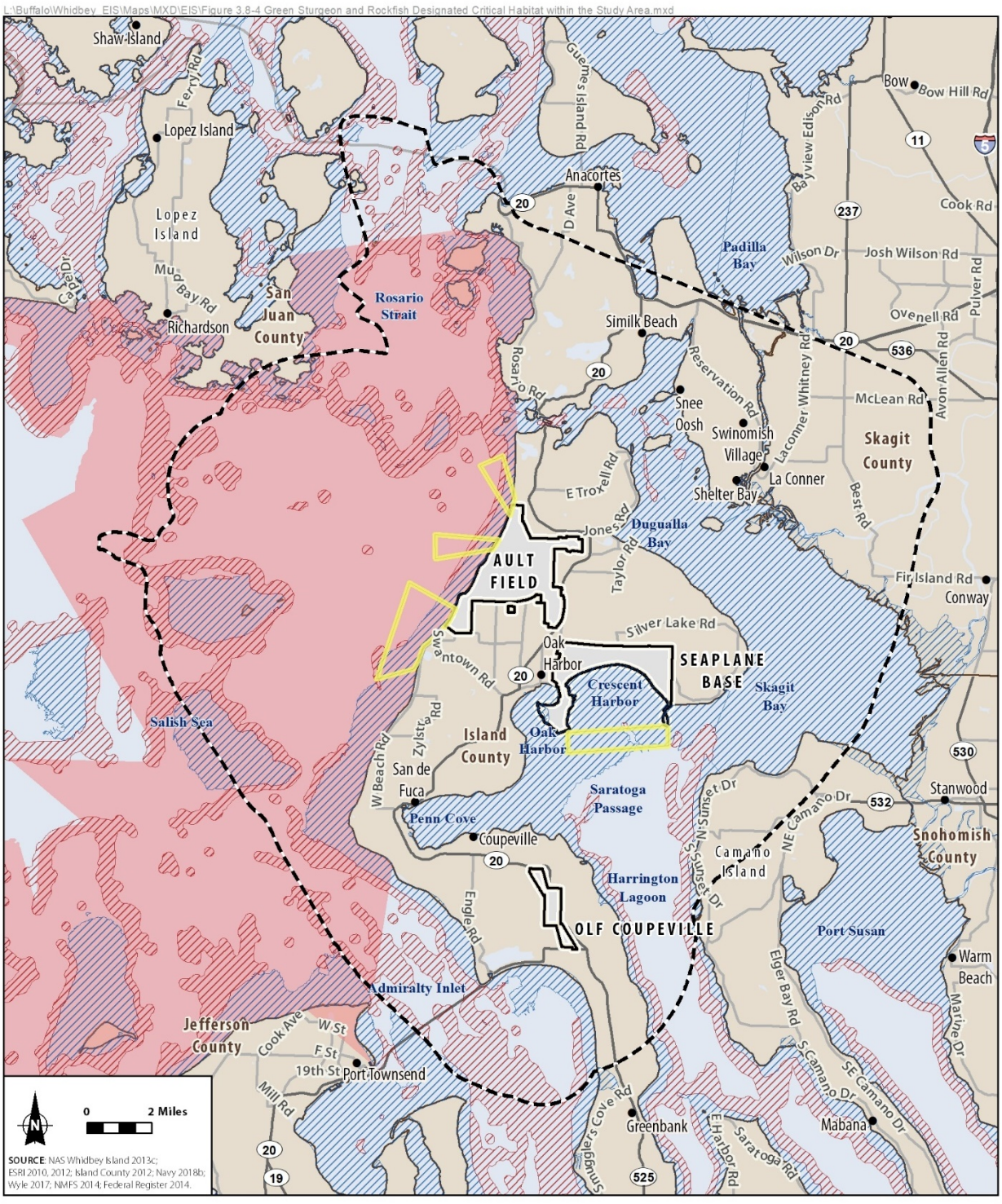


Figure 3.8-4
Green Sturgeon and Rockfish Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

3.8.2.4.1.2 Eulachon

The eulachon is an anadromous species of smelt that is distributed from northern California to the Bering Sea (NMFS, 2008). On March 18, 2010, NMFS listed the southern DPS of eulachon as threatened under the ESA, and critical habitat was listed on October 20, 2011. The Southern DPS of eulachon includes fish from the Mad River in northern California to the Skeena River in British Columbia (NMFS, 2016a).

Eulachon spawn in the lower reaches of mainland Pacific rivers. The eulachon spawning season is generally in early spring and varies widely across the species' range (NMFS, 2008). Eulachon reproduce at 2 or 3 years of age (Willson et al., 2006). Eulachon return to marine habitats as immatures and adults, but little is known about their distribution during non-natal periods. Most data gathered are as bycatch from commercial fisheries, particularly shrimp trawlers. Eulachon appear to prefer ocean bottom habitats at moderate depths, from 65 to 660 feet (Hay and McCarter, 2000), but occur at depths up to 2,000 feet (Allen and Smith, 1988). Both juvenile and adult eulachon feed on plankton such as copepods and euphausiids (NMFS, 2008, 2016a; Willson et al., 2006). Eulachon are preyed on by many species of marine mammals, fish, and birds.

In the study area and on Whidbey Island, there are no known spawning rivers. In Washington, eulachon spawn in the Nooksack River to the north of Whidbey Island, and the Elwha, Bogahchiel, Queets, Quinault, Moclips, Cupalis, Grays Harbor, Willapa Bay, and Columbia Rivers to the south (Willson et al., 2006). The nearest critical habitat to the study area is the Elwha River, west of Port Angeles (Shaffer et al., 2007; NMFS, 2016a). Spawning eulachon are known to be common in some of the Washington estuaries such as Grays Harbor, Willapa Bay, and the Columbia River, but historical records suggest eulachon spawning in Puget Sound was always rare or uncommon (NMFS, 2008; Monaco et al., 1990; Emmett et al., 1991).

While there is no spawning habitat or critical habitat within the study area, non-breeding eulachon may be present in waters within Puget Sound.

3.8.2.4.1.3 Salmonids

Seven species of Pacific salmonids (or salmon) occur in the Puget Sound, and four federally listed salmon species have the potential or are known to occur within the waters in the study area: Chinook salmon, Hood Canal summer-run chum, steelhead, and bull trout. Chinook salmon, Hood Canal summer-run chum, and steelhead are discussed collectively in this section, while the bull trout is discussed separately in the section below. The Chinook salmon Puget Sound Evolutionarily Significant Unit (ESU) was listed as threatened in 1998, the Hood Canal summer-run chum was listed as threatened in 2005, and the steelhead Puget Sound DPS was listed as threatened in 2007 (Ford et al., 2010).

All four salmon species of the study area are anadromous and may migrate 100 miles or more up freshwater rivers and streams to spawn. Chinook salmon Puget Sound ESU and steelhead Puget Sound DPS spawn in freshwater rivers; Hood Canal summer-run chum depend more so on estuarine rivers (Healey, 1982). Salmon eggs and fry mature at their natal sites for varying amounts of time, depending on the species, and then juveniles migrate back to marine waters. In Puget Sound, juvenile Chinook and Hood Canal summer-run chum will often stay in estuarine waters, feeding close to the shoreline and water surface (Fresh, 2006; Toft et al., 2007).

As salmon mature, they expand into deeper waters and more varied habitat (Fresh, 2006). Adult salmon occupy a variety of marine habitats; Chinook Puget Sound ESU predominately use coastal waters versus open ocean habitats (Healey, 1983), Hood Canal summer-run chum use open waters in the northeast Pacific Ocean (Neave, Yonemori, and Bakkala, 1976; Myers, 1993), and steelhead Puget Sound DPS tend to remain in offshore waters (Quinn and Myers, 2004; Myers et al., 1996).

Once reproductively mature, adult salmon migrate back to their natal rivers and complete their lifecycle. Chinook salmon Puget Sound ESU mature at ages 3 to 4 years (Myers et al., 1998), Hood Canal summer-run chum mature at ages 2 to 4 years (Ames, Graves, and Weller, 2000), and steelhead Puget Sound DPS mature at ages 2 to 3, although they may not spawn for another 1 to 3 years (NMFS, 2005b).

The Chinook salmon Puget Sound ESU is comprised of spawned fish from rivers that flow into the Puget Sound rivers from the Elwha River east to the Strait of Georgia at the U.S.-Canada border (NMFS, 1998). This population also includes hatchery-spawned fish at a number of facilities around the Puget Sound. Critical habitat for Chinook salmon Puget Sound ESU was designated in 2005 (70 FR 52630) and includes all of Whidbey Island and the surrounding marine areas (Figure 3.8-5). Nearby spawning critical habitat includes Quilceda Creek, the Stillaguamish River, Snohomish River, and Skykomish River. Critical habitat designation is exempted for lands on the NAS Whidbey Island complex owned and controlled, as well as management lands and tide lands (down to the extreme low tide line, -4.5 feet mean lower low water), based on implementation of an existing INRMP. Furthermore, critical habitat designation is also excluded from water-restricted areas off of Ault Field and Crescent Harbor off the Seaplane Base, based on probable national security impacts (NAS Whidbey Island, 2013a). Chinook salmon may occur in the offshore waters around Whidbey Island, especially juvenile fish that tend to prefer nearshore waters. There are no spawning sites within the study area and the NAS Whidbey Island complex.

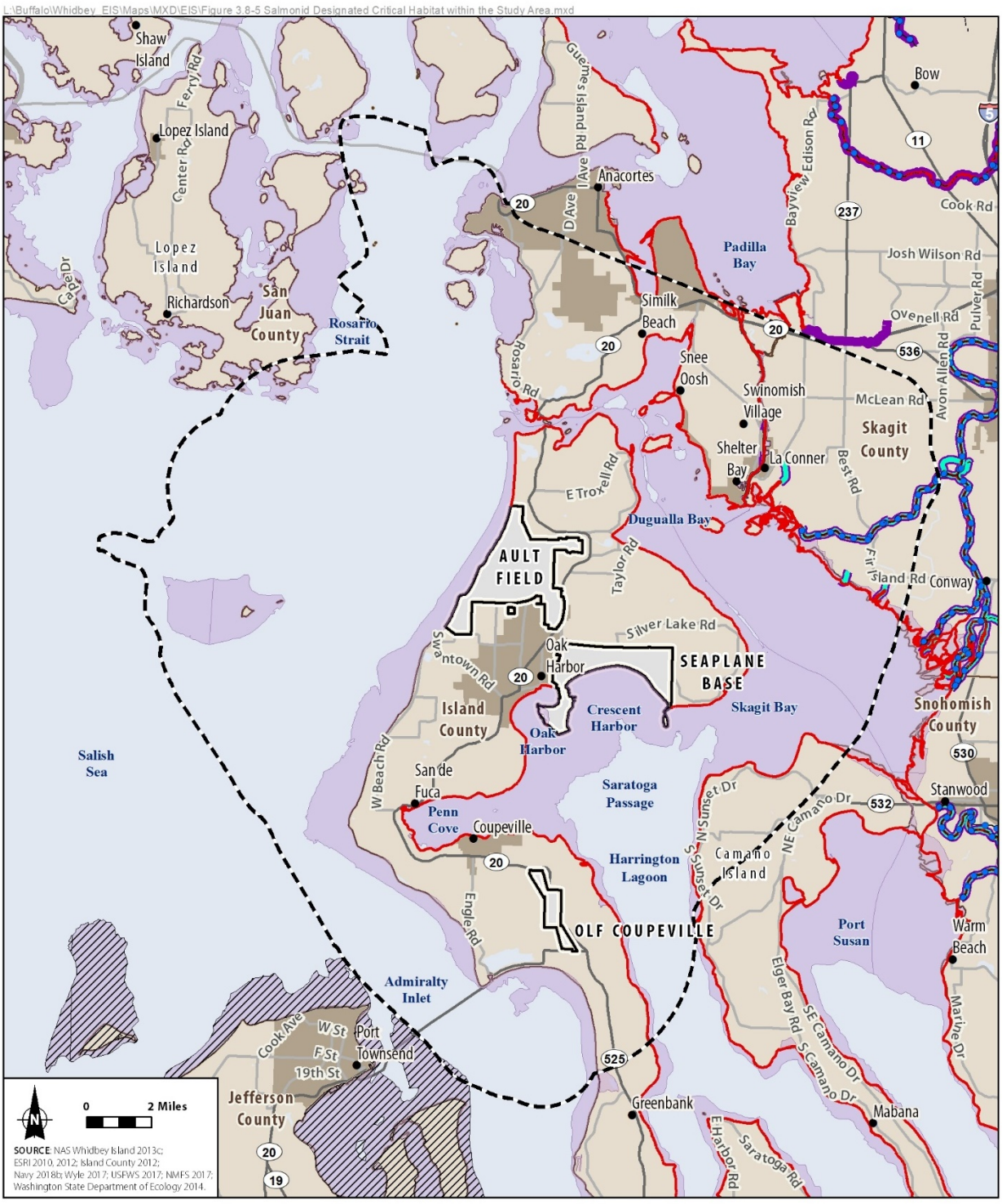


Figure 3.8-5
Salmonid Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

During the designation of the critical habitat, the specific primary constituent elements that were determined essential for the conservation of the Chinook salmon Puget Sound ESU, Hood Canal summer-run chum, and steelhead Puget Sound DPS included:

- freshwater spawning sites with water quantity and quality conditions and substrate to support spawning, incubation, and larval development
- freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks
- freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival
- estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation
- nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood , aquatic vegetation, large rocks and boulders, and side channels
- offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation

The Hood Canal summer-run chum population is comprised of fish spawned from the Hood Canal and its tributaries, and rivers in the Olympic Peninsula from the Hood Canal and Dungeness Bay. The ESU also includes hatchery-spawned fish from four programs. Critical habitat was designated in 2005 (70 FR 52630) and includes both rivers and nearshore waters in the Hood Canal and along the southern Puget Sound coastline to Dungeness Bay (Figure 3.8-5). The study area overlaps with critical habitat along its southwestern boundary. Waters adjacent to the NAS Whidbey Island complex are not included as critical habitat. The primary constituent elements essential for the conservation of the Hood Canal summer-run chum are the same primary constituent elements listed above for the Chinook salmon Puget Sound ESU. Hood Canal summer-run chum may occur in the offshore waters around Whidbey Island, especially juvenile fish that tend to prefer nearshore waters. There are no spawning sites within the study area and the NAS Whidbey Island complex.

The steelhead Puget Sound DPS is comprised of spawned fish from rivers that flow into the Puget Sound and includes the Elwha River, Hood Canal, South Sound, North Sound, and the Strait of Georgia, plus hatchery-spawned fish from six programs. Critical habitat was designed in February 2016 (70 FR 52630) and includes many river tributaries of Puget Sound from the Elwha River to the Canadian border (Figure 3.8-5). There is one river designated as critical habitat within the study area: the North Fork Skagit River. The primary constituent elements essential for the conservation of the steelhead Puget Sound DPS are the same primary constituent elements listed above for the Chinook salmon Puget Sound ESU and Hood

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

3.8.2.4.1.4 Bull Trout

The bull trout is a *Salmonidae* (salmon) and a native to western waters in North America. Populations of bull trout have four different life-history forms: fish that complete their lifecycle within one tributary (resident), fish that spawn in streams and mature in lakes (adfluvial), fish that spawn in streams and mature in rivers (fluvial), and fish that spawn in streams and mature in marine habitats (anadromous) (USFWS, 2014c). In November 1999, all populations of bull trout were listed as threatened under the ESA, including the Coastal-Puget Sound population of bull trout. The Coastal Puget Sound DPS of bull trout uniquely contains the anadromous life history.

The bull trout inhabits pristine, cold-water streams and lakes, and it requires connectivity between headwater streams and its river, lake, and/or ocean habitats for annual spawning and feeding migrations (USFWS, 2014c). In the study area, bull trout likely originate from the Skagit, Stillaguamish, and Snohomish Rivers. Anadromous bull trout tagged from the Skagit River entered marine waters of Skagit Bay from April to July and were located in the waters off the western coast of Whidbey Island (Hayes et al., 2011). Study fish used shallow nearshore habitats and did not travel far (less than 7.5 miles) from the mouth of their natal river.

The USFWS designated critical habitat for bull trout in 2005 and revised it in 2010 (75 FR 63898) (USFWS, 2010a). The current critical habitat designations include 754 miles of marine shoreline in Washington (Figure 3.8-5). The inshore extent of critical habitat is the mean higher high-water line, including the uppermost reach of the saltwater wedge within tidally influenced, freshwater heads of estuaries. Critical habitat extends offshore to the depth of 33 feet relative to the mean low low-water line. Within the study area, designated critical habitat occurs along most of the Skagit Bay shoreline; however, the NAS Whidbey Island complex shoreline was not included in the designation. During the designation of the critical habitat, the specific primary constituent elements that were determined essential for the conservation of the bull trout included:

- springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia
- migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers
- an abundant food base, including terrestrial organisms or riparian origin, aquatic macroinvertebrates, and forage fish
- complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that established and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks, and unembedded substrates to provide a variety of depths, gradients, velocities, and structure
- water temperatures ranging from 36 to 59 °F, with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

- in spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand and embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.
- a natural hydrograph, including peak, high, low, and base flows within historical and seasonal ranges, or, if flows are controlled, minimal flow departure from a natural hydrograph
- sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited
- sufficiently low levels of occurrence of nonnative predatory species (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding species (e.g., brook trout); or competing species (e.g., brown trout) that, if present, are adequately temporally and spatially isolated from bull trout

Within the study area, all coastal and marine waters are included within the Coastal Recovery Unit (USFWS, 2015d). The study area contains one "core area" of bull trout habitat (the Lower Skagit River) and includes the southern and eastern shorelines of Fidalgo Island and mainland shorelines. Bull trout are expected along all shorelines throughout the study area (Hayes et al., 2011), and they would potentially occur in the marine waters adjacent to Ault Field (NAS Whidbey Island, 2013a).

3.8.2.4.1.5 Dolly Varden

Dolly Varden are listed as a threatened species under the "Similarity of Appearance" provision. Dolly Varden closely resemble bull trout, and the two species cannot be easily distinguished from each other. As a result, please refer to the bull trout section, above. This species will not be discussed separately in subsequent sections of this document.

3.8.2.4.1.6 Rockfish

There are two federally listed rockfish species that have the potential or are known to occur within the study area: the bocaccio rockfish and yelloweye rockfish (NMFS, 2016b). Bocaccio rockfish are common in Oregon and California and are distributed from the Alaska Peninsula to central Baja California, Mexico (Drake et al., 2010). Yelloweye rockfish range from the Aleutian Islands to northern Baja, California (Love, Yoklavich, and Thorsteinson, 2002). On April 28, 2010, the bocaccio rockfish Puget Sound/Georgia Basin DPS was listed as endangered, and the yelloweye rockfish Puget Sound/Georgia Basin DPS was listed as threatened.

Bocaccio and yelloweye rockfish larvae and juveniles are pelagic and often found at or near (within 260 feet of) the water surface, drifting with nearshore and offshore kelp mats (Love, Yoklavich, and Thorsteinson, 2002; Busby, Matarese, and Mier, 2000). Compared to Pacific coastal waters, water exchange in the Puget Sound is low and results in more retention of these rockfish species, resulting in their distinct populations (Buonaccorsi et al., 2002; Drake et al., 2010). In Puget Sound, records of juvenile bocaccio and yelloweye rockfish are rare. This may be in part because these species may inhabit more offshore waters or because of the lack of studies and ability to identify juvenile fish to their species (Love, Yoklavich, and Thorsteinson, 2002; NMFS, 2014b).

As bocaccio and yelloweye rockfish age, they move to deeper waters within Puget Sound and surrounding waters. Adult bocaccio rockfish are generally found at depths between approximately 150

and 800 feet. Adult yelloweye rockfish are generally found at depths between approximately 150 and 1,300 feet and tend to have high site fidelity (DeMott, 1983; Love, Yoklavich, and Thorsteinson, 2002; Orr, Brown, and Baker, 2000). NMFS (2014b) summarized that together, adult yelloweye and bocaccio rockfish generally occupied habitats from approximately 90 to 1,400 feet.

Adult bocaccio rockfish first reach reproductive maturity after age 4 years (Drake et al., 2010), while yelloweye rockfish reach maturity at 15 years or older (Yamanaka and Kronlund, 1997). Rockfishes are long-lived fish, with lifespans exceeding 50 years. Yelloweye rockfish have been documented up to 118 years old.

In November 2014, the NMFS designated critical habitat (79 FR 68042) for the two rockfish species together: 590 square miles of nearshore habitat was designated for bocaccio rockfish, and 414 square miles of deepwater habitat was designated for yelloweye rockfish and bocaccio rockfish (Figure 3.8-4). The NAS Whidbey Island complex is bounded by nearshore critical habitat for the bocaccio rockfish. There are deepwater critical habitats for the bocaccio and yelloweye rockfish species within the study area. Adult rockfish are expected to use deepwater habitats away from the Whidbey Island shore. Juvenile rockfish, especially bocaccio rockfish, may occur nearshore to Whidbey Island and within the study area.

During the designation of the critical habitat, the physical and biological features that were determined essential for the conservation of the adult bocaccio and adult and juvenile yelloweye rockfish included:

- Benthic habitats or sites deeper than 98 feet (30 m) that possess or are adjacent to areas of complex bathymetry consisting of rock or highly rugose habitat, which are essential because these features support growth, survival, reproduction, and feeding opportunities by providing the structure for rockfishes to avoid predation, seek food, and persist for decades. Several attributes of these sites determine the quality of the habitat and are useful in considering the conservation value of the associated feature; these attributes include:
    - quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities
    - water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities
    - the type and amount of structure and rugosity that support feeding opportunities and predator avoidance

The physical and biological features that were determined essential for the conservation of the juvenile bocaccio include:

- Juvenile settlement habitats located in the nearshore with substrates such as sand, rock, and/or cobble compositions that also support kelp are essential for conservation because these features enable forage opportunities, refuge from predators, and behavioral and physiological changes needed for juveniles to occupy deeper, adult habitats. Several attributes of these sites determine the quality of the habitat and are useful in considering the conservation value of the associated feature; these attributes include:
    - quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities

- water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities

3.8.2.4.1.7 Humpback Whale

The humpback whale was listed as endangered under the ESA in 1970 (WDFW, 2013). On September 8, 2016, NMFS revised the ESA listing for humpback whales, separating the population into 14 DPSs. Two DPSs occur in the study area: the Mexico DPS and Central America DPS. Based on evidence of population recovery, the Central America DPS occurring in the study area remained listed as endangered, and the Mexico DPS was down-listed (to threatened) from the U.S. Endangered Species List (NMFS, 2016c). NMFS has not designated a critical habitat for the humpback whale. Humpback whales inhabit all of the world's major oceans, with the California/Oregon/Washington breeding stock occurring in waters off Washington (NMFS, 2015a). Humpback whales spend the summer months in feeding grounds at higher latitudes, and most individuals occur off Washington from July to September (WDFW, 2013; NMFS, 2015a). Their preferred feeding grounds are shallow, cold coastal waters (NMFS, 2015a). The California/Oregon/Washington stock migrates to its calving grounds off the coast of Mexico and Central America for the winter (WDFW, 2013; NMFS, 2015a). This stock was estimated at more than 2,000 individuals in 2007-2008 (WDFW, 2013). While they are most commonly observed off the coast of northern Washington, humpback whales are rare visitors to Puget Sound (Burke Museum of Natural History and Culture, 2013; WDFW, 2013).

3.8.2.4.1.8 Killer Whale (Southern Resident)

The Southern Resident population consists of about 75 individuals across three social groups identified as the J, K, and L pods, and this population was listed as endangered under the ESA in 2005 (WDFW, 2013; NMFS, 2015b).

Southern resident killer whales occur primarily in U.S. and Canadian waters in and around the San Juan Islands from late spring to fall (WDFW, 2013; NMFS, 2015b). During the remainder of the year, they move to the outer coast and travel to sites as far north as southeastern Alaska and as far south as central California. Their primary food source is salmonids, particularly Chinook salmon (*Oncorhynchus tshawytscha*).

The NMFS designated critical habitat for the Southern Resident killer whale in the waters around the San Juan Islands, Puget Sound, and the Strait of San Juan de Fuca in 2006 (71 FR 69062) (Figure 3.8-6; NMFS, 2006). The critical habitat designation excluded the waters within the boundaries of 18 military sites in the area, including within the study area and the NAS Whidbey Island complex. The critical habitat does not include waters shallower than 20 feet (6.1 m), based on extreme high water. The physical and biological features that were determined essential for the conservation of the killer whale (Southern Resident) include:

- water quality to support growth and development
- prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth
- passage conditions to allow for migration, resting, and foraging

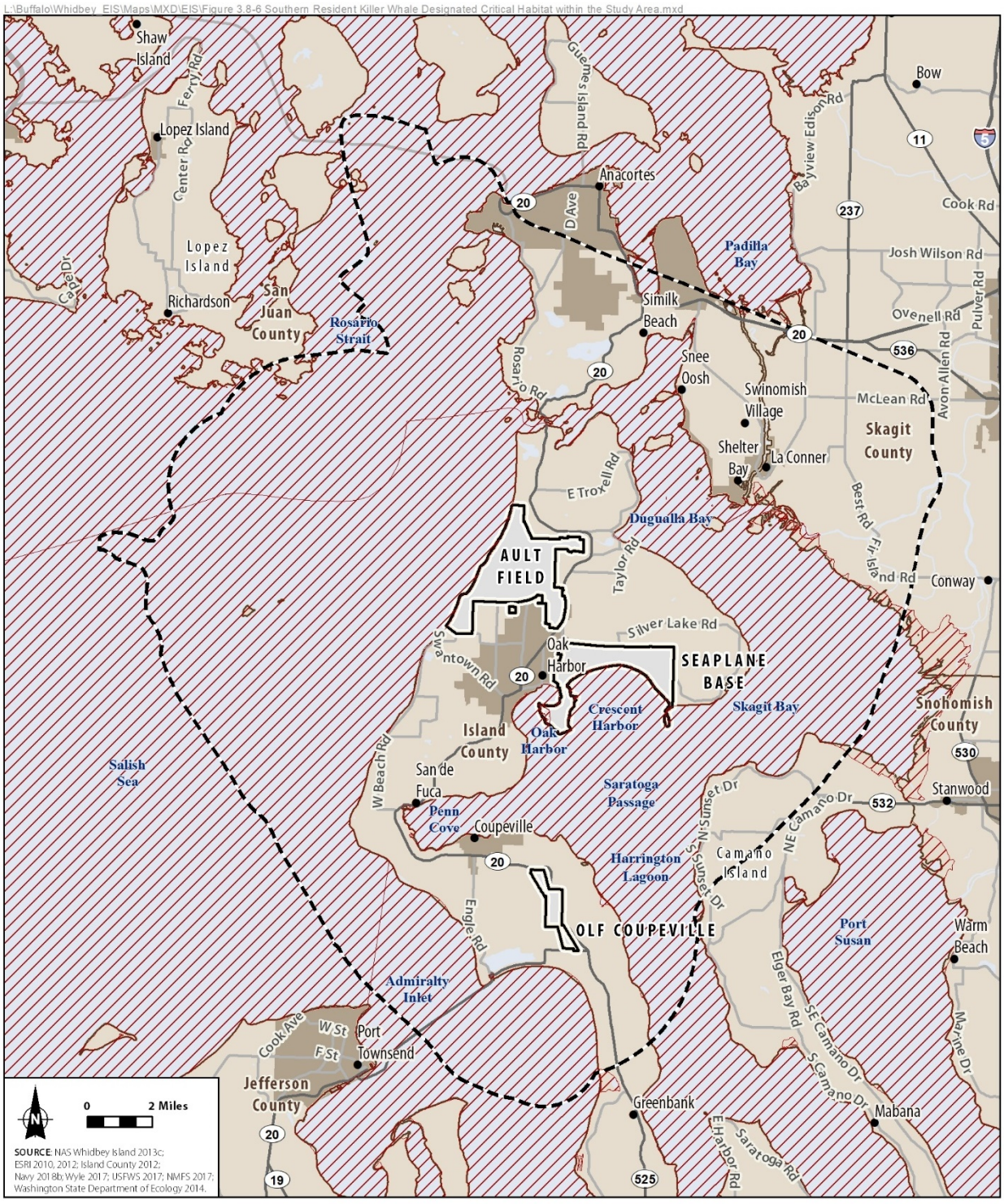


Figure 3.8-6
Southern Resident Killer Whale Designated Critical Habitat within the Study Area
Whidbey Island, Island County, WA

3.8.2.4.2 State Threatened and Endangered Marine Species

Three species of marine mammals that potentially occur in the waters of the study area are listed by the State of Washington. Two of these species, the humpback whale and Southern Resident killer whale, are also federally listed under the ESA. The gray whale is listed as sensitive by the state, but it is not protected under the ESA. Approximately six to 10 gray whales visit the marine waters near Whidbey Island each year, arriving beginning in January and staying until summer (WDFW, 2013).

3.9 Water Resources

This discussion of water resources includes groundwater, surface water, marine waters, marine sediments, wetlands, and floodplains. This section discusses the physical characteristics of these water resources; wildlife and vegetation are addressed in Section 3.8, Biological Resources. Water quality refers to the suitability of water for a particular use (i.e., potable water, irrigation) based on selected physical, chemical, and biological characteristics.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A Total Maximum Daily Load is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards occur.

Wetlands are transitional zones between the terrestrial and aquatic environments, and they include jurisdictional and non-jurisdictional wetlands. Jurisdictional wetlands are those that meet the three criteria (hydrology, hydric soils, and hydrophytic vegetation [i.e., plants occurring in saturated soils]) defined in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation manual. Wetlands are jointly defined by the USEPA and USACE as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Wetlands are generally associated with drainages, stream channels, and water discharge areas (both natural and man-made) and include “swamps, marshes, bogs and similar areas” (40 CFR section 230.3[t] and 33 CFR section 328.3[b]).

Groundwater is water that flows or seeps downward and saturates soil or rock, supplying springs and wells. Groundwater is typically found in aquifers with high-porosity soil where water can be stored between soil particles and within soil pore spaces. Groundwater is used for water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition.

Floodplains are areas of low-level ground present along rivers, stream channels, large wetlands, or coastal waters. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplain boundaries are most often defined in terms of frequency of inundation—that is, the 100-year and 500-year flood. The area subject to a 1-percent chance of flooding is referred to as the 100-year floodplain, while the area subject to a 0.2-percent chance of flooding is referred to as the 500-year floodplain. Floodplain

delineation maps are produced by the Federal Emergency Management Agency (FEMA) and provide a basis for comparing the locale of the Proposed Action to the floodplains.

Sediments are the solid fragments of organic and inorganic matter created from weathering rock transported by water, wind, and ice (glaciers) and deposited at the bottom of bodies of water. Components of sediment range in size from boulders, cobble, and gravel to sand (particles 0.05 to 2.0 millimeters [mm] in diameter), silt (0.002 to 0.05 mm in diameter), and clay (less than or equal to 0.002 mm in diameter). Sediment deposited on the Continental Shelf is delivered mostly by rivers but also by local and regional currents and wind. Most sediment in nearshore areas and on the Continental Shelf is aluminum silicate derived from rocks on land that is deposited at rates of greater than 10 centimeters per 1,000 years. Sediment may also be produced locally as nonliving particulate organic material ("detritus") that travels to the bottom (Hollister, 1973; Milliman et al., 1972). Some areas of the deep ocean contain an accumulation of the shells of marine microbes, composed of silicon and calcium carbonate, termed biogenic ooze (Chester, 2003). Through the downward movement of organic and inorganic particles in the water column, substances that are otherwise scarce in the water column (e.g., metals) are concentrated in bottom sediment (Chapman et al., 2003; Kszos et al., 2003).

3.9.1 Water Resources, Regulatory Setting

3.9.1.1 Federal Regulations

Waters of the U.S. are defined as 1) traditional navigable waters, 2) wetlands adjacent to navigable waters, 3) non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow perennially or have continuous flow at least seasonally (e.g., typically 3 months), and 4) wetlands that directly abut such tributaries.

The full regulatory definition of Waters of the United States is provided in the USEPA regulations found in 40 CFR Part 122. The term "Waters of the United States" has a broad meaning under the Clean Water Act (CWA) and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Jurisdictional Waters of the United States regulated under the CWA include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, and "other" waters that, if degraded or destroyed, could affect interstate commerce. Wetlands are currently regulated by the USACE under Section 404 of the CWA as a subset of all Waters of the United States. EO 11990, Protection of Wetlands, requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

The CWA requires that the State of Washington establish a Section 303(d) list to identify impaired waters and establish Total Maximum Daily Loads for the sources causing the impairment. While Section 303(d) of the CWA requires a report on impaired waters, Section 305(b) requires states to provide a description of water quality of all waters of the state, including rivers/streams, lakes, estuaries/oceans, and wetlands (Washington State Department of Ecology, 2015b). Per USEPA guidance, the Washington State Department of Ecology submits a combined report to the USEPA to fulfill the state's obligation under CWA sections 303(d) and 305(b).

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge material or fill into wetlands and other Waters of the United States. Any discharge of dredge material or fill into Waters of the United States requires a permit from

the USACE. The CWA also establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES) program, on the amounts of specific pollutants that can be discharged into surface waters to restore and maintain the chemical, physical, and biological integrity of the water. The NPDES program regulates the discharge of point (i.e., end of pipe) sources of water pollution.

Section 438 of the Energy Independence and Security Act (42 U.S.C. section 17094) establishes stormwater design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 square feet must "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow."

The principal federal regulation concerning the protection of groundwater is the Safe Drinking Water Act of 1974. This act was set forth to protect the nation's public water supplies, including groundwater, in areas where it is the main potable water source.

EO 11988, Floodplain Management, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development unless it is the only practicable alternative. Flood potential of a site is usually determined by the 100-year floodplain, which is defined as the area that has a 1-percent chance of inundation by a flood event in a given year. No construction would occur within FEMA-mapped floodplains under any of the proposed alternatives. Therefore, there would be no impacts on floodplains because all three alternatives would be fully consistent with EO 11988.

Section 10 of the Rivers and Harbors Act provides for USACE permit requirements for any in-water construction. The USACE and some states require a permit for any in-water construction. Permits are required for construction of piers, wharfs, bulkheads, pilings, marinas, docks, ramps, floats, moorings, and like structures; construction of wires and cables over the water, and pipes, cables, or tunnels under the water; dredging and excavation; any obstruction or alteration of navigable waters; depositing fill and dredged material; filling of wetlands adjacent or contiguous to Waters of the United States; construction of riprap, revetments, groins, breakwaters, and levees; and transportation of dredged material for dumping into ocean waters. No new in-water construction would occur under any of the proposed alternatives; therefore, this regulation is not addressed further in this EIS.

The National Wild and Scenic Rivers System was created by Congress in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The National Wild and Scenic Rivers Act (16 U.S.C. 1271 et seq.) is notable for safeguarding the special character of these rivers while also recognizing the potential for their appropriate use and development. The act encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection. There are no designated wild and scenic rivers on Whidbey Island; therefore, wild and scenic rivers will not be discussed further.

The Navy supports the development and implementation of state coastal non-point pollution control programs on Navy lands consistent with applicable laws and regulations. These could include identifying non-point sources, specifying corrective measures, and coordinating non-point source compliance efforts with state programs. The Navy also identifies areas of sensitive natural resources of the coastal zone, minimizes the loss or degradation of coastal wetlands, enhances the natural value of wetlands, and protects water quality. The Navy encourages research and development efforts to address non-

point sources of pollution to identify and understand Navy impacts on the coastal and marine environment.

3.9.1.2 State and Local Regulations

In the State of Washington, water resource regulations are contained in a series of chapters of the RCW known as the Water Resources Act of 1971 (Chapter 90.54 RCW) (Washington State Department of Ecology, n.d.[a]). The Washington State Department of Ecology, Water Resources Program, ensures voluntary compliance with these laws and will take enforcement actions when voluntary compliance is not provided.

The Washington State Wetland Rating System categorizes wetlands based on specific attributes such as rarity, sensitivity to disturbance, and functions (Hruby, 2004). This rating system was designed to differentiate between wetlands based on their sensitivity to disturbance, their significance, their rarity, the ability to replace them, and the functions they provide. The rating system, however, does not replace a full assessment of wetland functions that may be necessary to plan and monitor a project of compensatory mitigation. The "rating" categories are intended to be used as the basis for developing standards for protecting and managing the wetlands to reduce further loss of their value as a resource (Hruby, 2004). The rating system is primarily intended for use with vegetated, freshwater wetlands as identified using the State of Washington wetland delineation method (WAC, 1997; Hruby 2004).

Water quality standards for the surface waters of the State of Washington regulate point source pollution through permitting of both stormwater discharge and wastewater discharge (Washington State Department of Ecology, n.d.[b]). These permits stipulate specific limits and conditions of allowable discharge. The USEPA approved the marine Water Quality Assessment 305(B) reports and the 303(d) list of impaired waterbodies for Washington on December 21, 2012 (Washington State Department of Ecology, n.d.[c]). The 2014 report was submitted to the USEPA on September 28, 2015; however, because this report has not been approved by the USEPA, the 2012 report is considered the most current for this EIS (Washington State Department of Ecology, n.d.[d]).

Water quality standards for the groundwaters of the State of Washington include regulations regarding the Underground Injection Control (UIC) Program and water consumption. The UIC Program regulates discharges to UIC wells, which are man-made structures used to discharge fluid into the subsurface, including drywells, infiltration trenches, perforated pop, or any structure deeper than the widest surface dimension (Washington State Department of Ecology, n.d.[e]). They are generally used to discharge stormwater and sanitary waste. Water use is regulated through a state permit and certificate system that relies on a "first in time, first in right" policy, meaning applicants who apply first are given priority (Washington State Department of Ecology, n.d.[a]). The Water Code, enacted in 1917 (90.03 RCW), requires a permit or certificate for all uses of surface water. Exemptions include water for livestock, non-commercial lawns less than 0.5 acre, single homes, and industrial purposes (no acreage limit). These laws make it illegal to divert or withdraw water.

The Washington NPDES stormwater program requires that construction site operators obtain a construction Stormwater General Permit for any activates that will include clearing, grading, and excavating that could disturb 1 or more acres and discharge stormwater to surface waters. Operators must 1) develop stormwater pollution prevention plans, 2) implement sediment, erosion, and pollution prevention control measures, and 3) obtain coverage under the permit (Washington State Department of Ecology, n.d.[f]). Construction or demolition that necessitates an individual permit also requires

preparation of a Notice of Intent to discharge stormwater and a stormwater pollution prevention plan that is implemented during construction. As part of the 2010 Final Rule for the CWA, titled *Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category*, activities covered by this permit must implement non-numeric erosion and sediment controls and pollution prevention measures.

Authorized under the Water Pollution Control Act, Model Toxic Control Act, and Puget Sound Water Quality Authority Act, the Sediment Management Standards established standards for the quality of surface sediments (WAC, 1995). The purpose of the standards is to reduce and eliminate adverse effects on biological resources and health threats to humans from surface sediment contamination. The standards designate the maximum level of sediment contamination allowed and outline cleanup actions and standards.

Floodplain management guidelines establish statewide authority for floodplain management through regulatory programs that are compliant with the minimum standards of the National Flood Insurance Program (WAC, 2002). Regulatory areas include areas within the FEMA-designated 100-year flood plain.

Chapter 15.01 of Island County municipal code established the stormwater management program, which was created as a way to fund stormwater control facilities in the Marshall Drainage Basin in Island County. Owners of properties that have been determined to contribute to stormwater runoff and that would benefit from control facilities are required to pay fees to fund the program.

Chapter 15.03 of Island County municipal code established the clean water utility to allow for the management of surface water drainage to protect surface and groundwater quality in unincorporated areas of Island County that are located outside the Marshal Drainage Basin. Properties owned by the federal government are excluded from the utility.

3.9.2 Water Resources, Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under water quality resources at the NAS Whidbey Island complex.

3.9.2.1 Groundwater

Groundwater beneath the NAS Whidbey Island complex is present in three main aquifer systems: the shallow, intermediate, and deep aquifers. The aquifers are composed of sand or sand and gravel with confining layers of till, clay, and silt. The shallow aquifer is a major water-bearing zone on Whidbey Island and generally ranges in depth from 20 to 145 feet below ground surface; the intermediate aquifer extends throughout the northern portion of Whidbey Island, and its water levels are generally 5 to 20 feet beneath the shallow aquifer; and the deep aquifer (or sea-level aquifer) is a continuous water-bearing zone on Whidbey Island, with water levels ranging from 11 to 17 feet above sea level (Simonds, 2002).

The USEPA has designated the Whidbey Island aquifer system as a sole-source aquifer: it is the only supply of potable water for at least half of the island's residents. There is no viable alternative source of drinking water for those using groundwater, and the aquifer boundaries have been defined (URS, 1995).

Water-level data from environmental investigations at the NAS Whidbey Island complex and regional studies indicate that groundwater flow at Ault Field generally follows surface topography. Most of the groundwater underlying Ault Field converges in the central runway areas and likely discharges eastward

to Dugualla Bay. Groundwater along the western side of Ault Field appears to discharge westward to the Strait of Juan de Fuca (EA EST, 1996).

NAS Whidbey Island does not use groundwater as a source of drinking water. Rather, treated surface water is piped to the installation from the Skagit River. The City of Oak Harbor uses the Skagit River for 75 percent of its drinking water, with the remaining 25 percent supplied by three municipal wells. Island County residents near Ault Field who are not located in the Oak Harbor water district use private wells for drinking water.

In the mid-1990s, contaminated groundwater was found to be migrating westward off site toward private water supply wells in Oak Harbor (ATSDR, 2010). The source of this groundwater contamination was a former landfill located in the southeastern portion of the installation. In response, the Navy designed an extraction and treatment system to treat and control the migration of contaminated groundwater. All private wells in the vicinity of the contaminant plume were closed, and the residences were connected to public water supplies (ATSDR, 1993).

3.9.2.1.1 Per- and Polyfluoroalkyl Substances

The Defense Environmental Restoration Program (DERP) is addressing past releases of per- and polyfluoroalkyl substances, commonly known as PFAS. PFAS have been used in a variety of industrial and military applications, including as a component in aqueous film-forming foam (AFFF), which is routinely used to extinguish fuel fires. PFAS may be present in the soil and/or groundwater at Navy sites as a result of historical fire-fighting activities using this foam. In May 2016, the USEPA issued drinking water health advisories for two PFAS, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), in accordance with the Safe Drinking Water Act (*Federal Register*, 2016; USEPA, 2016i, 2016j, 2016k). PFAS are a type of "emerging contaminant," which is a chemical or material characterized by a perceived, potential, or real threat to human health or the environment or by a lack of published health standards (DoD, 2009b).

An emerging contaminant is a constituent:

- of relatively recent environmental concern that has a reasonably possible pathway to enter the environment
- that presents a potential unacceptable human health or environmental risk, and
- that does not have regulatory standards based on peer-reviewed science, or the regulatory standards are evolving due to new science, detection capabilities, or pathways (DoD, 2009b).

The Navy is committed to ensuring all individuals who live or work on or in the vicinity of Navy installations and facilities receive safe drinking water. Installation-wide assessments are being conducted to identify potential PFOA and PFOS release sites and prioritize future site investigations and remediation based on potential risk to drinking water sources. Locations where PFOA and/or PFOS may have migrated to off-installation drinking water sources are being proactively identified. Where USEPA lifetime health advisory levels have been exceeded, the Navy has provided alternative drinking water.

Based on historical use of AFFF, there are three areas of PFAS investigation identified at the NAS Whidbey Island complex: Ault Field, the Area 6 Former Landfill, and OLF Coupeville. Drinking water wells within 1 mile downgradient of known or suspected release sites at Ault Field and OLF Coupeville were tested to determine whether they were impacted from past releases of AFFF. Drinking water wells

within 0.5 mile downgradient to the east and south of the Area 6 Former Landfill were tested to determine whether they were impacted from past releases of AFFF.

As of June 29, 2018, the Navy had sampled 233 drinking water wells in the areas surrounding Ault Field, the Area 6 Former Landfill, and OLF Coupeville properties. Of the total 233 wells sampled, 15 wells are above the USEPA's lifetime health advisory level established for PFOS and/or PFOA. Where USEPA lifetime health advisory levels have been exceeded, the Navy has provided alternative drinking water until a long-term solution can be established.

The Navy implemented a robust public outreach initiative for Island County that included outreach meetings at multiple locations across the county, including eight public meetings from November 21, 2016, to June 18, 2018. Three public meetings were held in Coupeville and five in Oak Harbor. Public outreach efforts included the following: press releases issued to inform the public of meeting times, locations, and other pertinent information; mailing over 3,000 letters to property owners and Public Water Supply Districts whose drinking water wells are within the Navy's areas of investigation; postcards sent to property owners in advance of public meetings; emails sent to interested members of the public since December 2016; website updates with the latest information on the Navy's drinking water PFAS investigation; and phone calls to each property owner who had his or her drinking water sampled by the Navy, notifying them within 24 hours of receipt of analytical results. Partner agencies that participated in all public meetings include the USEPA Region 10, Agency for Toxic Substances and Disease Registry Region 10, Washington State Department of Health, and Island County Public Health. The Navy's DERP investigation is ongoing, and additional updates will be provided to the public as information becomes available. The DERP investigation is not part of the Proposed Action for this EIS.

3.9.2.2 Surface Water

NAS Whidbey Island currently holds a USEPA-issued NPDES permit for stormwater discharges associated with industrial activity. This permit requires stormwater monitoring, inspections, training/awareness, documentation, reporting, and implementation of control measures, including Best Management Practices (BMPs) to reduce and/or eliminate stormwater pollutant discharge.

The installation's Spill Prevention Control and Countermeasures Plan provides guidance that would be used in a spill response, such as response procedures, a notification and communication plan, roles and responsibilities, and response equipment inventories. In the event of an accidental spill, response measures would be implemented immediately to minimize potential impacts to the surrounding environment.

Surface water on Whidbey Island generally occurs on soils with low infiltration rates or in streams or constructed ditches due to runoff from precipitation or flowing springs. Low infiltration rates usually occur on clay soils, soils with a high water table, or shallow soils over impervious materials. A minor amount of surface water results from discharge from shallow aquifers.

No significant rivers or streams occur on Whidbey Island. The island's streams tend to be short coastal tributaries draining into cleared lands or, in some instances, lands with residual forest stands. Most of the streams on the island have densely vegetated riparian zones dominated by deciduous trees and shrubs. The streams tend to be shallow, and most of them carry a reduced water volume during the summer months, with the flow becoming subsurface in some stream reaches.

The freshwater streams occurring on the NAS Whidbey Island complex fall within two categories: 1) coastal streams draining small watersheds or water bodies, and 2) complexes of drainage channels manipulated for specific land-management purposes. The latter were originally shallow, meandering watercourses that were channelized and straightened, and the attendant riparian vegetation was removed.

Several created ponds occur at Ault Field on the golf course and at the Seaplane Base (Penfold Pond). Extensive marsh areas are found at the Seaplane Base. The Lake Hancock site includes a coastal lagoon and a saltwater slough draining the lagoon. Stormwater on Ault Field and the Seaplane Base is collected via storm drains, underground pipes, and open ditches and is discharged into the Strait of Juan de Fuca, Dugualla Bay, Crescent Harbor, and Oak Harbor.

Water quality in the ditched channels at Ault Field is considered poor. These ditches accumulate significant amounts of sediments that are contaminated with aromatic hydrocarbons and heavy metals, primarily from discharge from the flight line and hangar complex (NAS Whidbey Island, 2013a). The ditches are regularly dredged to maintain stormwater conveyance. Silt fences are erected during dredging operations to minimize downstream impacts.

To control non-point source pollution, the exposure of stormwater runoff to contaminants must be controlled. Developing stormwater and erosion-control measures, implementing standard stormwater BMPs, and educating station personnel are proactive measures to limit the exposure of stormwater to contaminants.

Examples of BMPs for controlling non-point source pollution include, but are not limited to:

- Activities in uncovered areas such as vehicle maintenance, chemical or waste oil storage, or transferring potential contaminants will be conducted in covered areas so stormwater will not wash contaminants into storm drains or surface waters.
- Areas that cannot be covered should have their stormwater runoff retained and diverted to the sanitary sewer system.
- The storm drain system should not to be used to dump or discharge any materials or chemicals. All departments should notify the Environmental Division before conducting any operations that may discharge materials or washes into the system. This includes water from vehicle washing. All storm drains should be labeled with no dumping signs.

3.9.2.3 Wetlands

Wetlands at the NAS Whidbey Island complex occur on soils with low infiltration rates, in streams, or in constructed ditches. Wetlands that are not within stream channels or ditches occupy about 1,147 acres of land within the NAS Whidbey Island complex. Wetlands in streams and ditches are not defined in the installation's INRMP by area but by linear mile, and they total 24.5 miles (NAS Whidbey Island, 2013a). The primary functions of the wetlands at the NAS Whidbey Island complex are to provide fish and wildlife habitat, flood attenuation, and water quality enhancement (Navy, 1996). A freshwater pond is present to the north of Ault Field. No wetlands are located in or adjacent to proposed construction areas. The closest wetland is approximately 0.8 mile away.

3.9.2.4 Floodplains

No areas at Ault Field are located in FEMA flood zones. FEMA defines the project area as Zone X (Griffin, 2012). Zone X areas are outside of both the 1-percent (100-year) and 0.2-percent (500-year) floodplains. The 100-year floodplain is a term used to describe an area that statistically has a 1-percent chance of flooding in any given year, while a 500-year floodplain is a term used to describe an area that statistically has a 0.2-percent chance of flooding in any given year. Storm-related tidal flooding occasionally occurs east of the runways, next to the eastern boundary of the installation, during winter storms when high winds combine with extreme high tides on Dugualla Bay to bring the tidal surge farther inland than normal (EA EST, 1996). The runway ditch network handles stormwater drainage for Ault Field and the surrounding area.

3.9.2.5 Marine Waters and Sediments

Water circulation, temperatures, and quality are complicated by the geography of the Puget Sound region. The Strait of Juan de Fuca is a weakly stratified estuary with strong tidal currents. The western end of the strait is strongly influenced by ocean processes, whereas the eastern end is influenced by intense tidal action occurring through and near the entrances to numerous narrow passages. Seasonal variability in temperature and salinity is small because the waters are vertically well mixed. In the eastern portion of northern Puget Sound, temperature and salinity vary from north to south, with the waters in the Strait of Georgia being slightly warmer than the waters near Admiralty Inlet. Waters near Admiralty Inlet also tend to have higher salinity than waters to the north. Dissolved oxygen levels vary seasonally, with lowest levels of about 4 milligrams per liter at depth during the summer months and highest levels of about 8 milligrams per liter near the surface (Gustafson et al., 2000). Major sources of freshwater are the Skagit and Snohomish Rivers located in the Whidbey Basin; however, the annual amount of freshwater entering Puget Sound is only 10 percent to 20 percent of the amount entering from the Strait of Georgia, primarily through the Fraser River (Gustafson et al., 2000).

Sediment characteristics around Whidbey Island include mixed fine-grained materials, including fine-grained sands, silts, and clays in bays and estuaries, and sands and gravels in deeper waters that grade out to finer sands toward the western end of the Strait of Juan de Fuca (Gustafson et al., 2000).

Longshore drift moves sediment in a northerly direction along the west side of Whidbey Island. Bluff erosion is evident near Rocky Point, along approximately one mile of shoreline, and along a stretch extending from the Recreational Vehicle Park northward for 0.4 mile (SCS, 1991). Long-term bluff erosion has been measured near the west end of Eighth Street at about 5.5 inches per year (SCS, 1991). Sediment samples from the Proposed Action area were found to be below the Washington State Sediment Quality Standards and Cleanup Screening Levels (SEE, 2011a, 2011b). Site SC13 located just south of the existing finger pier was the exception, with several polyaromatic hydrocarbon compounds detected at levels that exceeded the SQS or CSL. Sediments from the proposed dredging area were found to be suitable for in-water disposal at the Port Gardner non-dispersive disposal site (Dredged Material Management Program, 2011).

3.10 Socioeconomics

This section discusses population demographics, employment characteristics, schools, and housing occupancy status data and provides key insights into socioeconomic conditions that might be affected by the Proposed Action.

Socioeconomics is defined as the social, demographic, and economic characteristics of a demographic area such as a town, city, county, or state. Included in this resource analysis is a description and an assessment of the potential impacts to population and demographics; economy, employment, and income; housing stock; local government revenue and expenditures; and community services and facilities. The affected area for socioeconomic analysis is defined as the area where the principal effects from operating Growler aircraft at the NAS Whidbey Island complex are expected to occur.

3.10.1 Socioeconomics, Regulatory Setting

Socioeconomic data shown in this section are presented at the U.S. Census Bureau tract, city/town, county, and state levels to characterize baseline socioeconomic conditions in the context of regional and statewide trends. Data have been collected from previously published documents issued by federal, state, and local agencies and from state and national databases (e.g., the U.S. Bureau of the Census, the U.S. Bureau of Economic Analysis, and the U.S. Bureau of Labor Statistics).

3.10.2 Socioeconomics, Affected Environment

For the purposes of this EIS, the socioeconomic analysis concentrates on the communities most likely affected by actions at the NAS Whidbey Island complex, namely the Town of Coupeville; the Cities of Oak Harbor, Anacortes, and Mount Vernon; and Island and Skagit Counties, Washington. These communities were selected for several reasons. Historically, the vast majority (95.1 percent) of Navy personnel assigned to the NAS Whidbey Island complex have chosen to live within these communities. (See Table 3.10-2 for the exact breakdown by community). Therefore, it is expected that personnel associated with the Proposed Action would likely also reside in these communities. Areas that experience the most population growth would also likely experience the most significant impacts to housing, community services, local government spending, and economic activity. Therefore, these communities are included in the economic study area. Additionally, for each alternative and scenario, the greater than 65 dB DNL noise contours fall within the communities listed above. Finally, given the geographic nature of the area, the region of economic influence of Island County is somewhat restricted. Island County only has direct ground transportation links to Skagit County; ferry services must be used to access other nearby counties. This lack of easy access limits cross-county spending and, therefore, limits the impact economic activity in Island County would have on surrounding communities. As a result, this socioeconomic analysis focuses primarily on Island and Skagit Counties.

The analysis of potential impacts to the tourism industry is the one exception. Due to the economic importance of the tourism industry to San Juan County and the location of some of the greater than 65 dB DNL contours associated with the Proposed Action, the study area for the analysis of the tourism industry includes Island, Skagit, and San Juan Counties.

Because most economic statistics are collected and published on a county-wide basis, the socioeconomic analysis in the following sections is presented at this level. However, the analysis of community services and facilities, where impacts are more localized and where more local data are available, was completed on a municipal level.

3.10.2.1 Population, Affected Environment

3.10.2.1.1 NAS Whidbey Island Complex

In FY 2021, a total of 9,908 military, civilian, contractor, and non-appropriated fund civilian personnel are expected to be stationed at or employed by the NAS Whidbey Island complex. In addition, an estimated 5,627 military dependents are expected to be connected to the NAS Whidbey Island complex in 2021. Table 3.10-1 provides a summary of expected future base loading at the NAS Whidbey Island complex by personnel type.

Table 3.10-1 Military and Civilian Personnel Expected to be Assigned to the NAS Whidbey Island Complex in 2021

	Total Personnel FY 21
Military Personnel	8,129
Civilian	721
Contractor	521
Non-appropriated Fund Civilian[1]	537
Total Personnel	**9,908**

Source: Delaney, 2016

Note:
[1] A non-appropriated fund civilian personnel position is a job funded from non-appropriated fund sources and is not dependent on the DoD appropriations budget.

Key:
DoD = U.S. Department of Defense
FY 21 = Fiscal Year 2021

Table 3.10-2 shows a categorization of where personnel stationed at or employed by the NAS Whidbey Island complex chose to reside. As shown on the table, the majority of these personnel live within Island County (approximately 85 percent), with the remaining personnel living in Skagit County or in other communities outside the immediate region. These figures include both those personnel living in military housing (41.6 percent) as well as those renting or owning homes in the neighborhoods surrounding the station. The City of Oak Harbor was home to nearly 42 percent of those individuals stationed or employed by the NAS Whidbey Island complex (see Table 3.10-2).

Table 3.10-2 Personnel Stationed and Employed at the NAS Whidbey Island Complex by Place of Residence

County/Municipality	*% of Personnel*
Island County	
NAS Whidbey Island complex	41.6
City of Oak Harbor	40.8
Town of Coupeville	2.7
Subtotal	85.1
Skagit County	
Anacortes	7.1
Mount Vernon	2.9
Subtotal	10.0
Other (municipalities in various counties each with <2%)	4.9
Total	**100**

Source: Coury, 2018.

3.10.2.1.2 Island and Skagit Counties

Many of the communities surrounding the NAS Whidbey Island complex have experienced substantial population growth since 2000. Table 3.10-3 presents actual, estimated, and projected population totals for Island and Skagit Counties and for the Cities or Towns of Oak Harbor, Coupeville, Anacortes, and Mount Vernon from 2000 to 2030. Between 2000 and 2016, total population in Island County increased by approximately 12.0 percent, while population in the City of Oak Harbor increased by 13.9 percent and population in the Town of Coupeville increased 22.1 percent during the same time period. Skagit County experienced a slightly greater rate of population increase. Between 2000 and 2016, total population in Skagit County increased by 17.0 percent. During the same time period, the total population in the City of Anacortes increased by 11.5 percent, and the total population in the City of Mount Vernon increased by 27.3 percent. The State of Washington as a whole experienced a population increase of approximately 20.0 percent from 2000 through 2016 (see Table 3.10-3).

Table 3.10-3 Total Population Counts, Estimates, and Projections for Communities in the Study Area Surrounding the NAS Whidbey Island Complex

Geographic Area	Total Population				
	2000 (actual)	2010 (actual)	2016 (estimated)	2020 (projected)	2030 (projected)
Washington State	5,894,121	6,724,540	7,073,146	7,638,415	8,503,178
Island County	**71,558**	**78,506**	**80,113**	**84,044**	**89,848**
Coupeville	1,723	1,831	2,104	N/A	N/A
Oak Harbor	19,795	22,075	22,544	N/A	N/A
Skagit County	**102,979**	**116,901**	**120,475**	**130,705**	**146,880**
Anacortes	14,557	15,778	16,229	N/A	N/A
Mount Vernon	26,232	31,743	33,388	N/A	N/A

Sources: USCB, 2002, 2012a, 2012b, n.d.[a]; Washington State Office of Financial Management, 2017

Note: The Washington Office of Financial Management does not provide population projections for towns or cities.

Key:
N/A = Not Available

Total population in the region is expected to continue to grow, albeit at a slower pace than seen over the past decade. By 2030, total population in Island County is expected to reach 89,848 residents, and total population in Skagit County is expected to reach 146,880 residents (see Table 3.10-3). Population projections are not available at the city or town level in Washington State (Washington State Office of Financial Management, 2017).

3.10.2.2 Economy, Employment, and Income, Affected Environment

3.10.2.2.1 NAS Whidbey Island Complex

The NAS Whidbey Island complex has a large influence on the local and regional economy. According to a 2010 report that analyzed the economic impact of DoD expenditures in the State of Washington, Navy Region Northwest (which includes Naval Base Kitsap and Naval Station Everett in addition to the NAS Whidbey Island complex) employed just over 39,000 persons, had a payroll of approximately $2.08 billion, and was responsible for approximately $52 million in other expenditures in FY 09 (Berk and Associates, 2010).

The report noted that the State of Washington's defense installations were responsible for $7.9 billion in expenditures in FY 09 and that companies in the state received $5.2 billion in DoD contracts in that year. In particular, companies in Island County received almost $136 million in DoD contracts (Berk and Associates, 2010).

After deducting that part of the defense installations' expenditures and DoD contracts spent in other states, the State of Washington's defense installations contributed almost $8.7 billion in expenditures directly into the state's economy in FY 09. These expenditures generated an additional indirect or multiplier impact on the state's economy. In FY 09, the defense installations and the DoD contracts resulted in a total (direct and indirect) economic impact of almost $12.2 billion in the State of Washington, an amount equivalent to almost 4 percent of the state's gross state product (i.e., the final value of all goods and services produced in the state) in that year (Berk and Associates, 2010).

Another study conducted by the Island County Economic Development Council specifically to determine the economic benefits that the NAS Whidbey Island complex has on Island and Skagit Counties found that the Navy annually injects approximately $726 million into Island County's economy via salary and payroll expenditures, $44 million through retirement and disability payments, and $18 million via health care expenditures. In addition, the study found that the Navy annually injects approximately $15 million via salary and payroll expenditures in Skagit County, $28 million through retirement and disability payments, and $14 million via health care expenditures (Island County EDC, 2013).

3.10.2.2.2 Island and Skagit Counties

The economic characteristics of the two counties in the study area differ. Island County's economy revolves around the military, health and educational facilities, retail trade, and manufacturing. The NAS Whidbey Island complex was the largest single employer in the county (Island County EDC, 2013). The largest civilian (non-military) employment sector in 2016 in Island County was the "educational services, and health care and social services" sector, which provided jobs to approximately 20.9 percent of the employed civilian work force. Other large industrial sectors in the county during the same time period included manufacturing; public administration; retail trade; and the professional, scientific, and management, and administrative and waste management services sector (see Table 3.10-4).

In contrast, Skagit County has a fairly well-rounded economy. While best known regionally for its agriculture, Skagit County receives more than a third of its gross domestic product from manufacturing. Oil refining in Anacortes, marine and aerospace industries, food manufacturers, and other specialty/niche manufacturing industries all contribute to the county's economic health. Health care and education services are also important for the regional economy (Washington Employment Security Department, 2015). The largest employment sectors in 2016 in Skagit County were the educational services, and health care and social services sector; the retail trade sector; the manufacturing sector; and the arts, entertainment, and recreation and accommodation and food services sector (see Table 3.10-4).

Table 3.10-4 Civilian Employment[1] by Industrial Sector for Communities within the Study Area Surrounding the NAS Whidbey Island Complex in 2016

	Washington State	*Island County*	*Coupeville*	*Oak Harbor*	*Skagit County*	*Anacortes*	*Mount Vernon*
Agriculture, forestry, fishing and hunting, and mining	2.70%	1.40%	2.70%	1.90%	4.30%	1.60%	6.80%
Construction	6.10%	7.40%	3.50%	3.60%	8.10%	5.80%	8.10%
Manufacturing	10.50%	12.40%	3.40%	10.30%	12.20%	11.40%	11.90%
Wholesale Trade	2.90%	2.20%	1.30%	1.40%	2.60%	1.50%	1.60%
Retail Trade	11.80%	10.20%	7.10%	9.10%	12.40%	12.70%	14.90%
Transportation and warehousing, and utilities	5.20%	5.10%	8.60%	5.20%	4.20%	5.30%	3.40%
Information	2.30%	1.90%	3.80%	0.90%	1.10%	1.20%	0.70%
Finance and insurance, and real estate and rental and leasing	5.40%	4.60%	1.60%	4.70%	4.20%	4.40%	2.70%
Professional, scientific, and management, and administrative and waste management services	12.50%	9.60%	13.70%	7.60%	8.70%	9.20%	8.30%
Educational services, and health care and social assistance	21.40%	20.90%	34.20%	22.20%	22.00%	23.40%	20.30%
Arts, entertainment, and recreation and accommodation and food services	9.20%	9.20%	4.40%	12.00%	10.80%	13.20%	13.20%
Other services, except public administration	4.70%	4.80%	6.70%	4.30%	5.10%	5.10%	4.80%
Public Administration	5.30%	10.30%	9.10%	17.00%	4.10%	5.20%	3.30%

Sources: USCB, n.d.[b]

Note: Due to rounding, totals may not sum.

[1] Table includes information for the civilian employed population 16 years of age and older. Persons in the Armed Forces, unemployed, and not in the labor force are not included in these percentages.

The two counties in the study area also vary greatly in terms of income and unemployment levels. In 2016, Island County had income levels that were comparable to those in the State of Washington as a whole. In 2016, the county had a per capita income of $32,503 and a median household income of $60,261. During the same time period, the State of Washington had an overall per capita income of $32,999 and an overall median household income of $62,848. However, the City of Oak Harbor and the Town of Coupeville had per capita and median household incomes that were below these levels (see Table 3.10-5) (USCB, n.d.[b]).

Table 3.10-5 Selected Economic Characteristics for the Communities in the Study Area Surrounding the NAS Whidbey Island Complex

Geographic Area	*Annual Average Unemployment Rate (2016)*	*Per Capita Income (2016)*	*Median Household Income (2016)*	*Percent of Population with Incomes below the Poverty Level (2016)*
Washington State	5.4%	$32,999	$62,848	12.7%
Island County	6.0%	$32,503	$60,261	9.5%
Coupeville	N/A	$31,729	$46,657	14.5%
Oak Harbor	N/A	$23,946	$46,959	14.0%
Skagit County	6.8%	$28,586	$56,433	15.0%
Anacortes	N/A	$35,156	$61,922	10.0%
Mount Vernon	6.9%	$22,195	$49,307	19.6%

Sources: USCB, n.d.[b]; USBLS, 2018

Note: The U.S. Bureau of Labor Statistics does not collect labor statistics for cities with fewer than 25,000 residents.

Key:
N/A = Not Available

In contrast, both per capita and median household income levels in Skagit County were significantly less than comparable statewide levels. In 2016, Skagit County had a per capita income level of $28,586 and a median household income level of $56,433 (see Table 3.10-5).

The percentage of persons living below the poverty line also varies throughout the study area. Island County had the smallest percentage of persons with incomes below the poverty level, with 9.5 percent of its population, while Skagit County had the higher percentage of low-income residents out of the two counties. The Town of Coupeville and the City of Mount Vernon had approximately 14.5 and 19.6 percent of their populations, respectively, living below the poverty level, while the City of Anacortes had 10.0 percent of its population with incomes below this level (see Table 3.10-5).

Unemployment rates were equally variable throughout the study area. As shown on Table 3.10-5, Island County had an average annual unemployment rate in 2016 of 6.0 percent, while Skagit County had a higher 2016 average annual unemployment rate of 6.8 percent. In comparison, the State of Washington had an average annual unemployment rate of 5.4 percent during the same time period (see Table 3.10-5).

3.10.2.2.2.1 Agriculture

While agriculture is not a large employment sector, it is still an important industry to the economies of Island and Skagit Counties. According to data provided by the USDA's 2012 Census of Agriculture and the U.S. Census Bureau's 2010 Census of Population and Housing, approximately 11.4 percent of the total land area in Island County and 9.6 percent of the total land area in Skagit County is farmland (USDA, National Agricultural Statistics Service, 2014; USCB [U.S. Census Bureau], 2012e).

In 2012, a total of 377 farms were operating on Island County and reported a total market value of sales as $11.5 million. Main agricultural products in the county included cattle and calves; vegetables, melons, potatoes, and sweet potatoes; and grains, oilseeds, dry beans, and dry peas (USDA, National Agricultural Statistics Service, 2014).

During the same time period, a total of 1,074 farms were operating in Skagit County, and their total market value of sales was $272.3 million. The primary agricultural products in Skagit County included nursery crops, greenhouse crops, floriculture and sod, vegetables, melons, potatoes, sweet potatoes, and milk from cows (USDA, National Agricultural Statistics Service, 2014).

A total of 426 workers were employed on Island County farms in 2012, of which 315 were considered seasonal and worked fewer than 150 days per year. An additional 111 agricultural workers were employed for more than 150 days per year. Likewise, a total of 6,881 workers were employed on Skagit County farms in 2012, of which 5,027 were considered seasonal workers and worked fewer than 150 days per year. An additional 1,854 workers were employed for more than 150 days per year.

According to the 2012 Census of Agriculture, only seven migrant workers, employed on a total of three farms, were reported in Island County in 2012. In addition, migrant workers were only reported on two farms in Skagit County during the same time period. The actual number of migrant workers was withheld to avoid disclosing data for individual farms (USDA, National Agricultural Statistics Service, 2014).

3.10.2.2.2.2 Tourism

Tourism, particularly ecotourism, is also a very important economic driver in the region around the NAS Whidbey Island complex. The following section provides a brief overview of the tourism industry in the region. Due to the importance of this sector to the communities in San Juan County and San Juan County's proximity to the NAS Whidbey Island complex, the economic study area for this resource has been expanded to include Island, Skagit, and San Juan Counties.

According to a report completed by Dean Runyan Associates (2015), the travel and tourism industry employs a significant number of workers in Island, San Juan, and Skagit Counties and generates a substantial amount of income for the regional economy. Data on annual travel expenditures, as well as earnings and employment statistics for the three counties from 1991 to 2014, are provided on Table 3.10-6. As shown in the table, travel expenditures supported approximately 2,000 jobs in Island County; 2,600 jobs in San Juan County; and 3,800 jobs in Skagit County in 2014. In addition, the industry generated an estimated $54.6 million in earnings in Island County, $59.3 million in earnings in San Juan County, and $87.9 million in earnings in Skagit County (see Table 3.10-6).

Table 3.10-6 Annual Travel Expenditures, Earnings, and Employment in Island, San Juan, and Skagit Counties (1991-2014)

	Island County			*San Juan County*			*Skagit County*		
Year	*Total Travel Spending (in $ millions)*	*Total Earnings, Travel and Tourism Sector (in $ millions)*	*Total Employment, Travel and Tourism Sector*	*Total Travel Spending (in $ millions)*	*Total Earnings, Travel and Tourism Sector (in $ millions)*	*Total Employment, Travel and Tourism Sector*	*Total Travel Spending (in $ millions)*	*Total Earnings, Travel and Tourism Sector (in $ millions)*	*Total Employment, Travel and Tourism Sector*
1991	$87.7	$26.6	2,930	$59.2	$18.7	1,340	$137.8	$38.7	3,400
1992	$93.3	$28.3	2,990	$68.9	$21.8	1,500	$144.7	$40.4	3,410
1993	$95.7	$29.2	3,030	$74.3	$23.6	1,590	$138.6	$38.7	3,210
1994	$96.1	$29.2	2,940	$78.0	$24.7	1,610	$148.6	$41.7	3,350
1995	$97.2	$29.5	2,850	$91.5	$29.1	1,840	$151.7	$42.5	3,280
1996	$100.0	$30.3	2,710	$98.8	$31.5	1,870	$154.4	$43.1	3,110
1997	$102.9	$30.9	2,690	$93.5	$29.5	1,700	$164.7	$45.6	3,200
1998	$102.3	$31.1	2,590	$105.8	$33.9	1,780	$168.6	$47.5	3,130
1999	$109.1	$33.8	2,670	$106.7	$34.9	1,990	$183.3	$53.3	3,420
2000	$115.8	$36.4	2,730	$118.2	$39.3	2,210	$190.9	$56.1	3,460
2001	$117.6	$37.2	2,580	$124.1	$41.7	2,120	$188.0	$55.8	3,420
2002	$117.9	$37.7	2,500	$123.7	$41.9	2,150	$186.7	$56.1	3,310
2003	$118.0	$37.7	2,400	$118.2	$40.4	1,970	$195.5	$58.7	3,330
2004	$129.3	$40.0	2,470	$129.4	$43.1	2,040	$208.9	$61.0	3,320
2005	$134.4	$41.1	2,430	$132.5	$44.2	2,000	$220.4	$63.7	3,360
2006	$144.7	$43.5	2,480	$135.6	$44.5	1,950	$241.6	$68.9	3,580
2007	$144.2	$42.8	2,310	$137.0	$44.7	1,870	$252.4	$72.1	3,630
2008	$152.5	$44.4	2,400	$139.9	$45.0	1,820	$260.7	$73.0	3,690
2009	$148.1	$45.2	2,400	$127.6	$42.1	1,670	$242.4	$71.1	3,440
2010	$150.8	$43.0	2,240	$135.0	$42.1	1,640	$262.4	$73.6	3,470
2011	$167.6	$46.1	2,360	$146.4	$45.8	1,760	$271.0	$75.9	3,480
2012	$170.8	$48.6	2,430	$161.5	$49.7	1,810	$288.6	$80.5	3,610
2013	$172.1	$51.8	2,560	$172.4	$56.5	1,960	$292.2	$84.5	3,700
2014	$179.8	$54.6	2,620	$193.2	$59.3	2,000	$306.3	$87.9	3,760

Source: Dean Runyan Associates, 2015.

Table 3.10-7 further divides the travel and tourism sector earnings and employment into industrial subsectors for 2014. As shown in the table, the accommodation and food service sector accounts for approximately 56.6 percent to 65.3 percent of all earning in the industry and approximately 46.2 percent to 64.0 percent of the total employment of the industry (see Table 3.10-7).

Table 3.10-7 Industry Earnings Directly Generated by Travel Spending by Subsector in Island, San Juan, and Skagit Counties: 2014 ($ millions)[1]

	Island County		*San Juan County*		*Skagit County*	
Industrial Subsector	*Earnings*	*Employment*	*Earnings*	*Employment*	*Earnings*	*Employment*
Accommodation and Food Service	$30.9	1,210	$38.7	1,280	$55.1	1,930
Arts, Entertainment, and Recreation	$12.7	990	$11.3	410	$15.6	1,200
Retail[2]	$8.4	330	$7.0	240	$12.9	480
Ground Transportation	$2.1	70	$1.4	40	$3.7	120
Other Travel[3]	$0.4	10	$0.9	30	$0.6	30
Total Direct Earnings	**$54.6**	**2,620**	**$59.3**	**2,000**	**$87.9**	**3,760**

Source: Dean Runyan Associates, 2015.

Note:
1 Due to rounding, totals may not sum.
2 Retail includes gasoline sales.
3 Other Travel includes air travel and ground transportation impacts for travel to other Washington visitor destinations, travel arrangement and reservation services, and convention and trade show organizers.

Finally, Table 3.10-8 provides estimates of the local and state government revenue that was generated by travel and tourism expenditures in Island, San Juan, and Skagit Counties in 2014. As shown on the table, travel and tourism spending generated approximately $5.4 million of local tax receipts in Island County; $5.7 million of local tax receipts in San Juan County; and $8.0 million of local tax receipts in Skagit County. In addition, travel and tourism spending in the three counties is estimated to have generated $43.9 million in tax revenues for the State of Washington (see Table 3.10-8).

Table 3.10-8 Government Revenue Directly Generated by Travel Spending by Sector in Island, San Juan, and Skagit Counties: 2014 ($ millions)

Government Level	*Island County*	*San Juan County*	*Skagit County*
Local Tax Receipts	$5.4	$5.7	$8.0
State Tax Receipts	$11.5	$12.6	$19.8
Total Local and State Tax Receipts	**$16.9**	**$18.3**	**$27.7**

Source: Dean Runyan Associates, 2015.

Note: Due to rounding, totals may not sum.

Table 3.10-9 indicates the volume of overnight visitors to each county in terms of person-nights and person-trips. The number of single-day trips is not estimated at the county level because of data limitations (Dean Runyan Associates, 2015). As shown on the table, in 2014 Island County visitor volume reached approximately 2.1 million person-nights, which included more than 1 million trips. Visitor

volume in San Juan County in 2014 was approximately 1.4 million person-nights, which included nearly 770,000 person-trips. Finally, visitor volume in Skagit County was estimated to be 1.6 million person-nights, which included more than 640,000 person-trips (see Table 3.10-9).

Table 3.10-9 Overnight Visitor Volume in Island and San Juan Counties: 2012-2014

	Person-Nights			*Person-Trips*[1]		
Accommodation Type	***2012***	***2013***	***2014***	***2012***	***2013***	***2014***
Island County						
Hotel/Motel	386,000	389,000	411,000	246,000	248,000	262,000
Private Home	1,289,000	1,286,000	1,319,000	597,000	596,000	611,000
Other Overnight[2]	402,000	401,000	405,000	147,000	147,000	148,000
Total Overnight Visitors/Trips	**2,078,000**	**2,076,000**	**2,135,000**	**991,000**	**990,000**	**1,021,000**
San Juan County						
Hotel/Motel	685,000	731,000	827,000	437,000	466,000	527,000
Private Home	262,000	263,000	269,000	121,000	122,000	124,000
Other Overnight[2]	313,000	314,000	317,000	116,000	116,000	117,000
Total Overnight Visitors/Trips	**1,260,000**	**1,308,000**	**1,413,000**	**674,000**	**704,000**	**769,000**
Skagit County						
Hotel/Motel	439,000	449,000	479,000	175,000	179,000	191,000
Private Home	907,000	903,000	924,000	372,000	370,000	379,000
Other Overnight[2]	206,000	206,000	208,000	74,000	74,000	75,000
Total Overnight Visitors/Trips	**1,551,000**	**1,557,000**	**1,610,000**	**621,000**	**623,000**	**644,000**

Source: Dean Runyan Associates, 2015.

Note: Due to rounding, totals may not sum.

1 Each overnight visitor's trip counted as "one" regardless of the number of nights stayed.

2 The category "other overnight" includes campgrounds and vacation homes. Visitation rates for these categories are not available individually.

Important outdoor attractions in the vicinity of the NAS Whidbey Island complex include Deception Pass State Park, Ebey's Landing National Historical Reserve, and the San Juan Islands National Monument.

Deception Pass State Park, which straddles Whidbey and Fidalgo Islands, is the most frequently visited state park in the State of Washington (Thrasher, 2017a; 2017b). The 4,134-acre park has over 100,000 feet of saltwater and freshwater shoreline and almost 50 miles of hiking, biking, and horse trails (Washington State Parks, n.d.[a]). Table 3.10-10 presents attendance figures for the park. According to statistics collected by the Washington State Parks Department, in 2016 nearly 2.9 million people visited Deception Pass State Park. The vast majority of these visitors were "day use" visitors. An estimated 121,000 visitors utilized the overnight moorage or camping facilities in 2016 (see Table 3.10-10). Visits to Deception Pass State Park generate an estimated $50 million in consumer expenditures annually (Earth Economics, 2015a).

Table 3.10-10 Estimated Visitors to Deception Pass State Park, 1987-2008 (every third year) and 2011-2016

Year	*Overnight Moorage*	*Camping*[1]	*Day Use*	*Total*
1987	6,460	101,051	2,801,676	**2,909,187**
1990	5,164	91,906	3,313,492	**3,410,562**
1993	4,954	87,634	4,193,567	**4,286,155**
1996	2,635	88,431	4,246,075	**4,337,141**
1999	1,565	97,701	2,101,211	**2,200,477**
2002	4,494	93,352	2,604,827	**2,702,673**
2005	4,704	99,654	2,430,703	**2,535,061**
2008	4,543	114,142	1,554,920	**1,673,605**
2011[2]	5,766	89,525	1,341,647	**1,436,938**
2012	6,940	109,974	2,122,165	**2,239,079**
2013	6,881	112,758	2,327,433	**2,447,072**
2014	120,002[3]		2,490,176	**2,610,178**
2015	119,915[3]		2,513,325	**2,633,240**
2016	120,684[3]		2,740,067	**2,860,751**

Source: Thrasher, 2017a; 2017b

Notes:
1 Includes both tent-camping sites and improved sites with utility hookups or cabins.
2 Methods utilized to collect visitor attendance data at Deception Pass State Park changed in 2011.
3 Breakout of overnight moorage and camping not available.

Ebey's Landing National Historical Reserve in central Whidbey Island consists of 17,572 acres and encompasses three state parks, three county parks, the Town of Coupeville, and an abundance of privately held rural land (NPS, n.d.[d]). An estimated 85 percent of land within Ebey's Landing National Historical Reserve is privately owned, and several landowners of farms and important open spaces have sold restricted development easements to the NPS to ensure the character is maintained (NPS, 2006a). In 1978, Ebey's Landing National Historical Reserve was formed as a "partnership" park to be managed by the NPS, Washington State Parks, Island County, and the Town of Coupeville, charged with "preserv[ing] a rural community which provides an unbroken historic record from…19th century exploration and settlement in Puget Sound to the present time" (Public Law 95-625 and U.S.C. Sec. 461, Section 508 of the Parks and Recreation Act of 1978). Today, Ebey's Landing National Historical Reserve attracts visitors interested in the history of the region and the Town of Coupeville as well as outdoor recreationists seeking scenic vistas; hiking, biking, and horse trails; beaches; birding; and water-based activities (Bishop, 2017; NPS, n.d.[d]). Estimating visitor trips to Ebey's Landing National Historical Reserve is difficult because of its varied attractions, numerous entrances and exits, and unique land management structure (Bishop, 2017). Recent grant applications submitted by the Trust Board of the Ebey's Landing National Historical Reserve have cited more than 1 million visitors annually as a rough estimate (Bishop, 2017). This roughly reflects the visitors to the state parks within Ebey's Landing National Historical Reserve annually plus additional history-seeking visitors interested in the Town of Coupeville and the historic landscape, and still others who travel to Ebey's Landing for summer camps, reunions, and weddings (Bishop, 2017). Table 3.10-11 provides estimated attendance figures for the state parks within Ebey's Landing National Historical Reserve in 2016 by overnight and day use. Table

3.10-12 provides historical attendance figures for the state parks within Ebey's Landing National Historical Reserve from 1987 to 2016.

Table 3.10-11 2016 Estimated Visitors to State Parks within Ebey's Landing National Historical Reserve

State Parks within Ebey's Landing NHR	*Overnight Camping[1]*	*Day Use*	*Total*
Fort Casey	18,874	605,904	624,778
Fort Ebey	24,020	184,862	208,882
Ebey's Landing	-	141,181	141,181

Source: Thrasher, 2017b

Note:
[1] Includes both tent-camping sites and improved sites with utility hookups or cabins. No camping sites are available in Ebey's Landing State Park.

Table 3.10-12 Estimated Total Visitors to State Parks within Ebey's Landing National Historical Reserve for Selected Years 1987-2016

	Fort Casey	*Fort Ebey*	*Ebey's Landing*	*Total*
1987	475,722	213,580	66,567	**755,869**
1990	514,429	255,593	45,559	**815,581**
1993	597,886	430,682	34,819	**1,063,387**
1996	483,858	384,376	34,271	**902,505**
1999	785,857	387,004	17,312	**1,190,173**
2002	741,519	305,734	88,847	**1,136,100**
2005	693,104	326,337	72,109	**1,091,550**
2008	726,331	166,140	120,093	**1,012,564**
2011	667,789	251,187	67,758	**986,734**
2012	914,548	281,135	86,256	**1,281,939**
2013	725,119	232,510	150,715	**1,108,344**
2014	480,858	80,615	141,480	**702,953**
2015	609,849	209,100	121,482	**940,431**
2016	624,778	208,882	141,181	**974,841**

Source: Thrasher, 2017a; 2017b

Based on a visitor study in summer 2007, the average total expenditure per person inside Ebey's Landing National Historical Reserve and on the surrounding area in Whidbey Island was $95 (University of Idaho, 2008). When expenditures were restricted to just those spent within Ebey's Landing National Historical Reserve, the average expenditure per person was $22. Approximately 44 percent of visitor groups spent no money inside Ebey's Landing National Historical Reserve, and 46 percent spent $100 or less inside and outside of the reserve during their visit. The San Juan Islands are more than 450 islands, rocks, and pinnacles located west of Whidbey Island in northern Puget Sound and a well-recognized tourist destination. The four ferry-served islands within the archipelago, San Juan, Orcas, Lopez, and Shaw islands, are the most populous and provide the most dining and lodging options and tourism activities. Of these, Lopez Island is the closest to the NAS Whidbey Island complex and hosts varied outdoor

activities including kayaking, hiking, fishing, whale watching, beach-going, and bicycling (visitsanjuanislands.com, 2017).

The San Juan Islands National Monument, established in 2013, consists of BLM-managed land within the archipelago totaling approximately 1,000 acres (BLM, n.d.[d]). Dozens of small islands and rocks are included in the monument, as are several small land tracts near the outer edges of the San Juan Islands. The nearest monument land tracts to the NAS Whidbey Island complex are Cape St. Mary, Chadwick Hill, Watmough Bay, Point Colville, and Iceberg Point. Lands within the monument contain contrasting landscapes, cultural resources, and diverse habitats for mammals, birds, and insects (BLM, n.d.[e]). A cited estimate is over 500,000 visitors to the San Juan Islands annually, but the number visiting the monument properties, specifically, is unknown (BLM, n.d.[c]). The monument lands are undeveloped and attract hikers, kayakers, photographers, campers, and nature enthusiasts.

Several Washington State Parks are within the San Juan Islands; those within the vicinity of the greater than 65 dB DNL noise contour include James Island, Spencer Spit on Lopez Island, and Turn Island. James Island Marine State Park is the only park in the San Juan Islands with territory inside the greater than 65 dB DNL noise contour. Recent and historical visitor numbers to these state parks are provided in Tables 3.10-13 and 3.10-14.

Table 3.10-13 2016 Estimated Visitors to State Parks in San Juan Islands near the NAS Whidbey Island Complex

WA State Park	*Overnight Camping or Moorage*[1]	*Day Use*	*Total*
James Island	2,141	8,713	10,854
Spencer Spit	18,285	32,145	50,430
Turn Island	1,105	8,335	9,440

Source: Thrasher, 2017b

Note:
[1] All onshore camping sites are tent sites; no sites with utility hookups or cabins are available. Moorage is also available for boaters staying overnight.

Table 3.10-14 Estimated Total Visitors to State Parks in San Juan Islands near the NAS Whidbey Island Complex for Selected Years 1987-2016

	James Island	*Spencer Spit*	*Turn Island*
1987	16,040	40,764	7,173
1990	12,416	97,226	5,779
1993	13,738	144,458	4,532
1996	15,349	84,528	6,430
1999	15,247	83,412	10,708
2002	18,701	94,205	20,190
2005	8,583	80,383	20,454
2008	n/a	68,154	n/a
2011	6,201	88,919	9,105
2012	15,036	74,443	11,314
2013	15,737	90,156	11,735
2014	10,753	75,558	8,225
2015	10,825	58,001	11,294
2016	10,854	50,430	9,440

Source: Thrasher, 2017a; 2017b

Key:
n/a = Not available

According to a study completed by Earth Economics for the State of Washington, visitors to Washington State Parks spend an average of $21 per person per day. Similarly, visitors to national parks and national recreation areas located in Washington State spend an average of $53 per visitor per day. As explained in the report, visits to federal lands typically generate high daily expenditures because frequently these areas are well-recognized destinations that attract visitors from greater distances who therefore visit for a longer duration. State lands attract high numbers of visitors; however, their trips tend be shorter and the total expenditure associated with them is lower (Earth Economics, 2015b).

3.10.2.3 Housing, Affected Environment

3.10.2.3.1 NAS Whidbey Island Complex

Military personnel stationed at the NAS Whidbey Island complex reside either in military-controlled bachelor or family housing or in private housing off station, with the vast majority of military personnel living in private sector housing in the local economy. The Navy provides housing to eligible military personnel stationed at the NAS Whidbey Island complex in either unaccompanied housing units (i.e., bachelor enlisted quarters) or in family housing units.

In May 2016, the NAS Whidbey Island complex had the capacity to house a maximum of 1,625 unaccompanied personnel in its bachelor enlisted quarters. These unaccompanied housing units consisted of 11 buildings with a combined total of 1,137 rooms and 1,625 beds. Personnel ranked E4 and above are entitled to single-occupancy rooms. No additional unaccompanied housing units are planned to be constructed between now and 2021. As of May 2016, there were 1,465 personnel residing in the unaccompanied housing units, equating to a 90.2-percent occupancy rate (Switalski, 2016).

As shown on Table 3.10-15, according to the Navy's preliminary *Housing Requirements and Market Analysis 2017-2022* study, a total of 3,409 unaccompanied personnel assigned to the NAS Whidbey Island complex are expected to require either military-controlled or private housing in the region. In 2017, an estimated 1,637 military-controlled housing units were available for unaccompanied personnel. An additional 1,339 adequate private housing units were available in the region. Several factors are utilized when determining whether a housing unit in the local community is considered acceptable, including, among other factors, commute time to the station, rental costs, number of bedrooms, and overall size of the housing unit. Consequently, in 2017, there was an estimated deficit of 433 unaccompanied personnel housing units (see Table 3.10-15).

Table 3.10-15 Total Unaccompanied Personnel Housing Needs and Military Family Housing Needs and Available Assets at the NAS Whidbey Island Complex in 2017 and 2022

NAS Whidbey Island Complex	*2017*	*2022*
Unaccompanied Personnel		
Unaccompanied Personnel Requiring Housing	3,409	3,905
Military-controlled Units	1,637	1,602
Adequate Private Housing	1,339	1,389
Surplus/(Deficit) of Unaccompanied Personnel Housing Assets	(433)	(914)
Military Families		
Military Families Requiring Housing	3,769	4,358
Military-controlled Units	1,509	1,510
Adequate Private Housing Units	2,084	2,902
Surplus/(Deficit) of Military Family Housing Assets	(176)	54

Source: Leidos, Inc., 2017.

By 2022, this deficit is anticipated to grow. According to the report, by 2022 there will be an estimated 3,905 unaccompanied personnel requiring housing at the NAS Whidbey Island complex. During the same time, the total number of military-controlled units will decline to 1,602, but the number of adequate private housing units available to these personnel is expected to grow to 1,389. Consequently, a deficit of 914 suitable housing units is projected for unaccompanied personnel by 2022 (see Table 3.10-15).

According to the study, 3,769 military families at the NAS Whidbey Island complex required housing units in 2017. In this time, a total of 3,593 adequate family housing units were estimated to be available to military families in the area, including 1,509 family housing units under military control and 2,084 acceptable private housing units in the community. Consequently, there was an effective housing deficit of 176 units for military families in 2017 (see Table 3.10-15).

However, by 2022, this deficit is expected to change into a slight surplus of 54 units. By 2022, an estimated 4,358 military families are projected to need housing at the NAS Whidbey Island complex. During the same time, a total of 4,412 adequate family housing units are projected to be available to military families residing in the area. The number of military-controlled family housing units is not expected to change substantially; however, an additional 818 adequate family housing units are projected to be constructed in the region by 2022 (see Table 3.10-15).

In 2017, a total of 1,509 military-controlled public-private venture family housing units were available at the NAS Whidbey Island complex, including 246 enlisted two-bedroom units; 702 enlisted three-

bedroom units; 347 enlisted four-bedroom units; two E7 to O6 two-bedroom units; 145 E7 to O5 three-bedroom units; and 67 E7 to O6 four-bedroom or greater units (Leidos, Inc., 2017). As of May 2016, the total combined occupancy rate for these units was 98.1 percent, with the average waiting time for the units between 2 and 4 months for the smaller renovated units and 5 to 7 months for the larger, newer style units. No additional military-controlled family housing units are planned to be constructed between now and 2022 (Switalski, 2016). The Navy periodically assesses on- and off-base housing demand and availability to determine whether additional Navy-controlled housing is required for service members and their dependents.

3.10.2.3.2 Island and Skagit Counties

Table 3.10-16 provides information on the regional housing market surrounding the NAS Whidbey Island complex in 2016. These data are the most current data available at the time of publication. As shown on the table, the two-county region had a total of 92,769 housing units in that year. The majority of these units were owner-occupied. However, reflecting the transient nature of military personnel assigned to the NAS Whidbey Island complex, communities located in close commuting distance to the station, such as the City of Oak Harbor and the Town of Coupeville, had higher percentages of renter-occupied units compared with the county. In fact, the City of Oak Harbor had more renter-occupied units than owner-occupied units. In 2016, homeowner vacancy rates ranged from 0.0 percent in the Town of Coupeville to 3.7 percent in the City of Mount Vernon. Likewise, rental vacancy rates ranged from a low of 0.0 percent in the Town of Coupeville to a high of 8.1 percent in the City of Mount Vernon (see Table 3.10-16).

Table 3.10-16 Selected Housing Characteristics for the Communities in the Study Area Surrounding the NAS Whidbey Island Complex in 2016

Geographic Area	*Total Number of Housing Units*[1]	*Owner Occupied*	*Renter Occupied*	*Homeowner Vacancy Rate*	*Rental Vacancy Rate*	*Median Value of Owner-occupied Units*	*Median Gross Rent*
Washington State	2,966,814	1,683,381	1,013,225	1.6%	4.1%	$269,300	$1,056
Island County	40,711	22,416	10,972	2.1%	3.4%	$295,800	$1,085
Coupeville	1,002	524	425	0.0%	0.0%	$291,100	$796
Oak Harbor	9,956	3,540	5,782	1.5%	2.6%	$226,100	$1,091
Skagit County	52,058	31,134	14,974	2.1%	4.4%	$255,100	$970
Anacortes	7,661	4,620	2,404	1.3%	1.9%	$327,300	$1,059
Mount Vernon	12,429	6,835	4,677	3.7%	8.1%	$206,500	$885

Sources: USCB, n.d.[c]

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

Property values in the three-county region varied greatly, with the median value of owner-occupied housing units ranging from a low of $206,500 in the City of Mount Vernon to a high of $327,300 in the City of Anacortes. Rental prices also vary throughout the region. In 2016, the median gross rent ranged from $796 per month in the Town of Coupeville to $1,091 in the City of Oak Harbor (see Table 3.10-16).

Since 2016, property values have risen in Island and Skagit Counties, and fewer homes have been listed for sale. In the third quarter of 2016, the median sale prices of housing units were $325,800 and $289,600 in Island and Skagit Counties, respectively. By 2017, these prices had increased to $349,700 in Island County and $322,900 in Skagit County (University of Washington, 2017).

In the last decade, the number of houses listed for sale has decreased steadily in both Island and Skagit Counties, with fewer listings every year compared to the previous one (University of Washington, 2017). From the third quarter of 2010 to the third quarter of 2017, listings declined from 1,017 to 416 in Island County and from 1,133 listings to 468 in Skagit County. In comparison, 486 units had been listed for sale at the end of the third quarter of 2016 in Island County and 509 units in Skagit County. Similarly, the length of time that a housing unit remained unsold on the market declined between 2016 and 2017 In the third quarter of 2016, there was a 3.5-month supply of housing units available in Island County; by the third quarter of 2017, this number had declined to a 3.0-month supply of housing units. In Skagit County, the length of time that an existing housing unit remained on the market increased slightly from 2016 to 2017; in 2016 the county had a 2.6-month supply of housing units, and in 2017, it had a 2.7-month supply (University of Washington, 2017).

Information from the Northwest Multiple Listings Service (MLS) database provides further evidence for these trends. In March 2016, 342 single-family homes and 20 condominiums in Island County were listed for sale with the Northwest MLS, representing a decline of 24.6 percent over March 2015 levels. A total of 124 single-family home and condominium sales closed during March 2016 in Island County. The average sale price of these units was $322,364, and the median sale price of these units was $300,000 (Northwest MLS, 2016a, 2016b).

Similarly, in March 2016, 414 single-family homes and 15 condominiums were listed for sale in Skagit County, representing a decline of 12.6 percent from March 2015 levels. A total of 162 single-family home and condominium sales closed in Skagit County during March 2016; the average sale price of these units was $308,224, and the median sale price was $276,750 (Northwest MLS, 2016a).

According to data collected from the U.S. Census Bureau's *2012-2016 American Community Survey (5-Year Estimates)*, the homeowner vacancy rate was 2.1 percent for both Island County and Skagit County during 2016. During the same time, the U.S. Census Bureau estimated that the rental vacancy rate was 3.4 percent in Island County and 4.4 percent in Skagit County (see Table 3.10-16).

According to data collected by the NAS Whidbey Island Housing Department, in May 2016, 107 housing units were available for rent in the Military Housing Area surrounding the NAS Whidbey Island complex. At that time, rent for apartments ranged between $750 and $1,070; rent for condominiums ranged between $1,100 and $1,190; rent for townhouses/duplexes ranged between $685 and $1,850; rent for houses ranged between $1,300 and $1953; and rent for studio/loft apartments ranged between $550 and $869 (Switalski, 2016).

As part of the preliminary *Housing Requirements and Market Analysis 2017-2022* study, in 2017, the Navy conducted an inventory of rental housing in the housing market area (defined as all of Island County and most of Skagit County). This study found that 19,114 suitable rental housing units were located within an hour commute of the NAS Whidbey Island complex. A suitable rental housing unit is defined as a unit that meets Navy requirements for physical condition and health and safety. In 2017, approximately 9.3 percent (1,954 units) of all rental housing units in the market study area were considered unsuitable for Navy personnel. Table 3.10-17 categorizes the suitable units by monthly rent

and bedroom size. Many of these units do not meet the Navy's size and/or affordability requirements. The Navy does not consider studio apartments or efficiency apartments adequate for either unaccompanied personnel or Navy families. In addition, the Navy does not consider units suitable if they exceed the Navy's highest Maximum Allowable Housing Cost for the installation or if they fall below the Navy's cost of a minimal acceptable housing unit (Leidos, Inc., 2017).

Table 3.10-17 Suitable Rental Housing Located in the NAS Whidbey Island Housing Market Area: 2017

	Number of Bedrooms					
Monthly Rental Price	***None***	***One***	***Two***	***Three***	***Four+***	***Total***
$2,800 +	73	110	227	1,087	340	1,837
$2,600 - $2,799	29	42	88	399	122	680
$2,400 - $2,599	29	41	88	399	122	679
$2,200 - $2,499	8	26	191	252	80	557
$2,000 - $2,199	5	24	205	232	75	541
$1,800 - $1,999	5	24	205	232	75	541
$1,600 - $1,799	11	50	390	450	130	1,031
$1,400 - $1,599	16	71	562	630	187	1,466
$1,200 - $1,399	21	96	768	844	258	1,987
$1,000 - $1,199	86	502	1,020	196	114	1,918
$800 - $999	110	599	1,517	247	125	2,598
Below $800	345	2,380	1,803	545	206	5,579
Total	**738**	**3,965**	**7,064**	**5,513**	**1,834**	**19,114**

Source: Leidos, Inc., 2017.

In 2017, an estimated 357 of these units were vacant and available for rent. Total rental vacancy rate in the housing market area was estimated to be approximately 1.8 percent (Leidos, Inc., 2017). See Table 3.10-18 for detailed information on these vacant housing units by price and size.

Table 3.10-18 Vacant Suitable Rental Housing Located in the NAS Whidbey Island Housing Market Area: 2017

	Number of Bedrooms					
Monthly Rental Price	***None***	***One***	***Two***	***Three***	***Four+***	***Total***
$2,800 +	1	2	4	19	6	32
$2,600 - $2,799	1	1	2	7	3	14
$2,400 - $2,599	1	1	2	7	3	14
$2,200 - $2,499	-	-	3	5	1	9
$2,000 - $2,199	-	-	4	4	1	9
$1,800 - $1,999	-	-	4	4	1	9
$1,600 - $1,799	-	1	7	8	3	19
$1,400 - $1,599	-	2	10	12	4	28
$1,200 - $1,399	1	2	14	16	4	37
$1,000 - $1,199	2	10	19	4	2	37
$800 - $999	2	12	29	5	2	50
Below - $800	6	45	34	11	3	99
Total	**14**	**76**	**132**	**102**	**33**	**357**

Source: Leidos, Inc., 2017.

According to the study, the supply of rental housing is expected to grow 0.1 percent per year between 2017 and 2022. By 2022, the number of unsuitable rental housing units is projected to remain constant at 1,954 units. Therefore, the study forecasts that 19,221 suitable housing units will be available in the housing market area by 2022. Rental vacancy rates are forecast to remain constant at 1.8 percent throughout the next 5 years. A total of 359 suitable housing units are forecast to be vacant and available for rent by 2022 (Leidos, Inc., 2017).

3.10.2.3.3 Housing Affordability

As property values and rental prices have increased in the region, housing affordability has increasingly become an issue in Island and Skagit Counties. Affordable housing, as defined by the U.S. Department of Housing and Urban Development (HUD), is housing costs--which include rent or mortgage payments plus interest, utility costs, and insurance payments--that account for less than 30 percent of a household's income. Households that pay more than 30 percent of their income for housing costs are considered "cost burdened," while households that pay more than 50 percent of their income for housing costs are considered "severely cost burdened" (ECONorthwest, 2017).

According to a study completed by ECONorthwest for the Island County Housing and Housing Affordability Task Force, approximately 36 percent of all of Island County's households were cost burdened and spent more than 30 percent of their income on housing costs between 2011 and 2015. Renters were particularly impacted. Fifty percent of all households renting housing in Island County were considered cost burdened during this time, while only 29 percent of households that owned their homes were cost burdened (ECONorthwest, 2017).

Lower income households were the most affected by the high housing prices. Between 2011 and 2015, approximately 26 percent of Island County households had annual incomes of less than $35,000 and could only afford housing units with rents of less than $875 per month or valued at less that $87,500. More than 70 percent of these households did not have affordable housing (ECONorthwest, 2017).

The study also found that households in the northern portion of Island County were the most cost burdened in the county. Approximately 38 percent of all households in the northern portion of Island County had housing costs greater than 30 percent of their income. Oak Harbor and Coupeville had an estimated 43 percent and 35 percent, respectively, of their households that were cost burdened (ECONorthwest, 2017).

Housing affordability can also be measured using HUD's Fair Market Rent (FMR) and HUD's Affordable Housing Wage. The FMR is set at the 40th percentile among a distribution of rental units in a given area. In Island County, the 2017 HUD FMR varied by size of apartment, with the FMR ranging from $711 for a studio apartment to $1,569 for a four-bedroom apartment. Table 3.10-19 provides other FMRs by unit type. Similarly, HUD's Affordable Housing Wage estimates the hourly earnings that would be required in order to afford a two-bedroom apartment at HUD's FMR without the household becoming cost burdened. In 2017, a household in Island County had to earn at least $18.92 per hour, or $35,424 annually, to afford a two-bedroom apartment without exceeding 30 percent of its income (ECONorthwest, 2017).

Table 3.10-19 HUD Fair Market Rent by Unit Type, Island County, 2017

Rental Unit Type	*Studio*	*1-Bedroom*	*2-Bedroom*	*3-Bedroom*	*4-Bedroom*
Fair Market Rent	$711	$805	$984	$1,432	$1,568

Source: ECONorthwest, 2017.

Currently, there is a deficit of affordable housing in Island County, particularly for households that earn less than $50,000, or approximately 80 percent of the county's median family income. Table 3.10-20 show the deficit or surplus of affordable housing units in the county by income level. As shown on the table, there currently is a total deficit of an estimated 3,792 affordable units in the private sector for families with income of less than $50,000 (see Table 3.10-20). If other lower-cost housing options, such as government-subsidized housing, are unavailable, these households would be forced to spend an unaffordable portion of their income on housing (ECONorthwest, 2017).

Table 3.10-20 Available Affordable Housing Units in Island County by Income Level

	Annual Family Income								
	Less than $10,000	*$10,000-$14,999*	*$15,000-$24,999*	*$25,000-$34,999*	*$35,000-$49,999*	*50,000-$74,999**	*$75,000-$99,999*	*$100,000-$149,999*	*$150,000 or more*
Available Affordable Units	(88)	(701)	(1,975)	(433)	(595)	1,895	942	(390)	1,345

Source: ECONorthwest, 2017.

Key: *80% to 100% of the Median Family Income for a family of four in Island County, as determined by HUD.

Similar to Island County, Skagit County has experienced some issues with affordable housing. According to an affordable housing strategy report commissioned by the Skagit County Board of Commissioners, as of 2010-2014, an estimated 39 percent, or 17,534, of households in the county were cost burdened (Schissler, 2016).

The gap between what the average renter household earns and rental costs in Skagit County illustrates the affordable housing problem further. The Affordable Housing Wage, the hourly wage that would allow a household to rent a two-bedroom unit at the HUD-estimated FMR ($962 per month), is $18.50 per hour for a two-bedroom rental in Skagit County. The average wage rate for renters in Skagit County is approximately $11.82, meaning that these households could only afford a rental unit priced at $615 per month or less to maintain housing costs at or below 30 percent of income. Thus, the gap between the Affordable Housing Wage for a two-bedroom rental and the average renter wage is $6.68 per hour, or $13,894 per year (Schissler, 2016).

Given that at least 17,535 households in Skagit County are currently cost burdened, the same number of more affordably priced housing units are needed to alleviate their hardship. Moreover, some percentage of future households will require affordably priced housing if they are to keep their housing expenditures below 30 percent of income. Based on population projections through 2036 and the assumption that 39 percent of future households will be low income, there will be a demand for 5,404

new housing units priced for low-income households. Combining the current deficit and the future demand for affordable housing, Skagit County requires 22,939 new affordably priced homes to eliminate the housing cost burden by 2036 (Schissler, 2016).

3.10.2.4 Local Government Revenues, Affected Environment

In calendar year 2014, the Island County government collected approximately $64.5 million in revenues, with approximately 26 percent of this revenue coming from property taxes. Other large revenue sources for the county included intergovernmental revenues, which accounted for 27 percent of total revenues; licenses, permits, charges for services, fines, and forfeits, which also accounted for 27 percent of total revenues; and retail sales and use taxes, which accounted for 14 percent of total revenues (see Table 3.10-21).

Table 3.10-21 Total County Government Revenues by Source for Calendar Year 2014 in the Area Surrounding the NAS Whidbey Island Complex

	Island County	*Skagit County*
Property Taxes	$16,633,696	$45,027,529
Retail Sales and Use Taxes	$9,121,313	$21,287,528
All Other Taxes	$2,360,801	$2,352,921
Intergovernmental Revenues	$17,326,852	$15,664,879
Licenses, Permits, Charges for Services, Fines and Forfeits	$17,189,997	$23,336,896
All Other Revenue	$1,909,168	$5,344,767
Total Revenues	**$64,541,827**	**$113,014,520**

Source: Washington State Office of Financial Management, 2015
Note: Due to rounding, totals may not sum

During the same time period, the Skagit County government raised $113.0 million in total revenues. Similar to Island County, the major revenue sources in the county were property taxes; licenses, permits, charges for services, and fines and forfeits; retail sales and use taxes; and intergovernmental revenue. Property taxes provided 40 percent of total revenues in Skagit County during calendar year 2014 (see Table 3.10-21).

During calendar year 2014, total county government expenditures were $63.7 million in Island County and $120.8 million in Skagit County. Large expense categories included general government, security of persons and property, and transportation (see Table 3.10-22). See Table 3.10-22 for a breakdown of expenditures by category by county.

Table 3.10-22 Total County Government Expenditures by Category for Calendar Year 2014 in the Area Surrounding the NAS Whidbey Island Complex

	Island County	*Skagit County*
General Government	$13,316,636	$32,957,808
Security of Persons and Property	$11,605,650	$28,054,616
Physical Environment	$7,519,094	$9,728,181
Transportation	$8,649,198	$17,205,131
Mental and Physical Environment	$6,650,043	$12,488,410
All Other Expenditures (including debt service)	$15,942,364	$20,351,625
Total Expenditures	**$63,682,985**	**$120,785,772**

Source: Washington State Office of Financial Management, 2015
Note: Due to rounding, totals may not sum

3.10.3 Community Services, Affected Environment

The following section describes community services and facilities that could be affected by the Proposed Action. Due to the nature of these resources, the affected areas vary by the type of community service being assessed and do not correspond exactly to the study area utilized for the broader socioeconomic analysis. For purposes of this analysis, the impacts to educational services and facilities have been limited to the Oak Harbor, Coupeville, and Anacortes school districts. Combined, these three districts provide approximately 92 percent of all NAS Whidbey Island complex military dependents with educational services. The discussion of medical services covers a slightly broader area and includes facilities located in Island County as well as those located in the Cities of Anacortes and Mount Vernon because residents are typically willing to travel greater distances to receive specialty medical care. In contrast, the study area for fire and police services is focused on the City of Oak Harbor and the Town of Coupeville. This area has been selected as the likely area for impact because a large proportion of the influx of military personnel and their families is expected to live in these communities, and any emergency situation that may occur at Ault Field or at OLF Coupeville could require additional assistance from first responders in these communities.

Many of the community services discussed below are supported by NAS Whidbey Island personnel and their families. NAS Whidbey Island personnel volunteer thousands of hours of service each year and participate in trash cleanups at parks throughout the region; volunteer at local schools, clubs, and sports programs; provide classes to home-schooled students; and lead local Boy and Girl Scout troops. In addition, the Navy search and rescue (SAR) service at NAS Whidbey Island is tied to the installation's aircraft missions, including the Growler mission. The Navy's SAR teams typically maintain a 24-hour support posture to provide medical care and transport as well as SAR operations over water, land, and mountainous terrain. Over the past 10 years, the SAR service has completed 354 missions that have saved more than 400 lives of local residents and visitors to the area. Often, these SAR operations require highly specialized skills such as helicopter rappelling, hoisting, and mountain landings under all weather conditions.

3.10.3.1 Education, Affected Environment

The majority of students affiliated with the NAS Whidbey Island complex attend schools in the Oak Harbor, Coupeville, or Anacortes school districts, with the vast majority of these students attending the Oak Harbor School District. The Oak Harbor School District serves all of North Whidbey Island, including the City of Oak Harbor, the NAS Whidbey Island complex, and the surrounding area (Oak Harbor School

District, 2015). In 2016, eight public schools, including five elementary (grades Kindergarten through 5), two middle (grades 6 through 8), and one high school (grades 9 through 12), are in the district. In addition, the district runs a program for alternative learners and a cooperative service for home-schooled students (Oak Harbor School District, 2015).

In May 2016, the Oak Harbor School District had a total enrollment of approximately 5,500 full-time equivalent students and employed 710 staff members, in addition to an estimated 300 substitute teachers. Total enrollment in the district is forecast to increase to at least 6,000 students by 2021. Excluding portable classrooms, the Oak Harbor School District had the capacity to accommodate approximately 2,300 students in its elementary schools; 1,500 students in its middle schools; and 1,650 students in its high school (Gibbon, 2016).

In May 2016, the district's elementary schools were all operating above their designed capacity by an excess of 20 classrooms, or by approximately 500 students, districtwide. Due to state-mandated classroom-size reductions, which must be fully implemented in 2018, the elementary buildings exceeded their designed capacity during the 2016-2017 school year by 28 classrooms, or by approximately 675 students. These students were housed in 28 portable classrooms (Gibbon, 2016).

Conversely, in May 2016, there was an excess of 12 classrooms with a capacity to house approximately 325 students available in the middle school buildings. In addition, there was enough capacity in the high school to handle an additional 150 students (Gibbon, 2016).

In the fall of 2017, the district reconfigured its schools into five elementary schools (grades Kindergarten through 4), one intermediate school (grades 5 and 6), one middle school (grades 7 and 8), one high school (grades 9 through 12), and one combined early-learning center/district preschool and Kindergarten through grade 12 parent partnership school to eliminate some of the overcrowding in the elementary schools. Following the reconfiguration in 2017, elementary school enrollment is expected to exceed the designed capacity by 300 to 400 students during the 2017-2018 school year. Between 2018 and 2021, enrollment is expected to continue to grow, making elementary enrollment further exceed the designed capacity. By 2021, it is estimated that enrollment of the elementary schools will again exceed the designed capacity by approximately 600 students (Gibbon, 2016).

Once reconfiguration was complete, the middle schools switched from having surplus capacity to exceeding their designed capacity. Based on data received in 2016, during the 2017-2018 school year, the middle schools are expected to be overcrowded and exceed designed capacity by approximately 150 students. Eleven portable classrooms will be utilized in the middle schools to house these additional students. By 2021, the middle schools are expected to exceed designed capacity by approximately 275 students. The high school is expected to reach capacity by 2021 (Gibbon, 2016).

Approximately 50 percent of students in the district are federally connected students (i.e., have at least one parent in the military or who works on federal property and/or lives in federally controlled housing) (Gibbon, 2016). In 2012, 911 school-aged children who attended public schools in the district lived in Navy family housing in the NAS Whidbey Island complex. An additional 20 students lived on station but attended private schools in the area (Kovach, 2013).

During the 2012-2013 school year, the Oak Harbor School District received approximately $4.6 million in federal impact aid to offset the costs associated with educating these federally connected students. Oak Harbor School District's annual expenditures for the 2012-2013 school year totaled $46.3 million, or an average of $8,737 per student (Oak Harbor School District, 2014). The total amount of funding for

federal impact aid available to the U.S. Department of Education has been declining over the past decade. As a result, the amount of aid allocated to the Oak Harbor School District has also been declining. Between 2008 and 2016, the amount of impact aid received by the district has declined by 60 percent, or $2 million, despite the fact that fewer federally connected students attended the district in 2008 than currently do (Gibbon, 2016).

Since 2014, the district has spent $2.5 million from its general fund to purchase additional classrooms and related curricula and equipment. Next year, the district has budgeted an additional $750,000 to further expand classroom space. By 2021, it is anticipated that the Oak Harbor School District will require 39 portable classrooms to accommodate all students in the district (Gibbon, 2016).

The Coupeville School District serves central Whidbey Island and includes the Town of Coupeville, Greenbank, and the surrounding area. It shares a northern border with Oak Harbor School District and a southern border with the South Whidbey School District, just north of Bush Point. The Coupeville School District includes three public schools: one elementary, one middle, and one high school. During the 2012-2013 school year, the Coupeville School District employed 53 classroom teachers. As of October 2012, the district had a total enrollment of 973 students in grades kindergarten through 12 (Washington State Office of the Superintendent of Public Instruction, n.d.[a]). Approximately 9.7 percent of these students, or 94 pupils, were military dependents (Island County EDC, 2013).

Total enrollment in the Coupeville School District has declined since the 2012-2013 school year. In June 2016, approximately 920 full-time equivalent students were attending schools in the district, including approximately 400 students in the elementary school, approximately 220 students in the middle school, and approximately 300 students in the high school (Shank, 2016).

The district currently has some excess capacity in its facilities. By repurposing rooms currently utilized for other purposes such as music and technology, the district anticipates that an additional 75 to 100 students could be accommodated in the existing elementary school, an additional 100 students could be accommodated in the middle school, and an additional 100 students could be accommodated in the high school. If certain operational changes were made, further classroom space could be made available in the middle and high schools if necessary (Shank, 2016).

During the 2012-2013 school year, the district received $41,000 in federal impact aid to offset the costs associated with education for these federally connected students (Island County EDC, 2013). Coupeville School District's total annual expenditures during the 2012-2013 school year were approximately $9.2 million. Average per-pupil expenditure was $9,796 (Washington State Office of the Superintendent of Public Instruction, n.d.[b]). Similar to what other school districts have experienced, federal impact aid to the district has declined over recent years, despite the fact that the number of federally connected students attending the Coupeville School District has increased (Shank, 2016). In addition, state education aid is anticipated to remain relatively constant through 2021 (Shank, 2016).

The Anacortes School District serves the City of Anacortes and the northern portion of Fidalgo Island in Skagit County. The district consists of eight schools, including one early childhood education center, three elementary schools, a middle school, two high schools, and one career and technical academy (Anacortes School District, n.d.). All of the elementary schools are currently operating near capacity. The Anacortes Middle School and the Anacortes High School have excess capacity and could accommodate an additional 200 and 180 students, respectively. The Cap Sante High School is currently operating at capacity (Wenzel, 2016).

By 2021, total enrollment is expected to increase by 100 to 150 students districtwide. It is anticipated that there will be no extra capacity in the district and that all classrooms will be filled in all schools. An additional high school (grades 9 through 12) is expected to open in 2018 (Wenzel, 2016).

In October 2012, a total of 2,709 students were enrolled in the Anacortes School District, and 140 classroom teachers were employed by the district (Washington State Office of the Superintendent of Public Instruction, n.d.[c]). Approximately 4.8 percent of the students, or 142 pupils, enrolled in the district were military dependents (Island County EDC, 2013).

The Anacortes School District did not receive any impact aid during the 2012-2013 school year to support these federally connected students (Island County EDC, 2013). During that year, the total expenditures for the district were approximately $26.0 million, which equated to approximately $10,024 per student (Washington State Office of the Superintendent of Public Instruction, n.d.[d])

3.10.3.2 Medical Services, Affected Environment

Naval Hospital Oak Harbor, located at Ault Field, provides medical, surgical, and ambulatory health care services to active-duty personnel and their dependents, eligible retired military personnel, and North Atlantic Treaty Organization personnel (Canadian forces) and their dependents (Rose, 2018). The facility totals more than 108,000 square feet of inpatient and outpatient space (Naval Hospital Oak Harbor, 2015b). Hospital services available include surgical facilities, a dental clinic, an adult medical homeport, a laboratory, a pharmacy, radiology, mental health OB/GYN, occupational health, aviation medicine, a deployment health care center, an optometry clinic, an orthopedic clinic, a pediatric homeport, physical therapy, preventative medicine, a substance abuse and rehabilitation program, and a five-bed inpatient birthing center (Rose, 2018).

As of 2016, approximately 27,000 beneficiaries fell within the Naval Hospital Oak Harbor area of operation; approximately 20,300 of those beneficiaries enrolled in Naval Hospital Oak Harbor as their primary medical provider. By 2021, the expected number of beneficiaries enrolled at Naval Hospital Oak Harbor is expected to climb to approximately 21,470 (Rose, 2018).

Because no emergency services or in-patient treatment besides the birthing center are available at Naval Hospital Oak Harbor, emergency cases are sent to nearby civilian hospitals, typically WhidbeyHealth Medical Center in Coupeville or Island Hospital in Anacortes. Those requiring specialized treatments also may be referred to one of the three local civilian hospitals, such as WhidbeyHealth Medical Center in Coupeville, Island Hospital in Anacortes, or Skagit Valley Hospital in Mount Vernon (Naval Hospital Oak Harbor, 2015a).

WhidbeyHealth Medical Center is located 13 miles south of the NAS Whidbey Island complex in the Town of Coupeville. Established in 1970, the hospital has since expanded to include the main campus in Coupeville, three EMS stations, and eight outpatient locations. The system employs more than 70 physicians and more than 700 staff members. The main campus has a recently constructed 39-bed inpatient wing (WhidbeyHealth, 2018).

Island Hospital is located approximately 18 miles north of the NAS Whidbey Island complex in the City of Anacortes. It serves west Skagit County, north Whidbey Island, and the San Juan Islands. The 43-bed hospital provides Level III Trauma Care/Level II Stroke Emergency Services and employs more than 190 physicians and healthcare providers (Island Hospital, 2016). In 2011, Island Hospital had an occupancy

rate of 61 percent (Island Hospital, 2013). Island Hospital also operates seven family-care clinics: five in Anacortes and two in San Juan County (Island Hospital, 2016).

Skagit Valley Hospital is located 30 miles northeast of the NAS Whidbey Island complex in the City of Mount Vernon. The 137-bed hospital has a Level III Trauma Emergency Department and more than 400 health care professionals on the medical staff. The Skagit Valley Hospital received 33,246 visits to its emergency department in 2015. The hospital also operates 11 clinics, with locations in Mount Vernon, Anacortes, Camano Island, Oak Harbor, Sedro-Woolley, Smokey Point, and Stanwood (Skagit County Regional Health, 2016).

3.10.3.3 Fire and Emergency Services, Affected Environment

Fire and emergency services at the NAS Whidbey Island complex are currently provided by the NRNW F&ES. NRNW F&ES is a regionalized fire and emergency service organization that provides services to nine separate Navy installations in the Puget Sound region. In total, NRNW F&ES has 193 personnel, and they serve approximately 67,000 naval personnel, civilian employees, and contractors throughout the region. The organization has one continuously manned fire station located in Oak Harbor and also captures run data and provides personnel and apparatus at OLF Coupeville when flight operations are active. The fire department serves Ault Field, Navy housing, the Seaplane Base, OLF Coupeville, and off-base Navy-affiliated Child Development Centers. The primary responsibilities of NRNW F&ES are structural fire suppression, aircraft rescue and firefighting, emergency dewatering of vessels, hazardous materials technician response, technical and confined space rescue, and Emergency Medical Services Transport services at the Basic Life Support level (Merrill, 2016).

In a typical year, NRNW F&ES responds to approximately 1,110 calls for service at the NAS Whidbey Island complex. Currently, the department meets DoDI 6055.6, with an aggregate response time of less than 7 minutes for structural or emergency medical services calls; under 5 minutes for unannounced airfield emergencies; and under 1 minute for announced airfield emergencies. The frequency of calls and response times are not expected to change in 2021 (Merrill, 2016).

The department has a robust mutual aid agreement with both the City of Oak Harbor Fire Department and the North Whidbey Fire and Rescue Department. All three departments regularly train and respond to emergencies as necessary. NRNW F&ES is also part of the Island County Technical Rescue Team and responds to all calls for a technical rescue in the north end of Island County. In addition, NRNW F&ES is the only hazardous materials technician response provider for the entire county (Merrill, 2016).

Fire services in and around the City of Oak Harbor are provided by Oak Harbor Fire Department, which serves the City of Oak Harbor, and the North Whidbey Fire and Rescue Department, which serves the northern area of Whidbey Island (City of Oak Harbor, 2018b). In addition, the Central Whidbey Island Fire and Rescue Department provides service to the center portion of Island County.

The Oak Harbor Fire Department is located in the City of Oak Harbor and provides fire and emergency services to the 9.7-square-mile city and its estimated population of approximately 22,693 residents (City of Oak Harbor, 2018a; City of Oak Harbor Fire Department, 2017). In 2016, the department employed 11 career and 30 paid-on-call firefighters and had mutual and automatic aid agreements with all emergency service providers on Whidbey Island, including NAS Whidbey Island Fire. In 2016, the department responded to 1,177 emergency incidents and had an average response time of 4 minutes and 26 seconds. The fire department has four fire engines, one ladder truck, one rescue unit, and various support vehicles (City of Oak Harbor, 2018a; City of Oak Harbor Fire Department, 2017).

North Whidbey Fire and Rescue consists of seven fire stations and serves about 18,000 residents in approximately 55 square miles in the northern area of Whidbey Island, from Deception Pass Bridge southward to Libby Road, with the exception of the Oak Harbor city limits (City of Oak Harbor, 2018b; North Whidbey Fire and Rescue, n.d.[a]). It has a mutual aid agreement with NAS Whidbey Island Fire and other Whidbey Island fire departments. As of 2015, the department's personnel consisted of one fire chief, three paid deputy and battalion chiefs, 4.5 administrative staff, 11 volunteer officers, 25 to 30 compensated duty crew, and approximately 75 volunteer firefighters (North Whidbey Fire and Rescue, n.d.[b]). In 2016, the department responded to 2,302 calls for service (North Whidbey Fire and Rescue, n.d.[a]).

Central Whidbey Island Fire and Rescue has three fire stations; two are located in Coupeville, and one is located in the Greenbank area (Central Whidbey Fire and Rescue, 2017a). The department serves an area of approximately 50 square miles covering Coupeville, Greenbank, and Central Whidbey Island (Central Whidbey Fire and Rescue, 2017b). Based on 2010 population estimates, the department estimated it served approximately 8,264 residents (Central Whidbey Fire and Rescue, 2017b). The department provides emergency medical services as well as technical-level marine rescue and other services (Central Whidbey Fire and Rescue, 2017c). It has mutual and automatic aid agreements with each fire agency in Island County. The department is staffed by approximately nine full-time employees, 10 part-time employees, and 17 volunteers (Central Whidbey Fire and Rescue, 2017d).

3.10.3.4 Police Protection, Affected Environment

Security services around Ault Field and OLF Coupeville are provided by the Island County Sheriff's Department and local police departments. The Island County Sheriff's Department, which has an office located on 6th Street in Coupeville, serves all of Island County. The department's service area covers approximately 78,000 residents and includes a total of 517 square miles, of which 208 square miles are land. In 2017, the Island County Sheriff's Department had 75.5 fulltime-equivalent employees and a $9.2 million budget (Marlow, 2017).

Police protection is also provided by the Oak Harbor Police Department, which is located on S.E. Barrington Drive, and the Coupeville Marshal's Office, which is located on 7th Street. The Oak Harbor Police Department has a total of 38 personnel (three personnel in the administrative division, 20 in the special operations division, and 15 in the patrol division) (City of Oak Harbor, 2018c). The Coupeville Marshal's office is staffed through an agreement with the Island County Sheriff's Department and consists of two personnel, a town marshal, and a deputy marshal dedicated to the town.

3.10.3.5 On-Base Community Services Support

A number of services are available to Navy personnel and their dependents through the Fleet and Family Support Program. These services include individual, marriage, and family counseling; class reservations; individual resume assistance; financial counseling; and relocation assistance or deployment/mobilization support (Navy, n.d.[a]). Relocation assistance can offer families support with finding housing, childcare, schools, and employment (Navy, n.d.[b]). NAS Whidbey Island has a dedicated school liaison officer who serves as a point of contact between the Navy and school districts and can provide families with guidance on transitioning to a new school district (Navy, n.d.[c]). Financial management services can provide Navy families with access to accredited financial counselors and training to develop financial skills and long-term financial planning (Navy, n.d.[d]).

3.11 Environmental Justice

Closely aligned with socioeconomics are issues of environmental justice. The USEPA defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (USEPA, 2016h).

3.11.1 Environmental Justice, Regulatory Setting

Consistent with EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994), the Navy's policy is to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations.

3.11.2 Environmental Justice, Affected Environment

3.11.2.1 Environmental Justice Methodology

In order to assess the impacts to minority and low-income communities, the Navy first identified whether there were any areas of minority and low-income populations that may experience disproportionately high and adverse impacts from the Proposed Action. These environmental justice communities were determined by analyzing the demographic and economic characteristics of the affected area and comparing those to the characteristics of the larger community as a whole. This larger community is known as the community of comparison.

Once the presence or absence of environmental justice communities was determined, the Navy then assessed the impacts from the Proposed Action and determined whether these impacts would have a disproportionately high and adverse effect on these populations. This analysis involved comparing the impacts on the identified environmental justice communities to those on the general population within the affected environment (e.g., within the noise contours). In determining whether potential disproportionately high and adverse impacts exist, the Navy also considers the significance of the impacts under NEPA.

For the purposes of this EIS, the environmental justice analysis concentrates on the communities most likely affected by actions at the NAS Whidbey Island complex, namely Island and Skagit Counties, Washington. Data from the U.S. Census Bureau's 2010 Census of Population and Housing are utilized throughout the analysis to characterize minority populations in the area of impact. Likewise, data from the U.S. Census Bureau's 2006-2010 American Community Survey were used to define low-income populations throughout this section. Low-income populations in this analysis are defined using the percent of all individuals for whom poverty status has been determined, as defined by the U.S. Census Bureau, for each specific geographic area. The U.S. Census statistics were utilized in this analysis because of their ability to provide poverty estimates down to the census tract level. In addition, utilizing U.S Census Bureau data ensured that the demographic and poverty statistics used in the environmental justice analysis were consistent with the census block level population data that were used in the noise analysis. The 2006-2010 American Community Survey contains the most recent data published that provided income estimates that directly correlated to the 2010 census block population statistics utilized in the noise analysis.

Potential environmental justice communities that may be impacted by the Navy's actions were identified using population and demographic data from the U.S. Census Bureau, broken down to the census block group level. Data were collected on all census blocks and census block groups that were exposed to noise in the greater than 65 dB DNL noise contours.

Minority environmental justice communities are identified by comparing population characteristics from the census block groups to the larger community as a whole and determining whether there is a "meaningfully greater" difference between the two areas. Following recommendations made in the March 2016 report, *Promising Practices for Environmental Justice Methodologies in NEPA Reviews* (USEPA, 2016h), "the 'Meaningfully Greater' analysis requires use of a reasonable, subjective threshold (e.g., 10 percent to 20 percent greater than the reference community). What constitutes 'meaningfully greater' varies by agency, with some agencies considering any percentage in the selected geographic unit of analysis that is greater than the percentage in the appropriate reference community to qualify as being 'meaningfully greater.'" For this analysis, "meaningfully greater" is defined as demographic statistics that represent an increase in the proportion of minority populations and that differ by more than 15 percent from those of the community of comparison (the county). The 15-percent difference is an appropriate threshold for determining the presence of environmental justice communities because this increase is large enough to take into account natural variations in demographic populations within a community.

Low-income environmental justice communities are identified by comparing the percentage of the population living below the poverty level within census tracts to the larger community as a whole. If the percentage of residents with incomes below the poverty level in the census tract is greater than the percentage of residents in the community of comparison who have incomes below the poverty level, then there is a low-income environmental justice community.

For the purposes of this environmental justice analysis, Island and Skagit Counties have been identified as the communities of comparison. These counties were selected as the communities of comparison because they are the smallest geographic unit that incorporates the affected population within the entire No Action Alternative dB DNL noise contours. Although the No Action Alternative dB DNL noise contours do extend outside the limits of Island and Skagit Counties, all of the people impacted by the No Action Alternative dB DNL noise contours reside within the county borders. Figure 3.11-1 shows the location of the affected census block groups and the No Action Alternative dB DNL contours for Ault Field and OLF Coupeville.

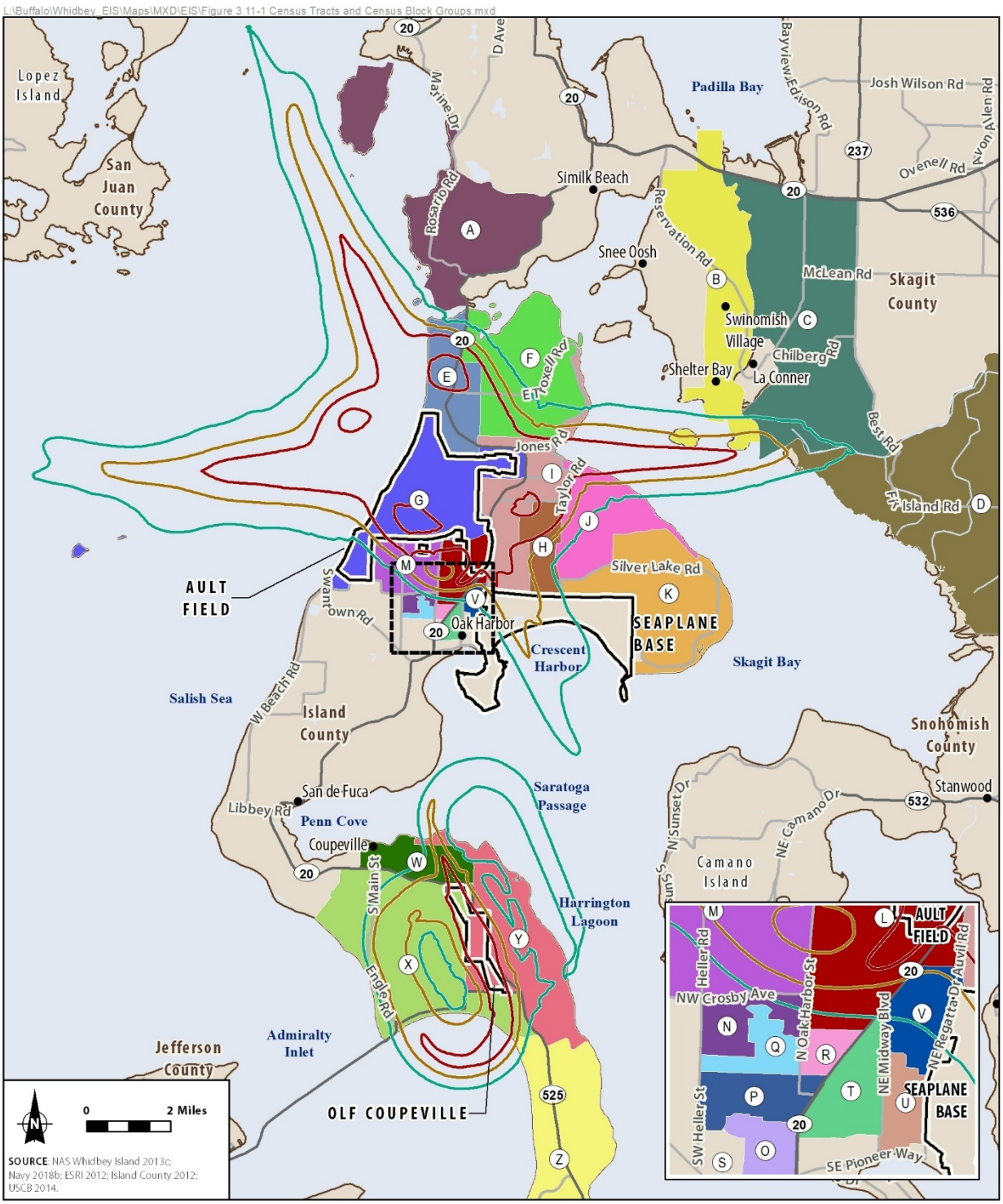


Figure 3.11-1
Census Tracts and Census Block Groups in the Environmental Justice Study Area
Whidbey Island, Island County, WA

3.11.2.2 Environmental Justice Assessment

In order to assess the presence of environmental justice communities from existing operations, the Navy looked at the census block groups within the No Action Alternative noise contours. Table 3-11.1 presents demographic and economic data that characterize the communities in which the potential for disproportionately high and adverse human health or environmental effects are assessed, in accordance with EO 12898. Demographic and economic data for Island and Skagit Counties as a whole are presented in Table 3-11.1.

Shading on Table 3.11-1 highlights minority and low-income populations affected by the No Action Alternative and indicates census block groups that contain environmental justice communities based on the indicated thresholds

As displayed on Table 3.11-1, minority environmental justice communities have seven census block groups where the percentage of these populations is “meaningfully greater” than the county percentages (i.e., the community of comparison). Additionally, there are eight census block groups where the percentage of residents with low incomes is greater than that of the communities of comparison. The remaining six census block groups in Island County and the two affected census block groups in Skagit County do not have a “meaningfully greater” concentration of minority residents and do not have a greater concentration of low-income residents compared to the community of comparison. Therefore, these areas are not considered environmental justice communities. Figure 3.11-2 shows the location of the census block groups that are considered environmental justice communities under the No Action Alternative.

Table 3.11-1 Comparison of Environmental Justice Populations in Census Block Groups Affected by the NAS Whidbey Island Complex under the No Action Alternative to County Totals

Census Block Group/County	*Percent Minority*[1]	*Percent Low Income*[2]
Island County (Community of Comparison) – County Total	***16.9%***	***8.0%***
Block Group 1, Census Tract 9701	18.7%	14.1%
Block Group 2, Census Tract 9701	13.6%	14.1%
Block Group 1, Census Tract 9702	35.2%	23.4%
Block Group 1, Census Tract 9703	24.3%	4.4%
Block Group 2, Census Tract 9703	15.7%	4.4%
Block Group 3, Census Tract 9703	13.5%	4.4%
Block Group 4, Census Tract 9703	11.6%	4.4%
Block Group 1, Census Tract 9704	39.3%	8.6%
Block Group 2, Census Tract 9704	31.9%	8.6%
Block Group 1, Census Tract 9706.01	41.3%	11.2%
Block Group 1, Census Tract 9708	25.9%	8.7%
Block Group 1, Census Tract 9710	12.7%	6.3%
Block Group 1, Census Tract 9711	14.7%	2.9%
Block Group 2, Census Tract 9711	7.5%	2.9%
Block Group 3, Census Tract 9713	5.9%	6.8%
Skagit County (Community of Comparison) – County Total	***23.3%***	***11.7%***
Block Group 2, Census Tract 9521	13.2%	9.1%
Block Group 3, Census Tract 9527	12.9%	7.3%

Sources: USCB, 2012c, 2012f, n.d.[d]
Notes:

[1] Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

[2] Percent low income is defined as the percent of all residents identified as having incomes placing them below the U.S. Census-defined poverty level according to data published by the U.S. Census Bureau in the 2006-2010 American Community Survey (5-Year Estimates). The American Community Survey does not estimate income data at the census block group level; therefore, the income data displayed in this table are from the census tract level. Census block groups within the same census tract will have the same percent of low-income residents.

Note:

No Action Alternative dB DNL contours extend into portions of Jefferson and San Juan Counties. However, no permanent residences are located where the dB DNL contours extend into these counties; therefore, these counties have been excluded from further analysis.

Population on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville) have been excluded.

Shaded cells identify census block groups with a "meaningfully greater" percentage of minority residents or census block groups with a greater percentage of low-income residents than the community of comparison (i.e., the county within which the census block group is located). For this analysis, "meaningfully greater" is defined as demographic statistics that differ by more than 15 percent from those of the community of comparison. The following formula (the percent difference between two percentages) was used to calculate whether these statistics differed by more than 15 percent:

$$\frac{|V_1 - V_2|}{\frac{(V_1 + V_2)}{2}} \times 100$$

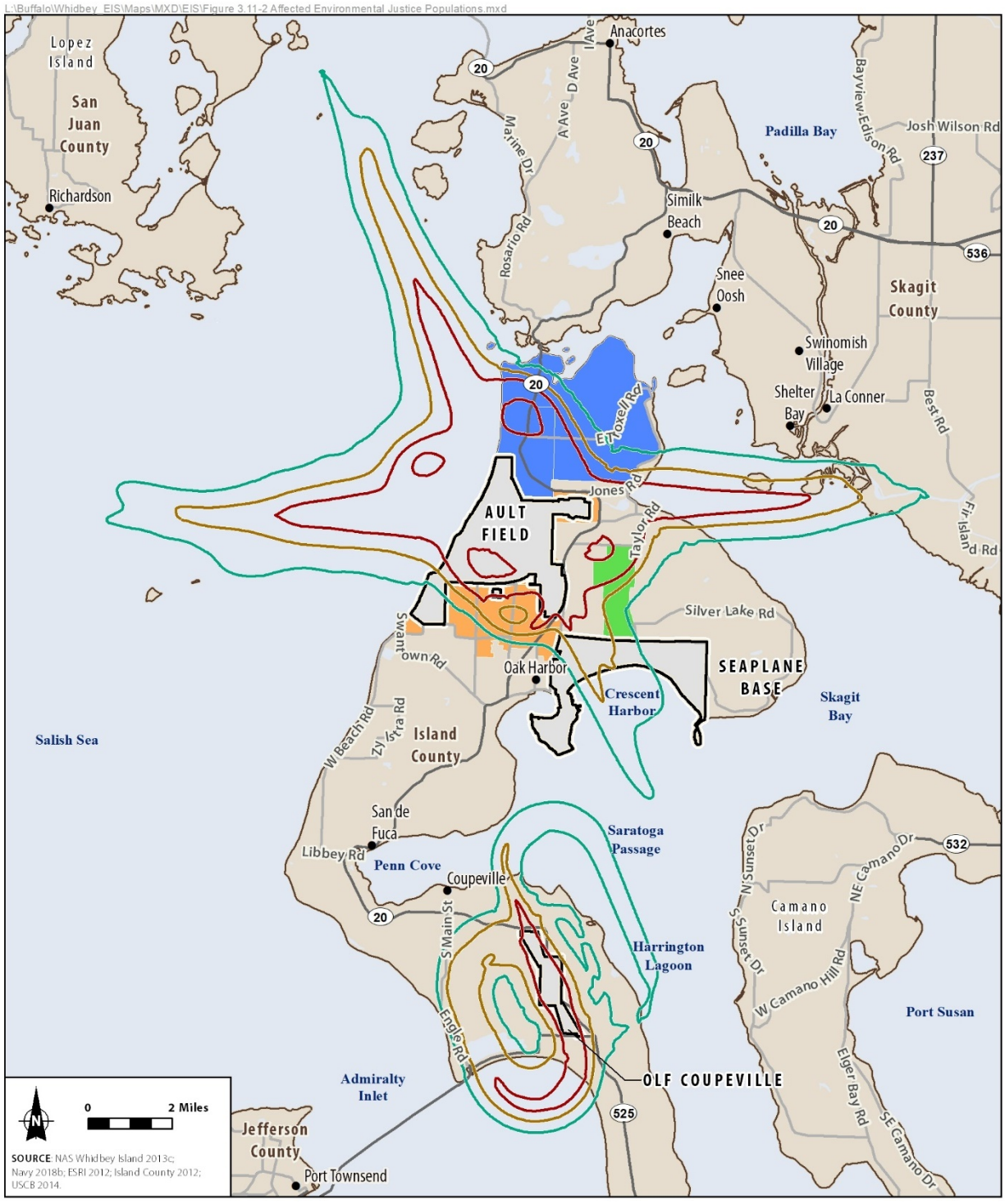


Figure 3.11-2
Environmental Justice Populations Affected by the No Action Alternative
NAS Whidbey Island Complex
Whidbey Island, Island County, WA

Based on the most current data available, an estimated total population (both environmental justice communities and non-environmental-justice communities) of 11,371 persons are affected by noise within the No Action Alternative dB DNL contours at Ault Field and OLF Coupeville. Approximately 22.4 percent of this population (2,543 persons) would be minorities, and approximately 7.9 percent of this population (1,083 persons) would be members of low-income populations (see Table 3.11-2). The analysis on whether or not these identified populations are disproportionately impacted under the No Action Alternative is included in Section 4.11.1 of this EIS. Section 4.11.1 includes a discussion and analysis of aircraft noise impacts, potential safety risks within Clear Zones/APZs, overcrowding within the Oak Harbor School District, and impacts on housing affordability and housing availability in relation to potential disproportionate impacts to minority and low-income populations. Section 3.2 describes the existing aircraft noise; Section 3.3 discusses potential safety risks within existing Clear Zones/APZs; and Section 3.10 describes existing conditions at the Oak Harbor School District and discusses existing housing affordability and housing availability in Island and Skagit Counties.

Table 3.11-2 Environmental Justice Populations[1] Affected by the NAS Whibdey Island Complex under the No Action Alternative

dB DNL Contours	*Total Population[2]*	*Total Minority[3] Population*	*Percent Minority[3]*	*Total Low-Income[4] Population*	*Percent Low Income[4]*
65-70 dB DNL	4,140	1,020	24.6%	315	7.6%
70-75 dB DNL	3,069	714	23.3%	218	7.1%
75+ dB DNL	3,962	733	18.5%	337	8.5%
Total Affected Population	**11,171**	**2,467**	**22.1%**	**870**	**7.8%**

Sources: USCB, 2012c, 2012f, n.d.[d]

Notes:

1 All population estimates for affected areas under the dB DNL contours utilized 2010 U.S. Census Bureau data. A 7.1-percent growth factor was applied to the 2010 census statistics to account for population changes between 2010 and 2020 based on medium forecasted population projections during that period for Island County (Washington State Office of Financial Management, 2017). To simplify the analysis, this growth factor was also used for areas of Skagit County that fall within the 65+ dB DNL contours.

2 Total population is the estimated number of residents living within the Ault Field and Outlying Landing Field (OLF) Coupeville dB DNL contours. These estimates were computed by utilizing the U.S. Census Bureau's 2010 Census of Population and Housing data. The percent area of the census block covered by the dB DNL contour range was applied to the population of that census block to estimate the population within the dB DNL contour range. This calculation assumes an even distribution of the population across the census block, and it excludes population on military properties within the dB DNL contours (NAS Whidbey Island [Ault Field], the Seaplane Base, and OLF Coupeville).

3 Minority is defined as individuals who are members of the following population groups: American Indian or Alaska Native; Asian; Native Hawaiian or Pacific Islander; or Black or African American, as well as individuals who self-identify as of Hispanic or Latino origin who are White. Individuals who self-identify as Hispanic or Latino from another race are already included in the analysis.

4 Percent low income is defined as the percent of all residents identified as having incomes placing them below the U.S. Census-defined poverty level according to data published by the U.S. Census Bureau in the 2006-2010 American Community Survey (5-Year Estimates). The American Community Survey does not estimate income data at the census block group level; therefore, the income data displayed in this table are from the census tract level. Census block groups within the same census tract will have the same percent.

Key:
dB DNL = day-night average sound level in decibels

3.12 Transportation

This discussion of transportation includes all of the land and sea routes with the means of moving passengers and goods. A transportation system can consist of any or all of the following: roadways, bus routes, railways, subways, bikeways, trails, and taxi services and can be evaluated on a local or regional scale.

3.12.1 Transportation, Regulatory Setting

3.12.1.1 State

The Washington State Department of Transportation (WSDOT) is responsible for building, maintaining, and operating the state highway system and the state ferry system. WSDOT is also responsible for developing the Statewide Transportation Improvement Program (STIP) in coordination with regional and local partners. The STIP includes projects such as pavement overlays, roadway widening, bridge replacement or repair, signal systems, safety enhancements, bicycle and pedestrian facilities, and transit improvements. The STIP includes projects from transportation improvement programs developed by each Metropolitan Planning Organization. A transportation project must be included in the STIP to be eligible for federal funds, although projects are typically funded by a combination of federal, state, and local sources. Relevant state regulations and policies include:

- RCW 36.70A: The 1990 Growth Management Act was enacted to promote planned and coordinated development. The legislation requires that LOS standards be established for all arterials and transit routes, and provide a means to identify how proposed development would affect the transportation system. Local jurisdictions must adopt LOS standards as part of their general plan. Ordinances must be put in place that prohibit approval of development that results in the LOS of local transportation facilities to fall below set standards.
- RCW 47.06.140: WSDOT must work in coordination with local governments to set LOS standards for highways of statewide significance.
- RCW 46.44.091: A special permit must be obtained from WSDOT for oversize or overweight vehicles that would be operated on state highways.

3.12.1.2 Regional

Skagit Council of Governments (SCOG) serves as the lead agency for the federally designated Metropolitan Planning Organization and the state-designated Regional Transportation Planning Organization (RTPO).The former Island Sub-RTPO representing Island County was a sub-RTPO within SCOG. In 2016, the Island RTPO was formed as a separate RTPO for Island County and as an alternative to the former sub-RTPO (Island County, 2016b). The SCOG and Island RTPOs are required by federal and state regulations to develop a Regional Transportation Improvement Program (RTIP) for their respective counties that spans at least 4 years and is updated at least every 2 years. Projects in the RTIP are taken from local transportation improvement plans. Projects must be included in a RTIP and a STIP to be eligible for federal transportation funding (Skagit-Island RTPO, 2013). Both the SCOG and Island RTPOs have developed RTIPs for the 2018-2023 period.

As of early 2018, the Island RTPO is currently in the process of developing a new regional transportation plan for Island County; however, the Skagit-Island Counties Metropolitan and Regional Transportation Plan developed by SCOG in 2011 currently serves as the strategic framework for addressing Island County's transportation needs. Relevant local regulations and policies include:

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

The Skagit 2040 Regional Transportation Plan was adopted in 2017 and serves as an update to the 2011 plan for Skagit County; no relevant policies were identified (SCOG, 2017).

3.12.1.3 Local

The Island County Public Works Department is responsible for maintaining 525 miles of county-owned roads (Island County, 2015a). The Department of Planning and Community Development oversees land use and development in unincorporated parts of Island County and is responsible for developing the county's comprehensive plan (Island County, 2015b). The comprehensive plan includes LOS standards for highways of statewide significance as well as other county roads. Relevant county regulations and policies include:

- SR 20 and SR 525 have been designated as highways of statewide significance (Island County, 2016d).
- Chapter 11.04 of the Island County code sets LOS standards at LOS C for rural roads, LOS D for urban roads, LOS D for rural highways of statewide significance, and LOS E for urban highways of statewide significance (Muni Code, 2017).
- A permit must be obtained from the Public Works Department for oversize and overweight vehicles traveling on county roads (Island County, 2015c).

Relevant Skagit County regulations and policies include:

- LOS standards are set at LOS D for all road segments that have Annualized Average Daily Traffic (ADT) counts greater than 7,000 vehicles, are not functionally classified by the federal government as an 09-Local Access Road, and are designated as a County Freight and Goods Transportation Systems Route (Skagit County, 2016).

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

- LOS standards are set at LOS D for city streets and intersections and LOS E for street segments and intersections along SR 20 (City of Oak Harbor, 2016).

Relevant local regulations and policies for Anacortes include:

- LOS standards are set at LOS D for SR 20 (City of Anacortes, 2016).

3.12.2 Transportation, Affected Environment

The traffic study area for describing transportation conditions consists of:

- SR 20 between Burlington and SR 525
- SR 525 between SR 20 and Clinton
- I-5 at its interchange with SR 20 in Burlington
- local roadways serving or immediately adjacent to Ault Field and the Seaplane Base

The roadways were identified based on their proximity to the NAS Whidbey Island complex and areas of concern identified in public scoping comments. Since Navy personnel and their dependents would be regionally distributed, trips on local roadways could not be reasonably determined; therefore, the analysis focused only on local roads near the gates to Ault Field. These intersections and roadways are depicted on Figures 3.12-1 and 3.12-2.

Information on the existing conditions of roadway networks and operations was obtained by a review of regional planning documents and transportation studies. The most recent traffic counts for state roads were obtained from the WSDOT and from Island County for local roadways near Ault Field. Traffic counts were used to estimate baseline traffic conditions (2021) and affected environment conditions presented in Section 4.12. Physical characteristics of nearby roads (i.e., number of lanes, intersection density) were obtained through visual inspection of aerial imagery. LOS for study area road segments was determined using the 2010 Highway Capacity Manual generalized daily service volumes for urban freeway facilities, urban multilane highways, two-lane highways, and urban street facilities. Assumptions used to categorize study area roadways are described below:

- Urban freeway facilities consist of four lanes or more, with limited access, divided highway, and a posted speed limit 55 miles per hour (mph) or higher.
- Urban multilane highways consist of four lanes or more with a posted speed limit of 55 mph or higher and signalized intersections 2 miles apart or more.
- Two-lane highways consist of two lanes, excluding a center turning lane or occasional right-turn-only lane, with a posted speed limit of 55 mph or higher and signalized intersections 2 miles apart or more.
- Urban street facilities consist of two to four lanes with a posted speed limit of 30 to 45 mph or higher and signalized intersections less than 2 miles apart.

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

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

3.12.2.1 Road Network and Access

Ground traffic and transportation refers to vehicle movement throughout a road and highway network. The American Association of Highway and Transportation Officials classifies roadways as principal arterials, minor arterial streets, collector streets, and local streets. Principal arterials (i.e., arterial highways and interstates) serve to move traffic regionally and between population and activity centers with a minimal level of access to adjacent properties. Collector roadways (i.e., minor arterial and collector streets) serve to move traffic from population and activity centers and funnel them onto principal arterials with a moderate level of access to adjacent properties. Local roadways provide access to adjacent properties and move traffic onto collector and arterial roadways.

3.12.2.1.1 Off-station Road Network

SR 20 and SR 525 serve as the principal arterials on Whidbey Island, and I-5 is a principal arterial providing regional land access to Skagit and Island Counties. SR 20 provides the only bridge connection to the mainland, via Fidalgo Island to the north. The study area for this analysis focuses on roadways near Ault Field that can reasonably be expected to be impacted by the Proposed Action and major roadways discussed as potential areas of concern in public scoping comments. A list of major roadways included in the study area is provided below:

- SR 20 is a main arterial in northern Washington State running from Port Townsend west to Newport near the Washington-Idaho state line. SR 20 within the study area begins at the Coupeville Ferry Terminal and runs east before turning north along the eastern boundary of OLF Coupeville. SR 20 then runs in a primarily north-south direction to Deception Pass Bridge and Canoe Pass Bridge. SR 20 is primarily two lanes on Whidbey Island with occasional turning lanes in the study area and four lanes through Oak Harbor. SR 20 provides the only bridge connection to the mainland via Fidalgo Island to the north. SR 20 becomes a four-lane divided roadway and heads in an east-west direction to an interchange with I-5 in Burlington, Washington. SR 20 is designated as part of the federal Strategic Highway Network, as a Highway of Statewide Significance, and as a State Scenic and Recreational Highway (Island County, 2016d).
- SR 525 is the primary arterial in the southern half of Whidbey Island, beginning at SR 20 near the southeast corner of OLF Coupeville. SR 525 runs south to the Clinton Ferry Dock. The road is primarily two lanes in the study area, with turning lanes at some intersections.
- Deception Pass Bridge/Canoe Pass Bridge (SR 20) provide the sole access point by land to Whidbey Island via SR 20. The bridges were built in 1935 and are listed on the NRHP (WSDOT, 2015a). The 28-foot-wide bridges include an 11-foot lane in each direction and sidewalks on both sides. Repairs were made to the bridges in the summer of 2015 that included repaving, replacement of bridge joint seals, and repairs to the bridge decks (WSDOT, 2015b). Some discussion has taken place in recent years regarding the replacement of the bridges; however, WSDOT has indicated that the bridges are in good condition, and no plans for their replacement have been made (Island County Sub-Regional RTPO, 2012). The WSDOT has identified the Deception Pass Bridge as one of 473 bridges in the state requiring seismic retrofits; however, no work on the bridge has been scheduled at this time (Gilbert and Doughton, 2017).
- I-5 is a main interstate highway on the West Coast of the U.S. and is a limited access, divided highway with primarily two lanes in each direction in the study area. On- and off-ramps in Burlington, Washington, provide direct access to SR 20.

- Ault Field Road is a minor arterial that begins at SR 20 north of Oak Harbor and continues west, providing access to Ault Field through the Charles Porter Avenue and Langley Boulevard gates. It is primarily a two-lane road (one lane in each direction) with both left and right turning lanes at a number of intersections.
- Heller Road provides a north-south route on the western edge of Oak Harbor, beginning at Ault Field Road south of Ault Field. Heller Road has one lane in each direction and right and left turning lanes at several intersections, including the Swantown Avenue intersection and the Ault Road/Clover Valley Road intersection.
- Whidbey Avenue is a minor arterial running east from Heller Road to its terminus at Regatta Drive. East of SR 20 and west of Oak Harbor Street, Whidbey Avenue has two lanes with left turning lanes at intersections. Two lanes in each direction and left turning lanes are present between SR 20 and Oak Harbor Street.
- Regatta Drive runs north from SE Pioneer Way along the western edge of the Seaplane Base and merges with SR 20 just north of Oak Harbor. Regatta Drive is a two-lane road with left turning lanes at major intersections.
- Crescent Harbor Road is located along the northern boundary of the Seaplane base, between Regatta Drive and North Reservation Road. Crescent Harbor Road is a two-lane road with left turning lanes at major intersections.

3.12.2.1.2 On-station Road Network

Ault Field is accessible through the four gates shown on Figure 3.12-1. The Langley Boulevard gate is accessed from Ault Field Road and serves as the main gate to Ault Field. The Langley Boulevard gate is the only gate for the station that is open 24 hours per day and on weekends. The Charles Porter gate is also accessed from Ault Field Road and serves as the gate for commercial and oversized vehicles. This gate is open between the hours of 5:00 a.m. and 8:00 p.m. (NAS Whidbey Island, n.d.[a]). The Saratoga Road gate is accessed from West Clover Valley Road, which extends west from the intersection of Heller Road and Ault Field Road. The Hammer Road gate is located at the northern border of Ault Field and is accessed from SR 20 via Banta Road. Gates for the Seaplane Base are located on Maui Avenue, north of the Oak Harbor City Marina, and Torpedo Road, to the east of the intersection of Regatta Drive and Crescent Harbor Road. Housing areas at the Seaplane Base can be accessed through non-gated roadways. Table 3.12-1 shows the daily average vehicle counts at each gate.

Table 3.12-1 NAS Whidbey Island Gate Traffic Counts

Ault Field Gate	*Daily Average Vehicle Count*
Charles Porter Avenue Gate	5,300
Langley Boulevard Gate	11,300
Saratoga Road Gate	1,800
Hammer Road Gate	1,000
Seaplane Base Gate	***Daily Average Vehicle Count***
Torpedo Gate	1,400
Maui Gate	3,800

Source: NAS Whidbey Island, n.d.(b)

Major roadways at Ault Field and the Seaplane Base are described below:

- **Charles Porter Avenue** is a two-lane road with a center turning lane that provides access to most work destinations at NAS Whidbey Island. The road runs from the Charles Porter Gate northwest through the installation.
- **Langley Boulevard** begins at Ault Field Road and runs north through the Langley Boulevard gate before connecting with Charles Porter Avenue in the center of the installation. Langley Boulevard is primarily two lanes with occasional turning lanes.
- **Maui Avenue** is a two-lane road with a median that alternates between a center turning lane and grassy area. The roadway serves as the main route into the Seaplane Base and extends from Regatta Drive east to the intersection of Coral Sea Avenue and Torpedo Road.
- **Torpedo Road** is a two-lane road that provides gated access to the Seaplane Base off of West Crescent Harbor Road and extends south to the intersection of Coral Sea Avenue and Torpedo Road.

Areas of congestion identified in the NAS Whidbey Island Transportation Plan include the intersections of Midway Street and Langley Boulevard, Midway and Charles Porter Avenue, and Lexington Street and Charles Porter Avenue. The plan recommends traffic improvements that include installation of a roundabout at the intersection of Midway Street and Langley Boulevard, and Rerouting Lexington Street to create a 90-degree connection with Princeton Street. Recommended improvements to Charles Porter Avenue that included reducing the road width from four through-lanes to two through-lanes with a center turning lane and bike lanes have been implemented. Additional recommendations include dedicated bicycle lanes on Langley Boulevard and sidewalk improvements throughout Ault Field (Makers, 2010).

3.12.2.2 Traffic Conditions

ADT and design capacity of the roadway represent two parameters to measure traffic (Transportation Research Board, 2010). Using these two measures of traffic, each roadway segment receives a corresponding LOS. The LOS designation is a professional industry standard used to describe the operating conditions of a roadway segment or intersection. The LOS is defined on a scale of A to F that describes the range of operating conditions on a particular type of roadway facility. LOS A through LOS B indicates free flow of travel. LOS C indicates stable traffic flow. LOS D indicates the beginning of traffic congestion. LOS E indicates the nearing of traffic breakdown conditions. LOS F indicates stop-and-go traffic conditions and represents unacceptable congestion and delay.

Impacts to ground traffic and transportation are analyzed in this EIS by considering the possible changes to baseline traffic conditions (2021) and the capacity of area roadways from proposed increases in commuter traffic. Table 3.12-2 presents existing ADT volumes on state roads and Island County roads within the study area along with an estimate of existing LOS. Estimated ADT volumes and LOS under the No Action Alternative and action alternatives are provided in Chapter 4.12. The highest existing traffic volumes are located on I-5 in Burlington and SR 20 between Burlington and Anacortes. On Whidbey Island, the highest traffic volumes are found on SR 20 in Oak Harbor. Most roadways operate at LOS C or higher. A segment of SR 20 between Anacortes and Oak Harbor currently operates at LOS D. All of the studied roadways currently meet standards set for highways of statewide significance, as discussed in Section 3.12.1. Seasonal traffic volumes for roadways within the study area were not available;

however, it is assumed traffic volumes would generally be higher, and roadways would therefore experience more congestion, in the summer months.

Table 3.12-2 Existing Average Daily Traffic and Level of Service within the NAS Whidbey Island Complex Study Area

Location	*ADT*	*Existing LOS*
Road: Interstate I-5 (I-5)		
Municipality: Burlington		
South of SR 20	73,000	C
North of SR 20	57,000	B
Road: State Route 20 (SR 20)		
Municipality: Burlington		
Under I-5	27,000	B
Municipality: Skagit County		
East of Pulver Road	28,000	B
East of Avon Allen Road	29,000	B
West of Avon Allen Road	27,000	B
East of SR 536	25,000	B
West of SR 536	32,000	B
East of LaConner Whitney Road	34,000	B
West of LaConner Whitney Road	34,000	B
East of March Point Road	33,000	B
West of March Point Road	33,000	B
Road enters Anacortes		
North of Rosario Drive	15,000	D
South of Rosario Drive	18,000	D
Road enters Island County		
Municipality: Anacortes		
East of SR 20 Spur	33,000	B
South of SR 20 Spur	19,000	D
Municipality: Island County		
North of Banta Road	17,000	D
North of Frostad Road	17,000	D
South of Frostad Road	18,000	D
Road enters Oak Harbor		
North of Sidney Street	13,000	C
South of Libbey Road	12,000	C
Road enters Coupeville		
East of Quail Trail Lane	8,800	C
North of SR 525 and Race Road	7,100	B
West of SR 525 and Race Road	1,100	B
Municipality: Oak Harbor		
North of Regatta Drive	17,000	D
North of Case Road	13,000	C
North of Goldie Street	15,000	C
South of SE Midway Boulevard	18,000	C
North of SE Sixth Avenue	21,000	C
South of SE Sixth Avenue	21,000	C
North of SE Barrington Avenue	19,000	C

Table 3.12-2 Existing Average Daily Traffic and Level of Service within the NAS Whidbey Island Complex Study Area

Location	*ADT*	*Existing LOS*
North of SE Pioneer Way	15,000	C
West of Beeksma Drive	18,000	C
North of Swantown Road	20,000	C
South of Swantown Road	16,000	C
Municipality: Coupeville		
West of Main Street	11,000	C
East of Main Street	8,500	B
Road: State Route 525 (SR 525)		
Municipality: Island County		
South of SR 20	7,600	B
North of Ellwood Drive	7,000	B
Road enters Freeland		
West of Bayview Road	13,000	C
West of Maxwelton Road	12,000	C
East of Maxwelton Road	11,000	C
West of Campbell Road	9,500	C
East of Cedar Vista Drive	9,400	C
West of Humphrey Road	8,700	C
East of Humphrey Road	7,300	C
At Clinton Ferry Dock	6,100	C
Municipality: Freeland		
West of Honeymoon Bay Road	7,200	B
East of Honeymoon Bay Road	12,000	C
West of Fish Road	14,000	C
Road: Banta Road (Island County)		
East of SR 20 Spur	1,470	C
Road: Clover Valley Road (Island County)		
West of Heller Road	2,864	C
Road: Heller Road (Island County)		
South of Ault Field Road	6,995	C
Road: Ault Field Road (Island County)		
West of Langley Boulevard	8,171	C
East of Langley Boulevard	10,073	C
East of Oak Harbor Road	10,506	C
East of Goldie Road	8,876	C
Road: Oak Harbor Road (Island County)		
South of Ault Field Road	5,174	C
Road: Goldie Road (Island County)		
North of Ault Field Road	8,864	C
South of Ault Field Road	7,561	C

Table 3.12-2 Existing Average Daily Traffic and Level of Service within the NAS Whidbey Island Complex Study Area

Location	*ADT*	*Existing LOS*

Source: WSDOT, 2016e; Island County, 2010, 2011, 2014, and 2016c

Note: LOS is based on 2010 Highway Capacity Manual (Transportation Research Board, 2010); Appendix D, Transportation Trip Generation Data; and methodology described in Section 4.12.

Key:
ADT = Average Daily Traffic
LOS = level of service
SR = state route

Traffic Safety

In 2016, 778 vehicle crashes were reported in Island County. While the majority of these incidents involved no apparent injury, five involved a fatality, and an additional 89 involved a serious or minor injury (WSDOT, 2016a). A total of 223 of the crashes that occurred in Island County were within the Oak Harbor city limits; of these, 18 crashes involved a serious or minor injury (WSDOT, 2016a). Approximately 10 crashes occurred on roadways or intersections near an Ault Field gate; however, none were reported to involve a fatality or serious injury (WSDOT, 2016a). Pedestrians were involved in 11 of the vehicle crashes, and bicyclists were involved in five of the collisions (including one fatality) (WSDOT 2016b, 2016c). The majority of these collisions involving pedestrians and bicyclists occurred within Oak Harbor; none occurred near OLF Coupeville (WSDOT 2016b, 2016c). Reported collision rates in Island County were lower compared to statewide rates. In 2014, the statewide collision rate per 10,000 licensed drivers was 203.3, while in Island County it was 104.3. In 2014, the statewide collision rate per 10,000 registered vehicles was 172.1, while in Island County it was 78.6 (WSDOT, 2016d).

3.12.2.3 Transit, Pedestrian, and Bicycle Facilities

3.12.2.3.1 Off-station Facilities

Public transportation near the NAS Whidbey Island complex is provided by Island Transit. Fixed route and deviated service is available for all of Whidbey Island. Many of the regional routes travel along SR 20 and SR 525 and stop at the Harbor Station in Oak Harbor. Route 12 begins at Harbor Station and provides service near NAS Whidbey Island, with a stop near Ault Field and North Langley Boulevard. Route 411W provides service between March's Point in Skagit County and Oak Harbor, with the closest stops near Ault Field at SR 20/Banta Road and at Whidbey General Hospital North in Oak Harbor (Island Transit, 2017). Route 3 has bus stops located along Regatta Drive near the Seaplane Base and on Crescent Harbor Road near the housing areas on the Seaplane Base (Island Transit, 2017). Route 10 provides circulation around Oak Harbor and has bus stops at the Oak Harbor City Marina and the Navy Exchange on the Seaplane Base (Island Transit, 2017).

Ferries in Washington State are operated by the WSDOT. Ferry routes provide access for vehicles to Whidbey Island at two locations (Coupeville and Clinton). In 2016, approximately 807,000 riders traveled between Port Townsend and Coupeville, representing 3.3 percent of the state's ferry system ridership. Over 4.1 million riders traveled between Mukilteo and Clinton, which accounted for 16.8 percent of the system's total ridership (WSDOT, 2018a).

Bicycle routes are concentrated in more populated areas such as Oak Harbor, Anacortes, and Burlington. However, a number of rural bicycle routes are located throughout Island and Skagit Counties. SR 20 is designated as a bicycle route throughout its entire length in the study area. Additional bicycle routes near NAS Whidbey Island are located on Ault Field Road, Heller Road, Frostad Road, and Hoffmann Road. Most bike routes do not have separate lanes but instead rely on shoulders or shared road space (Island County, n.d.).

3.12.2.3.2 On-station Facilities

No public transit service is available within the installation. Most roadways at Ault Field have sidewalks on at least one side; however, some roads lack adequate pedestrian facilities. Roads with limited pedestrian access include Langley Boulevard, Midway Street, North Princeton Street, and North Ranger Street (Makers, 2010). Dedicated bike lanes are limited to a section of Charles Porter Avenue between Oriskany Avenue and Wasp Street. Ault Field generally has adequate parking. Specific locations with possible parking deficiencies include the south flight line, Fleet Readiness Center, portions of the bachelor housing area, PSD (Building 2641), and Navy Exchange (Makers, 2010).

The Seaplane Base is considered more auto-oriented, with incomplete sidewalk networks that do not adequately connect family housing areas with the retail core (i.e., the Commissary and Navy Exchange) (Makers, 2010). The Maylor Point housing area is connected to the retail core via a pedestrian path along Coral Sea Drive. No dedicated bike lanes are present at the Seaplane Base. An informal trail runs along the Crescent Harbor shoreline for approximately 1.4 miles between Torpedo Road and Solomon Road (Makers, 2010). The City of Oak Harbor's waterfront trail was recently extended along the western edge of the Seaplane Base to Maylor Point.

3.13 Infrastructure

This section discusses infrastructure, including utilities (i.e., water distribution, wastewater collection, stormwater collection, solid waste management, energy, and communications) and facilities. Transportation systems and traffic are addressed separately in Section 3.12.

3.13.1 Infrastructure, Regulatory Setting

3.13.1.1 Federal Regulations

EO 13834, Efficient Federal Operations, requires that agencies meet statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. In implementing this policy, each agency shall prioritize actions that reduce waste, cut costs, and enhance the resilience of federal infrastructure and operations. This EO also requires agencies to track and report on energy-management activities, performance improvements, cost reductions, GHG emissions, energy and water savings, and other appropriate performance measures. EO 13834 requires federal agencies to meet goals associated with energy use, water use, building design and utilization, fleet vehicles, and procurement and acquisition decisions.

OPNAVINST 4100.5E outlines the Secretary of the Navy's vision for shore energy management. The focus of this instruction is establishing the energy goals and implementing strategy to achieve energy efficiency.

DoD installations are required to report energy and water use performance data related to pertinent laws, regulations, EOs, and policies. Information and data collected are used to develop the Department of Energy Annual Report to Congress on Federal Government Energy Management. This report is referred to as the Annual Energy Management Report (AEMR) or, when combined with other reporting areas, the larger Annual GHG and Sustainability Report. It is distributed to the Office of Management and Budget and the House and Senate Committees on Armed Services. (NAS Whidbey Island, 2016).

Section 402 of the CWA established the NPDES to regulate the discharge of effluents into Waters of the United States. The regulation requires a permit be obtained for the discharge of pollutants. The State of Washington Department of Ecology is responsible for administering the state's stormwater management program, which includes NPDES permits. State NPDES regulations are found in RCW 90.48.260, and water quality standards are identified in 173-201A WAC.

3.13.1.2 Local Regulations

Chapter 15.01 of Island County municipal code established the stormwater management program, which was created as a way to fund stormwater control facilities in the Marshall Drainage Basin in Island County. Owners of properties that have been determined to contribute to stormwater runoff and that would benefit from control facilities are required to pay fees to fund the program.

Chapter 15.03 of Island County municipal code established the clean water utility to allow for the management of surface water drainage to protect surface and groundwater quality in unincorporated areas of Island County that are located outside the Marshal Drainage Basin. Properties owned by the federal government are excluded from the utility.

3.13.2 Infrastructure, Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under infrastructure at the NAS Whidbey Island complex.

Infrastructure Study Area

Infrastructure refers to the system of public works, such as utilities, that provides the underlying framework for a community or installation. Infrastructure components and utilities discussed in this EIS include the water supply system, wastewater system, stormwater drainage system, electrical supply facilities, natural gas system, and solid waste management facilities. Transportation infrastructure components, including roadway and street systems, the movement of vehicles, and mass transit, are discussed in Section 3.12, Transportation.

Because infrastructure and utilities systems are directly related to activities within the NAS Whidbey Island complex and the communities from which it draws its services, the potentially affected area includes the complex and the counties where it occurs. The infrastructure study area is based on existing distribution of where Navy personnel reside and includes the NAS Whidbey Island complex, Oak Harbor, and Anacortes.

3.13.2.1 Potable Water

3.13.2.1.1 Water Supply and Distribution System

Island County has 229 public community water systems serving over 98,000 individuals (USEPA, 2018c). The majority of these systems serve fewer than 1,000 individuals and rely on groundwater sources.

Approximately 7 percent of the county relies on individual wells for water (Island County, 2016d). Saltwater intrusion (i.e., movement of marine saltwater intro a freshwater aquifer) has the potential to cause some aquifers to be unsuitable for irrigation or drinking. Aquifers below sea level are at greatest risk for saltwater intrusion. Water level elevations close to or below sea level on Whidbey Island are generally located close to shorelines, including some areas west of Oak Harbor and Coupeville and along the eastern shore of central Whidbey Island (Island County, 2016d).

The two largest public water systems in Island County are those owned by the City of Oak Harbor and NAS Whidbey Island, which serve over 19,215 and 12,791 individuals, respectively (USEPA, 2018b). The City of Oak Harbor operates 90 miles of water mains. Water is purchased wholesale from the City of Anacortes (City of Oak Harbor, 2014b). Water is transmitted from Anacortes' system to Oak Harbor via 24-inch and 10-inch mains located along SR 20. Water is then pumped through three pump stations to three storage reservoirs with a storage capacity of 6.6 million gallons. The city's water system plan includes a 20-year plan for capital improvements that includes replacement of water mains (City of Oak Harbor, 2014b).

Skagit County has 88 public water systems (USEPA, 2018c). The largest district includes the Skagit County Public Utility District (PUD), which serves 65,000 residents in Burlington, Mount Vernon, and unincorporated parts of Skagit County, including Fidalgo Island residents (USEPA, 2018c). The Anacortes system provides water for over 20,000 residents in Anacortes in addition to selling water to Oak Harbor and NAS Whidbey Island. Anacortes' water treatment plant is located in Mount Vernon (USEPA, 2018c). The treatment plant was built in 2013 and replaced the previous facility that was located on the same site (City of Anacortes, 2018a).

3.13.2.1.2 NAS Whidbey Island Water Supply and Distribution System

The NAS Whidbey Island complex purchases water for Ault Field and the Seaplane Base wholesale from the City of Oak Harbor, which receives its water from Anacortes (NAVFAC, 2014). OLF Coupeville is considered self-sufficient regarding water and is served by two wells located at the site (NAVFAC, 2014). The installation also maintains two wells used for emergency purposes, but the majority of potable water is received from Oak Harbor (NAVFAC, 2014). NAS Whidbey Island is responsible for 50 percent of the cost of maintaining the 24-inch main that transmits water from Anacortes to Oak Harbor (NAVFAC, 2014). The system has four active storage tanks and two reservoirs with a distributed capacity of 4.9 million gallons (NAVFAC, 2014). The reservoirs provide potable water to Ault Field and the Seaplane Base, each with a storage capacity of 1.5 million gallons (NAVFAC, 2016a). Average daily demand at Ault Field and the Seaplane base was 0.63 million gallons per day (mgd) in 2013. Water usage has decreased from an average daily demand of 0.83 mgd in 2007, in large part due to implementation of water-conservations measures, such as low-flow plumbing fixtures and high-efficiency water heaters and appliances, and the implementation of the Advanced Metering Initiative (NAVFAC, 2014). The City of Oak Harbor is interested in creating two connections to the Seaplane Base; however, the Navy needs to evaluate system demands before further discussions with Oak Harbor take place (City of Oak Harbor, 2014b; NAVFAC, 2016a). OLF Coupeville is relatively undeveloped and used for FCLP; therefore, water usage at that site is assumed to be minimal.

3.13.2.1.3 Water Supply Capacity and Usage

The City of Anacortes obtains its drinking water from the Skagit River (City of Anacortes, 2018b). The water treatment plant has a capacity of 42 mgd and is expandable to 55 mgd (City of Anacortes, 2018b).

The city has water rights to 54.94 mgd from the Skagit River (City of Anacortes, 2011). In 2013, the plant produced 5.74 billion gallons of water, or approximately 15.7 mgd (City of Anacortes, 2014). The Skagit County PUD water treatment plant has a capacity of 24 mgd, with current use around 12 mgd, and has water rights to withdraw 35.8 mgd from the Skagit River (Skagit PUD, 2014). The surface water obtained from the Skagit River is largely dependent on the mountain snowpack. The spring of 2015 experienced one of the lightest mountain snowpacks in decades; although no water shortage was reported, the City of Anacortes encouraged costumers to voluntarily conserve water (City of Oak Harbor, 2015b).

Oak Harbor receives 99.7 percent of its potable drinking water from Anacortes, and Oak Harbor is committed to 970 million gallons per year (City of Oak Harbor, 2014b, 2016). The city also holds water rights to 11 wells, with only three currently active that serve as additional backup supply. The city's current agreement with Anacortes will expire in 2027; however, the two cities typically renegotiate every three years to change the annual amount of water committed. Total water consumption has varied from 880 mg in 2007 to 746 mg in 2012, with a decrease largely attributable to repair and replacement of leaky pipes and equipment, and average daily demand is 1.4 mgd (City of Oak Harbor 2014b). The NAS Whidbey Island Water System Plan states that average daily demand for water is expected to increase to 0.77 mgd by 2034 (NAVFAC, 2014). Oak Harbor is expected to have sufficient capacity under the current agreement with Anacortes to meet projected demand for the City of Oak Harbor and NAS Whidbey Island until 2024. Improvements to existing wells that would permit maximum allowable water withdrawals based on water rights would allow Oak Harbor to meet projected demand until 2060 (City of Oak Harbor, 2014b). However, the current water service contract between the Navy and Oak Harbor requires the city to have capacity to transmit no less than 4.5 mgd to NAS Whidbey Island (Navy, 1971).

Water for the Skagit County PUD is diverted from streams in the Cultus Mountains and the Skagit River to Judy Reservoir. The utility district recently upgraded its treatment facility at Judy Reservoir and constructed a new pumping facility on the Skagit River, doubling the system's capacity to produce up to 36 mgd (Skagit PUD, 2016a). Average annual production is approximately 2.9 mgd (Skagit PUD, 2014). The system is anticipated to have enough capacity to meet projected water demands for the next four decades (Skagit PUD, 2016b).

Each year, water data are reported by NAS Whidbey Island to the DoD in the AEMR (NAS Whidbey Island, 2016). In 2015, NAS Whidbey Island used over 94 million gallons of water. This water use represents a decrease of 40.6 percent from the FY 2007 usage baseline. Water use reduction is the result of building managers' and building energy monitors' efforts to identify, secure, and report leaks for repair. NAS Whidbey Island has achieved a 40.6-percent reduction in water consumption compared to the FY 2007 baseline. Table 3.13-1 shows a summary of water consumption at NAS Whidbey and the progress toward water use reduction goals.

Table 3.13-1 Water Consumption Data at NAS Whidbey Island, 2010 through 2015

Fiscal Year	*Water Consumed (x1,000 gallons)*	*Water Use Intensity (1,000 gallons per 1,000 square feet)*	*% Progress from Previous Year*	*% Progress from 2007 Baseline*
FY 07 Baseline	164,550	41.20	N/A	N/A
FY 15	83,520	21.34	3.90%	-48.21%
FY 14	80,382	20.54	-8.92%	-50.15%
FY 13	88,256	22.55	-16.54%	-45.27%
FY 12	105,750	27.02	-21.79%	-34.42%
FY 11	136,899	34.54	7.89%	-16.15%
FY 10	126,883	32.02	N/A	-22.29%

Source: NAS Whidbey Island, 2016

Key:
N/A = not applicable

3.13.2.2 Wastewater

3.13.2.2.1 Wastewater Collection and Treatment System

The City of Oak Harbor's current wastewater system serves approximately 24,000 people within Oak Harbor and the Seaplane Base (Carollo Engineers, 2013). Less than 2 percent of the city's population relies upon on-site sewer systems (Carollo Engineers, 2013). The city owns, operates, and maintains a rotating biological contactor treatment plant, near the city's central business district, with a capacity of 0.7 mgd (Tetra Tech, 2008). The rotating biological contactor does not discharge into state waters but serves as a pretreatment facility for up to 20 percent of the city's wastewater (Carollo Engineers, 2013). Under a lease agreement with the U.S. Navy, the city also operates an aerated lagoon facility with anaerobic pretreatment; this facility is located on the Seaplane Base and has a capacity of 2.5 mgd (Tetra Tech, 2008). Oak Harbor's gravity collection system consists of approximately 65 miles of pipe, including older clay pipes in the downtown area that were installed in 1940; these older pipes often require additional maintenance (Tetra Tech, 2008). The City of Anacortes' wastewater treatment plant was constructed in 1992 (City of Anacortes, 2018b).

3.13.2.2.2 NAS Whidbey Island Wastewater Collection and Treatment System

NAS Whidbey Island's current NPDES permit allows for discharge from an outfall into the Strait of Juan de Fuca. The NAS Whidbey Island Ault Field Wastewater Treatment Plant was upgraded in 1997 with a sequencing batch reactor and a chlorine contact chamber. Additional upgrades in 2005 allowed for discharging of effluent during high tides, increasing effectiveness during high tide events (USEPA, 2008). As discussed above, the Seaplane Base is served by Oak Harbor's current treatment facility located on Navy property. The Navy and City of Oak Harbor are currently under a 50-year contract for the city to operate and maintain the sewage lagoon (Navy, 1987). The collection system serving the Seaplane Base is owned, operated, and maintained by the Navy.

3.13.2.2.3 Wastewater Supply Capacity and Usage

The total combined maximum monthly flow for the City of Oak Harbor wastewater system (including the Seaplane Base) was 2.9 mgd in 2011 (Carollo Engineers, 2013). The city projects total maximum monthly

flow in 2030 to be 3.9 mgd, assuming no additional growth at the Seaplane Base. The existing contract between the city and the Navy allows the Navy to discharge up to 0.85 mgd into the lagoon. The city is currently in the process of constructing a new wastewater plant to replace the aging facilities that will be unable to handle expected population growth and increasing water quality standards (City of Oak Harbor, 2017). The new facility is expected to increase the city's wastewater capacity by 2.7 mgd (City of Oak Harbor, 2015a) and to be online by mid-2018 (City of Oak Harbor, 2017). The City of Ancoretes' wastewater treatment plan has an average daily flow of 1.89 mgd and a permitted capacity for 4.5 mgd (City of Anacortes, 2018b).

The Ault Field Wastewater Treatment Plant has a design capacity of 0.85 mgd. The system currently serves approximately 10,000 Navy personnel and discharges 0.366 mgd (USEPA, 2008). The Navy is expected to resume control of the aerated lagoon facility at the Seaplane Base after completion of the city's new wastewater plant (NAVFAC, 2016b).

3.13.2.3 Stormwater

3.13.2.3.1 Stormwater Supply and Distribution System

Oak Harbor's stormwater system is served by a combination of pipes of varying diameter, ditches, and other natural features. There are two primary 42-inch-diameter outfalls in Oak Harbor. Numerous smaller outfalls serve much smaller tributary areas along the waterfront (Tetra Tech, 2006). The city's comprehensive stormwater drainage plan identified a number of existing areas that experience high flows during storm events that could experience flooding, including:

- Oak Harbor Street North of Whidbey Avenue
- Whidbey Avenue between Fairhaven Drive and Oak Harbor Street
- SW 6th Avenue West of Oak Harbor Street
- Barrington Drive East of SR 20
- SR 20 Near Beeksma Drive
- SR 20 South of the intersection with Midway Boulevard
- SE 4th Avenue vicinity between SE Ely Street and O'Leary Street
- SE Pioneer Way near Ireland Street
- SE Bayshore Drive near SE City Beach Street
- SW Erie Street north of SR 20
- SW Scenic Heights south of SR 20

3.13.2.3.2 NAS Whidbey Island Stormwater Supply and Distribution System

Ault Field's stormwater system includes approximately 20 miles of channelized and straightened surface ditches and subsurface storm drains. Ault field has approximately 600 acres of impervious surface. Surface runoff drains toward Dugualla Bay and is then pumped through a dike into the bay. Surface runoff from the airfield aprons and runways is collected and passed through oil-water separators before being discharged. Surface ditches and subsurface storm drains serve as the storm sewer system at the Seaplane Base that carries runoff to outfalls in Oak Harbor and Crescent Harbor (NAVFAC, 2016b).

3.13.2.3.3 Stormwater Supply Capacity and Usage

Oak Harbor's stormwater system is currently operating at maximum capacity, and the city's stormwater management plan indicates an increase in impervious surface of 8 percent within the city could substantially increase the number of areas that could be susceptible to flooding (Tetra Tech, 2006).

Storm-related flooding at Ault Field and the Seaplane Base has only been an issue related to high-tide and high-wind events. While the Installation Development Plan does not identify current stormwater capacity as an issue, it does recognize water quality in stormwater infrastructure is often poor. The plan recommends use of green infrastructure outside of the airfield and runways and use of Low Impact Development practices be used in construction projects (NAVFAC, 2016b).

3.13.2.4 Solid Waste Management

3.13.2.4.1 Solid Waste Distribution System

Solid waste collection in Oak Harbor is provided by the city for residents and businesses located within its jurisdiction. Island Disposal, Inc., collects waste generated in unincorporated areas of Whidbey Island and the City of Langley. Residents and businesses may also haul their own waste to receiving facilities in the county. Over half of the waste in Island County is collected at curbside, while 46 percent is self-hauled to a receiving facility. The county has two solid waste transfer stations and two drop box stations where waste collection providers or self-haulers bring waste. Allied Waste transports non-recyclable waste generated in Island County via truck to Everett, where it is then transported by rail to the Roosevelt Regional Landfill (Green Solutions, 2008).

3.13.2.4.2 NAS Whidbey Island Solid Waste Distribution System

A private company is under contract to the federal government to collect waste at NAS Whidbey Island. The waste is transported to a transfer station located at NAS Whidbey Island and then shipped to the Roosevelt Regional Landfill (Green Solutions, 2008).

3.13.2.4.3 Solid Waste Capacity and Usage

Approximately 60,700 tons of waste was generated in Island County in 2005, of which 9,215 tons was recycled. The per capita disposal rate varied between 2.8 and 3.7 pounds between 2000 and 2005. The county projects that in 2025, 221 tons of waste will be generated each day (Green Solutions, 2008). The Roosevelt Regional Landfill has a permitted capacity of 120 million tons over 40 years and is anticipated to have adequate capacity to accept solid waste until 2050 (Republic Services, 2012; USEPA, 2018d). Whidbey Island has been designated a sole-source aquifer under the federal Safe Drinking Water Act (Public Law 93-523), and, therefore, no new or expanded landfills may be sited in Island County (Green Solutions, 2008).

3.13.2.5 Energy

3.13.2.5.1 Energy Supply

Puget Sound Energy (PSE) is the sole provider of electricity within the study area and the largest electric utility in Washington (Island County, 2016d; PSE, 2018).

PSE serves approximately 37,000 customers on Whidbey Island. The island contains over 500 miles of underground distribution lines and 600 miles of overhead distribution lines (Island County, 2016d).

Twelve distribution centers are located on the island. Whidbey Island relies on power from Skagit County and the mainland. The U.S. Energy Information Administration reports that over 114 million megawatt-hours of electricity were generated in Washington in 2016 (EIA, 2018a). Hydroelectric power makes up approximately two-thirds of Washington's electricity generation, with additional generation from natural gas (12.9 percent), nuclear (11.0 percent), coal (9.7 percent), and other sources such as wind and biomass (EIA, 2018b). The prominence of renewable energy sources in Washington's electricity generation system (approximately 66 percent) results in the State of Washington achieving the lowest carbon intensity of its energy supply (36.4 kilograms of energy-related CO_2 per million British thermal units [BTU]) in the U.S. (EIA, 2018b).

Cascade Natural Gas Corporation (CNG) is the sole provider of natural gas in the study area, including Oak Harbor and Anacortes. Natural gas service on Whidbey Island is limited to Oak Harbor, NAS Whidbey Island, and surrounding unincorporated areas (Island County, 2016d; CNG, 2012). Natural gas is supplied to Oak Harbor via a 6-inch high-pressure line from Camano Island that crosses Skagit Bay to Strawberry Point to the east of the Seaplane Base. Gas pipelines in Oak Harbor are typically located in street rights-of-way and occasionally easements on adjoining properties (City of Oak Harbor, 2014a).

3.13.2.5.2 NAS Whidbey Island Energy Distribution System

Ault Field, the Seaplane Base, and OLF Coupeville are connected to three separate electric systems, with two service connections at Ault Field and one connection each at the Seaplane Base and OLF Coupeville. Electricity is purchased from PSE. A separate connection at the Seaplane Base provides service to housing directly from PSE. Ault Field contains two substations: Central Switching Station (owned by the Navy), which is fed by Clover Valley Substation (owned by the PSE) (NAVFAC, 2016a). The distribution system on Ault Field was originally constructed in the 1940s and includes approximately 4.1 miles of overhead and 37.9 miles of underground lines. The system has received a number of system upgrades, the most recent in 2011. The Seaplane Base includes one switching station. The distribution system at the Seaplane Base includes approximately 0.9 mile of overhead and 4 miles of underground lines, and it was also first constructed in the 1940s (NAVFAC, 2016a). The electrical system at OLF Coupeville was built in the 196os and includes a short distance of underground lines (NAVFAC, 2016a).

Natural gas for NAS Whidbey Island is supplied by CNG, which owns and operates the majority of the natural gas infrastructure at the installation. The Navy owns and operates approximately 7.5 miles of distribution piping and approximately 400 residential service points (NAVFAC, 2016a, 2016b).

NAS Whidbey Island also operates a centralized steam plant for heating and hot water at Ault Field. The plant and distribution system were originally constructed in 1954. Two additional boilers were installed in 1994 (NAVFAC, 2016a). The steam system is designed to use natural gas as the primary fuel source, with fuel oil serving as a backup (NWCAA, 2013). The plant currently serves 40 major buildings (NAVFAC, 2016a). The steam plant is currently operating at about 25 percent of its capacity, and the current boilers are oversized and costly to maintain. The distribution system primarily consists of underground steam pipes and condensate return pipes (NAVFAC, 2016b).

3.13.2.5.3 Energy Capacity and Usage

PSE anticipates the electric demand within its service area to grow between 1.3 percent and 1.4 percent annually between 2018 and 2037 (PSE, 2017). PSE's Integrated Resource Plan indicates that PSE could generate enough energy on its own annually to meet demand through 2025 in addition to the ability to

purchase wholesale market energy (this projection does not take into consideration changes in usage under the alternatives) (PSE, 2017).

The current peak electrical load demand for NAS Whidbey Island is approximately 8 to 8.5 megawatts daily. The lease agreement between the Navy and PSE was recently amended to provide 12 megawatts of power to the station, or 60 percent of the Clover Valley Substation (Navy, 2015c).

Each year, energy data are reported by NAS Whidbey Island to the DoD in the AEMR (NAS Whidbey Island, 2016). In 2015, NAS Whidbey Island used over 50 million kilowatt hours, or 171,511 million British thermal units of electricity, and 244,426 million British thermal units of natural gas. This energy use represents a decrease of 40 percent in energy use from the FY 03 baseline. Table 3.13-2 shows a summary of energy consumption at NAS Whidbey and the progress toward energy use reduction goals.

Table 3.13-2 Energy Use Data at NAS Whidbey Island, 2009 through 2015

Fiscal Year	*Energy Consumed (Million BTU)*	*Energy Intensity (Million BTU per 1,000 square feet)*	*% Progress from Previous Year*	*% Progress from 2007 Baseline*
FY 03 Baseline	630,431.72	179.20		
FY 15	421,069.00	107.58	-4.17%	-39.97%
FY 14	439,392.00	112.26	-4.50%	-37.35%
FY 13	460,113.02	117.56	-4.52%	-34.40%
FY 12	481,913.32	123.13	2.03%	-31.29%
FY 11	478,246.19	120.68	2.35%	-32.66%
FY 10	467,287.60	117.91	-6.22%	-34.20%
FY 09	498,278.15	125.73		-29.84%

Source: NAS Whidbey Island, 2016

Key:
BTU = British thermal unit

NAS Whidbey Island has improved electricity-usage efficiency through implementation of several building renovation projects. The installation has won six Secretary of the Navy Platinum and eight Gold awards for Energy and Water Conservation (NAVFAC, 2016a). Energy Independence and Security Act of 2007 goals were achieved early, and the installation continues to reduce energy use. Many energy efficiencies were developed through the use of advanced metering to determine the largest energy users and implement effective scheduling and energy management of them (NAS Whidbey Island, 2016).

CNG obtains its natural gas from production sites in the Rocky Mountains and Western Canada (CNG, 2016). CNG's Integrated Resource Plan indicates additional resources will be needed by 2020 to meet demand under a high-growth scenario (CNG, 2016). Extension of natural gas service must be requested by customers; however, properties must be within a reasonable distance to main lines (Island County, 2016d).

3.13.2.6 Communications

3.13.2.6.1 Communications Distribution System

Verizon provides landline telephone service in northern Whidbey Island, including Oak Harbor and the surrounding urban growth area (City of Oak Harbor, 2015a). Local telephone service in South Whidbey Island and parts of Central Whidbey Island is provided by Whidbey Telecom, with additional service in Oak Harbor and Coupeville provided by Frontier (Island County, 2016d). Verizon, Sprint, AT&T, and T-Mobile all provide nearly complete cellphone coverage of Whidbey Island and western Skagit County, with some variation in service levels (Verizon, 2016; Sprint, 2016; AT&T, 2016; T-Mobile, 2016). More than 20 communications towers are located throughout Whidbey Island (Island County, 2016d). Advances in technology are expected to continue to increase cell site capacity, while consumer demand will drive construction of new cell sites where needed (City of Oak Harbor, 2015a).

3.13.2.6.2 NAS Whidbey Island Communication System

A complex network of fiber-optic and copper cables constitutes the communications system at NAS Whidbey Island. This network supports the installation's alarm, telephone, video conferencing, enterprise land/mobile radio, and other systems. Systems are managed by the Information Resource Management Department, the Navy Marine Corps Intranet, Naval Computer and Telecommunications Area Master Station, Pacific Detachment Puget Sound. The majority of facilities are connected to the fiber-optic system; however, capacity is often insufficient to meet demand (NAVFAC, 2016b).

3.13.2.7 Facilities

Ault Field and the Seaplane Base include over 3.7 million square feet of facilities to support NAS Whidbey Island's mission. Facilities covering approximately 3.2 million square feet are located at Ault Field, facilities covering 550,000 square feet are located at the Seaplane Base, and facilities covering 6,500 square feet are located at OLF Coupeville. The largest portion of facilities is for Sailor & Family Readiness, which uses over 1.3 million square feet of space and includes housing, food services, and Moral, Welfare and Recreation facilities. Airfield operations make up the next largest category, which does not include pavement for runways. The majority of facilities at NAS Whidbey Island have "fair" or "good" ratings for configuration and capacity, but many facilities are ranked "poor" for condition.

3.14 Geological Resources

This discussion of geological resources includes topography, geology, seismic activity, and soils. The principal geological factors influencing the stability of structures are soil stability and seismic properties. Topography describes the physical state of the land and includes elevation and relief features of the land surface. Topographic characteristics can include both manmade and natural features but generally includes hills, ridges, mountains, valleys, and plains (USGS [U.S. Geological Survey], n.d.). Soil is the unconsolidated material above bedrock. Soil is formed from the weathering of bedrock and other parent materials. Topography and soils are analyzed in this EIS in terms of drainage and erosion. The analysis of topography and soils focuses on the area of soils that would be disturbed, the potential for erosion of soils from construction areas, and the potential for eroded soils to become pollutants in downstream surface water during storm events. The analysis also examines potential impacts from geologic hazards, including liquefaction, landslides, and earthquakes, to project activities.

3.14.1 Geological Resources, Regulatory Setting

3.14.1.1 State Regulations

The Washington State Building Code Act was amended in 2006, at which time the 2006 international codes were adopted that included provisions for structural design regarding earthquake loads (WSSPC, 2016). The building codes are driven in part by soil and liquefaction maps prepared by the Washington Department of Natural Resources. Liquefaction can occur when very wet soils are shaken during an earthquake and lose their structure and the ability to support foundations for buildings, which therefore may tilt or sink. These soils also slide more easily, resulting in landslides.

3.14.2 Geological Resources, Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under geological resources at Ault Field.

3.14.2.1 Topography

Ault Field on the NAS Whidbey Island complex comprises the study area for topography and soils because this is where any impacts to topography would occur as a result of any military construction that would be required to support the Proposed Action. Current landforms are predominantly the result of erosion and deposition that occurred as the Vashon ice retreated northward. Whidbey Island lies within the Puget Sound Lowland, a topographic and structural depression between the Olympic Mountains and the Cascade Range (Navy, 2014b). Topographical features around Ault Field consist mainly of gentle to moderate slopes with elevations ranging from sea level to approximately 220 feet above MSL. Gentle ridges run the length of the other regions of the island. The developed area of Ault Field, including the airfield and surrounding facilities, is in a level, low-lying area with elevations ranging from 10 feet to approximately 50 feet above MSL (Navy, 2014b). Steep slopes occur mainly along the shoreline of the station.

3.14.2.2 Geology

The NAS Whidbey Island complex is underlain by layers of unconsolidated gravels, sands, silts, and clays with a thickness of 500 to 1,800 feet. These layers were deposited over the past 2 million years during alternating glacial and non-glacial periods and overlie much older bedrock. Most near-surface deposits in the project area are associated with the most recent glaciation, including till and advance outwash, which are approximately 12,000 to 16,000 years old (Navy, 2011).

3.14.2.3 Seismic Activity and Geologic Hazards

Five fault lines occur within 15 miles of Ault Field, including, in order of closest to farthest, Strawberry Point Fault (less than 1 mile to the south), Devil's Mountain Fault (approximately 1 mile to the north), Utsalady Point Fault (approximately 2 miles to the south), unnamed faults in the Strait of Juan de Fuca and Puget Sound (approximately 4 miles to the north and northwest), and Southern Whidbey Island Fault (approximately 12 miles to the south and southwest) (USGS, 2016). Seismic activity in this region results from subduction of the Juan de Fuca plate beneath North America. An inactive fault discovered in the 1970s, known as the Northern Whidbey Island Fault, crosses the island in an east-west direction approximately 3 miles north of Oak Harbor. The most recent apparent significant activity at this fault was approximately 18,000 years ago (Cheney, 1987). Since earthquakes are a reflection of active tectonic processes, this fault does not appear to present any significant seismic hazard. Evidence

suggests an approximately 6.7 magnitude or greater earthquake may have occurred at the Utsalady Point Fault between 1550 and 1850 (Johnson et al., 2004). However, no human record of the quake exists. The Utsalady Point Fault, Strawberry Point Fault, and Devil's Mountain Fault may be active (Johnson et al., 2004). Hazards associated with seismic activity on the faults include surface fault rupturing, strong ground motion or shaking, and liquefaction. The northern portion of Ault Field has a high liquefaction susceptibility, while the southern portion has a low to moderate liquefaction susceptibility (Palmer et al., 2004). Whidbey Island also has several regions with a variety of instabilities along its shoreline; these instabilities are associated with landslides (Washington State Department of Ecology, 1979).

3.14.2.4 Soils

Forty-one soil types are mapped within the boundaries of the NAS Whidbey Island complex. The primarily soils mapped include Sholander, cool-Spieden complex, and Urban Land-Coupeville-Coveland cool complex. These somewhat poorly drained soils are generally found in valleys and are made up of glacial drift, glacial outwash, dense glaciomarine deposits, and organic material. Scholander permeability is moderately rapid to very rapid above the densic contact and very slow in the densic material, and erodibility is relatively low (USDA, 2009, 2011; SoilWeb, 2015a). Spieden series permeability is moderately high to very high, and erodibility is relatively low (USDA, 2007, 2009; SoilWeb, 2015b). The permeability of Urban Land-Coupeville-Coveland cool complex is very low to high, and erodibility is relatively low (SoilWeb, 2015c, 2015d; USDA, 2008). Typical soil profiles contain gravelly loam, gravelly sandy loam, and sandy loam soils. Areas also occur that have been previously filled to construct the airfield and support facilities, so natural surface soils do not occur in these areas (Navy, 2014b). The soil series occurring on the NAS Whidbey Island complex lands were grouped into six categories according to the formation processes and geologic features with which they are associated.

These categories are:

- **Soils of Glacial Uplands**
  Soils that occur on glacial uplands occupy approximately 75 percent of Island County. On the NAS Whidbey Island complex, they include Bozarth, Casey, Hoypus, Keystone, Swantown, Townsend, and Whidbey soil series. These soils are derived from coarse- to fine-textured glacial drift and all developed under forest except for the Townsend soils. Their internal drainage is moderately good to somewhat excessive (NAS Whidbey Island, 2013a).

  Most of these soils have only fair suitability for agricultural use. The Hoypus and Keystone soils are generally too droughty for growing crops and are typically used for pasture or left in forest. Casey soils retain moisture to a greater extent than many of the other soils occurring on glacial uplands and so are typically used for agriculture, primarily for pasture and hay in conjunction with dairying. Townsend soils have a higher organic content and retain adequate moisture for growing a number of crops (NAS Whidbey Island, 2013a).

- **Soils of Terraces**
  Terraces are raised, level areas with vertical or sloping sides, often occurring in series, one above the other. On Whidbey Island, they were probably formed by isostatic rebound and the resultant varying sea level. Isostatic rebound occurs as landforms are freed from the weight of ice sheets and glaciers during periods of glacial retreat. Land masses rise up and relative sea level drops during interglacial periods (NAS Whidbey Island, 2013a).

Terrace soils do not cover extensive areas at the NAS Whidbey Island complex. They include Coupeville, Ebeys, San Juan, and Snakelum soil series. These soils formed from marine or lake sediments and from glacial outwash; their internal drainage is moderately good to excessive.

The San Juan and Snakelum series are prairie soils derived from gravelly or sandy outwash and are considered relatively good agricultural soils. The Coupeville and Ebeys soils are considered the most highly productive in Island County, producing high yields of wheat, oats, squash, cabbage for seed, alfalfa, and other crops (NAS Whidbey Island, 2013a).

- **Soils of Depressions in Uplands and Terraces**
  These soils occur in small depressions, basins, or sloping concave areas that receive considerable seepage and runoff from surrounding uplands. The soils are often saturated during the rainy months and are poorly drained. They include Bellingham, Coveland loam, and Norma soils. Norma and Bellingham soils developed under forest, while Coveland soils developed under grasses, sedges, and brush. These are typically poorly drained soils that are associated with wetlands unless drained. When drained, Norma and Bellingham soils are used for pasture grasses; Coveland soils are used to grow cereal grains and vegetables (NAS Whidbey Island, 2013a).
- **Soils of Deltas, Tidal Flats, Tidal Marshes, and Coastal Beaches**
  Soils of deltas and tidal flats at the NAS Whidbey Island complex include Hovde, Lummi, and Tidal Marsh. Hovde sand is found in nearly level beach areas adjacent to coastal beach soils. Lummi silt loam occurs on deltas and tidal flats in tidal salt marsh areas that have been artificially drained using dikes and ditches. Soils mapped as Tidal Marsh are bordered by salty or brackish water and are generally submerged at high tide. These soils have developed from marine sediments and are generally alkaline unless diked and drained (NAS Whidbey Island, 2013a).

  Coastal beaches are long, narrow, nearly level strips of sandy and gravelly materials. They are above the level of the mean tide but are swept by storm waves. They occur at the base of coastal bluffs or lowlands bordering the Strait of Juan de Fuca. Tacoma peat occurs in depressional areas adjacent to coastal beach. These soils are not typically considered for agricultural purposes unless diked or drained (NAS Whidbey Island, 2013a).
- **Organic Soils**
  Organic soils are formed from the decomposition of plant material that has accumulated in shallow lakes, on slow-moving stream banks, or in permanently wet depressions. Organic soils are characterized by poor drainage, surface-water ponding, and a slight erosion hazard. By definition, they are hydric soils, and wetlands are typically associated with them. Most of these soils receive runoff and seepage from higher elevations; surface runoff from organic soils is typically slow. Soil series of this type occurring at the NAS Whidbey Island complex include Carbondale, Rifle, Tacoma, and Tanwax (NAS Whidbey Island, 2013a).
- **Disturbed Soils**
  The surface layers of disturbed soils have usually been modified by the placement of fill for construction purposes or the removal of surface soil for landfill material. The subsurface characteristics of the original soil have usually not been altered, and these characteristics control the movement of water on and through the soils. Areas where significant amounts of fill have been placed are mapped on soils maps as “Made Land” (NAS Whidbey Island, 2013a).

3.15 Hazardous Materials and Wastes

This section discusses hazardous materials, hazardous waste, and contaminated sites.

3.15.1 Hazardous Material and Wastes, Regulatory Setting

Hazardous materials are defined by 49 CFR section 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table, and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations.

Hazardous wastes are defined by the Resource Conservation and Recovery Act, as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR part 273. Four types of waste are currently covered under the universal wastes regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

The DoD established the DERP to facilitate thorough investigation and cleanup of contaminated sites on military installations (active installations, installations subject to Base Realignment and Closure, and formerly used defense sites). The Installation Restoration Program and the Military Munitions Response Program are components of the DERP. The Installation Restoration Program requires each DoD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The Military Munitions Response Program addresses nonoperational rangelands that are suspected or known to contain unexploded ordnance, discarded military munitions, or munitions constituent contamination. The Environmental Restoration Program is the Navy's initiative to address the DERP.

3.15.2 Hazardous Materials and Wastes, Affected Environment

The Navy has implemented a strict Hazardous Material Control and Management Program and a Hazardous Waste Minimization Program for all activities. These programs are governed Navy-wide by applicable OPNAVINST and at the installation by specific instructions issued by the Base Commander. The Navy continuously monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes.

3.15.2.1 Hazardous Materials

Hazardous materials are used at Ault Field for airfield operations and industrial support activities, including petroleum, oils, and lubricants; solvents and thinners; caustic cleaning compounds and surfactants; cooling fluids (antifreeze); adhesives; acids and corrosives; paints; and herbicides, pesticides, and fungicides. Hazardous materials are also used for aircraft and vehicle repair and maintenance at Ault Field (Navy, 2014b).

3.15.2.2 Hazardous Wastes

Ault Field is classified as a large-quantity hazardous waste generator, as defined by the Resource Conservation and Recovery Act, because it has the potential to generate more than 2,200 pounds of hazardous waste every month. Activities at Ault Field that generate hazardous wastes include painting, using solvents for cleaning and degreasing, mechanical and chemical paint and corrosion removal, fluids change-out, electroplating, metal casting, machining, and welding and soldering. Hazardous wastes are accumulated at less-than-90-day accumulation points throughout the installation before being transferred to and collected at less-than-90-day central processing facilities prior to transportation offsite and disposal at a permitted Treatment, Storage, and Disposal facility. Ault Field maintains a hazardous waste management plan that establishes procedures and provides guidance regarding hazardous waste generation, accumulation, and disposal at the installation (Navy, 2014b).

3.15.2.3 Defense Environmental Restoration Program

The Navy is committed to ensuring all individuals who live or work on or near Navy installations and facilities are protected from contaminants from past releases. The Navy maintains comprehensive environmental instructions detailing procedures to meet the requirements found in state and federal regulations and policies. The Navy manages past releases of contaminants through the DERP. The Navy has several sites in various stages of investigation, remediation, or site closure at Ault Field, the Seaplane Base, and OLF Coupeville.

3.16 Climate Change and Greenhouse Gases

Climate change refers to any significant change in measures of climate lasting for an extended period. Global climate change threatens ecosystems, water resources, coastal regions, crop and livestock production, and human health. Many scientific studies correlate the observed rise in global annual average temperature and the resulting change in global climate patterns with the increase in GHGs in the Earth's atmosphere from human (anthropogenic) activity (IPCC [Intergovernmental Panel on Climate Change], 2013). Most of the average worldwide warming effect that appears to be driving climate change has been caused by human emissions of GHGs, which are the result of the burning of fossil fuels for energy, removing forest, releasing emissions from landfills, producing certain industrial products, applying agricultural fertilizers, and raising livestock. These emissions include CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers (USEPA, 2016e). Each GHG is assigned a global warming potential, which refers to the ability of a gas or aerosol to trap heat in the atmosphere (USEPA, 2016e). An increase in GHGs, especially those with larger global warming potentials, causes more heat to be retained. This additional heat can disrupt the natural balance of global energy inputs, which leads to changes in long-term atmospheric conditions (i.e., climate), depending on the resulting environmental feedbacks (e.g., changes in snow and ice cover) (IPCC, 2013). The global warming potential rating system is standardized to CO_2, which has a value of one. The equivalent CO_2 rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs, referred to as the CO_2 Equivalent, abbreviated as CO_2e (USEPA, 2016e).

3.16.1 Policies for the Mitigation of and Adaptation to Climate Change

In the U.S., federal agencies and state governments have implemented programs and policies in an attempt to reduce GHG emissions to mitigate the extent of climate change and adapt to the impacts that are likely to occur.

3.16.1.1 Federal Policies Related to Climate Change

Legislation includes the Energy Policy Act of 2005, which addressed energy efficiency, renewable energy, energy tax incentives, and ethanol in motor fuels (USEPA, 2016f), and the Energy Independence and Security Act of 2007, which reinforces energy reduction goals for federal agencies. Under the CAA, the USEPA has developed and implemented GHG emission standards for stationary sources through the Greenhouse Gas Tailoring Rule and the Greenhouse Gas Reporting Program (USEPA, 2016g).

Several EOs have been issued in recent years that direct federal agencies to address climate change, and GHG emissions with emission reductions and preparedness planning and implementation. EO 13834, Efficient Federal Operations, requires that agencies meet statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. In implementing this policy, each agency shall prioritize actions that reduce waste, cut costs, and enhance the resilience of federal infrastructure and operations. This EO also requires agencies to track and report on energy management activities, performance improvements, cost reductions, GHG emissions, energy and water savings, and other appropriate performance measures (EO 13834, 2018).

Federal agencies are required to consider GHG emissions and climate change in environmental assessment in accordance with NEPA. The Office of the Chief of Naval Operations M-5090.1D Environmental Readiness Program Manual (Navy, 2014a) states that the Navy must address the effects of climate change, identifying and quantifying GHG emissions (where possible) that may be generated in executing the Proposed Action, and also describing the beneficial activities being implemented Navy-wide to reduce GHG emissions.

3.16.1.2 Department of Defense Policies Related to Climate Change

The DoD and the Department of the Navy have established various directives, including the Navy's Environmental Readiness Program Manual mentioned above and DoD Directive 4715.21, from January 2016, which integrates climate change considerations into all aspects of the department (DoD, 2016a). DoD components are charged with assessing, managing risks, and mitigating the effects of climate change on natural and cultural resource management, force structure, basing, and training and testing activities in the field environment.

Additionally, the DoD 2016 Operational Energy Strategy (DoD, 2016b) sets forth plans to reduce the demand for energy and secure energy supplies. This policy also directs DoD components to reduce GHG emissions from operational forces. Other recent policies, updates, and/or directives include the FY 15 DoD Sustainability Performance Plan (DoD, 2015) and the 2014 Climate Change Adaptation Roadmap (DoD, 2014), which focuses on various actions DoD is taking to increase its resilience to the impacts of climate change. The Secretary of the Navy set goals to improve energy security, increase energy independence, and reduce the reliance on petroleum by increasing the use of alternative energy (Navy, 2010b). Section 4.16, Climate Change and Greenhouse Gases, provides more details on the DoD and Navy programs to address GHG emissions and climate change in the future.

3.16.1.3 State Policies Related to Climate Change

Washington State's *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy* (Washington State Department of Ecology, 2012) was published to describe the risks of climate change to the state and identify the state's priorities in addressing these risks.

In 2009, the Washington State Legislature approved the State Agency Climate Leadership Act E2SSB 5560, which established GHG emissions reduction limits for state agencies in law (RCW 70.235.050 and RCW 70.235.060) and directed state agencies to quantify GHG emissions, report on actions taken to reduce GHG emissions, and develop a strategy to meet the GHG reduction targets. Washington State has established the following GHG reduction targets to reduce overall emissions (RCW 70.235.020):

- by 2020, reduce overall emissions of GHGs in the state to 1990 levels
- by 2035, reduce overall emissions of GHGs in the state to 25 percent below 1990 levels
- by 2050, the state will do its part to reach global climate stabilization levels by reducing overall emissions to 50 percent below 1990 levels, or 70 percent below the state's expected emissions that year (Washington State Department of Ecology, 2016b)

Chapter 173-442 WAC, The Clean Air Rule, was adopted in September 2016 and regulates the businesses that are responsible for about two-thirds of carbon pollution in Washington State, such as transportation, refining, and manufacturing. In 2017, organizations that are responsible for 100,000 MT of carbon pollution annually were required to cap and gradually reduce their emissions. Every three years, the threshold is lowered by 5,000 MT, and more emitters are brought into the program. By 2035, the threshold will reach 70,000 MT, where it will remain (Washington State Department of Ecology, n.d.[g]).

NAS Whidbey Island was not identified as a potentially eligible party under the new clean air rule (Washington State Department of Ecology, 2016a) because its stationary emissions have historically been below 25 tons.

In June 2017, Washington Governor Jay Inslee formed the U.S. Climate Alliance with the governors of New York and California to commit to reducing emissions by 26 to 28 percent from 2005 levels in order to meet or exceed targets of the federal Clean Power Plan. (Office of the Governor of Washington, 2017). The U.S. Climate Alliance, which was joined by 12 other states and Puerto Rico (*National Geographic*, 2017), was created in response to President Donald Trump's decision to withdraw from the Paris Climate Accord (White House Office of the Press Secretary, 2017).

3.16.2 Affected Environment

Evidence for global, national, and regional effects of climate change has been growing. In 2016, the USEPA released the fourth report describing trends related to the causes and effects of climate change (USEPA, 2016e):

- While U.S. GHG emissions decreased 7 percent since 2005, these annual emissions still represent a 7-percent increase between 1990 and 2015. CO_2 in the atmosphere has increased from a historical peak of 280 parts per million to an average of 400 parts per million.
- Average U.S. and global temperatures have increased since 1900, more quickly since the 1970s. The top 10 warmest years on record have all occurred since 1998, and extreme high and low temperature conditions are becoming more common. Changes to climate patterns include more intense storms in some areas and more severe droughts in others.

- Average sea surface temperatures have increased, resulting in more acidic oceans, as well as rising sea levels. Average global sea levels rose an average of 0.06 inch per year from 1880 to 2013; however, they have risen 0.11 to 0.14 inch per year since 1993. Despite overall increases, regional changes in sea level vary, and increases in land elevation have resulted in a decrease in sea level in some locations in Alaska and the Pacific Northwest.
- Climate change has resulted in changes to snow and ice. On average, snowfall, snow cover, and snowpack in the northern U.S. have decreased. Changes to snow cover and reduced snowfall affect water supplies, hydroelectric power production, transportation, recreation, vegetation, and wildlife.
- Changes to the earth's climate will have secondary effects on the health and well-being of its human inhabitants and natural ecosystems. (USEPA, 2016e)

3.16.2.1 Impacts of Climate Change on Department of Defense Mission

The 2014 DoD Climate Change Adaptation Roadmap indicates that rising global temperatures, changing precipitation patterns, increasing frequency or intensity of extreme weather events, and rising sea levels and associated storm surges are likely to affect the DoD's activities, and adaptation will require consideration of climate change in DoD planning and, operations; training; buildings and infrastructure; and acquisition (DoD, 2014). For Example, climate change may affect planning and operations. Sea level rise and changing temperatures could impact amphibious landings and operation timing windows. Increased frequency of extreme weather could impact operational capabilities and require new domestic and international need for disaster relief and humanitarian services. The opening of Arctic seas lanes could result in an expanded mission to monitor and safeguard navigation. (DoD, 2014).

3.16.2.2 Impacts of Climate Change in Washington State and Puget Sound

According to Washington State's *Preparing for a Changing Climate: Washington State's Integrated Climate Response Strategy* (Washington State Department of Ecology, 2012), climate change is affecting the state with warmer temperatures, rising sea levels, reduced snow pack, and extreme weather (Washington State Department of Ecology, n.d.[h]).

Warmer temperatures have resulted in milder winters, more rain, and hotter summers with less rain. Changes in weather are already having an impact on the state's agricultural industry through increasing droughts (Washington State Department of Ecology, n.d.[i]). Sea level rise effects include coastal community flooding, coastal erosion and landslides, seawater intrusion into groundwater wells, and lost wetlands and estuaries (Washington State Department of Ecology, n.d.[j]). Washington has experienced reduced snow pack and earlier runoff. Much of Washington's water supply is stored in its snow pack and glaciers that melt into rivers. Downstream effects include changes in the timing of peak freshwater flows, power output at hydropower facilities, fish migration, and water availability in the dry summer season (Washington State Department of Ecology, n.d.[k]).

3.16.3 Greenhouse Gas Emissions

3.16.3.1 Regional and State Greenhouse Gas Emissions

The USEPA and Washington State have a number of programs designed to collect and analyze GHG emissions to better understand the sources of GHGs in the state. These programs help the state design

policies to reduce GHG emissions and track its progress towards meeting the state's statutory GHG reduction limits.

The USEPA collects and reports nationally GHG emissions in the *Annual Inventory of U.S. Greenhouse Gas Emissions and Sinks*. The State of Washington's anthropogenic GHG emissions for the period from 1990 to 2013 (see Table 3.16-1) were developed using a set of generally accepted principles and guidelines for state GHG emission inventories, with adjustments for Washington-specific data and context, as appropriate—including the addition of military aircraft (Washington State Department of Ecology, 2007). The most recent inventory was published in October 2016 (Washington State Department of Ecology, 2016b).

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

Million Metric Tons CO_2e	***1990***	***2010***	***2011***	***2012***	***2013***
Electricity, Net Consumption-based	***16.9***	***20.7***	***15.7***	***15.2***	***18.2***
Coal	16.8	15.8	12.8	12.1	13.3
Natural Gas	0.1	4.8	2.8	3.0	4.8
Petroleum	-	0.1	0.1	0.1	0.07
Residential/Commercial/Industrial	***18.6***	***19.7***	***20.8***	***20.5***	***21.9***
Transportation	***37.5***	***42.2***	***41.9***	***42.5***	***40.4***
Onroad Gasoline	20.4	21.9	21.3	21.2	21.7
Onroad Diesel	4.1	8.0	8.0	7.4	7.0
Marine Vessels	2.6	3.0	3.3	4.1	3.4
Jet Fuel and Aviation Gasoline	9.1	8.1	7.6	8.0	6.6
Natural Gas Industry	***0.5***	***0.8***	***0.8***	***0.8***	***0.8***
Industrial Process	***7.0***	***4.5***	***4.6***	***4.6***	***4.8***
Waste Management	***1.5***	***3.1***	***3.1***	***3.2***	***3.3***
Agriculture	***6.4***	***6.2***	***6.5***	***6.6***	***5.9***
Total Gross Emissions	***88.4***	***97.2***	***93.7***	***93.6***	***94.4***

Source: Washington State Department of Ecology, 2016b

Bold values are included in the total gross emissions; all other rows and values included are subsets of the category above.
2010-2012 data have been revised based on values contained in the new International Panel on Climate Change Fourth Assessment Report for Global Warming Potential.

Key:
CO_2e = carbon dioxide equivalent

3.16.3.2 NAS Whidbey Island Greenhouse Gas Emissions

The NAS Whidbey Island complex also reports GHG emissions, as required under WAC 173-401-200 (19) and (35) (9/10/11) (NWCAA, 2013). Recent annual GHG emissions from stationary sources reported for the NAS Whidbey Island complex are shown in Table 3.16-2. Station-wide mobile GHG emissions are not reported or estimated.

Table 3.16-2 NAS Whidbey Island Complex Annual Reported GHG Air Emissions Inventory (Required Stationary Sources Only)

Year	*CO_2*	*CH_4[1]*	*N_2O[2]*	*Total $MTCO_2e$ Emissions*
2009	11,407	NR	NR	11,407
2010	11,129	5	21	11,155
2011	15,939	8	0	15,947
2012	17,843	8.4	13.6	17,864
2013	16,542	7.14	12.4	16,562
2014	11,357	5	6	11,371
2015	13,373	6.3	7.7	13,387
2016	13,560	6.5	8.0	13,575

Sources: NWCAA, 2013; NAS Whidbey Island, 2013b, 2017b; Stewart, 2018

Note: Measurements in $MTCO_2e$ per year totals may not sum because of rounding.

[1] 2010-2013 Global warming potential of CH_4 = 21, 2014-2016 GWP for CH_4 = 25.
[2] 2010-2013 Global warming potential of N_2O = 310, 2014-2016 GWP for N_2O = 298.

Key:
CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
GHG = greenhouse gas
GWP = global warming potential
MT = metric tons
N_2O = nitrous oxide
NR = not reported

Using methods, emissions factors, and average time-in-mode assumptions described in Section 3.4, GHG emissions from the Growler aircraft have been estimated. Counting all operations that produce emissions (i.e., all engine and auxiliary power unit use), each typical sortie with one full landing and take-off cycle (including all ground operations, such as warm-up, taxiing in and out, and refueling operations), transit to OLF Coupeville, and eight touch-and-go operations would take 95 minutes, or 1.6 hours, including an estimated 40 seconds total of AB use. Each such sortie would burn 1,480 gallons of jet fuel and produce 14.25 MT of equivalent carbon dioxide ($MTCO_2e$), for an average fuel use of 937 gallons per hour and an emission rate of 9.03 $MTCO_2e$ per hour.

This analysis has estimated the emissions that will be produced by Growler OLF training over the course of a year. While there are a certain number of operations per year, they are not constant, and power settings vary based on the type of operation. The total GHG emissions from NAS Whidbey Island's Growler aircraft operations are currently 89,145 $MTCO_2e$ per year, and GHG emissions from current Growler aircraft personnel commuting are 9,091 $MTCO_2e$ per year (Refer to Appendix B for complete air emissions calculations).

This page intentionally left blank.