Naval Air Station Whidbey Island

Draft Amended Analysis to

Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex, Washington, September 2018

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Abbreviations and Acronyms

μPa	Micropascal
AEA	Airborne Electronic Attack
AGL	Above Ground Level
APCD	Air Pollution Control District
BASH	Bird/Wildlife Aircraft Strike Hazard
CEQ	Council of Environmental Quality
CH_4	Methane
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
dB	Decibel
dBA	A-weighted Decibel
DNL	Day-Night Average Sound Level (*see also* L_{dn})
DNWG	Defense Noise Working Group
DoD	Department of Defense
EA	Environmental Assessment
EAWS	Electronic Attack Weapons School
EIS	Environmental Impact Statement
ELA	English Language Arts
EMS	Electromagnetic Spectrum
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCLP	Field Carrier Landing Practice
FICAN	Federal Interagency Committee on Aviation Noise
FLOLS	Frensel Lens Optical Landing System
FRCNW	Fleet Readiness Center Northwest
FRS	Fleet Replacement Squadron
GHG	Greenhouse Gas
GWP	Global Warming Potential
IFLOLS	Improved Fresnel Lens Optical Landing System

kHz	Kilohertz
lbs	Pounds
L_{den}	Day-Evening-Night Sound Level
L_{dn}	Day-Night Average Sound Level (*see also* DNL)
L_{eq}	Equivalent Sound Level
$L_{eq(16h)}$	16-hour Equivalent Sound Level
$L_{eq(8h)}$	8-hour Equivalent Sound Level
L_{max}	Maximum Sound Level
MCAS	Marine Corps Air Station
MTR	Military Training Route
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAF	Naval Air Facility
NAS	Naval Air Station
NAT	Number of Flight Events Above a Certain Noise Threshold
NEPA	National Environmental Policy Act
nm^2	Square Nautical Miles
NO_x	Nitrogen Oxides
OLF	Outlying Landing Field
O_3	Ozone
PM	Particulate Matter
RANCH	Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health
ROD	Record of Decision
SEL	Sound Exposure Level
SIP	State Implementation Plan
SUA	Special Use Airspace
U.S.	United States
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USEPA	United States Environmental Protection Agency

USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WHO	World Health Organization

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1.0 Introduction

In 2018 and 2019, the Department of the Navy (hereinafter the Navy) published an Environmental Impact Statement (EIS) assessing the effects of augmenting the Navy's existing Airborne Electronic Attack community at Naval Air Station (NAS) Whidbey Island by operating additional EA-18G "Growler" aircraft appropriated by Congress. *Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex, Washington, September 2018, https://www.nepa.navy.mil/growler/EIS-Docs/* (hereinafter 2018 Final EIS). In subsequent litigation in the U.S. District Court for the Western District of Washington, the Court found that the 2018 Final EIS and Record of Decision "violated [the National Environmental Policy Act (NEPA)] by failing to disclose the basis for greenhouse gas emissions, failing to quantify the impact of increased operations on classroom learning, failing to take a hard look at species-specific impacts on birds, and failing to give detailed consideration to the El Centro, California alternative." The Navy has prepared this amended analysis consistent with the Court's findings. Specifically, this amended analysis (1) updates GHG emissions calculations and explains the basis for those calculations; (2) clarifies and expands on the analysis of species-specific impacts on birds; (3) refines the analysis of the impact of increased operations on childhood learning and attempts to quantify the degree of impact to the extent supported by the best available science; and (4) reassesses whether relocating some or all of the "Growler" community to Naval Air Facility (NAF) El Centro is a reasonable alternative and provides a fuller explanation of the Navy's reasoning for eliminating the alternative from detailed study.

1.1 Background

In the 2018 Final EIS, the Navy evaluated environmental impacts associated with augmenting the Navy's existing Airborne Electronic Attack community at NAS Whidbey Island by operating additional EA-18G "Growler" aircraft appropriated by Congress, including associated personnel changes, increasing airfield operations and modifying the distribution of operations between airfields, and establishing facilities and functions at NAS Whidbey Island's main airfield, Ault Field, to support an expanded EA-18G "Growler" mission. Ultimately, the Navy selected an alternative (Alternative 2A) that would expand expeditionary and carrier capabilities by establishing two new expeditionary squadrons, adding two additional aircraft and additional squadron personnel to each of the nine existing carrier squadrons, augmenting the Fleet Replacement Squadron (FRS) with eight additional aircraft and additional squadron personnel, and redistributing field carrier landing practice (FCLP) between Ault Field and NAS Whidbey Island's Outlying Landing Field (OLF) Coupeville, such that approximately 80 percent of the total projected annual (average year) FCLPs would be conducted at OLF Coupeville and approximately 20 percent at Ault Field. In total, this alternative would result in a net increase of 36 aircraft and an estimated increase of 628 Navy personnel and 860 dependents.

2.0 Amended Analysis Impact Evaluations

2.1 Greenhouse Gas Emissions from EA-18G "Growler" Operations

The 2018 Final EIS quantified EA-18G "Growler" air emissions, including GHGs, for all aircraft operations below 3,000 feet above ground level (AGL), consistent with the standard practice at that time for estimating emissions from airfield actions, which relied on regulatory guidance developed by the U.S. Environmental Protection Agency (USEPA) for criteria pollutants. See *Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources*, 1992 (USEPA, 1992). This practice was also consistent with the conclusions reached by the Federal Aviation Administration (FAA) in a 2000 study on modeling aircraft emissions above 3,000 feet AGL, which determined that "airplane operations at or above 3,000 feet AGL should be considered a Categorical Exclusion for modeling of local air quality impacts" (FAA, 2000).

Although the USEPA guidance and the FAA study's findings were developed for criteria pollutants, historically the Department of Defense and FAA relied on these analyses in estimating aircraft GHG emissions in EISs assessing airfield actions. As a result, the 2018 Final EIS followed this approach in only quantifying EA-18G "Growler" criteria pollutant and GHG emissions below 3,000 feet AGL.

Developments in scientific understanding and approaches to calculating greenhouse gas emissions subsequently resulted in a change to policy and practice for quantification of GHG emissions from aircraft. The revised approach recommends that all GHG emissions from an airfield action such as the Proposed Action, including emissions at or above 3,000 feet AGL, should be considered in analyzing the effects of a proposed action.[1] Unlike the localized air quality impact of criteria pollutants emitted below 3,000 feet AGL, GHG emissions emitted both below and above 3,000 feet AGL contribute to the global aggregation of GHGs in the atmosphere. In response to public comments and consistent with current practice and the latest science, EA-18G "Growler" operational GHG emissions below and above 3,000 feet AGL have now been quantified, as detailed in Appendix A and discussed further below.

Because the GHG analysis in the 2018 Final EIS focused on local air quality concerns, specifically emissions from aircraft flying below 3,000 feet above ground level (AGL), the reported GHG emissions from the EA-18G "Growler" in the 2018 Final EIS only included fuel burned during operations near the airfield, including when conducting FCLPs. In contrast, the annual fuel inventories at NAS Whidbey Island documented all fuel consumed by the EA-18G "Growler" over the course of a year, including fuel used during flights above 3,000 feet AGL and during other training activities not covered in the 2018 Final EIS.

As a result, the baseline fuel consumption reported in the 2018 Final EIS (which was used to calculate baseline GHG emissions) is lower than the total fuel consumption recorded in the annual fuel inventories, which includes all EA-18G "Growler" operations, including non-FCLP activities. Additionally, the annual fuel inventories document actual fuel consumption, which can vary depending on factors like the number and type of flight events and the duration of each flight. However, the fuel consumption estimates for future years in the 2018 Final EIS were based on historical data and projections for future operations, and were different from the baseline fuel data, which was based on just one year's worth of actual fuel consumption.

In this amended analysis, the Navy has reassessed the GHG emission rates for the Proposed Action by incorporating GHG emissions that would result from EA-18G "Growler" fuel consumed above 3,000 feet AGL under baseline conditions. This reassessment adopts the same assumptions used to forecast future emissions resulting from the Proposed Action in the 2018 Final EIS, relying on historical data and projections for future operational requirements. As in the 2018 Final EIS, this analysis only accounts for GHG emissions under the Proposed Action and does not address Growler emissions analyzed in other NEPA documents (e.g. the Northwest Training and Testing EIS/OEIS).

If complete fuel combustion were to occur during aircraft engine operation, the carbon content of the fossil fuel burned would be entirely converted to carbon dioxide (CO_2) (the dominant GHG). However, due to incomplete combustion processes, some of the carbon content of the fossil fuels is converted to

[1] The Magistrate's Report and Recommendation noted that Dr. Christopher Graecen submitted comments on the draft EIS indicating that Growler fuel usage was greater than the numbers being used by the Navy. The Court also considered extra-record evidence that purported to demonstrate that the Navy had underestimated Growler fuel usage in the 2018 Final EIS (*See State of Washington, et al.*, v. *United States Department of the Navy*, et al., Case No. 19-cv-1059, Docket 109, pp. 10-13). In applying updated policy and practice to include emissions above 3,000 feet AGL and clarifying fuel consumption reports, the amended analysis addresses these concerns.

other non-GHG byproducts in addition to CO_2, such as carbon monoxide. Additionally, fuel combustion efficiency varies across aircraft engine operating modes such as idling, accelerating, or cruising, and is further influenced by factors such as the air-fuel ratio and engine temperature. This leads to varying levels of fuel combustion efficiency and thus varying CO_2 and other byproduct emission rates (commonly referred to as emission factors) across the different engine operating modes used throughout a flight operation. Therefore, the same methodology used in the 2018 Final EIS to estimate CO_2 emissions below 3,000 feet AGL from real combustion processes was applied in this amended analysis. The CO_2 emission factors were based on the Navy Aircraft Environmental Support Office-provided engine mode-specific database developed and tested by engine manufacturers. The mode-specific CO_2 emission factors for EA-18G "Growler" range from 2,712 to 3,205 pounds (lbs) of CO_2 per 1,000 lbs fuel combusted.

Upon reaching higher cruising altitudes above 3,000 feet AGL, less throttle adjustments are required, and engine operations stabilize, which result in more complete fuel combustion. This reduces the level of incomplete combustion and maximizes the amount of GHG emissions. Therefore, the CO_2 emission factor for the engine cruise mode with engine power settings at the same level as the approach is considered appropriate for estimating CO_2 emissions above 3,000 feet AGL. The emission factor at engine cruise mode (3,191 lbs of CO_2 per 1,000 lbs of fuel consumed, based on the engine mode-specific database) was applied to the predicted annual EA-18G "Growler" flight hours above 3,000 feet AGL to calculate potential CO_2 emissions above 3,000 feet AGL and compare potential emissions from Preferred Alternative 2A to the No Action Alternative.

GHG emissions from fossil fuel combustion also include methane (CH_4), nitrous oxide (N_2O), and other fluorine-containing compounds. The 2018 Final EIS did not consider CH_4 or N_2O emissions, as emission factors for these compounds were not available in the Navy Aircraft Environmental Support Office-provided engine mode-specific database. The amended analysis derives CH_4 and N_2O emissions from "Growler" operations above 3,000 feet AGL by prorating the engine mode-specific database "Growler" cruise CO_2 emission factor, applied to the available jet fuel CO_2, CH_4, N_2O, and CO_2e emission factor speciation profile established by the U.S. Air Force in the Air Emissions Guide for Air Force Mobile Sources (Air Force Civil Engineer Center, 2023), to compare potential emissions from Preferred Alternative 2A to the No Action Alternative. Additionally, CH_4 and N_2O each have a different potential to contribute to atmospheric heating, referred to as its global warming potential (GWP). The GWP for CO_2 is 1, for CH_4 is 25, and for N_2O is 298 (i.e., one metric ton of CH_4 has the same atmospheric heating potential of 25 metric tons of CO_2). Total GHG emissions can be expressed in terms of the carbon dioxide equivalent (CO_2e) (the number of metric tons of CO_2 emissions with the same global warming effect as the total of each GHG multiplied by its GWP). In the 2018 Final EIS, CO_2 was considered equivalent to CO_2e because emission factors for CH_4 and N_2O were not available and their contributions to total GHG emissions in terms of CO_2e were small. This amended analysis considers CH_4 and N_2O contributions to total GHG emissions in addition to CO_2 and refines emissions of all three GHGs and CO_2e using the U.S. Air Force-established jet fuel GHG speciation profile. EA-18G "Growler" GHG emissions below 3,000 feet AGL were also recalculated using the above approach, and therefore the refined CO_2e emission value varies from the CO_2e value reported in the 2018 Final EIS. The revised EA-18G "Growler" GHG emissions from Preferred Alternative 2A and the No Action Alternative are presented in terms of CO_2e in **Table 2-1**. Compared to the No Action Alternative, the amended GHG emissions from Preferred Alternative 2A represent a net increase of 48,091 metric tons of CO_2e emissions for operations above 3,000 feet AGL, and a net increase of 38,536 metric tons of CO_2e for operations below 3,000 feet AGL.

Table 2-1 Naval Air Station Whidbey Island Complex Annual GHG Emissions

Emission Source	GHG Emissions (Metric Tons Per Year of CO2e)		Net Change in GHG Emissions (Metric Tons Per Year of CO2e)
	No Action	Preferred Alternative 2A	(Preferred Alternative 2A – No Action Alternative)
Aircraft			
"Growler" Operations >3,000 ft (amended to 2018 Final EIS)	***241,679***	***289,770***	***48,091***
"Growler" Operations <3,000 ft (updated from CO_2 reported in 2018 Final EIS to CO_2e)	88,037	126,573	38,536
Total "Growler" Combined	**329,716**	**416,343**	**86,627**
Combined Sources			
Other Mobile and Stationary Sources (employee vehicles, ground support equipment such as tow tractors, air compressors, and building electricity and natural gas use)	20,800	22,684	1,884
Total Combined Sources	**350,516**	**439,027**	**88,511**

Legend: < = less than; > = greater than; CO_2e = carbon dioxide equivalent; EIS = Environmental Impact Statement; ft = feet; GHG = greenhouse gas.

Overall, Preferred Alternative 2A would cause a total annual net increase of 88,511 metric tons of CO_2e emissions from both aircraft and other emissions sources (mobile and stationary), including an annual net increase of 86,627 metric tons of CO_2e from EA-18G "Growler" operations, as compared to the No Action Alternative. Appendix A provides calculation worksheet summaries and samples that detail the calculations performed for this amended analysis.

As previously discussed, the additional GHG emissions likely to be generated under Preferred Alternative 2A would contribute to global atmospheric GHG concentrations, regardless of the specific location or altitude at which they were produced. Based on the most recent available GHG emissions inventory for the U.S., the net GHG emissions resulting from Preferred Alternative 2A, as compared to the No Action Alternative, would represent a small increase of approximately 0.0014 percent over U.S. baseline GHG emissions, as shown in **Table 2-2**. The predicted net increase in GHG emissions would be equivalent to those from 11,887 homes' energy use for one year per USEPA's GHG Equivalencies Calculator (https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator).

Table 2-2 Comparison of GHG Emissions

Alternative	Preferred Alternative 2A GHG Emissions Increase (metric tons CO_2e)	U.S. 2022 Baseline National GHG Emissions Inventory[1] (metric tons CO_2e)	Preferred Alternative 2A GHG Emissions Increase Over National Baseline
Preferred Alternative 2A	88,511	6,343,200,000	0.0014%

Legend: GHG = greenhouse gas; CO_2e = carbon dioxide equivalent; % = percent; U.S. = United States.
Source: [1]https://www.epa.gov/system/files/documents/2024-04/us-ghg-inventory-2024-main-text_04-18-2024.pdf.

If comparing with 53,000 million metric tons of CO_2e emitted worldwide in 2023 estimated by the European Commission (European Commission, 2024), the net increase from the Proposed Action would nominally increase local and regional GHG emissions but would not meaningfully affect global GHG emissions.

Washington State has established GHG reduction targets to reduce overall emissions (RCW 70.235.020 Washington State Legislature, 2008 and Washington State Department of Ecology, 2024) and increases in GHG emissions could affect the state's efforts to meet these targets. However, the change in GHG emissions from the Proposed Action would only result in a small percentage of total aircraft GHG emissions in the State of Washington. Therefore, the GHG emissions from this Proposed Action should not have a significant impact on achievement of Washington's GHG emission reduction goals.

2.2 Avian

This amended analysis addresses the potential impacts of the Proposed Action on four Washington state-listed bird species (as defined below in **Section 2.2.2**): American White Pelican, Common Loon, Sandhill Crane, and Tufted Puffin. As explained further below, the Navy selected these bird species for detailed analysis because Washington State has classified these species as endangered or otherwise protected and each has the potential to be present in the Biological Resource Study Area. The potential impacts to Endangered Species Act (ESA)-listed or Bald and Golden Eagle Protection Act-covered species were previously analyzed in the 2018 Final EIS and are therefore not part of this amended analysis.

The 2018 Final EIS is incorporated herein by reference, but some aspects of this analysis relative to the 2018 Final EIS analysis warrant clarification. This analysis addresses potential impacts to four state-listed bird species that occur within the Biological Resource Study Area (hereafter "study area"). The 2018 Final EIS (Section 3.8.2) defines the study area as including all areas where modeled Proposed Action average noise levels would be equal to or greater than 60 A-weighted decibels (dBA) day-night average sound level (L_{dn}) at ground/surface level, and all areas where aircraft operations would occur at or below an altitude of 3,500 feet. The 60 dBA noise threshold was considered a conservative (risk-averse) threshold because research shows that some animals begin to respond to aircraft noise at 60 dBA (Black et al., 1984). The 60 dBA L_{dn} threshold does not represent a harm threshold for impacts to all species, but rather represents a conservatively defined area of *potential* impacts to wildlife in general (see 2018 Final EIS Section 3.8.2).

To assess potential Proposed Action impacts on the four state-listed bird species, a literature review was conducted to identify species-specific information about harm thresholds from noise disturbance. After evaluating the best available scientific information and precedent established in other studies, the Navy used a harm threshold of 92 dBA SEL when evaluating effects of noise on the four state-listed bird species. The threshold is based on the results of published studies on auditory disturbances on avian species from various families (raptors, seabirds, etc.) (USFWS, 2010, 2020a). The 92 dBA SEL (harm threshold distance) differs from the 60 dBA L_{dn} (potential impact distance) because it represents the potential impacts of exposure to single events (i.e., SEL; like an aircraft overflight), as opposed to constant noise averaged over 24-hours (i.e., L_{dn}).

The 92 dBA threshold is also a better indicator of harmful effects that are more than temporary (USFWS, 2010, 2020a; see also 2018 Final EIS Section 4.8.2.1.2.2.1) and can thereby potentially threaten the health of an individual of a species or its population. For the purposes of this analysis, the noise level threshold of 92 dBA was considered sufficient for determining whether adverse impacts may occur to state-listed species in the absence of species-specific data (USFWS, 2010, 2020a).[2]

2.2.1 Regulatory Setting

[2] The availability of species-specific data is addressed in Section 2.2.3.2 below.

The Washington Department of Fish and Wildlife (WDFW) administers the protection of wildlife species listed by the State of Washington as endangered or otherwise protected. Washington's listing procedures are defined in Washington Administrative Code (WAC) 220-610-110; endangered species are classified under WAC 220-610-010, and three subcategories of protected species are designated under WAC 220-200-100 (WDFW, 2024a). These protections are defined as follows:

- *Endangered Wildlife:* 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.
- Protected Wildlife
  - *Threatened*: Species native to the State of Washington that are likely to become endangered 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.
  - *Other*: Other wildlife species deemed by the State of Washington to warrant protection, including all birds not classified as game birds, predatory birds, or endangered species, or designated as threatened or sensitive species.

Species under consideration for listing as endangered, threatened, or sensitive by the State of Washington are deemed "State Candidate Species" (WDFW, 2024a). State Candidate Species are considered priority species for management in the Washington State Wildlife Action Plan (WDFW, 2015) but are not afforded regulatory protections.

2.2.2 State Endangered, Threatened, and Sensitive Species

Seven bird species with potential to occur in the study area are listed as endangered, threatened, or sensitive by the State of Washington (WDFW, 2024a; **Table 2-3**) and are hereafter defined as "state-listed."

The preferred habitat and likelihood of occurrence within the study area for these seven state-listed species are discussed below and summarized in **Table 2-3**. Three of the seven state-listed species are also federally listed under the ESA. These three species (marbled murrelet, spotted owl, and streaked horned lark) were analyzed in the 2018 Final EIS (Section 3.8.2.2.1) and did not require an amended analysis. Therefore, they are not addressed further in this analysis. The remaining four state-listed bird species discussed herein are:

- American white pelican (*Pelecanus erythrorhynchos*)
- Common loon (*Gavia immer*)
- Sandhill crane (*Grus canadensis*)
- Tufted puffin *(Fratercula cirrhata*)

These four bird species are also included on either the Whidbey Audubon Society's "Birds of Whidbey Island List" (Whidbey Audubon Society, 2021) or in the NAS Whidbey Island Integrated Natural Resources Management Plan (NAS Whidbey Island, 2024). The distribution of these four bird species within the study area is discussed in detail below. Potential effects of the Proposed Action on these four species are discussed under Section 2.2.4 (Impact Analysis).

Table 2-3 State Endangered, Threatened, and Sensitive[1] Bird Species, Their Preferred Habitats, and Their Likelihood of Occurrence within the Study Area (adapted from 2018 Final EIS Table 3.8-5)

Common Name	Scientific Name	State Listing Status	Preferred Habitat	Likelihood of Occurrence[1]
American white pelican	*Pelecanus erythrorhynchos*	Sensitive	Open water (primarily fresh), shores, riverbanks	Nonbreeder, uncommon year-round (except common at Crockett Lake).
Common loon	*Gavia immer*	Sensitive	Open water (marine or freshwater)	Nonbreeder; common in spring/fall migration and throughout winter.
Marbled murrelet	*Brachyramphus marmoratus*	Endangered	See text in 2018 Final EIS under "Federal Threatened and Endangered Species."[2]	See text in 2018 Final EIS under "Federal Threatened and Endangered Species."[2]
Spotted owl	*Strix occidentalis*	Endangered	See text in 2018 Final EIS under "Federal Threatened and Endangered Species."[2]	See text in 2018 Final EIS under "Federal Threatened and Endangered Species."[2]
Sandhill crane	*Grus canadensis*	Endangered	Meadows, wetlands, open grasslands, agricultural fields	Nonbreeder; rare migrant in spring and fall.
Streaked horned lark	*Eremophila alpestris strigata*	Endangered	See text in 2018 Final EIS under "Federal Threatened and Endangered Species."[2]	See text in 2018 Final EIS under "Federal Threatened and Endangered Species."[2]
Tufted puffin	*Fratercula cirrhata*	Endangered	Offshore islands, open marine water	Rare, except small breeding colony on Smith Island; generally absent in winter.

Legend: EIS = Environmental Impact Statement

Notes: [1]Likelihood of occurrence definitions from Whidbey Audubon Society (2021): "Common" – Expected to be present in suitable habitat at the right time of year; "Uncommon" – As with common but usually harder to find, "Occasional" – Irregular in suitable habitat, and "Rare" – Not expected but may occur.

[2]Species also listed under Endangered Species Act or Bald and Golden Eagle Protection Act are described under those sections in the 2018 Final EIS (3.8.2.2.1 and 3.8.2.2.3 of 2018 Final EIS, respectively).

Sources: WDFW, 2000, 2012, 2013, 2015, 2017, 2019, 2022, 2023, 2024a; eBird, 2015, 2023a, b, c, d; Seattle Audubon Society, 2015; Whidbey Audubon Society, 2021; Naval Facilities Engineering Command Northwest, 2014; U.S. Navy 2024.

2.2.2.1 Avian Survey and Distribution Data

Information about species presence within and adjacent to the study area was obtained from various sources cited in the species-specific sections below. Three datasets were evaluated to understand how species occurrence varies in space and time. Each dataset is summarized below.

2.2.2.1.1 eBird

The Cornell Lab of Ornithology's eBird dataset provides data collected on bird distribution, abundance, habitat use, and trends worldwide. Species occurrence summaries within Island County, Washington, over the past 10 full calendar years (2014–2023) were created for the four state-listed species using the eBird website (eBird, 2024). Each species occurrence summary includes (1) a density map of species occurrence in and surrounding Island County, (2) a map of specific points where species detections occurred in and surrounding Island County, (3) a frequency bar chart showing the percent of eBird checklists on which the species was detected during each week of the year, (4) the number of checklists submitted (i.e., sample size for each week of the year), and (5) links to the interactive data on the eBird website. These species summaries are provided in **Appendix A**.

2.2.2.1.2 U.S. Navy Winter at-Sea Marbled Murrelet Survey Data[3]

The focus of this annual nearshore marine survey effort is to estimate marbled murrelet densities in waters adjacent to NAS Whidbey Island and several other Navy facilities in the region during the nonbreeding season (October–March). Biologists use small motorboats to survey along transects in the nearshore areas adjacent to seven naval facilities (including NAS Whidbey Island) in the inland waters of Puget Sound. The most recent surveys methods and results are detailed in Pearson et al. (2023). Survey data from 2012 through 2023 are included in the dataset. Although the focus of the surveys is on marbled murrelets, all bird species are recorded when detected; thus, other state-listed species encountered within the study area are also included. The dataset does not provide information about the distribution of the tufted puffin because surveys were conducted during the nonbreeding season when tufted puffins are generally absent from the study area. The 300,250 records in the dataset include 7,521 records of common loons and one sandhill crane (a flyover detected 35 miles south of the study area). No American white pelicans or tufted puffins were recorded.

2.2.2.1.3 U.S. Navy Bird/Wildlife Airstrike Hazard (BASH) Avian Monitoring Observations

This dataset represents 2,765 observations of birds made by U.S. Department of Agriculture (USDA) Wildlife Services collected during avian monitoring in support of the Bird/Wildlife Airstrike Hazard Monitoring (BASH) program (USDA Wildlife Services, 2024). Monitoring was performed from September 2021 through January 2024 on Whidbey Island, primarily near Ault Field and OLF Coupeville, but also at select other locations. Observations recorded do not necessarily represent a complete survey of species present on the airfields. Instead, the focus of monitoring was primarily on birds that are strike safety hazards for aircraft, which would have included any of the four state-listed species addressed in this analysis, if detected.

2.2.2.2 Avian State-Listed Species

2.2.2.2.1 American White Pelican

The American white pelican was first listed as endangered in the state of Washington in 1981, after major declines due to habitat loss, sensitivity to human disturbance, direct targeting, disease, and contaminants (WDFW, 2022; Knopf and Evans, 2020). Through conservation efforts and the establishment of a breeding colony in 1994 on the Columbia River, near the mouth of the Wala Wala River, the population has increased substantially over the last 30 years (Pacific Flyway Council, 2018). Major populations nearest to the study area consist of breeding colonies on Badger Island, Washington, and at Miller Sands, Oregon, (approximately 223 and 136 miles from the study area, respectively) (WDFW, 2022). Since 2015, American white pelican records in the Puget Sound region have increased during the April–October

[3] Note: this annual survey effort is distinct from the survey requirement in the 2020 Biological Opinion (USFWS, 2020a).

months (eBird, 2023a). As a result of increased numbers, the species was downlisted to threatened in 2017, and downlisted to sensitive in 2024 (WDFW, 2022; 2024a).

American white pelicans exhibit colonial-nesting almost exclusively on freshwater bodies and feed primarily on fish, amphibians, and crayfish. American white pelicans exhibit cooperative foraging by swimming in coordinated groups to encircle fish (WDFW, 2022). Preferred foraging habitat includes inland bodies of water, such as lakes and ponds, with foraging also taking place below dams to catch salmonids (WDFW, 2022). When foraging, typical flight height for an American white pelican is 40 to 50 feet (Jung and Fisher, 2018). American white pelicans also fly in a formation after taking off from water and will use thermals (rising currents of warm air) to gain lift and travel long distances to forage when necessary (WDFW, 2022).

American white pelicans are uncommon year-round throughout the study area, except at Crockett Lake in the southern part of the study area. The species has been documented at Crockett Lake during summers over the past 10 years, with up to 200 individuals recorded at a time there (eBird, 2023a). Breeding has not been documented at Crockett Lake or elsewhere within the study area (WDFW, 2022). Crockett Lake is located about 1.3 miles west of the main north–south oriented airstrip at OLF Coupeville and within the area where FCLP pattern operations occur. Summering populations of American white pelicans also occur near, but outside, the study area at Deer Lagoon, about 9 miles south of the southern boundary of the study area.

A breeding colony of American white pelicans occurs in Padilla Bay (near the mouth of Swinomish Channel) about 0.5 mile north of the study area, 9.5 miles northeast of Ault Field, and outside the closed-loop pattern for FCLPs at Ault Field (WDFW, 2022; eBird, 2023a). In 2017, the colony produced 18 chicks. However, despite the continued presence of birds at Padilla Bay, and nesting in some years, successful breeding has not been documented since 2017 (WDFW, 2022). American white pelicans could occur near portions of Ault Field, but the lack of reported detections in the northern part of the island suggests they are uncommon in that area (eBird, 2023a).

2.2.2.2.2 Common Loon

The common loon was listed as a "Species of Concern" in Washington in 1980 and is now listed as sensitive (WDFW, 2024a). While range-wide the species is classified as Least Concern by the International Union for Conservation of Nature, historic declines in Washington state of common loons were largely due to small breeding populations in the state, the development of areas surrounding lakes and reservoirs that previously served as common loon breeding and nesting habitat, and proximity to other human activities (WDFW, 2000; BirdLife International, 2025). Monitoring and conservation efforts have increased over the years, helping to decrease human impacts on the common loon, including restrictions adopted in 2010 by the Fish and Wildlife Commission that took effect in 2011 to decrease the use of lead tackle, and the formation of the Washington Common Loon Working Group in 2020 (WDFW, 2024b).

The common loon is a regular migrant, winter resident, and rare breeder within the state of Washington (WDFW, 2000). The species winters primarily on coastal and inland marine waters where they forage in nearshore and offshore waters (Seattle Audubon Society, 2015; Whidbey Audubon Society, 2021; eBird, 2023b). Their diet consists mostly of fish, but they also eat crustaceans and invertebrates. They cannot walk well on land but are excellent swimmers and powerful fliers (WDFW, 2000).

Common loons are abundant in the study area from early fall through late spring (eBird, 2023b). The species has been recorded year-round over the past 10 years with some nonbreeding individuals remaining in the area during summer months. Common loon observations collected during annual winter marbled murrelet surveys performed from 2018 to 2023 indicate that common loons occur in nearly all nearshore areas of the study area during winter months (U.S. Navy, 2024) (**Figure 2-1**). During 2021 to 2023, NAS Whidbey Island BASH wildlife surveys at Ault Field, OLF Coupeville, and at Bos Lake (near Swantown), common loons were detected three times near Ault Field and one time at Bos Lake (U.S. Navy, 2024; **Figure 3-1**).

2.2.2.2.3 Sandhill Crane

The sandhill crane was first listed as endangered by the State of Washington in 1981. Among the largest threats to sandhill cranes are human-caused habitat loss and changes to nesting grounds caused by climate change (WDFW, 2017). There are three subspecies of sandhill crane (greater, lesser, and Canadian), and all three are considered endangered in Washington. All sandhill cranes are migratory, with some populations stopping in spring and fall in Washington, and other populations remaining in Washington for breeding (WDFW, 2017). The greater sandhill crane breeds in eastern Washington and comprises most of the state's resident breeding population. It is the only subspecies designated by WDFW as a "Species of Greatest Conservation Need" (WDFW, 2024c). Lesser sandhill cranes and Canadian sandhill cranes may pass through the study area during migration to their main breeding grounds along the coast of British Columbia and the Alaska panhandle (Canadian sandhill cranes) and south-central Alaska (lesser sandhill cranes). Over 35,000 lesser sandhill cranes stop during migration in central Washington at the south-central Columbia Basin in Franklin, Benton, Yakima, and Adams Counties (WDFW, 2024c). Canadian sandhill cranes previously bred in small numbers in western Washington and possibly as far south as Oregon. The presence of two breeding pairs at the Ridgefield Wildlife Refuge in Clark County, Washington (160 miles south of the study area) in 2020 was the first documented nesting of sandhill cranes in western Washington for more than 100 years (WDFW, 2024c).

Migrating sandhill cranes of all subspecies typically stop in open habitat, such as grasslands and agricultural fields. They are omnivores and opportunistic feeders, eating grains, as well as small animals. Nesting cranes also inhabit open areas, but more specifically wetland areas that contain vegetation above the water surface (WDFW, 2017). In Washington, major staging and overwintering areas are located in the Columbia Basin and Lower Columbia River (WDFW, 2017).

None of the subspecies of sandhill crane breeds in the study area, and they are otherwise rare visitors to Whidbey Island (Whidbey Audubon Society, 2021). Since 2014, there have been six separate eBird records of one to eight individuals (eBird, 2023c). Records from May and October, coinciding with the spring and fall migratory periods were from open areas, typically near water, such as Bos and Crockett Lakes. The December records were of a flock of eight individuals detected in several locations in or near the study area on December 9, 2017, including near Rodena Beach (1.5 miles north of OLF Coupeville), at Fort Casey Beach (2.5 miles southwest of OLF Coupeville), and at Deer Lagoon (9 miles south of the southern edge of the Study Area) (eBird, 2023c). The nearest major breeding areas are located on Conboy Lake National Wildlife Refuge, Trout Lake Natural Area Preserve, and Klickitat River Natural Resource Conservation Area, all more than 150 miles from the study area (WDFW, 2017).

2.2.2.2.4 Tufted Puffin

The tufted puffin was first considered as a candidate for state listing in 1998 after a dramatic decline in the population in the southern portion of the species' breeding range for reasons that are still unclear. In 2014, the Natural Resources Defense Council filed a petition with the United States Fish and Wildlife Service (USFWS) to list the tufted puffin as endangered under the ESA; however, the USFWS determined the species did not warrant listing. The USFWS listing determination noted that the tufted puffin continues to be widely distributed and abundant across the species' range (USFWS, 2020b). Within the State of Washington, however, population numbers have declined and many breeding colonies are reduced or have disappeared. The State of Washington listed the state's tufted puffin population as endangered in 2015 (WDFW, 2019).

Washington State's most recent Tufted Puffin Recovery Plan and Periodic Status Review (WDFW, 2019) indicates that population numbers remain well below thresholds recommended for long-term viability. Within the state, the majority of tufted puffin breeding colonies are located about 80 miles west of the study area, along the outer coast from Point Grenville to Cape Flattery in the northwestern most point of Washington[4] (WDFW, 2019). Historically, more tufted puffin colonies were found in the inner marine waters of the Salish Sea. Over the years, many breeding sites formerly present in this area have been abandoned. In the Salish Sea, tufted puffins currently breed only on Protection Island and Smith Island (WDFW, 2019). Protection Island is roughly 12 nautical miles southwest of OLF Coupeville and 17 nautical miles southwest of Ault Field. Smith Island is roughly 6 nautical miles west of Ault Field and 11 nautical miles northwest of OLF Coupeville (see **Figure 2-1**). Both islands are beyond the closed-loop pattern for FCLPs at either airfield and outside interfacility flight tracks between Ault Field and OLF Coupeville.

[4] Growler training and testing activities in the Olympic Military Operations Area and along Washington's Olympic coastline are analyzed in the Northwest Training and Testing Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement, available at https://nwtteis.com.

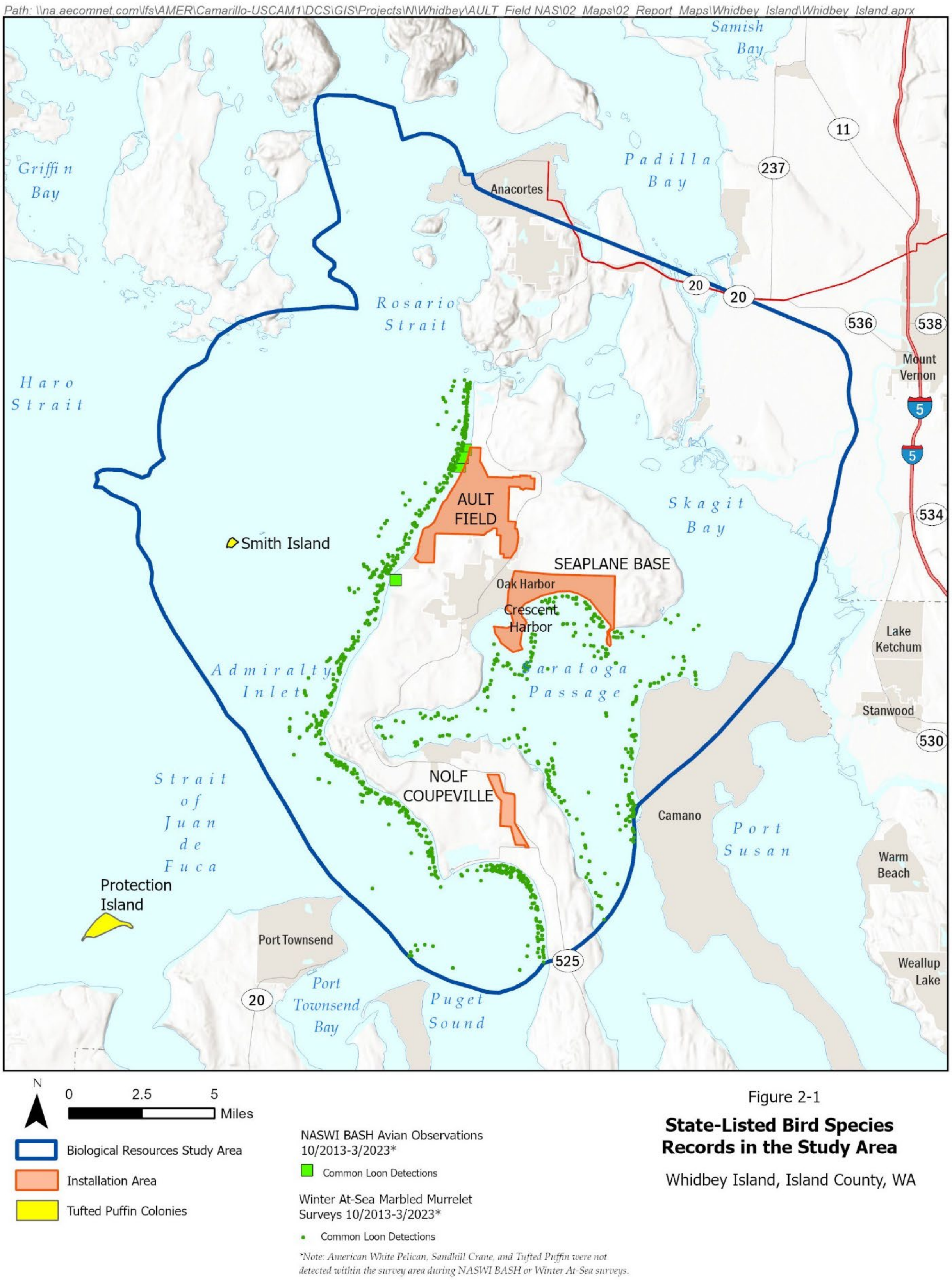

Figure 2-1 State-Listed Wildlife Bird Species Records in the Study Area

Tufted puffin populations in Washington depend on availability of forage fish in nearby waters; with populations that cycle dramatically in response to large-scale changes in ocean conditions (WDFW, 2019). Areas of conservation concern include reduced prey availability, changing ocean and climate conditions, entrapment in fishing nets, mortality from oil spills and chemical contaminants, human disturbance of breeding colonies (mainly historical), impacts from introduced species, and increased bald eagle predation (Hanson and Wiles, 2015; WDFW, 2019). Research into the possible drivers of the population decline, long-term monitoring, and surveys are all a part of the state Tufted Puffin Recovery Plan (WDFW, 2019). Along with interagency coordination and partnerships, the "Tufted Puffin Technical Committee" was formed in 2017 among members of the Pacific Seabird Group to determine conservation and research needs for the species (WDFW, 2019).

Within the study area, tufted puffins are rarely found on Whidbey Island and in surrounding waters during summer months (June through September), and generally absent the rest of the year (Whidbey Audubon Society, 2021). They are routinely detected during summer months at the Smith Island breeding colony noted above. Otherwise, records of the species within the study area have been along ferry routes in the offshore waters on the west side of Smith Island and between Port Townsend and Fort Casey in the southern portion of the study area (eBird 2023d)[5]. Specific to Smith Island, a high count of tufted puffins between 2000 through 2019 was 28 individuals in 2016, compared to high counts totaling 1,343 individuals among 18 breeding colonies on the outer coast and one colony on Protection Island during the same period (high counts at all colonies were recorded between 2010 and 2016) (WDFW, 2019). Thus, the Smith Island colony comprises about 2 percent of the State of Washington breeding population.

2.2.3 Potential Effects

This section addresses potential effects of the Proposed Action to four state-listed bird species that can occur within the study area: the American white pelican, common loon, sandhill crane, and tufted puffin.

To address the potential effects of the Proposed Action on state-listed species, a literature review was conducted including scientific articles published post-ROD to determine whether currently available information would alter any analysis or conclusions in the Final EIS related to impacts on state-listed bird species. The literature review sought available information regarding the ecology, life history, and potential species-specific effects of the Proposed Action on each state-listed species and, in the absence of species-specific data, to gather data and scientific literature from which effects could be reasonably extrapolated.

The review involved searches for technical reports, datasets, and peer-reviewed papers from research studies. Information was sought from online data sources in the scientific community to find journal articles and primary research that may be relevant to the four state-listed birds. Technical reviews or surveys were also examined to help shed light on species distribution and occurrence, ecology, and behavior within the study area, including surveys conducted by the Navy, as well as by citizen scientists through the eBird website. Research synthesis and summary reports were also consulted, including the USFWS website and species accounts, the WDFW website and species accounts, and the Whidbey Audubon Society web pages. Specific terms referring to the probability of occurrence within the study area (e.g., common, uncommon, occasional, and rare) follow definitions adopted by the Whidbey Audubon Society (2021; see Table 3-3 footnote).

[5] Observational data is limited outside these areas.

2.2.3.1 Types of Effects Evaluated

The effects examined in this analysis pertain to noise disturbance from increased EA-18G "Growler" flights associated with the Proposed Action. Aircraft noise can cause physiological or behavioral responses in wildlife that may affect survival or reproduction of individuals and potentially result in population-level effects at the local or regional scale. **Table 2-4** lists the physiological and behavioral response types and effects on species exposed to high noise levels in general, along with supporting literature references.

Physiological responses are those that effect the day-to-day functioning of an organism's body internally (e.g., increased cortisol levels) and cannot often be detected until there are measurable effects (e.g., decreased survival or birth rates). Behavioral responses are more obvious since they affect animal behavior, such as flushing or fleeing an area, increased vigilance, etc.

Table 2-4 Sensory Disturbance Effects Arising From Aircraft Noise

Response Type	Key Attributes	Examples and Effects	Supporting Literature
Physiological	Effect day-to-day functioning; typically long-term but may be short-term; measurable through biometrics or long-term trends	Hearing loss (loss of important auditory cues). Increased stress hormones (can reduce energy and foraging activity, which lead to decreased birth and survival rates).	Saunders and Dooling, 1974; Kleist et al., 2018
Behavioral	Observable and often immediate; long- or short-term; easily measurable	Flushing or fleeing of an area regularly may lead to geographic shifts in species or population distribution. Increased vigilance may lead to loss in foraging time and less food.	Black et al., 1984; Frid and Dill, 2002; Shannon et al., 2015

2.2.3.2 Availability of Species-Specific Data

Species-specific information was applied in the effects analysis when available. However, despite a thorough search of the literature and other scientific sources, species-specific information was not available for the four state-listed birds regarding noise thresholds associated with hearing loss due to intermittent aircraft noise associated with overflights or similar short-duration sound exposure. Similarly, data were not available for the four state-listed birds regarding noise thresholds that result in physiological and behavioral response types.

Although species-specific information could be relevant to evaluating reasonably foreseeable significant effects, were it available, the Navy has determined that this information is not essential to a reasoned choice among alternatives and that the overall costs of obtaining the information are unreasonable, as further explained in **Section 2.3.1.1.1**.

Due to the lack of information about species-specific effects of noise on the four state-listed birds, the effects analysis presented in **Section 2.2.4** builds on information previously presented in the 2018 Final EIS, and uses additional information obtained through the updated literature review to describe the potential effects of noise on other bird species that may act as a proxy for the four state-listed species, and from which effects could be reasonably extrapolated, including species related to the four state-listed birds. This approach is consistent with USFWS' use of a similar approach to evaluate disturbance impacts to marbled murrelets based on data from multiple species studies (USFWS, 2010, 2020a, 2020c).

2.2.3.3 Threshold for Evaluation of Noise Effects

As stated previously, the Navy used a noise level threshold of 92 dBA in this analysis when evaluating effects of noise on the four state-listed bird species. This noise level is used as the harm threshold for bird species in the absence of species-specific data regarding harmful effects of noise. The threshold is based on the results of published studies on noise disturbances on avian species from various families (raptors, seabirds, etc.) and has been applied by the USFWS to evaluate noise impacts on the federally endangered marbled murrelet and other bird species (USFWS, 2010, 2020a). In contrast to the 60 dBA L_{dn} used to conservatively define the study area boundary and area of *potential* impacts to wildlife in general (see 2018 Final EIS Section 3.8.2 and introductory text to **Section 2.2** of this document), the 92 dBA SEL threshold is a better indicator of a disturbance that causes harmful effects that are more than temporary (USFWS, 2010, 2020a; see also 2018 Final EIS Section 4.8.2.1.2.2.1), and can thereby potentially threaten the health of an individual of a species or its population. A-weighting is used in this analysis because it is the standard scale for quantifying aircraft noise (Brown, 1990) and it most closely represents the sensitivity of the avian ear (Meyer, 1986). For the purposes of this analysis, the noise level threshold of 92 dBA was considered suitable for determining whether adverse impacts may occur to state-listed species in the absence of species-specific data (USFWS, 2010, 2020a).

2.2.4 Impact Analysis

This section addresses potential impacts of the Proposed Action to birds arising from aircraft noise and incorporates relevant information from the 2018 Final EIS, including the noise parameters defined in the 2018 Final EIS, Chapters 1 and 3, and Appendix A.

2.2.4.1 Changes to Aircraft Operations

Birds in the study area experience varying levels of exposure to noise from various human disturbances, including vehicular traffic, industrial equipment, construction work, and aircraft operations. Depending on the location on Whidbey Island, average day and night noise levels range from about 40–84 dBA (U.S. Navy, 2021). The No Action Alternative noise levels were compared to Proposed Action noise levels to evaluate impacts to avian species. The increase in noise was evaluated in terms of what individual animals are already accustomed to experiencing, which may dampen the intensity of impacts because the change in noise level is not as pronounced (Grubb, 1979; Smit and Visser, 1993; Trimper and Thomas, 2001; Delaney et al., 1999). Under the No Action Alternative, birds in the study area are exposed to intermittent aircraft noise, and the main difference under the Proposed Action is an increase in the cumulative duration of exposure to intermittent aircraft noise. Specifically, aircraft operations under the Proposed Action would produce increased noise disturbance to birds where aircraft noise can be heard within the study area (U.S. Navy, 2021), taking into account the predominant flight tracks and distribution of airfield operations. The increase in noise above the No Action Alternative in some areas could elicit behavioral and physiological responses that lead to effects on fitness of individual birds in the study area.

Proposed Action and No Action Alternative noise contours pertinent to avian impacts are displayed in **Figure 2-2**. The contours represent spatial boundaries that include areas where aircraft noise levels are expected to exceed 92 dBA SEL (i.e., the 92 dBA SEL contour [see 2018 Final EIS Section 3.2.2.3 for additional detail]). Within the 92 dBA SEL contour, noise levels exceeding this threshold may be experienced in any location during an EA-18G "Growler" event[6] depending on the proximity of the aircraft to birds or their habitat. The 92 dBA SEL contour for the Proposed Action is slightly narrower in

[6] The 2018 Final EIS defines "event," for purposes of analyzing noise associated with aircraft operations, as "a single aircraft overflight, ground run-up, arrival, departure, or pattern operation."

the southwestern portion compared to the No Action Alternative due to changes in proposed flight tracks (**Figure 2-2**). Because departing aircraft spend less time below 500 feet AGL than arriving aircraft, noise levels during EA-18G "Growler" events are expected to exceed 92 dBA SEL for a duration of up to 20 seconds per aircraft departure, 60 seconds per aircraft arrival, and 60 seconds per FCLP pattern flight which involve both takeoff and landing. Under the Proposed Action, the Navy estimates up to 114,000 total annual flight operations at the NAS Whidbey Island complex, 89 percent of which would be flown by EA-18G "Growler" aircraft (2018 Final EIS Appendix A). The Navy also estimates 29,600 total FCLPs (about 26 percent of total airfield operations and about 29 percent of total EA-18G "Growler" operations), compared to 17,400 under the No Action Alternative. Within the 92 dBA SEL contour, elevated noise levels from EA-18G "Growler" events would occur more frequently near runways because this is where takeoff and landing activity would be concentrated (particularly for FCLP flights), whereas in-flight activity would be more dispersed throughout the 92 dBA SEL contour area but would be concentrated along predominant flight tracks.

To determine the amount of increased noise disturbance (between the No Action Alternative and the Proposed Action), the total amount of exposure time to EA-18G "Growler" events greater than or equal to 92 dBA SEL was calculated. Aircraft operations are not seasonally dependent and, therefore, average weekly totals are used for comparison. **Table 2-5** provides the amount and percentage of time during an average week that noise levels from EA-18G "Growler" aircraft are estimated to be greater than 92 dBA SEL for the No Action Alternative and Proposed Action. The data in **Table 2-5** indicates that the cumulative time state-listed birds would be exposed to noise above 92 dBA under the Proposed Action would increase by 1.16 percent (from 11.89 to 13.84 hours per week) at Ault Field and by 1.74 percent (from 1.03 to 3.96 hours per week) at OLF Coupeville. Importantly, EA-18G "Growler" flight activity would not be continuous in any area. Instead, flight activity would occur periodically over each day and week. EA-18G "Growler" events typically occur during the work week. Most events (88 percent at Ault Field and 84 percent at OLF Coupeville) occur between 7:00 a.m.—10:00 p.m., while the remainder occur between 10:00 p.m.—7:00 a.m. FCLP operations are conducted in discrete "training evolutions" (see 2018 Final EIS, Section 1.4), each lasting approximately 45 minutes and usually involving three to five aircraft conducting a series of touch-and-go events. Although there may be several training evolutions on a given day, no one location within the 92 dBA SEL contour would be exposed to elevated noise levels for more than 20-60 seconds at a time. Accordingly, elevated noise exposure associated with the Proposed Action is intermittent and brief, not continuous, and separated by periods with no jet noise or exposure to noise levels lower than 92 dBA SEL.

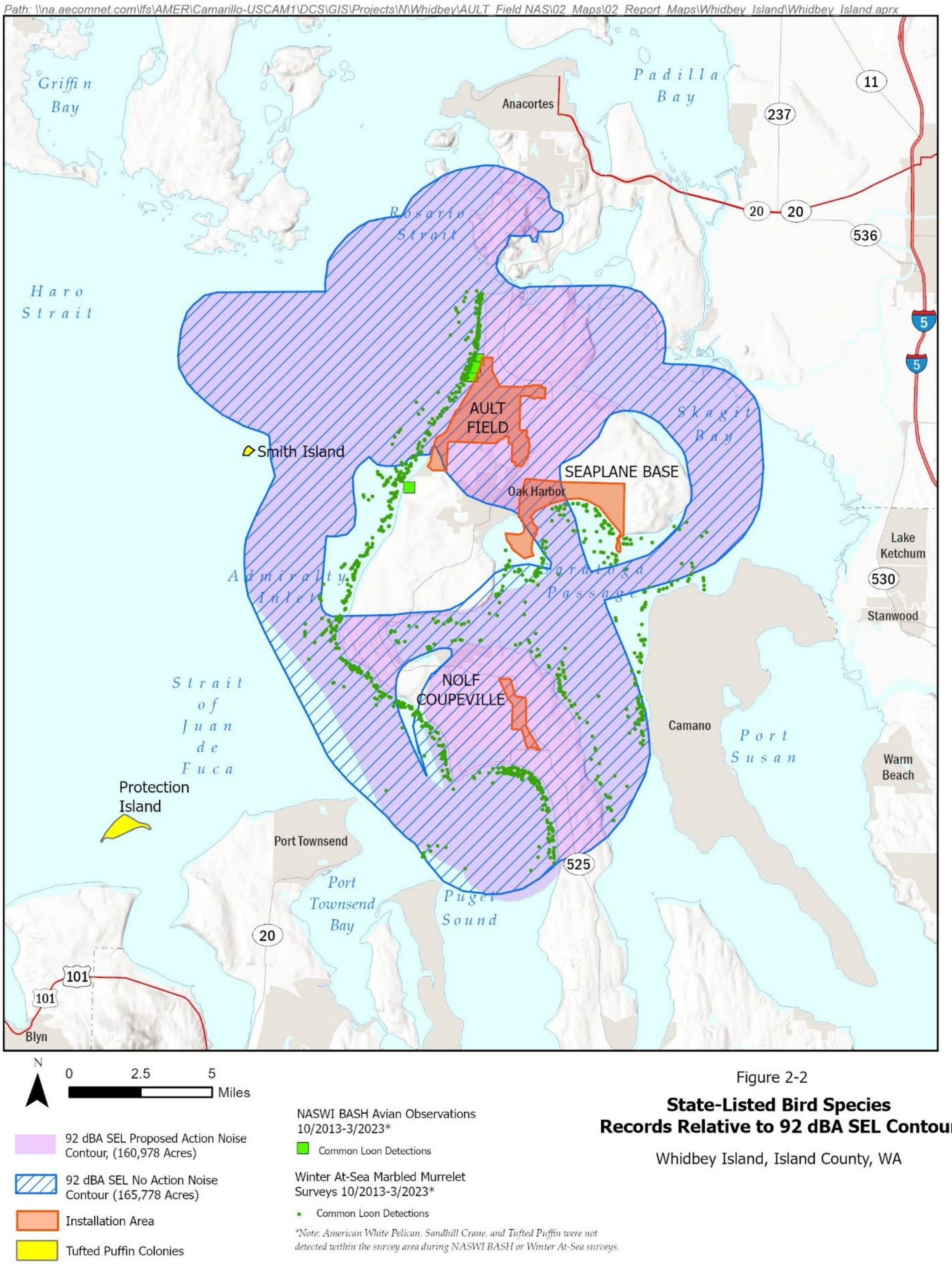

Figure 2-2 State-Listed Bird Species Records Relative to 92 dBA SEL Contour

Table 2-5 Weekly Time of Exposure for State-Listed Birds to EA-18G "Growler" Events Greater than or Equal to 92 dBA in the Study Area (adapted from Final EIS Table 4.8-1)

Location	Operation Type[1]	Weekly Hours of Exposure within the 92 dBA SEL Contour[2]	Percentage of Time of Exposure within the 92 dBA SEL Contour[3]	Change in Percentage From No Action to Proposed Action
No Action Alternative				
Ault Field	Departures	1.60	0.95	N/A
	Arrivals	4.79	2.84	N/A
	Pattern	5.51	3.27	N/A
	Total	**11.89**	**7.06**	**N/A**
OLF Coupeville	Departures	0.05	0.03	N/A
	Arrivals	0.14	0.08	N/A
	Pattern	0.85	0.50	N/A
	Total	**1.03**	**0.61**	**N/A**
Alternative 2 Scenario A, Preferred Alternative				
Ault Field	Departures	2.02	1.20	0.25
	Arrivals	6.05	3.59	0.75
	Pattern	5.78	3.43	0.16
	Total	**13.84**	**8.22**	**1.16**
OLF Coupeville	Departures	0.16	0.09	0.06
	Arrivals	0.48	0.28	0.20
	Pattern	3.33	1.98	1.48
	Total	**3.96**	**2.35**	**1.74**

Legend: dBA = A-weighted decibels, N/A = Not Applicable; OLF = Outlying landing field, SEL = Sound Exposure Level.

Notes: [1]Ault Field Departures include "Departures" and "Interfacility – Departure to OLF." Ault Field Arrivals include "Arrivals" (Visual Flight Rules SI/Non-Break, Overhead Break, and Instrument Flight Rules), and "Interfacility – Break Arrival from OLF." Ault Field Pattern Operations include half the number of "Closed Pattern" events because a pattern includes an arrival and departure; only half the number of events is necessary because the entire pattern is above 92 dBA SEL and only needs to be counted once. OLF Coupeville Departures include "Interfacility – Departure to Ault." OLF Coupeville Arrivals include "Interfacility – Break Arrival from Ault." OLF Coupeville Pattern Operations include half the number of "Close Pattern" events, as explained above.

[2]Within the 92 dBA SEL contour, elevated noise levels may be experienced for up to 20 seconds per departure and 60 seconds upon arrival. The annual number of operations was multiplied by either 20 or 60 seconds, depending on operation type, and then converted to the total annual number of hours. The annual total was divided by 52 weeks to obtain the average weekly hours within the 92 dBA SEL contour.

[3]Percentage of time is calculated by dividing the total annual hours by the total hours in a year (8,760 hours).

Sources: Data for number of operations obtained from Aircraft Noise Study for Naval Air Station Whidbey Island Complex, Washington (see **Appendix A**). No Action Alternative data were obtained from 2018 Final EIS Table 5-2; Alternative 2A data were obtained from 2018 Final EIS Table 7-2.

Changes in the frequency, intensity, and duration of noise exposure associated with the Proposed Action were examined to determine potential effects to state-listed birds. Spatial variation in terms of noise levels on different parts of the island were considered, as well as seasonal variation in exposure (presence during or only in breeding or nonbreeding seasons).

The following sections focus on potential aircraft disturbances on birds in the study area, including separate discussions of the four state-listed birds.

2.2.4.2 Effects from Increased Aircraft Operations – Noise

Bird responses to human disturbances can vary depending on the species and situation (Grubb and Bowerman, 1997; Goudie, 2006), but aircraft noise from Proposed Action overflights would likely cause similar types of reactions (e.g., alerting, flushing) with some variation in those reactions. The following paragraphs discuss types of reactions to noise from a variety of species to establish the range of reactions that exist among species that have been studied. This is intended to help identify the range of possible reactions that may be expected from state-listed species for which species-specific information about responses to noise is not available.

Birds rely heavily on acoustic signals to avoid predators, for territorial defense, and to attract mates (Slabbekoorn and Ripmeester, 2008). Noise can affect hearing by inhibiting the perception of sound, a phenomenon called "masking." Masking essentially covers up or precludes a bird's ability to hear another bird's vocalizations due to noise levels above normal ambient conditions. Masking may disrupt avian communication, causing some birds to either alter their vocalization to reduce masking effects or change their use of habitats (to move away from the noise source causing the masking). Masking only occurs during a noise event and does not persist after the noise ceases. As such, masking can affect mate choice by limiting the number of individuals heard, and it can affect social groups that use alarm calls to warn of predators or use contact calls to maintain group cohesion. In addition, masking of one species' vocalizations can affect other species' abilities to assess predation risks, find prey, or make habitat decisions (Barber et al., 2010). The masking of critical communication between birds can increase levels of physiological stress, leading to reduced reproductive success of impacted individuals (Alquezar and Macedo, 2019). Since none of the four state-listed bird species are known to currently breed within the 92 dBA SEL contour, potential impacts to courting, mating, and breeding are unlikely. In addition to masking, elevated noise can also cause a form of hearing loss called "threshold shift" when birds are exposed to long-duration (30 minutes to 72 hours), continuous, non-impulsive, high-level sound exposures. Threshold shift normally affects hearing at the frequencies birds hear best (e.g., between 2 and 4 kilohertz [kHz]). Studies of threshold shift have shown that hearing loss varies substantially by species, even in species with similar auditory sensitivities, hearing ranges, and body size (Niemiec et al., 1994; Ryals et al., 1999; Saunders and Dooling, 1974). However, data on threshold shift in birds due to shorter duration sound exposures that could be used to estimate the onset of threshold shift are limited. Saunders and Dooling (1974) provide the only threshold shift growth data measured for birds. Saunders and Dooling (1974) exposed young budgerigars (*Melopsittacus undulatus*) to four levels of continuous noise (at 1/3-octave band; 76, 86, 96, and 106 dB relative to 20 micropascals [µPa]) centered at 2.0 kHz and measured the threshold shift at various time intervals during the 72-hour exposure. The earliest measurement found 7 dB of threshold shift after approximately 20 minutes of exposure to the 96 dB (re 20 µPa sound pressure level noise; 127 dB re 20 µPa2- SEL). Because of the observed variability of threshold shift susceptibility among bird species and the relatively long duration of sound exposure in Saunders and Dooling (1974), a higher SEL may be required to induce threshold shift for shorter duration exposures.

Based on the evidence for threshold shifts occurring due to continuous rather than intermittent exposure, threshold shifts in response to EA-18G "Growler" operations lasting 20 to 60 seconds per exposure, with total exposure being less than 8.22 percent of the time at any location (see **Table 2-5**), are unlikely when compared with the data from Saunders and Dooling (1974).

Although birds are more resistant to hearing loss than other animals, continually loud environments or stimuli may damage sensory hair cells that transmit sound vibrations to the brain via electrical signaling (Beason, 2004). Data are not available regarding the potential for hearing loss associated with intermittent aircraft overflight operations or similar short-duration sound exposure. However, birds of multiple species have been shown to have the ability to regenerate hair cells in the ear after they have been damaged or destroyed[7], usually resulting in considerable anatomical, physiological, and behavioral

[7] The damage to these hair cells occurred when chickens were exposed to 120 dB sound pressure level for 48 hours continually (Cotanche, D.A. Regeneration of hair cell stereociliary bundles in the chick cochlea following severe

recovery within several weeks and return to normal functioning (Rubel et al., 2013; Ryals et al., 1999). Constantly noisy environments have a greater potential for long-term impact to species because masking conditions are more prevalent (Patricelli and Blickley, 2006). Given the intermittent frequency (less than 8.22 percent of the time involves noise levels above 92 dBA in any one affected area; see **Table 2-5**) and short period of exposure of aircraft noise (20 to 60 seconds at a time), hearing loss is not anticipated to occur to bird species in the study area.

Behavioral responses to aircraft operations are likely the result of both the noise and visual factors. Behavioral reactions by birds include lifting the head up, adopting alert postures, agitation, flushing, and diving, as well as displacement or avoidance of affected areas, increased vigilance, impaired environmental risk perception, and changes in foraging behavior, habitat selection, mate attraction, and parental investment (Frid and Dill, 2002; Shannon et al., 2015; Kleist et al., 2018). Species such as tufted puffins and common loons may exhibit avoidance diving, which is different from foraging dives because they occur suddenly in response to a disturbance, such as the presence of a boat nearby (USFWS, 2020a). These species may dive underwater as an escape mechanism when they perceive noise or visual disturbance as threatening. Since some diving species have underwater hearing capabilities similar to aerial hearing (e.g., Therrien, 2014), diving behavior may not prevent underwater noise disturbance, although it would be expected to dampen the noise levels.

Behavioral reactions to aircraft overflights documented in the scientific literature vary by species and activity at the time of the event. Generally, birds tend to begin to react to aircraft overflights (by lifting the head or alerting to the stimulus) at 60 dBA to 65 dBA (Black et al., 1984), with more intense alert responses (e.g., flushing) occurring when noise levels exceed 75 dBA (Wright et al., 2010; Goudie and Jones, 2004). However, other birds showed no reaction or significant effect from overflights with noise levels ranging from 52 to 101 dBA (Grubb, 1979; Burger, 1981; Trimper and Thomas, 2001).

Most observations report a return to normal behaviors within 5 minutes of exposure (Goudie and Jones, 2004; Komenda-Zehnder et al., 2003; Black et al., 1984; Smit and Visser, 1985, as cited by Smit and Visser, 1993). However, experimental manipulation of food provisioning to Atlantic puffin chicks showed that reduced feeding rates (i.e., if adults were exposed to disturbance while foraging) resulted in depressed chick growth rates (Oyan and Anker-Nilssen, 1996).

Birds exposed to repeated exposure to aircraft noise may become less responsive to the disturbance through a process known as habituation, which has been noted in numerous species (Grubb, 1979; Smit and Visser, 1993; Trimper and Thomas, 2001; Delaney et al., 1999). Habituation is a reduction in response to a repetitious or continuous stimulus over time, as individuals learn there are neither adverse nor beneficial effects associated with responding to the stimulus (Bejder et al., 2009). Importantly, not all species exhibit the same pattern of habituation, and residual effects are possible (Koolhaas et al., 1993; Goudie, 2006). Habituation keeps animals from expending energy and attention on harmless disturbances, but physiological factors might change the amount of adjustment observed (Bowles, 1995), and the amount can vary among species. For example, in a study comparing two waterfowl species, 25 to 30 percent of captive American black ducks (*Anas rubripes*) initially responded to aircraft noise and visual disturbances, but they became adjusted to the disturbances with repeated exposure (1–44 exceedances of 80 dBA per hour), whereas wood ducks (*Aix sponsa*) did not exhibit this same trait (Conomy et al., 1998). Animals can learn to control the behavioral reactions associated with a startle

acoustic trauma. Hear Res. 1987a;30:181–95) or when exposed to ototoxic drugs (Cruz, R.M., Lambert, P.R., Rubel, E.W. Light microscopic evidence of hair cell regeneration after gentamicin toxicity in chick cochlea. Arch Otolaryngol Head Neck Surg. 1987;113:1058–62).

response and often become accustomed to noise (National Park Service, 1994; Bowles, 1995; Larkin et al., 1996).

Energy lost by behavioral responses to noise must be replaced, or the health of the individual exhibiting those behavioral responses may decline. Replenishing energy requires additional time spent feeding and resting than the individual might have otherwise budgeted. If the affected individual is caring for an egg or chick, then the energy expenditures or altered activity may also negatively affect the young's health. The disturbances could also keep birds away from more productive feeding habitats. This could also negatively affect the impacted individuals because they may be forced to forage in areas with smaller or inferior prey resources. Noise and other disturbances can also distract birds, taking their attention away from other key functions and behaviors, such as predator awareness (Chan and Blumstein, 2011; Francis and Barber, 2013).

While difficult to measure in the field, behavioral responses are often accompanied by some form of physiological response (Frid and Dill, 2002). Negative physiological responses to noise may include hearing loss, increased stress, hypertension, and startle responses (Barber et al., 2010). A startle response is a rapid, primitive reflex characterized by rapid increase in heart rate, shutdown of nonessential functions, and changes in energy reserves. As with behavioral changes, physiological changes in response to noise or visual disturbance are likely to be temporary in nature for most species, although impacts often persist longer than behavioral responses. Changes in both baseline and stress-induced hormones were documented in nestling and adult birds of three species exposed to continuous anthropogenic noise from air compressors in a natural gas field (Kleist et al., 2018).

The potential for population-level effects from aircraft overflights has been evaluated in several studies. Aircraft overflights generally have not been shown to impact breeding, nest attendance, feeding of young, nest success, chick survival, nestling mortality, or nesting timing of wading birds (Black et al., 1984). However, Rojek et al. (2007) identified that flushing of nesting seabirds can result in eggs breaking or chicks and/or eggs being exposed to predation or the elements. Human disturbance from several sources (i.e., on foot, boat, or aircraft) caused American white pelicans to abandon nests or entire colonies for the breeding season (Evans and Knopf, 1993). Results in one study also showed a weak association between aircraft noise and reduced reproductive success in the coastal California gnatcatcher (*Polioptila californica californica*) and the least Bells's vireo (*Vireo pusillus belli*) (Hunsaker, 2001).

The introduction of noise may also affect ecological patterns. For example, some species of passerines (i.e., songbirds belonging to the order *Passeriformes*) had higher nest success in noisy habitats with natural gas extraction equipment operating, which has been attributed to reduced rates of nest predation by western scrub-jays (*Aphelocoma californica*[8]) that exhibit reduced occupancy rates in noisy areas (Francis et al., 2009, 2011). Francis et al. (2012) observed black-chinned hummingbirds (*Archilochus alexandri*) exposed to noise pollution from energy extraction activities pollinated more flowers, but western scrub-jays (*Aphelocoma californica*) exposed to the same noise visited pinyon pine (*Pinus edulis*) seed dispersal stations less frequently compared to other western scrub-jays at control feeding stations (i.e., no additional noises). The same noise activity in the study had both positive (increased pollination) and negative (decreased or disrupted seed dispersal) effects toward ecosystem services rendered by birds, depending on the species.

There is no published research available examining the impacts of aircraft or other human noise on pigeon guillemots (*Cepphus columba*), one of the more common seabirds in the study area, present year-round (eBird, 2015; Seattle Audubon Society, 2015). Considering that the population of pigeon

[8] The interior population of the western scrub-jay is now known as the Woodhouse's scrub-jay (*Aphelocoma woodhouseii*).

guillemots (*Cepphus columba)* has remained stable in recent years and may have increased since the 1980s, it is probable that existing levels of human disturbance, including decades of aircraft operations at the NAS Whidbey Island complex, have not significantly impacted this species. Pigeon guillemot (*Cepphus columba*) nesting population trends are considered one indicator of ecosystem health in the Puget Sound marine environments (Pearson and Hamel, 2013; Bishop et al., 2016). As such, the health of seabird populations, particularly colony-nesting species, may be reflected, to some degree, in the pigeon guillemot's (*Cepphus columba*) stable to increasing populations on Whidbey Island (Bishop et al., 2016) despite many years of varying levels of exposure to aircraft noise and other human disturbances.

Birds in the study area that have not become accustomed to the current level of aircraft operations, or those that are new to the area (including hatch-year birds), may respond to aircraft operations under the Proposed Action by exhibiting alert postures, flushing, or diving, but they may resume normal critical activities (e.g., feeding or resting) within a short period after overflights as shown for harlequin ducks in response to short-duration low-level military jet overflights (Goudie and Jones, 2004).

Birds that reside in the area of potential aircraft disturbance within the study area are currently exposed to a high level of noise from long-term operations activity as well as other human-made disturbances. The Proposed Action would have an incremental increase in the amount of sensory disturbance to birds from aircraft noise. This means individual sensory disturbance events would be intermittent and brief during aircraft overflights and would continue to occur over the long term as operations are expected to continue. However, based on a review of the aforementioned studies, the Proposed Action is unlikely to result in long-term population-level effects to the bird species in the study area. Behavioral and physiological impacts are evaluated on a case-by-case basis below for state-listed birds.

2.2.4.2.1 Effects on State-Listed Birds

Of the four state-listed bird species, three—the American White Pelican, Sandhill Crane, and Tufted Puffin—are uncommon or rare within the study area, and their occurrence within the study area comprise a small proportion of their regional population. Furthermore, none of the four species breeds within the 92 dBA SEL contour, and only the tufted puffin breeds anywhere in the study area (exclusively on Smith and Protection Islands). Therefore, the opportunity for significant population-level impacts to these species is limited. However, the common loon occurs regularly within the 92 dBA SEL contour and in the nearshore habitat adjacent to both airfields, and in the summer months the American white pelican occurs locally at Crockett Lake, near Runway 32 at OLF Coupeville. Where state-listed species do occur within the 92 dBA SEL contour, noise from aircraft operations may result in behavioral or physiological responses, or both, that impact individuals.

Despite a thorough search of the literature and other scientific sources, species-specific information regarding noise disturbance thresholds for state-listed bird species was not found. Although species-specific information could be relevant to evaluating reasonably foreseeable significant effects, were such data available, the Navy has determined that this information is not essential to a reasoned choice among alternatives and further that the overall costs of obtaining the information are unreasonable. Given the rarity, small numbers, and limited breeding in the study area, and therefore the limited possibility for noise disturbance from the Proposed Action to have significant population-level impacts to these species, obtaining incomplete or unavailable data on species-specific impacts is not essential to the Navy's decision making. Additionally, the cost required to undertake new scientific research to obtain relevant information for each species would likely be substantial and unreasonable. In many cases, such studies would be logistically challenging due to the low occurrence of these species within the study area, making it difficult to obtain sample sizes sufficient to draw a statistically significant distinction between the No Action Alternative and the Proposed Action and increasing overall costs. Even if a study were performed on surrogate species that are more abundant in the study area, a minimum of two years would likely be required to conduct the appropriate field and laboratory studies for each species with sufficient sample sizes to understand the responses of such surrogate bird species to different levels of aircraft noise and evaluate the corresponding impacts. Field studies of this type require specialized staff and equipment and could cost upward of $500,000 to $1,000,000 annually per study. In addition to financial considerations, the Navy must consider costs associated with operational impacts. Combatant Commanders rely on EA-18G "Growler" aircraft to support U.S. and allied missions in the air and on the ground, and the risk to mission accomplishment and to the lives of servicemembers if training is inadequate or if additional EA-18G "Growler" aircraft are not made available to Combatant Commanders is unacceptable. If limits are placed on Navy training pending completion of these studies, the potential implications are substantial. These costs are unreasonable when compared to the limited potential for significant population-level impacts to state-listed species from the Proposed Action.

Therefore, consistent with the analysis of noise impacts to marbled murrelet, noise levels above 92 dBA SEL were considered the "disturbance level" threshold at which impacts to state-listed birds may occur. The application of this threshold to these species in the absence of species-specific information is consistent with USFWS application of the same threshold to evaluate disturbance impacts to marbled murrelets based on data from multiple species studies (USFWS, 2010, 2020a, 2020c).

2.2.4.2.1.1 American White Pelican

American white pelicans are uncommon summer visitors to the study area, particularly in or near the island's ponds/lakes/lagoons, except at Crockett Lake which is located within the 92 dBA SEL contour and about 1.3 miles southwest of OLF Coupeville (eBird, 2023a). Under prevailing winds, the downwind leg of the modeled predominant FCLP flight tracks using Runway 32 would pass directly over the eastern half of Crockett Lake. On the downwind leg, the aircraft is descending to 600 feet AGL before the descending turn to the northwest over Admiralty Bay and approach to the runway. Approximately half of all FCLP flights at OLF Coupeville are likely to overfly Crockett Lake. Birds on the island are typically transient visitors, stopping off for a few hours or a few days (eBird, 2023a) before moving on. American white pelicans present on Whidbey Island and within the 92 dBA SEL contour would potentially experience short-term stress or may flush in response to the aircraft operations slightly more often compared to the No Action Alternative, but these behaviors are not anticipated to have any population-level effects, especially since the species does not breed within the study area. Accordingly, although minimal, short-term impacts on American white pelicans are possible, these impacts would not be significant.

2.2.4.2.1.2 Common Loon

Common loons are the most frequently detected state-listed bird in the study area and the most likely to occur within the 92 dBA SEL contour. There is no research examining the impacts of aircraft disturbance on nonbreeding loons; however, breeding loons are sensitive to visual disturbance from humans and will abandon their nesting sites temporarily if approached or permanently if the nesting site or lake is no longer viable due to disturbance (WDFW, 2000). Common loons do not breed in the survey area and, if present in the marine waters off Whidbey Island are typically foraging. In the absence of a nest site that requires tending, wintering common loons are able to move about freely if disturbed by noise from aircraft operations. Once noise disturbances cease, they may return, as the habitat is not permanently altered by the noise disturbance. However, results from winter marbled murrelet surveys performed from 2012 to 2023 (U.S. Navy, 2024) show that common loons were present in nearshore areas throughout the study area, including adjacent to Ault Field and OLF Coupeville airfields (see **Figure 2-2**). Aircraft noise levels during this period were either at or slightly below those associated with the Proposed Action, suggesting common loons do not completely avoid areas of high noise. Behavioral and physiological responses to the more frequent aircraft traffic would likely be temporary but may occur more often during aircraft overflights relative to the No Action Alternative. Individual common loons may experience noise disturbance and may flush, dive, or slowly swim away from the direction of the noise disturbance. This may cause common loons to avoid preferred foraging areas temporarily or spend more time in a state of vigilance during aircraft overflights; however, the noise disturbance itself is unlikely to cause injury or mortality. Changes in foraging location or short-term stress associated with the noise disturbance are not anticipated to have population-level effects on common loons. Across North America, adult winter site fidelity is high and is estimated at 85 percent (Parluk et al., 2015), thus, individual common loons are likely returning to the study area notwithstanding Navy flight activities. Therefore, while noise disturbance from the Proposed Action may have minor, temporary effects on the common loon, these impacts would not be significant.

2.2.4.2.1.3 Sandhill Crane

Sandhill cranes are rare migrant or winter visitors to Whidbey Island (Whidbey Audubon Society, 2021). Species were found in open areas, typically near water such as Bos Lake (near Swantown) and Crockett Lake. Like the American white pelican, sandhill cranes on Whidbey Island are typically short-term visitors, stopping off for a few hours or a few days before continuing migration (eBird, 2023c). Studies examining the responses of sandhill cranes to aircraft activities have demonstrated a variety of behaviors from flushing to no response at all. One study observed that sandhill cranes flush from roosting locations or alter foraging behavior in response to small plane flights at or below 500 feet AGL (Kessel, 1979) or in response to planes taking off at distances of about 0.5 mile (2,625 feet) (Herter, 1982). The distance and duration of the flush is likely to change given varying decibel levels, with louder planes causing flushing at greater distances (Herter, 1982). However, sandhill cranes have also been seen remaining on their nests when exposed to helicopter flights as low as 130 feet (Dwyer and Tanner, 1992).

Given the range of documented behavioral reactions by sandhill cranes to either the noise or the visual disturbances, responses are most likely to be temporary, with the birds returning to their normal behaviors shortly after exposure. Most observations report a return to normal behaviors within 5 minutes of exposure (Goudie and Jones, 2004; Komenda-Zehnder et al., 2003; Black et al., 1984; Smit and Visser, 1985, as cited by Smit and Visser, 1993). Sandhill cranes present on Whidbey Island would potentially experience short-term stress or may flush more frequently in response to the increased aircraft operations relative to the No Action Alternative; however, these behaviors are not anticipated to have any population-level effects. Consequently, while minor, temporary effects are possible, the impacts of the Proposed Action on the sandhill crane would not be significant.

2.2.4.2.1.4 Tufted Puffin

The tufted puffin is the only state-listed species known to breed in the study area, on Smith Island, approximately 6 miles west of Ault Field (Pearson et al., 2022). The nesting location is outside of the 92 dBA SEL contour (see **Figure 2-2**), which, as described above, is considered disturbance level noise for the purposes of this analysis (USFWS, 2020a, 2020c). Studies of the closely related Atlantic puffin have demonstrated that Atlantic puffins have fully developed capacity for in-air hearing despite being adapted for diving underwater (Mooney et al., 2020), so it is reasonable to conclude that tufted puffins do as well. Tufted puffins are generally absent from the study area from October through May. Most tufted puffin records covering the breeding season (June through September) document species occurrence on or west of Smith Island, outside of the 92 dBA SEL contour (eBird, 2023d). However, birds foraging in the marine waters between Smith Island and Whidbey Island may be within the 92 dBA SEL contours and may be exposed to noise above 92 dBA SEL. Since tufted puffins were detected both within and outside the 92 dBA contour, the reaction of tufted puffins within the 92 dBA SEL contour may include habituating to new sound levels or avoidance of the area for other foraging locations. If tufted puffins avoid the 92 dBA SEL contour, they may experience increased energy expenditure.

Although the noise increase at OLF Coupeville would be greater than at Ault Field under the Proposed Action, records of this species are not concentrated in either area (eBird, 2023d [Appendix A]; see **Figure 2-2**). When disturbed, tufted puffins may dive underwater or flush from the source of disturbance and would likely exhibit short-term behavioral and physiological stress responses. However, aircraft overflights are generally brief, and flights are not anticipated to occur over most areas where breeding puffins forage. Nonetheless, in the limited areas where foraging puffins are exposed to disturbance level noise, there may be a reduction in the amount of time those individuals spend foraging. They may also avoid certain areas during aircraft overflights, forcing them to find new foraging areas, or fly further away to find food. This may result in increased energy expenditure and overall decreased fitness. Research on diving birds indicates that they may have underwater hearing that is at least as sensitive as their aerial hearing (e.g., Therrien, 2014), so it is possible that diving may not allow them to escape all of the noise associated with overflights, though it would likely be dampened. The exposure to noise associated with overflights may increase slightly relative to the No Action Alternative, but this increase is not anticipated to cause changes in short-term behavioral and physiological responses relative to the No Action Alternative. With only short-term effects, it is unlikely that the increase in noise would have population-level effects, as there are no anticipated impacts to survival or breeding. Therefore, although minor, temporary effects are possible, the impacts of the Proposed Action on the tufted puffin would not be significant.

2.3 Childhood Learning[9]

This amended analysis refines the Navy's evaluation of the impact of increased EA-18G "Growler" operations on childhood learning and includes a summary of the latest scientific literature on the effects of aircraft noise, an updated description of quantifiable impacts to childhood learning from aircraft noise exposure, a description of EA-18G "Growler" noise exposures at the representative schools resulting from the proposed action and the potential impacts to childhood learning, and current information on noise mitigations implemented by NAS Whidbey Island.

2.3.1 Literature Review

A number of studies and analyses have examined the effects of aircraft noise on childhood learning and found impacts related to cognitive abilities, memory, annoyance, reading levels, and classroom interference. While these studies have identified some correlations between aircraft noise and childhood learning, clear cause-and-effect relationships have only been established in relation to reading. Specifically, studies have shown that aircraft noise exposure negatively affects children's reading levels.

Studies of the effects from aircraft noise have also found evidence of a relationship between noise exposure and other cognitive skills, such as memory (Stansfeld and Clark, 2015). Although evidence has begun to show a stronger link between aircraft noise exposure and cognitive effects in children, the ongoing need for further research and the adjustment for confounding factors means that the existing data remains incomplete and does not support a firm causal connection. In light of this limitation, this and subsequent sections will further describe the available science, evaluate the implications of this uncertainty in the context of the No Action Alternative and Preferred Alternative 2A, summarize the current scientific understanding, and explore potential effects using analytical approaches and available research methods.

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[9] For the purpose of this analysis, "childhood learning" is interchangeable with "children's learning," "child learning," and "classroom learning," as these terms appear in proceedings in *State of Washington, et al.*, v. *United States Department of the Navy*, et al., Case No. 19-cv-1059.

2.3.1.1 Aircraft Effects on Reading

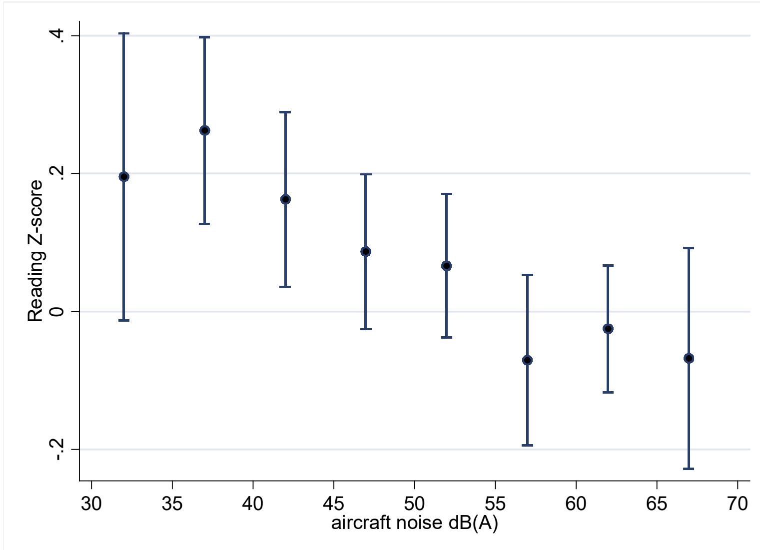
Early studies in several countries (Cohen et al., 1973, 1980, 1981; Bronzaft and McCarthy, 1975; Green et al., 1982; Evans et al., 1998; Haines et al., 2002; Lercher et al., 2003) found lower reading comprehension among children living or attending school in noisy areas compared to children living or attending school in less noisy environments. In some studies, noise-exposed children were less likely to solve difficult puzzles or more likely to give up while attempting to do so. In one study, significant differences in reading scores were observed among primary school children in two different classrooms at the same school (Bronzaft and McCarthy, 1975). One classroom was exposed to high levels of railway noise, while the other classroom was quiet. The mean reading age of the noise-exposed children was 3 to 4 months behind that of the control children.

A longitudinal study reported by Evans et al. (1998) conducted prior to relocation of the Munich Airport in 1992 reported that high noise exposure was associated with deficits in long-term memory and reading comprehension in children with a mean age of 10.8 years. Two years after the closure of the airport, these deficits disappeared, indicating that noise effects on cognition may be reversible if exposure to the noise ceases. When the new airport opened, deficits in memory and reading comprehension developed over a two-year period in children who became newly exposed to aircraft noise in the vicinity of the new airport.

More recently, the Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health (RANCH) study (Stansfeld et al., 2005; Clark et al., 2005) compared the effect of aircraft and road traffic noise on over 2,000 children in three countries. This study derived exposure-effect associations between aircraft and road noise to childhood learning, and it was the first to compare effects across countries. The study found that long-term exposure to aircraft noise was associated with worsening reading comprehension and memory, but road traffic noise did not have the same effect. In fact, children in areas with high road traffic noise performed better on memory tests. Exposure to aircraft noise did not appear to impact attention or working memory (Stansfeld et al., 2005; Clark et al., 2005).

Figure 2-3 depicts the RANCH study's findings regarding the effects of aircraft noise on reading comprehension. Reading falls below average (a z-score[10] of 0) at a daytime outdoor equivalent continuous sound level (L_{eq}) greater than 55 dB. Because the relationship is linear, reducing exposure at any level should lead to improvements in reading comprehension. Once the threshold of 55 dB L_{eq} is crossed, the impact remains steady at higher decibel levels. The RANCH study observed that children may be exposed to aircraft noise for many of their formative childhood years and noted that the consequences of long-term noise exposure were unknown at that time.

[10] A z-score of 1 represents a value 1 standard deviation above the mean, and likewise and z-score of -1 represents a value 1 standard deviation below the mean.



Sources: Stansfeld et al. 2005; Clark et al. 2005

Figure 2-3 RANCH Study -- Reading Scores Varying with L_{eq}

Subsequently, Clark et al. (2021) conducted a meta-analysis[11] on data from three methodologically similar studies carried out in 106 schools near London Heathrow, Amsterdam Schiphol, and Madrid Barajas airports (the Schools Environment and Health Study; the West London Schools Study; RANCH study).[12] This meta-analysis establishes an objective relationship between aircraft noise and children's reading z-scores. The researchers found that a 1 decibel (dB) increase in aircraft noise exposure at school was associated with a −0.007 (95 percent confidence interval (CI) −0.012 to −0.001) decrease in reading z-score and a 4 percent increase in the odds of scoring well below or below average on a reading test.[13] The analyses also found that a 1 dB increase in aircraft noise exposure at school was associated with a 0.017 (95 percent CI 0.007–0.028) increase in hyperactivity score. The study noted that evidence of aircraft noise impacts on other aspects of children's health remain uncertain.

A separate study of schools near Frankfurt Airport, the Noise-Related Annoyance, Cognition, and Health (NORAH) study, investigated the effects of aircraft noise on cognition and quality of life in 1,243 second graders from 29 schools around Frankfurt/Main Airport in Germany (Klatte et al., 2017). Although exposure levels at schools were below 60 dB, and thus considerably lower than in previous studies, multilevel analyses revealed that increasing exposure was linearly associated with less positive ratings of quality of life, increasing noise annoyance, and decreasing reading performance. A 20 dB increase in aircraft noise exposure was associated with a reading delay of about 2 months. No effects were found for verbal precursors of reading acquisition. Teachers' reports suggest that severe disruptions of classroom instruction due to aircraft noise may contribute to effects on reading. However, the study noted the current

[11] A meta-analysis is a research method that combines the results of multiple studies on a similar topic to identify patterns, draw more reliable conclusions, and provide a clearer overall picture. Instead of relying on the results of just one study, a meta-analysis analyzes data from many studies, often looking at large amounts of information to determine if there is a consistent effect or relationship across different research. This method helps to increase the accuracy and generalizability of findings by pooling data from various sources.
[12] Referred to as the Clark meta-analysis.
[13] The increase odds of scoring poorly means if a student has a 10% of scoring poorly and the noise increases by 2 dB, then the students odds of scoring poorly will be 10.8% (an increase of 8%).

findings on the effects of chronic aircraft noise exposure on children was insufficient to make credible predictions of learning impacts in noise-exposed areas.

Subsequent analyses also included a review of 16 studies conducted by Thompson et al. (2022) in conjunction with a previous review of 32 studies conducted by Clark & Paunovic (2018). A meta-analysis from three studies found that reading comprehension scores in quiet classrooms (no level specified) were higher than children in relatively noisier classrooms.

Finally, an analysis conducted by Basner et al. (2017) summarizing aviation noise impacts found sufficient evidence of negative effects from aircraft noise exposure on children's cognitive skills, such as reading and memory, as well as on standardized academic test scores. The research cites the RANCH study as providing a good measure of the effects of aircraft noise on children's reading scores. The analysis considered a range of plausible mechanisms to account for aircraft noise effects on children's learning.

To date, few studies have evaluated the effects of persistent aircraft noise exposure throughout a child's education, and there remains a need for longitudinal studies of the effects of aircraft noise exposure on educational outcomes in the long term. This type of longitudinal research is beyond the competency of the Navy and the time required to complete such research, even assuming funding is appropriated, would significantly and detrimentally impact the Navy's ability to take necessary actions to meet its responsibilities under title 10, United States Code.

2.3.1.2 Aircraft Noise and Test Scores

In 2000, the Federal Interagency Committee on Aviation Noise (FICAN) funded a pilot study to assess the relationship between aircraft noise reduction and standardized test scores (Eagan et al., 2004; FICAN, 2007). The study evaluated whether abrupt aircraft noise reduction within classrooms, from either airport closure or sound insulation, was associated with improvements in test scores. Data were collected in 35 public schools near three airports in Illinois and Texas. The study used several noise metrics, however the focus was on indoor noise levels, which makes it difficult to compare with the outdoor levels used in most other studies.

The FICAN study found a significant association between noise reduction and a decrease in failure rates for high school students, but not middle or elementary school students. Weaker associations were observed between noise reduction and an increase in failure rates for middle and elementary schools. Overall, the study found that the associations observed were similar for children with or without learning difficulties and between verbal and math/science tests. As a pilot study, the FICAN study was not intended to provide **definitive answers** but offered valuable insights (FICAN, 2007).

Evidence suggests that potential negative effects on classroom performance can be due to chronic ambient noise exposure. A study of French 8- and 9-year-old children found a significant association between ambient noise levels in urban environments due primarily to road noise (Pujol et al., 2014). The study estimated noise levels at children's bedrooms (L_{den}) and found a modest effect of lower scores on French tests, and these lower scores were associated with higher L_{den} at children's homes. Once adjusted for the classroom environment ($L_{Aeq,day}$), the association between L_{den} and math test scores became borderline significant.

A study of the effect of aircraft noise on student learning (Sharp et al., 2013) examined student test scores at a total of 6,198 U.S. elementary schools, 917 of which were exposed to aircraft noise at 46 airports and with noise exposures exceeding 55 dB L_{dn}. The study found small but statistically significant associations between airport noise and student mathematics and reading test scores, after taking demographic and school factors into account. Researchers observed associations between both ambient noise and total noise and student mathematics and reading test scores, suggesting that noise levels from any source, including from aircraft, might play a role in student achievement. This study also found that daily noise events above 70 dBA at an average rate of six events per hour resulted in a four percent decrease in a school's state ranking.

Additionally, this study quantified the potential positive effect of sound insulation on children's learning. The study found that students at insulated schools have higher test scores compared to students at schools with no insulation. This finding may indicate that sound insulation at schools could contribute to improved scores by lowering classroom ambient sound levels.

Basner et al. (2017) also found evidence to support the use of noise reduction insulation at schools exposed to high levels of aircraft noise. Specifically, "[i]t was found that the effect of aircraft noise on children's learning disappeared once the school had sound insulation installed. These studies suggest that insulation of schools yields improvements in children's learning."

2.3.1.3 Aircraft Noise and Classroom Interference

A recent Airport Cooperative Research Program study (Eagan et al., 2017) of 11 schools surrounding Los Angeles International Airport focused on the impact of aircraft noise on student and teacher classroom behaviors. The results of the student observations showed no aircraft-related distractions occurring during the study. The primary distractions were caused by other students and "other" sources of distractions. These two sources accounted for 80 percent of student distractions. In addition to the classroom observation on distraction, teachers were surveyed on the effect of aircraft noise on the classroom environment. Teachers reported that aircraft noise caused interference with teacher-student communications, student concentration loss, and reduced quality of student work. Teachers in schools exposed to aircraft noise above 55 dB L_{dn} were more likely to report interference from that noise. Accordingly, while teacher survey results indicated that aircraft noise can disrupt the classroom environment, student observations did not identify aircraft noise as a source of student distractions.

Connolly et al. (2019) investigated the impact of classroom noise levels on students' performance on reading and vocabulary-learning tasks, to address the lingering high background noise level in classrooms in England. A total of 976 high school students were tested with reading tasks while exposed to different levels of noise played through headphones. The tasks consisted of reading science texts then answering multiple-choice questions. The results of the tests were used to determine a student's comprehension and word learning. The following parameters were recorded for the analysis: number of questions attempted, time to read the texts, time to answer questions, and percentage of correct answers. The study consisted of two similar experiments, the first comparing performance in classrooms with noise at levels of 50 and 70 dB LA_{eq}; and the second at levels of 50 and 64 dB LA_{eq}. The results showed that student performance was significantly negatively affected in the 70 dB L_{Aeq} group compared to the 50 dBA L_{Aeq} group. However, the comparison between the 64 dBA and 50 dBA L_{Aeq} groups were less apparent. Negative effects were observed only in the older students. This study focused on high background noise levels inside classrooms. As a result, the study has limited relevance for assessing aircraft noise effects on children's learning. For aircraft noise exposure to reach these interior noise levels, a school would have to be exposed to noise levels of 74 dBA L_{dn} or higher.

2.3.1.4 Aircraft Noise and Cognitive Abilities

Klatte et al. (2013) have identified a range of linguistic and cognitive factors responsible for noise-related difficulties with speech perception in children. Children have lower stored phonological knowledge to reconstruct degraded speech, reducing the probability of successfully matching incomplete speech input compared with adults. Additionally, young children are less able than older children and adults to make use of contextual cues to reconstruct noise-masked words presented in sentential context. These dynamics are intuitive and rational, but no cause-effect relationship has been established.

A South Korean study (Baek et al., 2023) evaluated the effects of chronic exposure to aircraft noise on the cognitive functions of Korean elementary school students attending an elementary school around a military airfield, clarifying the relationship between noise exposure and cognitive functions. The results of the study found that the high-exposure group had significantly lower reasoning scores compared to the no-exposure groups. However, other measures did not show a significant association between aircraft noise and children's cognitive functions. Using the lower reasoning scores results, the authors suggest that military aircraft noise may have a negative effect on children's learning abilities.

Another South Korean study (Bhang et al., 2018) evaluated the effect of traffic noise on cognitive function of school children. The study pool consisted of 268 elementary aged children from three schools. After adjusting for sociological demographics, researchers found that traffic noise was a factor in differences in cognitive test scores between children exposed to traffic noise and those who were not. The effect was strongest for children who were otherwise at greater risk of poor academic performance.

In meta-data analysis conducted by Thompson et al. (2022), the authors found moderate quality evidence against an association between aircraft noise and executive functioning in children. Generally, the literature supported other cognitive effects, but the strength of these other effects had low or very low-quality evidence. The authors summarize their analysis by stating that the evidence to date suggests noise exposure is negatively associated with cognition measures. However, more quality research is required to confirm these results and to establish precise risk estimations. Overall, this study's meta-analysis better frames the correlation between noise exposure and cognitive measures, however it does not establish an empirical relationship between the two.

2.3.1.5 Aircraft Noise and Children's Annoyance

Seabi (2013) investigated health and annoyance reactions from changes in chronic exposure to aircraft noise on a sample of South African children. The intent of this study was to identify the effects of noise on health and annoyance and examine whether such effects persist over time, or whether such effects are reversible after the cessation of exposure to noise. A total of 732 children with a mean age of 11.1 (range = 8–14) participated at baseline measurements in Wave 1 of the study in 2009. After the airport was relocated, 649 children (mean age = 12.3; range = 9–15) were reassessed in Wave 2, and 174 children (mean age = 13.3; range = 10–16) were reassessed Wave 3 in 2011. The study found that the children who were exposed to chronic aircraft noise continued to experience significantly higher annoyance than their counterparts in all the waves at school, and only in Wave 1 and Wave 2 at home. Aircraft noise exposure did not have adverse effects on the children's self-reported health outcomes. Taken together, these findings suggest that chronic exposure to aircraft noise may have a lasting impact on children's annoyance, but not on their subjective health assessment. The study suggested that higher annoyance may affect learning, but this relationship was not determined by the results.

A study by Spilski, et al. (2019) aimed to evaluate the incremental value of using other daytime noise exposure metrics, beyond the dominant noise exposure metrics used to calculate the relationship between noise and annoyance (LA_{eq} and L_{den}), to predict effects of aircraft noise on annoyance for different groups of people and in different contexts. The analyses confirmed that alternative noise metrics, for example

LA_{max}, "emergence," and NAT[14] are significant single predictors of the negative effects of aircraft noise exposure. For each of these metrics, exposure was significantly associated with noise-induced annoyance for children and teachers during lessons in the classroom and for children and parents at home. However, further analyses demonstrated that only the NAT alternative noise metric served as a significant predictor over and above daytime LA_{eq}, which suggests that both the average noise exposure (LA_{eq}) and the NAT should be taken into account in analyzing the effects of aircraft noise on annoyance. However, the value of the NAT metric was only apparent in the school classroom context, both for teachers and children, and when the selected noise level threshold was greater than or equal to 70 dBA and less than 75 dBA and the number of events above that threshold increased. The study concluded that for assessments of aircraft noise annoyance of teachers and children, the NAT criterion should be included in future studies to improve the prediction of annoyance, at least in the school context. Although this study highlights the use of alternative noise metrics to better describe annoyance, it does not identify specific noise level thresholds for determining the potential impact on children's learning, regardless of the metric selected (LA_{eq} or NAT).

2.3.1.6 Aircraft Noise and Memory

Goldschagg, Cockcroft, and Seabi (2014) investigated the relationship between noise and children's memory by comparing children in noisy school environments to children in quieter schools. They summarized their findings as:

> *The noise exposed children performed better than children at the quieter schools on the cued recall measure of episodic memory and working memory. However, noise exposed children performed significantly worse than their peers at the quieter schools on prospective memory. The groups did not differ on free recall of episodic memory or attention. Neither noise annoyance nor sensitivity mediated the effects of noise on episodic or working memory. The conclusion reached is that children in noisy environments may develop coping mechanisms, including increased control mechanisms such as working memory. This supports models of cognitive arousal which propose that noise enhances attention and performance via stochastic resonance. While children's memory capabilities may be more resilient than anticipated, chronic noise may impair aspects of memory vital for learning, such as prospective memory.*

This study does not establish a direct relationship between aircraft noise and children's learning. Rather, the study notes that more attention needs to be paid to multiple causal links that can impair learning. However, the study does suggest that when noise occurs during learning situations, it may affect cognitive processing and have long term effects on the achievement of academic potential. Even so, the researchers also found that resiliency in some children in a noise exposed group may account for better cognitive results, contrary to predictions that the development of resilience through cognitive coping should lead to generalized poor attention, but the authors acknowledged that more research is needed.

2.3.2 Summary of Findings

While many factors can contribute to learning deficits in school-aged children, a body of research suggests that chronic exposure to high aircraft noise levels may impair learning. Reading, attention, problem solving, and memorization are among the cognitive effects most strongly affected by noise, though the effects depend on the type of noise and task being performed (WHO, 1999). For aircraft noise, chronic exposure has been shown to impair reading skills. This research has led the World Health

[14] This metric is the same as Number of Events Above, which is used in this amended analysis.

Organization (WHO) and a North Atlantic Treaty Organization (NATO) working group to conclude that daycare centers and schools should not be located near major sources of noise, such as highways, airports, and industrial sites (NATO, 2000; WHO, 1999).

However, there was insufficient evidence at that time from which to quantify effects. FICAN published a report (2018) that included the following summary on aircraft noise and childhood learning:

> *While there is evidence to suggest that aircraft noise has adverse learning effects, FICAN concludes there is not sufficient information to quantify the effect in terms of a recommended noise metric or dose-response relationship. FICAN recommends that analyses addressing noise effects on children's learning include predictions of school-day noise exposure (8-hour L_{eq}[15]) until research suggests a more appropriate metric. FICAN also recommends that classroom acoustic design for new construction follow guidelines presented by ANSI[16] S12.60-2002, Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools.*

Subsequent scientific research has led to the development of objective measures to determine the effects of noise on reading comprehension. The strongest association of aircraft noise exposure and childhood learning is provided by the findings of the RANCH study (Stansfeld et al., 2005; Clark et al., 2005) and Clark meta-analysis (2021). The RANCH study demonstrated an aircraft noise-exposure effect on reading z-scores. The Clark meta-analysis connected the change in reading z-scores with changes in noise exposure levels as well as the increase in odds of scoring well below or below average on a reading test. These two findings provide objective measures to determine impacts on childhood learning. Additionally, the Sharp et al. (2013) study found that daily noise events above 70 dBA that averaged six or more per hour resulted in a four percentile decrease in a school's state ranking.

2.3.3 Recommended Childhood Learning Assessment

This amended assessment of childhood learning impacts from aircraft noise exposures uses the RANCH finding that reading z-scores will fall below average with an outdoor average noise exposure of 55 dB L_{eq}, which can lead to a one-month delay in reading abilities for students. The assessment also relies on the results of the Clark meta-analysis, which showed a reading z-score decrease of 0.007 and a 4 percent increase in the odds of scoring well below or below average on the reading test for every 1 dB increase in the outdoor L_{eq}.

Along with these objective measures, the amended analysis will use noise guidelines issued by the Defense Noise Working Group (DNWG) (2009) and the WHO (2018). The DNWG guidelines are based on much of the research discussed above, through the year 2008. The DNWG identified the following threshold noise levels for the classroom environment:

- Continuous noise, such as heating, ventilation, and air conditioning systems should be no louder than an equivalent continuous sound level (L_{eq}) of 35 dB,
- Intermittent noise such as aircraft flyovers should be no louder than 40 dB L_{eq} inside the classroom, and
- Individual outside noise events that exceed an interior noise level of 50 dB may interfere with classroom communication.

[15] Equivalent Continuous Sound Level (L_{eq})
[16] American National Standards Institute

Additionally, DNWG set a screening level for outdoor noise at a daytime L_{eq} of 60 dB. However, the DNWG guidance does not include any objective effect on childhood learning from aircraft noise exposure. Still, the guidelines are similar to the RANCH study results for outdoor noise levels and subsequent research conducted by Sharp et al. (2013) on the effects of noise from interfering aircraft noise events on test scores.

Based on the results from the RANCH project, the WHO Regional Office for Europe issued similar guidelines in 2018 on the effects of noise from various sources, including aircraft, on classroom learning. Both identify effects on children's reading comprehension from outdoor cumulative exposures to aircraft noise. The RANCH project used a daytime L_{eq} as the noise metric to describe the noise dose, although the WHO recommended the 24-hour average day-evening-night average sound level (L_{den}) as the noise metric to be used. Both state that children exposed to outdoor noise exposure levels above 55 dB L_{eq} or L_{den} may have their oral comprehension delayed by one month. Both the RANCH study and WHO guidance suggests a 1–2-month delay in reading comprehension for every 5 dB increase in noise exposure. However, the WHO acknowledges that the association between aircraft noise and reading and oral comprehension is supported by evidence of "moderate quality" and further that the impact "cannot be predicted very accurately." The WHO determined that evidence of moderate quality also shows an association between aircraft noise and other measures related to cognition, such as poorer performance on standardized tests and long-term memory. However, the WHO did not find a substantial effect from aircraft noise on children's attention or executive function. Unlike the DNWG guidelines and the RANCH findings, the WHO uses a 24-hour-based noise metric to determine the effect on children's reading comprehension.

2.3.4 Noise Environment at Representative Schools

This analysis utilized three metrics to evaluate the potential for classroom/learning interference due to noise events from aircraft overflights (see Appendix A of the 2018 Final EIS for descriptions of these metrics). The first metric is the daytime $L_{eq,(8h)}$ that estimates the cumulative noise exposure for an 8-hour school day (8:00 a.m. to 4:00 p.m.). Daytime L_{eq} is used to compare with the RANCH findings, the Clark meta-analysis, and the DNWG guidelines. The second metric is the L_{dn} (DNL), which is used to compare with the WHO guidelines. The third metric, NA_{50Lmax}, is the number of events inside the classroom above 50 dB (maximum sound level [L_{max}]) and represents the average number of interfering aircraft noise events that occur per hour. NA_{50Lmax} is used for comparison with the Sharp et al. (2013) findings about interfering aircraft noise events.

2.3.4.1 Outdoor Noise Exposures at the Representative School Locations

Table 2-6 provides the modeled outdoor daytime L_{eq} and L_{dn} noise results for the No Action Alternative and Alternative 2A scenarios, as detailed in Appendix A of the 2018 Final EIS:

- No Action L_{eq}: Table 5-9 on page A-70,
- No Action L_{dn}: Table 5-5 on pages A-63 to A-64,
- Preferred Alternative 2A L_{eq}: Table 7-16 on page A-165, and
- Preferred Alternative 2A L_{dn}: Figure 7-7 on pages A-152 to A-154.

To account for the DNWG's guidance that intermittent noise such as aircraft flyovers should be no louder than 40 dB L_{eq} inside the classroom, the Navy reviewed all values less than 45 dB in the 2018 Final EIS and confirmed that in each case the values were also less than 35 dB.

Table 2-6 Modeled Values for L_{eq} and L_{dn} at the Representative School Locations

Point of Interest			Daytime Leq, dB		Increase from No Action, dB	Ldn, dB		Increase from No Action, dB
Type	ID	Description	No Action	Alt 2A		No Action	Alt 2A	
Residence	R03	Central Whidbey	57	59	+2	57	58	+1
	R11	Sequim	<35	<35	-	<35	<35	-
School	S01	Oak Harbor High School	57	57	-	59	59	-
	S02	Crescent Harbor Elementary School	67	69	+2	67	69	+2
	S03	Coupeville Elementary School	51	57	+6	57	61	+3
	S04	Anacortes High School	46	47	+1	48	50	+2
	S05	Lopez Island School	<35	<35	-	<35	<35	-
	S06	Friday Harbor Elementary School	<35	<35	-	<35	<35	-
	S07	Sir James Douglas Elementary School	<35	<35	-	<35	<35	-
	S08	Fidalgo Elementary School	49	50	+1	51	53	+2
	S09	La Conner Elementary School	51	52	+1	53	55	+2
	S10	Elger Bay Elementary School	<35	<35	-	<35	<35	-

Legend: < = less than; + = positive values; - = no change or negligible levels; Alt 2A = Preferred alternative 2A; dB = A unit used to express relative difference in power or intensity, usually between acoustic signals, equal to ten times the common logarithm of the ratio of the two levels; ID = Point of Interest Site Identification Code; L_{eq} = Equivalent Continuous Sound Level; L_{dn} = Day-Night Average Sound Level.

2.3.4.2 Interior Noise Exposures and Intermittent Noise Events at the Representative School Locations

The analysis of interior noise levels in the classrooms required adjustments to the outside noise levels since outside noise is attenuated within buildings. The level of attenuation depends on building features that contribute to the reduction of noise levels, such as walls, doors, and insulation. FICON (1992) recommends the use of Noise Level Reduction factors of 15 dB for windows open and 25 dB for windows closed to account for the attenuation buildings provide. Single aircraft events that generate interior sound levels greater than 50 dB have the potential to interfere with student and teacher interaction by affecting conversation and comprehension (DNWG, 2009). Thus, the outdoor threshold levels of 65 dB (for windows open) and 75 dB (for windows closed) correspond to an indoor threshold level of 50 dB.

Table 2-7 provides the modeled interior daytime L_{eq} values for the No Action and Preferred Alternative 2A scenarios as well as the two window conditions, and Table 2-8 provides the number of hourly noise events. These values are pulled from Appendix A of the 2018 Final EIS:

- No Action Indoor L_{eq}: Table 5-9 on page A-70, and
- Preferred Alternative 2A Indoor L_{eq}: Table 7-16 on page A-165.

Table 2-7 Indoor L_{eq} Values at the Representative School Locations

ID	Description	Daytime L_{eq}[2], dB					
		No Action Alternative		Alternative 2A		Differences (Alt 2A - No Action)	
		Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]
School Surrogates							
R03	**Central Whidbey**	42	<35	44	<35	2	-
R11	**Sequim**	<35	<35	<35	<35	-	-

ID	Description	Daytime L_{eq}[2], dB					
		No Action Alternative		Alternative 2A		Differences (Alt 2A - No Action)	
		Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]
Schools							
S01	**Oak Harbor High School**	42	<35	42	<35	0	-
S02	**Crescent Harbor Elementary School**	52	42	54	44	2	2
S03	**Coupeville Elementary School**	36	<35	42	<35	6	-
S04	**Anacortes High School**	<35	<35	<35	<35	-	-
S05	**Lopez Island School**	<35	<35	<35	<35	-	-
S06	**Friday Harbor Elementary School**	<35	<35	<35	<35	-	-
S07	**Sir James Douglas Elementary School**	<35	<35	<35	<35	-	-
S08	**Fidalgo Elementary School**	<35	<35	<35	<35	-	-
S09	**La Conner Elementary School**	36	<35	37	<35	1	-
S10	**Elger Bay Elementary School**	<35	<35	<35	<35	-	-

Notes: 1. Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
2. For this metric, daily classroom hours are modeled to be 8:00 a.m. to 4:00 p.m.

Legend: < = less than; + = positive value; - = negligible value; Alt 2A = Preferred Alternative 2A; dB = A unit used to express relative difference in power or intensity, usually between two acoustic signals, equal to ten times the common logarithm of the ratio of the two levels; ID = Site Identification; L_{eq} = Equivalent Continuous Sound Level.

Table 2-8 Hourly Interfering Events at the Representative School Locations

ID	Description	Events per Hour[2]					
		No Action Alternative		Alternative 2A		Differences (Alt 2A - No Action)	
		Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]
School Surrogates							
R03	**Central Whidbey**	4	0	5	0	1	0
R11	**Sequim**	0	0	0	0	0	0
Schools							
S01	**Oak Harbor High School**	5	2	6	2	1	0
S02	**Crescent Harbor Elementary School**	4	2	5	2	1	0

ID	Description	Events per Hour[2]					
		No Action Alternative		Alternative 2A		Differences (Alt 2A - No Action)	
		Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]
S03	**Coupeville Elementary School**	0	0	2	1	2	1
S04	**Anacortes High School**	0	0	0	0	0	0
S05	**Lopez Island School**	0	0	0	0	0	0
S06	**Friday Harbor Elementary School**	0	0	0	0	0	0
S07	**Sir James Douglas Elementary School**	0	0	0	0	0	0
S08	**Fidalgo Elementary School**	0	0	0	0	0	0
S09	**La Conner Elementary School**	1	0	1	1	0	1
S10	**Elger Bay Elementary School**	0	0	0	0	0	0

Notes: 1. Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
2. 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 (LA_{max}) of 50 dBA.

Legend: Alt 2A = Preferred Alternative 2A; ID = Point of Interest Site Identification Code.

2.3.5 Impact Analysis

2.3.5.1 Childhood Learning Impacts based on Outdoor Noise Exposures

The Navy next compared the outdoor daytime L_{eq} values to the RANCH and Clark meta-analysis to assess effects. Table 2-9 provides the results of that comparison. First, the Navy looked at the RANCH study's finding that a daytime outdoor L_{eq} above 55 dB may lead to a one month delay in reading comprehension. Three school locations have daytime outdoor L_{eq} values above 55 dB for both the No Action and Preferred Alternative 2A scenarios: Oak Habor High School (S01), Crescent Harbor Elementary School (S02), and schools near the Central Whidbey neighborhood (R03). Coupeville Elementary School (S03) has an increase in L_{eq} from 51 dB to 57 dB, which moves it above the 55 dB threshold. This change may result in a new effects at Coupeville Elementary School from the increase in operations.

Table 2-9 also provides the increase in the daytime outdoor L_{eq} due to increases in the Preferred Alternative 2A. The Clark meta-analysis is used to translate these increases to impacts on students' reading z-scores. Six schools will see increases in L_{eq} values. Coupeville Elementary School (S03) has the largest increase of 6 dB, which translates to a 0.042 decrease in reading z-scores and a 24 percent increase in the odds of scoring poorly on a reading test. Two locations, Crescent Harbor Elementary School (S02) and schools near the Central Whidbey neighborhood (R03), have an increase of 2 dB, which translates to a 0.014 decrease in reading z-scores and an 8 percent increase in the odds of scoring poorly on a reading test. Three schools, Anacortes High School (S04), Fidalgo Elementary School (S08) and La Conner Elementary School (S09), have an increase of 1 dB, which translates to a 0.007 decrease in reading z-score and a 4 percent increase in the odds of scoring poorly on a reading test.

When outdoor daytime L_{eq} values are compared to the DNWG guidelines, only Crescent Harbor Elementary School (S02) is indicated to be impacted (L_{eq} above 60 dB). To best (and conservatively) capture the potential impacts of aircraft noise on student reading comprehension, the Navy used the RANCH study's 55 dB threshold to assess impacts rather than the DNWG's 60 dB threshold.

Table 2-9 Comparison of Outdoor daytime L_{eq} values to the RANCH and Clark Meta-Analysis Findings

Point of Interest			Daytime L_{eq}, dB		Increase from No Action, dB	Reading Impacted		Decrease in Reading Scores	Increase in Odds of Poor Reading Score
Type	ID	Description	No Action	Alt 2A		No Action	Alt 2A		
Residence	R03	Central Whidbey	57	59	+2	Yes	Yes	0.014	8%
	R11	Sequim	<35	<35	-	No	No	-	-
School	S01	Oak Harbor High School	57	57	-	Yes	Yes	-	-
	S02	Crescent Harbor Elementary School	67	69	+2	Yes	Yes	0.014	8%
	S03	Coupeville Elementary School	51	57	+6	No	Yes	0.042	24%
	S04	Anacortes High School	46	47	+1	No	No	0.007	4%
	S05	Lopez Island School	<35	<35	-	No	No	-	-
	S06	Friday Harbor Elementary School	<35	<35	-	No	No	-	-
	S07	Sir James Douglas Elementary School	<35	<35	-	No	No	-	-
	S08	Fidalgo Elementary School	49	50	+1	No	No	0.007	4%
	S09	La Conner Elementary School	51	52	+1	No	No	0.007	4%
	S10	Elger Bay Elementary School	<35	<35	-	No	No	-	-

Legend: < = less than; + = positive value; - = negligible value; Alt 2A = Preferred Alternative 2A; dB = A unit used to express relative difference in power or intensity, usually between two acoustic signals, equal to ten times the common logarithm of the ratio of the two levels; ID = Point of Interest Site Identification Code.

Table 2-10 provides a comparison of the modeled L_{dn} values with the WHO guidelines. This comparison shows that four schools are above the 55 dB L_{dn} WHO threshold for both the No Action and Preferred Alternative 2A scenarios: Oak Harbor High School (S01), Crescent Harbor Elementary School (S02), Coupeville Elementary School (S03), and schools near the Central Whidbey neighborhood (R03). La Conner Elementary School (S09) is the only school that will see an increase to the 55 dB WHO threshold from a L_{dn} of 53 dB to 55 dB under Preferred Alternative 2A. The WHO guideline states that students may have a one month delay in reading comprehension when the L_{dn} is above 55 dB, which is the same as the RANCH study findings.

Table 2-10 Comparison of L_{dn} Values to the WHO Guidelines

Point of Interest			L_{dn}, dB		Increase from No Action, dB	Reading Impacted	
Type	ID	Description	No Action	Alt 2A		No Action	Alt 2A
Residence	R03	Central Whidbey	57	58	+1	Yes	Yes
	R11	Sequim	<35	<35	-	No	No
School	S01	Oak Harbor High School	59	59	-	Yes	Yes

Point of Interest			L_{dn}, dB		Increase from No Action, dB	Reading Impacted	
Type	ID	Description	No Action	Alt 2A		No Action	Alt 2A
	S02	Crescent Harbor Elementary School	67	69	+2	Yes	Yes
	S03	Coupeville Elementary School	57	61	+4	Yes	Yes
	S04	Anacortes High School	48	50	+2	No	No
	S05	Lopez Island School	<35	<35	-	No	No
	S06	Friday Harbor Elementary School	<35	<35	-	No	No
	S07	Sir James Douglas Elementary School	<35	<35	-	No	No
	S08	Fidalgo Elementary School	51	53	+2	No	No
	S09	La Conner Elementary School	53	55	+2	No	Yes
	S10	Elger Bay Elementary School	<35	<35	-	No	No

Legend: < = less than; + = positive value; - = negligible value; Alt 2A = Preferred Alternative 2A; dB = A unit used to express relative difference in power or intensity, usually between two acoustic signals, equal to ten times the common logarithm of the ratio of the two levels; ID = Point of Interest Site Identification Code.

In summary, while the data reveal slightly different results depending on the metric chosen, Coupeville Elementary School is likely to be most impacted under Preferred Alternative 2A as compared to the No Action Alternative. These impacts may correspond to a one-month delay in reading comprehension, a 0.042 reduction in reading z-scores, and a 24 percent increase in the odds of scoring poorly on a reading test. Five other school locations may experience smaller impacts to reading scores. However, as explained in Section 2.3.5.3 below, ongoing Growler operations have to-date not led to student performance dropping below the State average, including at schools with the most noise exposure. Thus, at least some anecdotal data supports the conclusion that Growler operations have not caused detrimental learning effects at local schools.

2.3.5.2 Childhood Learning Impacts based on Indoor Noise

The Navy next compared the modeled daytime indoor L_{eq} values in **Table 2-7** to the DNWG guidelines for interior noise from outdoor noise sources in **Table 2-11**. The DWNG guidelines state that intermittent noise such as aircraft flyovers should be no louder than 40 dB L_{eq} inside the classroom. The comparison includes the No Action Alternative and Preferred Alternative 2A in the windows opened and closed conditions. First, in the windows open condition, three schools, Oak Harbor High School (S01), Crescent Elementary School (S02), and schools near the Central Whidbey neighborhood (R03), are above this threshold for both the No Action Alternative and Preferred Alternative 2A. Coupeville Elementary School (S03) rises above the threshold for the Preferred Alternative 2A scenario with an estimated increase of six dB. In the windows closed condition, only Crescent Harbor Elementary School (s02) is above the threshold for both the No Action Alternative and Preferred Alternative 2A.

Table 2-11 Comparison of Indoor Daytime L_{eq} Values to the DNWG Guidelines

ID	Description	Daytime Leq[2], dB						Exceeds DNWG Guidelines			
		No Action Alternative		Alternative 2A		Differences (Alt 2A - No Action)		No Action Alternative		Alternative 2A	
		Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]
School Surrogates											
R03	**Central Whidbey**	42	<35	44	<35	2	-	Yes	No	Yes	No
R11	**Sequim**	<35	<35	<35	<35	-	-	No	No	No	No
Schools											
S01	**Oak Harbor High School**	42	<35	42	<35	0	-	Yes	No	Yes	No
S02	**Crescent Harbor Elementary School**	52	42	54	44	2	2	Yes	Yes	Yes	Yes
S03	**Coupeville Elementary School**	36	<35	42	<35	6	-	No	No	Yes	No
S04	**Anacortes High School**	<35	<35	<35	<35	-	-	No	No	No	No
S05	**Lopez Island School**	<35	<35	<35	<35	-	-	No	No	No	No
S06	**Friday Harbor Elementary School**	<35	<35	<35	<35	-	-	No	No	No	No
S07	**Sir James Douglas Elementary School**	<35	<35	<35	<35	-	-	No	No	No	No
S08	**Fidalgo Elementary School**	<35	<35	<35	<35	-	-	No	No	No	No
S09	**La Conner Elementary School**	36	<35	37	<35	1	-	No	No	No	No
S10	**Elger Bay Elementary School**	<35	<35	<35	<35	-	-	No	No	No	No

Notes: 1. Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
2. For this metric, daily classroom hours are modeled to be 8:00 a.m. to 4:00 p.m.

Legend: < = less than; + = positive value; - = negligible value; Alt 2A = Preferred Alternative 2A; dB = A unit used to express relative difference in power or intensity, usually between two acoustic signals, equal to ten times the common logarithm of the ratio of the two levels.; ID = Point of Interest Site Identification Code; L_{eq} = Equivalent Continuous Sound Level.

To determine the effect of interfering events, the values in **Table 2-8** were then compared to the Sharp et al. findings (2013) for both the No Action Alternative and Preferred Alternative 2A in the windows opened and closed conditions. **Table 2-12** provides the results of this comparison. Oak Harbor High School (S01) is the only school that reaches the average of six hourly events under the Preferred Alternative 2A scenario with windows opened. No school is at the six hourly events threshold in the windows closed condition. For the windows closed condition the highest hourly events is two at Oak Harbor High School (S01) and Crescent Harbor Elementary School (S02) for both the No Action Alternative and Preferred Alternative 2A.

The data reveal that Coupeville Elementary School is likely to be most impacted under Preferred Alternative 2A as compared to the No Action Alternative, but only in the windows open condition. Additionally, Oak Harbor High School is the only location that may experience an average of six hourly events under the windows open condition – an increase of one event over the No Action Alternative. However, the data notwithstanding, both schools currently have assessment scores above the Washington State average.

2.3.5.3 Representative School Washington Reading Scores

Next, the Navy examined public data on individual school's reading scores obtained from the Washington Office of Superintendent of Public Education (https://reportcard.ospi.k12.wa.us/). Data were retrieved for all school locations except for Sir James Douglas Elementary School, which is in Canada. Additionally, data on overall Washington State results were retrieved. The State assessment scores include two methods: "Foundational Grade-Level Knowledge (and above)" and "Consistent Grade-level Knowledge (and above)." Reading falls under the assessment's English Language Arts (ELA) category. The assessment scores were compared to each school's modeled daytime outdoor L_{eq} value for Preferred Alternative 2A. This comparison does not make any adjustments to the assessment scores based on social demographics. **Figure 2-4** shows the comparison between the daytime outdoor L_{eq} and "Foundational Grade-Level Knowledge (and above)" assessment score. Crescent Harbor Elementary School (S02), which has the most impacts, has an ELA score of 68.9 percent compared to the Washington State score of 70.8 percent. Other schools with impacts, Oak Harbor High School (S01) and Coupeville Elementary School (S03), have scores above the Washington State score. Overall, schools with the most noise exposure have reported scores at or above the Washington State scores, which suggests impacts to students' reading abilities due to ongoing Growler operations have, at minimum, not resulted in impacts to those students that would reflect their performance dropping below the State average.

Table 2-12 Comparison of Indoor Daytime Interfering Events with Findings from Sharp et al. (2013)

ID	Description	Events per Hour[2]						Four Percentile Decrease in School's State Ranking			
		No Action Alternative		Alternative 2A		Differences (Alt 2A - No Action)		No Action Alternative		Alternative 2A	
		Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]	Windows Open[1]	Windows Closed[1]
School Surrogates											
R03	**Central Whidbey**	4	0	5	0	1	0	No	No	No	No
R11	**Sequim**	0	0	0	0	0	0	No	No	No	No
Schools											
S01	**Oak Harbor High School**	5	2	6	2	1	0	No	No	Yes	No
S02	**Crescent Harbor Elementary School**	4	2	5	2	1	0	No	No	No	No
S03	**Coupeville Elementary School**	0	0	2	1	2	1	No	No	No	No
S04	**Anacortes High School**	0	0	0	0	0	0	No	No	No	No
S05	**Lopez Island School**	0	0	0	0	0	0	No	No	No	No
S06	**Friday Harbor Elementary School**	0	0	0	0	0	0	No	No	No	No
S07	**Sir James Douglas Elementary School**	0	0	0	0	0	0	No	No	No	No
S08	**Fidalgo Elementary School**	0	0	0	0	0	0	No	No	No	No
S09	**La Conner Elementary School**	1	0	1	1	0	1	No	No	No	No
S10	**Elger Bay Elementary School**	0	0	0	0	0	0	No	No	No	No

Notes: 1. Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively, based upon the walls, doors, insulation, and other building features that reduce the noise levels inside (FICON, 1992).
2. 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_{Amax}) of 50 dBA.

Legend: Alt 2A = Preferred Alternative 2A; ID = Point of Interest Site Identification Code.

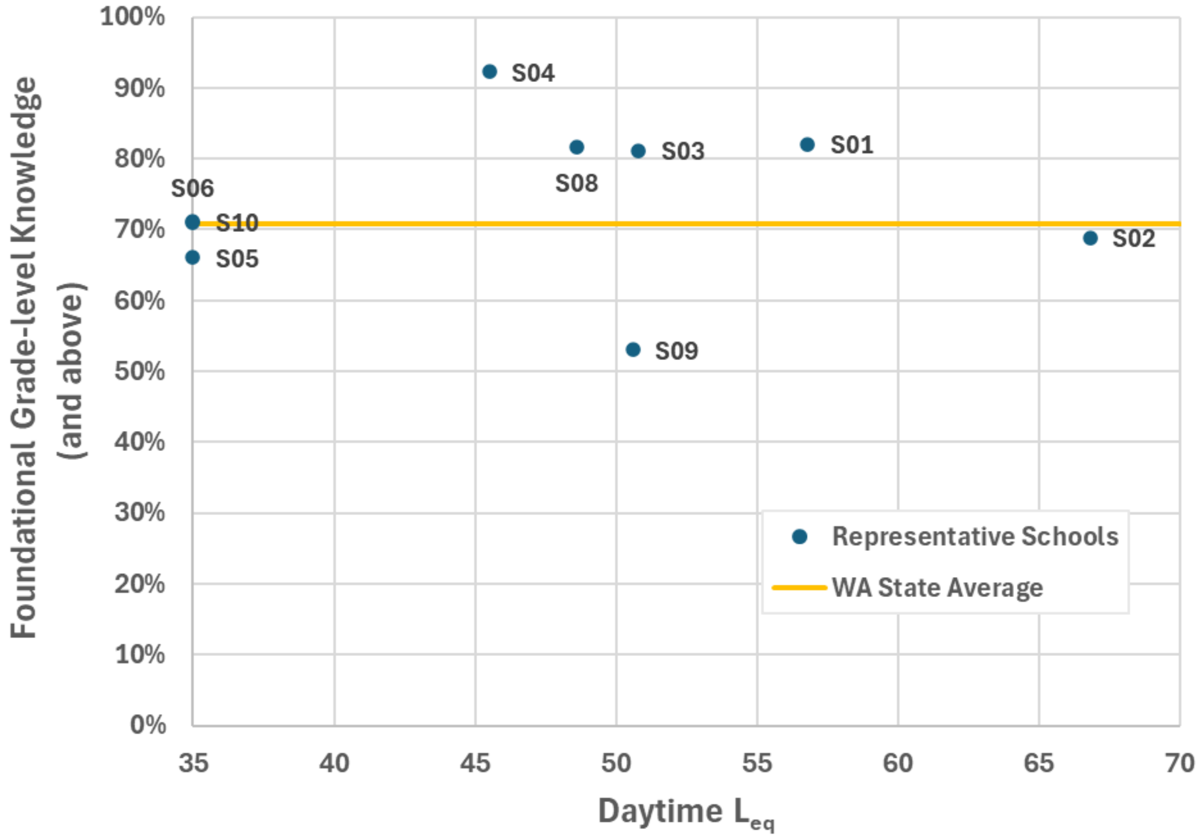


Figure 2-4 Comparison of Daytime Outdoor L_{eq} with School's Functional Grade-level English Language Arts Assessment Score

Figure 2-5 shows the comparison between the daytime outdoor L_{eq} and "Consistent Grade-level Knowledge (and above)" assessment score. Crescent Harbor Elementary School (S02), which has the most indicated impacts, has an ELA score of 44.6 percent compared to the Washington State score of 50.3 percent. Other schools with impacts, Oak Harbor High School (S01) and Coupeville Elementary School (S03), have scores above the Washington State score.

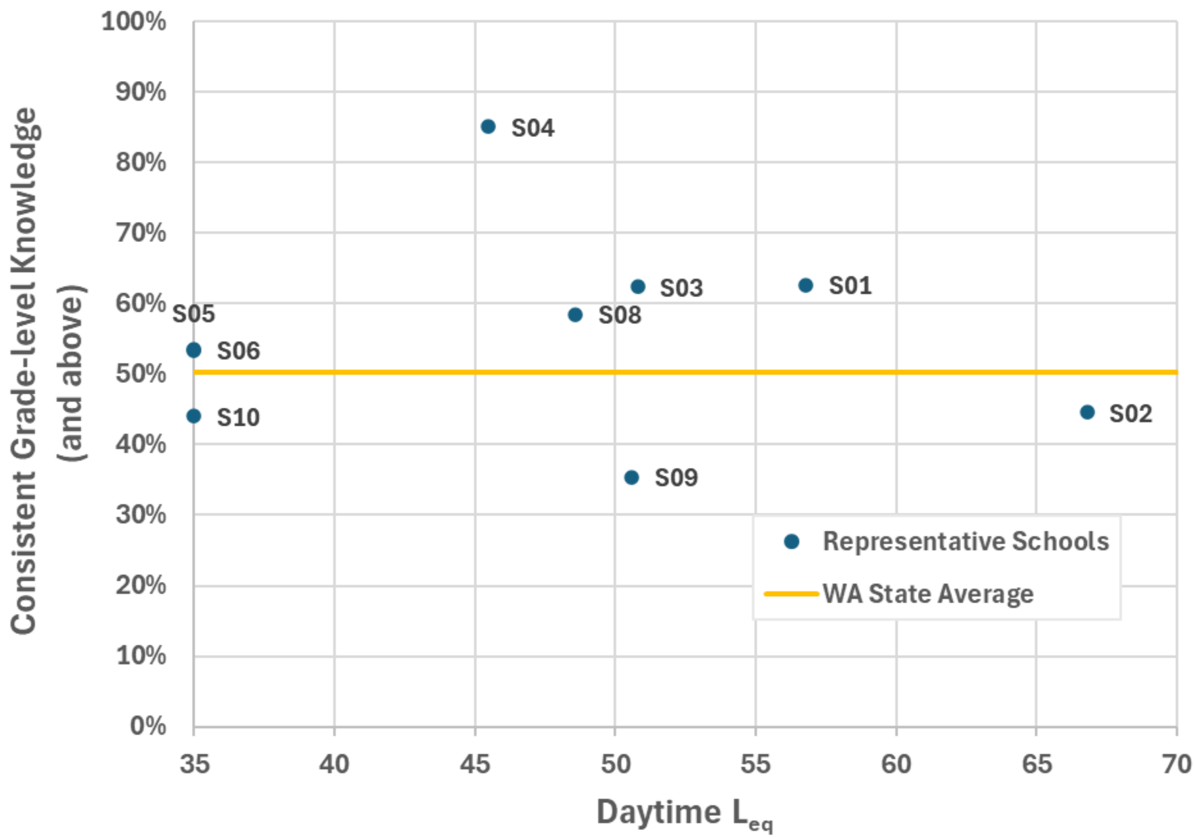


Figure 2-5 Comparison of Daytime Outdoor L_{eq} With Schools' Consistent Grade-level English Language Arts Assessment Score

2.3.5.4 NAS Whidbey Island Mitigations

As detailed in Appendix H to the 2018 Final EIS, it is the Navy's policy to conduct required training and operational flights with the least impact practical on surrounding communities, including schools. The Navy continues to pursue design solutions to reduce overall noise emissions, and measures to make carrier landings safer and more automated, reducing the number of FCLPs required. Additionally, while Congress has not given the Navy standing legal authority to expend federal funds to install sound insulation in homes or schools that are not owned by the federal government, aircrews are directed to employ prudent airmanship techniques to the maximum extent practicable to reduce aircraft noise impacts and to avoid sensitive areas except when safety dictates otherwise. NAS Whidbey Island maintains open lines of communication with local schools to minimize impact on childhood learning. When alerted by school principals, the NAS Whidbey Island Air Operations Department monitors airfield operational schedules and attempts to mitigate potential operational impacts during key academic testing periods in schools by rescheduling flight times around testing days where possible. Finally, the Office of Local Defense Community Cooperation (OLDCC) provides funding to install sound insulation as part of the Public Schools on Military Installations program. This program funds the construction, renovation, repair, or expansion of public schools located on military installations to address capacity or facility condition deficiencies. This funding is being used to install sound insulation in two facility replacement projects, Crescent Harbor Elementary and Hand-In-Hand/Home Connection early learning center and school, which are scheduled to be completed in 2026. Also, in October 2024, NAS Whidbey Island gave critical support to Oak Harbor School District's grant application to OLDCC under the Community Noise Mitigation Program. The program is designed to fund the installation of noise mitigation in eligible facilities impacted by military fixed wing aviation noise. On December 9, 2024, following a competitive selection process, the Assistant Secretary of Defense for Energy, Installations, and Environment approved the selection of the Oak Harbor School District's proposal and invited the district to apply for the Community Noise Mitigation Program. While this invitation does not necessarily mean the grant will be awarded, it represents a major milestone in the grant application process. If approved, the grant would fund installation of noise attenuation measures in four school facilities within the school district, further reducing interior noise levels.

2.4 El Centro

2.4.1 Scope of Analysis

The Navy discussed the reasons for eliminating the NAF El Centro alternative from detailed study in section 2.5.2 of the 2018 Final EIS, *Moving Some or All of the "Growler" Community Aircraft Elsewhere*. The reasonableness of the NAF El Centro alternative was considered within a broader discussion regarding relocating some or all of the Airborne Electronic Attack (AEA) community to an alternative location. This amended analysis reexamines the reasonableness of the NAF El Centro alternative in the same context.

The Navy reassessed the NAF El Centro alternative in view of the purpose of and need for the Proposed Action, as informed by the considerations in Section 2.2 of the 2018 Final EIS. As explained in this section, the Navy again concludes that relocating all or any portion of the AEA community to NAF El Centro would degrade the community's overall effectiveness and does not meet the purpose of and need for the Proposed Action. Accordingly, the Navy has eliminated this alternative from detailed consideration and does not carry it forward.

This discussion is limited to the reasonableness of the NAF El Centro alternative. The Navy's rationale for eliminating alternative locations other than NAF El Centro (specifically, NAS Lemoore, Naval Air Weapons Station China Lake, NAS Oceana, and Marine Corps Air Station Cherry Point), as well as for eliminating other siting options, was not at issue in the litigation and is not reexamined in this amended analysis. The Navy was not required to solicit or consider any other siting proposals.

2.4.1.1 Purpose of and Need for the Proposed Action

Federal agencies have discretion in determining the purpose of and need for the Proposed Action. In the 2018 Final EIS, the Department of the Navy proposed to augment its existing AEA squadrons at the NAS Whidbey Island complex, the home to all Navy tactical AEA squadrons[17] flying the EA-18G "Growler," to meet critical national defense requirements consistent with the Navy's statutory responsibilities under section 8062 of title 10, U.S.C.

The purpose of the Proposed Action was to augment the AEA community at the NAS Whidbey Island complex by operating additional EA-18G "Growler" aircraft appropriated by Congress. The Navy needed to effectively and efficiently increase electronic attack capabilities to counter increasingly sophisticated threats and provide more aircraft per squadron to give operational commanders more flexibility in addressing future threats and missions. The additional EA-18G "Growler" aircraft would be assigned to

[17] One squadron is forward deployed to Japan as part of Carrier Air Wing FIVE.

squadrons home based at NAS Whidbey Island, which serves as the hub, and only home, for the tactical AEA community in the U.S.

2.4.1.2 EA-18G "Growler" Mission

The mission and tactical actions of the Navy's EA-18G "Growler" aircraft are crucial to the effectiveness of U.S. missions both in the air and on the ground. The EA-18G "Growler" is the U.S. military's only AEA aircraft capable of offensive jamming of enemy integrated air-defense systems. EA-18G "Growler" aircraft suppress enemy air defenses and communications systems by denying the enemy freedom of action in the electromagnetic spectrum; escort other U.S. and allied strike aircraft in missions against heavily defended targets, enabling strike aircraft to penetrate air defenses and deliver ordnance against assigned targets; and disrupt land-based threats by disrupting enemy communications and the use of radio controlled improvised explosive device through electronic measures, protecting the lives of U.S. and allied ground forces and furthering mission accomplishment.

The Navy's AEA community is organized into three types of squadrons: carrier air wing squadrons, which fly missions from aircraft carriers; expeditionary squadrons, which are forward deployed from overseas airfields to support shore-based operations; and an FRS, which does not deploy but provides post-graduate training to pilots prior to transferring into carrier or expeditionary squadrons. The FRS is three to four times larger than any carrier or expeditionary squadron.

In 2009, the Secretary of Defense directed the Navy to take responsibility for the Nation's tactical AEA mission. As a result, the Navy is the only U.S. military service that currently maintains a tactical AEA capability for the joint force[18] and must preserve and cultivate the expertise and knowledge of the AEA community. Combatant Commanders rely on the Navy's EA-18G "Growler" fleet to ensure air dominance in warfare by countering the threat posed by the enemy and enabling combat survivability and effectiveness. Combatant Commanders highly seek these assets for use worldwide; frequently, EA-18G "Growler" aircraft are a required asset for mission success. More EA-18G "Growler" aircraft airborne during a mission allows for more precise location of threats and sustains the mission even in the face of aircraft attrition due to maintenance or losses in combat. The AEA community has performed a key role in every combat action over the past 40 years. EA-18G "Growler" squadrons, specifically, have contributed to the U.S. global strategy and electronic attack mission for Operations ENDURING FREEDOM, IRAQI FREEDOM, and INHERENT RESOLVE and will continue to do so into the foreseeable future. Most recently, EA-18G "Growler" aircraft were deployed to the Red Sea and Yemen to combat Houthi attacks on commercial and naval ships. EA-18 "Growler" carrier and expeditionary squadrons are both in high demand; five Navy expeditionary EA-18G "Growler" squadrons (25 aircraft) currently operate in support of the U.S. Air Force, which no longer has dedicated AEA aircraft, for use in joint missions. The importance of EA-18G "Growler" aircraft to the joint force was reinforced by Congress in the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, which prohibits the Navy from retiring any EA-18G "Growler" aircraft, placing EA-18G "Growler" aircraft in active or inactive storage status, or reducing funding for EA-18G "Growler" unit personnel or weapon system sustainment activities in a manner that presumes future congressional authority to divest such aircraft.

Accordingly, the Navy needed to augment the AEA community effectively and efficiently, without any degradation of the AEA mission. Any delay in augmenting operational squadrons, training aircrews and

[18] The term "joint force" as used herein refers to the 11 unified combatant commands, each led by a Combatant Commander, with command and control of military operations in accordance with chapter 6, sections 161 et seq., of title 10, U.S.C. and the Unified Command Plan.

maintenance personnel, or providing facilities for aircraft and personnel meant that Combatant Commanders lacked the assets necessary to protect the lives of U.S. and Allied forces and to meet national defense requirements. As explained in the 2018 Final EIS, in order to maximize effectiveness and efficiency, the Navy needed to make maximum use of existing infrastructure, manpower, training, and logistical resources, while minimizing significant cost outlays, including major construction (which would cause additional delays), and reducing or avoiding internal administrative and other barriers. Because the AEA community is relatively small[19] and EA-18G "Growler" aircraft are in high demand to support U.S. and allied missions in the air and on the ground, any delay resulting in mission degradation posed an unacceptable level of operational risk.

2.4.1.3 Identification of Reasonable Alternatives under NEPA

NEPA requires federal agencies to study, develop, and describe a "reasonable range of alternatives" to the proposed agency action. Reasonable alternatives are those that are technically and economically feasible and meet the purpose and need of the proposal. 42 U.S.C. Section 4332(2)(C)(iii), (F). Agencies may exercise discretion and judgment to eliminate alternatives that are unreasonable or do not meet the purpose of or need for the Proposed Action provided such decisions are based on common sense, rather than agency preference.

Agencies may also exercise discretion and judgment to limit the scope of reasonable alternatives, provided the agency considers a reasonable range of alternatives that will foster informed decision-making. The identification of reasonable alternatives is governed by a rule of reason. The range of alternatives must be "reasonable, practical, and not boundless" (87 FR 23458). There is no requirement to consider every conceivable alternative. It is ultimately for the agency to determine what alternatives are needed to inform its decision-making (87 FR 23459). For alternatives eliminated "from detailed study," the Council on Environmental Quality (CEQ) directs agencies to "*briefly* discuss the reasons for their elimination" (40 C.F.R. Section 1502.14) (emphasis added).[20]

In developing the range of reasonable alternatives (see Section 2.2 of the 2018 Final EIS), the Navy reviewed several important considerations relevant to the Navy's purpose and need and to the

[19] Compare the Navy's strike fighter community, which is considerably larger than the more specialized AEA community. The strike fighter community is approximately four times the size of the AEA community, requiring the Navy to maintain two master jet bases, three training squadrons, and related supporting infrastructure at each location (NAS Oceana and NAS Lemoore). This contextual distinction helps explain why the Navy considered NAF El Cento as a reasonable alternative in the F-35C West Coast Home basing EIS, but did not carry the NAF El Centro alternative forward in the 2018 "Growler" Final EIS. The smaller size of the AEA community, with a single hub at NAS Whidbey Island, necessitated consideration of different factors than were considered in the F-35C West Coast Home basing EIS. See Footnote 5 for further details.

[20] The Navy is aware that on January 20, 2025, President Trump issued Executive Order (EO) 14154, revoking E.O. 11991, President Carter's 1977 E.O. that directed the CEQ to promulgate regulations implementing NEPA. 90 Fed. Reg. 8,353 (Jan. 20, 2025). E.O. 14154 also directed CEQ to propose rescinding its NEPA regulations and to provide guidance to federal agencies on implementing NEPA. E.O. 14154, ¶ 5(b). On February 25, 2025, CEQ issued an interim final rule rescinding its NEPA regulations effective April 11, 2025, and removing 40 C.F.R. Part 1500 *et seq*. from the Federal Register. 90 Fed. Reg. 10,610 (Feb. 25, 2025). The interim final rule also states that "agencies should, in defending actions they have taken, continue to rely on the version of CEQ's regulations that was in effect at the time that the agency action under challenge was completed." 90 Fed. Reg., at 10,614. The Navy is also aware of the decision of the U.S. District Court for the District of North Dakota vacating the Phase 2 NEPA regulations issued on May 1, 2024, but declining to reach the validity of CEQ's July 16, 2020, rulemaking or the 2022 Phase 1 amendments issued on April 20, 2022. *Iowa* v. *Council on Envt'l Quality*, 2025 U.S. LEXIS 36732 (D. N.D. 2025). The cited text originated in the 1978 NEPA regulations and was retained in the 2020 rulemaking and 2022 amendments, which remain in force as of publication of this Draft Amended Analysis.

reasonableness of each alternative in addition to considering public comments, including proposed alternative locations. These considerations are replicated here as they also inform the Navy's amended analysis as to the NAF El Centro alternative. Considerations included:

- the current home of the Navy's EA-18G "Growler" mission
- the location of suitable airfields that provide for the most realistic training environment
- the distance aircraft would have to travel to accomplish training
- the expense of duplicating capabilities that already exist at Ault Field
- the operational readiness and synergy of the small EA-18G "Growler" community
- access to training ranges, Special Use Airspace (SUA),[21] and military training routes (MTRs)[22]
- the effective use of existing infrastructure
- the management of aircraft inventories, simulators, maintenance equipment, and logistical support
- the effective use of personnel to improve operational responsiveness and readiness

In addition, the Navy looked at specific airfield criteria to realistically train naval aviators and aircrew to land on an aircraft carrier:

- The airfield elevation must be at or below 1,000 feet above mean sea level to duplicate the atmospheric conditions at sea.
- The runway width, length, and weight-bearing capacity must be sufficient to safely support tactical jet aircraft.
- The runway must be aligned with the prevailing winds, with a painted simulated carrier landing area for day operations and flush-deck lighting to simulate the carrier landing area for night operations.
- Ambient nighttime lighting must be low to replicate the at-sea carrier environment at night as closely as possible.
- The maximum transit distance from the home field must be no greater than 50 nautical miles, which is the distance an EA-18G "Growler" can travel on a fuel load to conduct eight to 10 FCLP passes with sufficient fuel to return to its home field with required reserves.
- The airfield must not be beneath the lateral limits of Class B or C airspace.
- The airspace must permit the replication of the aircraft carrier landing pattern.
- The airfield must be available 24/7 to support the exclusive use of FCLPs without interruption, except in the case of an emergency.
- Suitable arresting gear must be available at the airfield or at another airfield within 17 nautical miles to assist an aircraft landing in the case of an emergency.
- A MK-14 Improved Fresnel Lens Optical Landing System (IFLOLS), a Manually Operated Visual Landing Aid System, and supporting equipment must be available. Because the Navy only has 27 IFLOLS worldwide and this equipment is no longer being manufactured, the Navy would

[21] Special use airspace (SUA) consists of airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not part of those activities, or both. SUA includes Military Operations Areas (MOAs), which are established to separate civil air traffic from military training activities. Additional explanation can be found in section 3.1.1 of the 2018 Final EIS.

[22] Military training routes (MTRs) are aerial routes developed jointly by the Federal Aviation Administration and Department of Defense for use by the military for the purpose of conducting low-altitude, high-speed training. Additional explanation can be found in section 3.1.1 of the 2018 Final EIS.

have to move an existing system or contract for the manufacture of an additional IFLOLS if the FCLPs were to be conducted at an airfield that does not currently support them.

- A Landing Signal Officer workstation must be available with the necessary supporting equipment, including a weather terminal, ultra-high frequency and very high frequency radios, IFLOLS controls, an Aldis lamp for emergency communications, and an abeam position marker light visible to pilots in the FCLP landing pattern.

2.4.1.4 Preferred Alternative

The Navy’s Preferred Alternative – detailed in Section 2.4 of the Final EIS – was to add 36 EA-18G “Growler” aircraft previously appropriated by Congress to the existing EA-18G “Growler” fleet at NAS Whidbey Island (for a total of 118 EA-18G “Growler” aircraft), and in doing so increase the size of each carrier air wing squadron from 5 to 7 aircraft (from 45 to 63 aircraft in 9 carrier squadrons), expand the size of the training squadron by 8 aircraft (17 to 25), and establish 2 new expeditionary squadrons made up of 5 aircraft each (10), for a total of 5 expeditionary squadrons and 25 aircraft (15 to 25).

The number of available aircraft does not drive an increase in airfield operations per se, although the 2018 Final EIS also contemplated an increase in annual operations consistent with the surging demand for EA-18G “Growler” support to the joint force, which necessitated an increase in pre-deployment training. Airfield operations are determined by mission requirements and the training needs of pilots and aircrews, not by the number of aircraft present; each carrier air wing pilot, for example, must complete the requisite number of FCLP operations to ensure proficiency prior to a carrier deployment, where they are exposed to the heightened dangers of at-sea operations. Because of the concentration of EA-18G “Growler” squadrons and training schools at NAS Whidbey Island and considering operational demands, the Navy’s Proposed Action necessarily focused on augmenting the EA-18G “Growler” fleet at NAS Whidbey Island. Nevertheless, the 2018 Final EIS reexamined past home basing decisions and meaningfully considered potential relocation options suggested by the public.

The Navy also proposed to re-distribute carrier air wing squadron FCLP operations between Ault Field and OLF Coupeville, maximize the use of OLF Coupeville because it more closely replicates the carrier landing pattern and conditions at sea — building and reinforcing correct flight-pattern habits, muscle memory, and familiarity with conditions resembling the at-sea environment — and therefore provides superior training to aviators while also safely managing the risks associated with at-sea carrier operations. FCLP operations train pilots and aircrew assigned to carrier air wing squadrons to land on an aircraft carrier. As explained in the 2018 Final EIS, the OLF sits atop a low-elevation 199-foot ridge surrounded by flat terrain, in an isolated setting with low ambient lighting like that of an aircraft carrier operating on the open sea, effectively mimicking carrier operations.

Additionally, the Navy found that conducting FCLP operations at the OLF impacts the fewest number of residents living in the community and reduces the strain on Ault Field, a busy multi-mission airfield. Using OLF Coupeville also allows the Navy to conclude daily operations in less time, thereby reducing community impacts. At Ault Field, the likelihood of multiple types of aircraft flying various patterns to, from, and around the airfield hinders FCLP operations, increases safety risks, and extends flights beyond their normal pattern. Operations by non-FCLP aircraft degrade FCLP operations due to aircraft separation requirements, varying field lighting, topography requirements, and specific approach requests. This degradation in training can occur for pilots conducting FCLP operations as well as other pilots who are in some cases precluded from practicing their own landings due to aircraft limitations in the landing pattern. For example, aircraft may have takeoffs, practice approaches, or landings delayed or denied. An inability to accomplish required training due to pattern congestion disrupts training schedules, increases operational costs to the Navy, and complicates pilot training. Due to the topography surrounding Ault Field, pilots cannot practice the precise landing pattern they will need to perform at sea and can develop pattern habits that put them at greater risk, because unlike at OLF Coupeville, the practice does not match the visual cues and required power settings needed to fly a safe approach and land on an aircraft carrier. Performing FCLP operations at Ault Field can also be more impactful to the community by extending flight patterns, extending daily operations later into the night because of airfield congestion, and impacting more densely populated areas in and around Oak Harbor, the largest city in Island County with nearly 30 percent of the total population on Whidbey Island in 2024.

2.4.1.5 Prior NEPA Analysis and Decision-Making

Agencies are not required to reanalyze alternatives previously considered. The "process of narrowing alternatives is in accord with NEPA's 'rule of reason' and common sense—agencies need not reanalyze alternatives previously rejected, particularly when an earlier analysis of numerous reasonable alternatives was incorporated into the final analysis and the agency has considered and responded to public comment favoring other alternatives" (85 Federal Register 43304, 43330) (July 16, 2020). The NAF El Centro alternative was not previously considered as an alternative location for the AEA community (or any portion thereof) prior to the 2018 Final EIS, but the Navy had repeatedly explained in prior analysis why it continued to single-site the AEA community at NAS Whidbey Island. The 2018 Final EIS references these prior analyses (below) as "key documents" incorporated into and informing the analysis.

- ***2005 Final Environmental Assessment (EA) for Replacement of EA-6B Aircraft with EA-18G Aircraft at NAS Whidbey Island***. In the 2005 Final Environmental Assessment (EA) for Replacement of EA-6B Aircraft with EA-18G Aircraft at NAS Whidbey Island, the Navy considered four possible sites for home basing 57 EA-18G carrier air wing aircraft: NAS Whidbey Island, NAS Lemoore, NAS Oceana, and MCAS Cherry Point. Of these sites, only NAS Whidbey Island met all operational requirements. NAS Whidbey Island was already the home of the Navy's AEA community flying the EA-6B. Thus, the AEA community would continue to use the same facilities and functions and sustain the expertise and knowledge base to accomplish the same AEA mission; the only difference was the aircraft platform used to accomplish the AEA mission.
- ***2008 Chief of Naval Operations (N3/N5) Strategic Laydown and Dispersal of Ships and Aircraft***. The 2005 decision to single-site the AEA community at NAS Whidbey Island was reaffirmed in the 2008 Chief of Naval Operations for operations, plans, and strategy (N3/N5) Strategic Laydown and Dispersal of Ships and Aircraft (U.S. Navy, 2008), a military planning process that reviews homeports, home bases, and hubs so that the distribution of forces reflects DoD and Department of the Navy strategic guidance.
- ***2012 EA for the Expeditionary Transition of EA-6B Prowler Squadrons to EA-18G "Growler" at NAS Whidbey Island, Oak Harbor, Washington***. The 2005 single-siting decision was also reevaluated in the 2012 EA for the Expeditionary Transition of EA-6B Prowler Squadrons to EA-18G "Growler" at NAS Whidbey Island, Oak Harbor, Washington. Like the 2005 EA, the 2008 EA analyzed the potential environmental effects of transitioning the expeditionary Electronic Attack squadrons from the aging EA-6B Prowler to the newer EA-18G "Growler." The action included retaining the expeditionary Electronic Attack squadrons at NAS Whidbey Island and performing in-place transitions to the new airframe.
- ***2013-2014 Scoping Process for 2018 Final EIS***. The Navy also reconsidered relocating EA-18G "Growler" aircraft squadrons to other locations in the 2013 and 2014 scoping process for the 2018 Final EIS, which incorporated alternative location suggested by the public.

Accordingly, single siting the AEA community at NAS Whidbey Island is a product of continual investment in the installation's AEA mission over decades, each incremental action the result of planning, environmental analysis, and decision-making captured in prior NEPA documents. These past decisions do not constrain Navy action, but practically, these decisions inform and scope future decisions. The 2018 Final EIS was not analyzing home basing a new mission or platform for the first time, home basing a general-purpose platform with an existing footprint at multiple airfields, or home basing a platform at one of several locations already resourced to fully support the aircraft and its mission. Instead, the Navy sought to augment the existing fleet of 82 EA-18G "Growler" aircraft at the hub of the AEA community and the only installation in the U.S. at which EA-18G "Growler" aircraft are based, the only installation with the facilities and specialized equipment necessary to support the AEA mission on day one, and the only installation capable of sustaining EA-18G "Growler" operations without any impact to the mission.

Examined in this context, the Proposed Action to augment the Navy's EA-18G "Growler" fleet with 36 new aircraft is one more incremental development in the continued sustainment of the AEA mission at NAS Whidbey Island. Nevertheless, in consideration of public comments, the 2018 Final EIS reanalyzed the single-siting decision and considered the reasonableness of several alternative locations suggested by the public, including NAF El Centro.

Ultimately, the Navy determined that these alternative locations did not meet the purpose of and need for the Proposed Action and were not reasonable. In compliance with the U.S. District Court's (W.D. Wash.) order, the Navy has now reexamined the reasonableness of the NAF El Centro alternative. This amended analysis, like the analysis contained in the 2018 Final EIS, builds upon and is informed by the foundation provided by prior decision-making and corresponding NEPA analyses, as well as the analyses contained in other key documents identified in Section 1.6 of the 2018 Final EIS, which are incorporated herein by reference.

2.4.2 Relocation Considerations

In the 2018 Final EIS, the Navy thoroughly reviewed past home basing decisions, reconsidered the reasonableness of alternatives previously eliminated from consideration, and evaluated relocation options suggested by the public.

The Navy first examined relocating the AEA community, or a portion thereof, as a general matter before moving on to address specific locations identified by the public.[23] After considering the efficiencies gained by single-siting EA-18G "Growler" operations at NAS Whidbey Island in Section 2.5.2.1 and the complexities involved with dividing the community, the Navy determined that dividing or splitting the small AEA community[24] into multiple sites would not meet the purpose of and need for the Proposed Action. The Navy documented several reasons for this conclusion, including unreasonable duplication of resources, increased cost to the taxpayer, major infrastructure investments, and logistical and administrative inefficiencies (e.g., longer logistical chains and more personnel reassignments, with associated delays between training and fleet assignment). The Navy also analyzed whether the entire AEA

[23] There are 134 DoD airfields within the continental U.S. It is not practical to consider all of them, so the Navy focused on those locations the public had identified in formal public comments.

[24] Pursuant to the direction of Congress, the AEA community consists of 158 total EA-18G Growler aircraft, of which 118 are home based at NAS Whidbey Island; one squadron (VAQ-141) is forward deployed to Japan and the remaining are in inventory but not in an operational status. Comparatively, the Strike Fighter community is comprised of 118 FA-18 C/D and 364 FA-18E/F aircraft. There is no compelling operational need to divide the community or move all EA-18G Growler squadrons to a new airfield away from the nucleus of AEA training and operations at NAS Whidbey Island.

community could be relocated and determined that no other installation could absorb the entire community without excessive cost, major new construction, and impacts to the mission, and further that NAS Whidbey Island already possessed all the resources necessary to support the AEA mission and therefore met the Navy's purpose and need without sacrificing efficiency and effectiveness. In accordance with naval aviation policy to maximize efficiency of operations by co-locating operational squadrons with support functions, training ranges, and airfields for squadron-level training, the Navy therefore decided against relocating all or any portion of the AEA community elsewhere, regardless of location. However, the Navy noted in its analysis that the Chief of Naval Operations reviews single-site home basing decisions annually as part of the Chief of Naval Operations strategic laydown and dispersal plan, affording opportunities to reevaluate home basing decisions in the event of changed circumstances. As part of a thorough reassessment, these discussions in the 2018 Final EIS are reincorporated herein, with additional analysis based on the Navy's further review.

After explaining the Navy's reasoning for single siting the AEA community at NAS Whidbey Island, the 2018 Final EIS then addressed five alternative installations identified by the public. Specifically, the Navy analyzed NAS Lemoore (Section 2.5.2.2.1), NAF El Centro (Section 2.5.2.2.2), Naval Air Weapons Station China Lake (Section 2.5.2.2.3), NAS Oceana (Section 2.5.2.2.4), and MCAS Cherry Point (Section 2.5.2.2.5). Finally, in Section 2.5.3, the Navy analyzed other options for conducting FCLP operations elsewhere. Ultimately, guided by the considerations outlined in Section 2.2 of the 2018 Final EIS, the Navy concluded that none of the relocation proposals met the purpose of and need for the Proposed Action.

2.4.2.1 Single Siting the AEA community at NAS Whidbey Island

The 2018 Final EIS provided a detailed discussion of the reasons for single siting the AEA community at NAS Whidbey Island. Because this analysis is necessary to contextualize the Navy's rationale for eliminating the NAF El Centro alternative, it is reincorporated herein.

2.4.2.2 Operational Synergy

Maintaining a single hub for the AEA community at NAS Whidbey Island promotes the most effective cooperation of command structure, squadrons, and schools to efficiently use personnel, aircraft, equipment, and facilities to achieve the AEA mission and meet national security requirements.

- **Co-located leadership.** NAS Whidbey Island is the home of the AEA Type Wing Commander headquarters and staff, the U.S. Pacific Fleet's Electronic Attack Wing. Commander, Electronic Attack Wing Pacific, oversees the Navy's EA-18G "Growler" squadrons and interacts daily with the squadrons and the FRS to ensure standardization in operations and maintenance of this small community, management of aircraft inventories and manpower resources, and technical leadership across the AEA community.

- **Shared operational support functions.** The AEA community's supporting manpower and infrastructure is wholly based at NAS Whidbey Island. Efficient and effective management of personnel, aircraft inventories, simulators, maintenance equipment, and logistical support are critical to meeting national security requirements. The efficient reassignment of limited resources between squadrons and effective use of personnel are key components of this management strategy, improving overall responsiveness and readiness. The AEA community realizes efficiencies through shared maintenance and logistical services, simulators, flight line service support, infrastructure, and shared aircraft and support equipment. Maintaining the EA-18G "Growler" community at NAS Whidbey Island maximizes the efficiency of its support facilities, simulation devices, training and doctrine development, and utilization of on-site support personnel.

- **Center of Excellence.** NAS Whidbey Island has been home to the Navy’s AEA mission for over 45 years. As a result, NAS Whidbey Island has developed into a “center of excellence” supporting every aspect of the AEA mission—preparing and certifying pilots and aircrew to meet operational objectives, training the next generation of aviators, developing doctrine and best practices, honing the expertise of maintenance personnel to provide essential support to the community, including cross-squadron support, and maintaining and cultivating the expertise and knowledge base of the AEA community to support Combatant Commander requirements. NAS Whidbey Island is the home of the Center for Naval Aviation Tactical Technical Unit, which is the only center for EA-18G “Growler” aircraft maintenance training, and the Electronic Attack Weapons School (EAWS), which provides comprehensive formal training to EA-18G “Growler” aircrews and extensive weapons-related training to EA-18G “Growler” ordnance and maintenance personnel. EAWS acts as a central repository for all EA-18G “Growler” tactical matters. NAS Whidbey Island is also home to Fleet Readiness Center Northwest (FRCNW), which is responsible for 90 percent of all repairs to the ALQ-99 Tactical Jamming System, the EA-18G “Growler” aircraft’s primary weapon system, as well as repairs to the AN/ALQ-247 Next Generation Jammer, a partial replacement to the ALQ-99. As such, FRCNW maintains singular expertise over these weapon systems.

- **Community-based learning.** Success in the AEA community is assisted by the concentration of EA-18G “Growler” squadrons and schools in one location and the effective transfer of knowledge, leading to improved understanding of training concepts and opportunities to collaborate and innovate to solve problems, reduce risk, and gain efficiencies. The next generation of aviators have ample opportunities to engage with and learn from more advanced aviators, ensuring the highest standards of performance are passed down and expectations are well understood; leadership can communicate directly with all members of the community; and all personnel benefit from on-site experts, educators, and assessors. This learning environment maximizes community-wide knowledge, facilitates regular assessment and immediate refinement or correction, and leads to the development of advanced tactics, techniques, and best practices as well as the standardization of procedures, critical components in minimizing risk and successful execution of the AEA community’s highly specialized operational mission. Any alternative that divides this relatively small tactical community would reduce efficiency and effectiveness, risking both the mission and the lives of service members.

- **Personnel efficiencies.** The principal factor in maintaining operational readiness is manpower. The co-location of EA-18G “Growler” squadrons with training and support facilities ensures efficient movement of pilots and aircrew through the training pipeline and into operational service in support of the joint force, without the need to relocate to a new geographic area. Service members and their families are not forced to relocate or live separately during the EA-18G “Growler” training and certification/re-certification cycles, families have ample support during squadron deployments, and the financial costs, relocations burdens, and lost time associated with regular relocation of personnel are minimized. This, in turn, reduces the stress and other impacts on service members and their families and improves quality of life while also facilitating operational deployment schedules by eliminating time costs associated with relocation. Additionally, co-location allows for effective and efficient personnel transfer, including when manning shortfalls inhibit full squadron manning, ensuring the AEA community is always ready to support Combatant Commander requirements. This is particularly important in emergent or surge situations, such as when EA-18G "Growler" aircraft are required to rapidly fulfill an urgent operational need that, if left unfulfilled, will result in capability gaps potentially resulting in the loss of life or critical mission failure. Operational readiness requires the AEA community to anticipate and plan for such situations. Co-location directly supports this requirement.

2.4.2.3 Superior Training Environment

Maintaining the entire AEA community at NAS Whidbey Island maximizes training efficiency and effectiveness, leveraging expansive regional training ranges, SUA, MTRs, electronic frequency bands, and realistic training environments essential to develop and sustain the highly specialized tactical skill sets necessary to support the AEA mission.

- **Unparalleled Access to Training Ranges and SUA.** In much of the U.S., airspace is a scarce resource. The northern Puget Sound region of the Pacific Northwest has uniquely unimpeded SUA and MTRs due primarily to the comparatively low volume of commercial air traffic. EA-18G "Growler" aircraft home based at NAS Whidbey Island are within range of expansive training ranges, SUA, and MTRs within the Northwest Training Range Complex, with adequate airspace unavailable elsewhere due to civil airspace congestion. SUA and MTRs in other regions that support larger installations and aviation communities are at or near capacity due in part to highly congested airspace.
    - *Naval Weapons Systems Training Facility Boardman/Restricted Area 5701/Boardman Military Operations Area.* This range provides more than 47,000 acres of land and approximately 490 square nautical miles (nm^2) of SUA. Naval Weapons Systems Training Facility Boardman is the principal regional air-to-ground range, providing the only terrestrial impact area and restricted low-altitude training airspace for use by NAS Whidbey Island-based student and fleet aircrews.
    - *Northwest Training Range Complex, including overland and overwater SUA, sea space, and mobile threat emitter simulators.* This range complex covers approximately 122,000 nm^2 of ocean and 46,000 nm^2 of airspace, including:
        - *Darrington Operating Area.* This area is a stationary altitude reservation activated through the FAA for EA-18G "Growler" use for functional check flights and electronic counter-measure training.
        - *Olympic, Okanagan, and Roosevelt Military Operations Areas,* including associated Air Traffic Control Assigned Airspace, which represent the primary area for EA-18G "Growler" training other than FCLP. These areas provide more than approximately 13,000 nm^2 of airspace.
        - *Pacific Northwest Electronic Warfare Range.* This area includes electronic emitters that transmit signals skyward to EA-18G "Growler" aircraft for aircrews to detect, locate, and identify.
- **Unique Electromagnetic Frequency Availability.** The electromagnetic operational environment has become increasingly congested, contested, and constrained. As a result, the DoD is challenged to assure and maintain access and use of the electromagnetic spectrum (EMS). This

jeopardizes the DoD's ability to sense, command, control, communicate, test, train, protect, and project force effectively. EMS superiority is a fundamental component of achieving superiority in air, land, sea, space, and cyberspace operations. The Nation's adversaries are also reliant on EMS-dependent capabilities; DoD must be trained and equipped to target their vulnerabilities with advanced electromagnetic attack capabilities designed to keep the enemy in a defensive posture and maintain military superiority. These capabilities detect, identify, locate and replicate complex emitters/signals of interest rapidly to build awareness of the operational environment and enable targeting for both kinetic and non-kinetic fires. The Navy is the only U.S. military service that currently maintains a tactical airborne electromagnetic attack capability for the joint force; as such, the AEA community must always be ready to sustain a posture of EMS superiority. Achieving and sustaining readiness necessarily requires training under realistic operational conditions to employ electromagnetic attack capabilities, whether to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability, or to protect personnel, facilities, and equipment from any effects of friendly or enemy use of the EMS to degrade, neutralize, or destroy friendly combat capability. Through more than 45 years of operating in the Pacific Northwest, the Navy's AEA community has obtained unparalleled access to electromagnetic frequency bands critical to electronic attack training that are unavailable elsewhere, where the electromagnetic spectrum is being repurposed for commercial mobile broadband technologies and other uses. Electromagnetic frequency availability was previously considered in the 2005 EA for Replacement of EA-6B Aircraft with EA-18G Aircraft at NAS Whidbey Island, Washington, where it was noted that the Navy has difficulty gaining access and control of critical transmission frequencies to support AEA training in geographic areas with established and Federal Communications Commission-approved civilian and commercial uses. Since the AEA community has operated in the Northwest for decades, the Navy has coordinated with local Federal Communications Commission officials to preserve access to critical frequency bands for training and maintenance of AEA systems.

- **Critical, Realistic Field Carrier Landing Practice.** The Navy has continuously used NAS Whidbey Island's OLF Coupeville for FCLP operations since the late 1960s. The OLF provides realistic training to carrier air wing squadrons that allows pilots to practice under the operational conditions they will experience at sea, which is essential to minimizing risk to life and to the mission. Landing on a carrier is the most dangerous task in military aviation. Realistic training is vital and can be a matter of life or death; there is no substitute for rigorous training in an onshore environment that closely replicates at sea carrier operations, where the Navy can safely manage the risks associated with such operations. In this regard, OLF Coupeville is a premier training environment. The field elevation is 199 feet above mean sea level; the OLF sits atop a low-elevation ridge surrounded by flat terrain, an isolated setting with low ambient nighttime lighting, replicating an aircraft carrier operating on the open sea. The altitude above ground at which the aircraft fly the landing pattern at OLF Coupeville closely replicates the altitude of the aircraft carrier landing pattern. The runway aligns with the prevailing winds, the airfield is not beneath the lateral limits of Class B or C airspace (see section 3.1.1 of the 2018 Final EIS), and the airfield is available 24/7 to support the use of FCLP operations. Additionally, the proximity of OLF Coupeville to Ault Field allows for more training per fuel load and provides a safe divert field in the event of an emergency. And since the Navy uses the OLF chiefly for FCLP operations, squadrons can maximize the number of practice landings and conduct each training evolution without disruption and in less time, reducing impacts to the surrounding community. OLF Coupeville also has a MK-14 Improved Frensel Lens Optical Landing Systems (IFLOLS) as well as supporting equipment, which provide critical visual landing information to pilots. The MK-14

IFLOLS uses fiber optic light to provides pilots with accurate visual altitude and glide-slope information that assists them to land safely. The IFLOLS allows aviators to "fly the ball" earlier in the approach process (the "ball" or "meatball" indicates the relative position of the aircraft in reference to the glide scope, i.e., whether the aircraft is at the correct altitude to land safely on the carrier). The fiber optic light is sharper and crisper, enabling pilots to begin to "fly the ball" further away from the ship, making the transition from instrument flight to visual flight smoother. NAS Whidbey Island also has a Manually Operated Visual Landing Aid System, a standard carrier deck "box" painted on the approach end of each runway with carrier deck lighting (simulated carrier decks), and variable high-intensity runway lights.

2.4.2.4 Efficient Use of Existing Infrastructure

The NAS Whidbey Island complex already has the facilities, equipment, and logistical support necessary to ensure the operational readiness of the augmented EA-18G "Growler" fleet, including essential EA-18G "Growler"-specific infrastructure, all supported by previous NEPA analyses. The complex also has substantial existing support infrastructure, including housing, medical services, and quality-of-life resources. No other location can provide immediate and complete support to an augment of additional EA-18G "Growler" aircraft. Given the high demand for AEA capabilities, and the risk to the mission and to service members if additional EA-18G "Growler" aircraft are not expeditiously made available to Combatant Commanders, relocation options that would involve considerable infrastructure investment are not reasonable.

Relocation of the AEA community to any of the alternative locations identified by the public would require a significant, and entirely avoidable, investment of time, taxpayer dollars, manpower, and resources. Infrastructure resources would need to be moved or duplicated, requiring major construction projects and equipment acquisition at considerable expense, including any support projects necessary to ensure adequate housing and quality of life for sailors and their families. These projects would likely take years to complete.

New construction necessarily requires congressional funding, after a lengthy administrative and legislative process, and there is no guarantee that the Navy's request would be incorporated into approved military construction appropriations. If the project is ultimately funded by Congress, publication, bidding, and award of the contract takes additional time. Finally, once the contracts are executed and funded, it may take several years to complete construction and deliver usable facilities to the Navy. The volume of construction required to replicate already existing facilities, as well as the cost, timing, and practicality considerations, necessitate a finding that relocation would not be reasonable and would not support the purpose of and need for the Proposed Action.

The ultimate price tag and dependence on congressional or other agency action do not, in themselves, make alternative locations unreasonable, but these considerations, along with manpower requirements, construction and long-term maintenance requirements for new facilities, and—most importantly here—the time required for all facilities and personnel to be mission ready, drive Navy policy toward sustainability through continued investment in and efficient use of existing infrastructure, policy that necessarily informs Navy decision-making.

The impacts on sailors and their families must also be considered. The infrastructure is in place at NAS Whidbey Island to fully support the mission and provide for sailors and their families. In utilizing existing infrastructure, the Navy avoids placing any additional, and unnecessary, burdens on sailors and their families. Once new facilities are constructed, this action would cause significant life disruptions for sailors and their families currently at NAS Whidbey Island forced to relocate or live apart, potentially more than once during the various stages of training and operational deployment. Finally, if the Navy relocates only a portion of the AEA community, families at the alternative location would be separated from the considerable support networks at NAS Whidbey Island until such networks and resources can be established, and service members would be separated from their families when required to return to NAS Whidbey Island for training or services not available at the alternative location.

- **Location of specialized EA-18G “Growler” weapons systems**

  The NAS Whidbey Island has a MK-14 IFLOLS, a Manually Operated Visual Landing Aid System, and supporting equipment. Additionally, NAS Whidbey Island has the specialized equipment required for the EA-18G “Growler” platform. The EA-18G “Growler” has unique and specialized weapons systems, the ALQ-99 Tactical Jamming System and ALQ-218 AEA Systems Enhancement. There is a limited inventory of the ALQ-99 pods. Therefore, squadrons must share pod assets, and single-siting ensures optimal reliability, maintenance, and availability of this unique weapon system. NAS Whidbey Island also has the specialized equipment necessary to maintain the ALQ-99 and ALQ-218 weapons systems, as well as the AN/ALQ-247 Next Generation Jammer, a partial replacement for the ALQ-99.

- **EA-18G “Growler”-specific training schools**

  NAS Whidbey Island is the home of the Center for Naval Aviation Tactical Technical Unit, which is the only center for EA-18G “Growler” aircraft maintenance training, and the EAWS, which provides comprehensive formal training to EA-18G “Growler” aircrews and extensive weapons-related training to EA-18G “Growler” ordnance and maintenance personnel. EAWS acts as a central repository for all EA-18G “Growler” tactical matters.

- **EA-18G “Growler”-specific flight simulators**

  The Navy currently has six EA-18G “Growler” flight simulators, and all of them are located at NAS Whidbey Island. EA-18G “Growler” squadrons and the FRS use flight simulators daily to satisfy a myriad of flight-training requirements. Modern military simulators are multimillion-dollar sophisticated equipment with dedicated support facilities. Despite the similarity between the FA-18E/F and the EA-18G airframe, EA-18G simulators are unique, mirroring the AEA electronic systems on the aircraft. Moving the AEA community in whole or in part would necessitate moving existing simulators or acquiring an additional 3–4 simulators at a cost of approximately $9 million, with corresponding construction and infrastructure support otherwise not needed (and not included in the $9 million estimate).

- **Fleet Readiness Center Northwest**

  The Navy’s specialized EA-18G “Growler” aircraft maintainers are co-located with the aircraft they maintenance. The FRCNW provides intermediate and depot-level aircraft maintenance support for the EA-18G “Growler”-specific aircraft components and other aircraft based at NAS Whidbey Island. Single-siting the EA-18G “Growler” enables efficient maintenance and logistical support of unique EA-18G “Growler” aircraft components, including the ALQ-99. Relocation would require the Navy to move or assign new personnel to perform maintenance and to duplicate maintenance services at the alternative location. Relocation would also necessitate moving or assigning experienced training personnel to sustain expertise and quality of service, which are critical to life safety.

- **Classified Operations**

  NAS Whidbey Island has the infrastructure and infrastructure security in place to support classified operations, a mission-critical requirement to support the joint force, particularly in the context of renewed great power competition and increasing global instability. Infrastructure security must be maintained at all times to enable mission success; mitigate risk to U.S. and partner forces, assets, and critical infrastructure; deny adversaries information on U.S. intelligence, technologies, tactics, techniques, procedures, capabilities or critical vulnerabilities; prevent damage or harm to U.S. interests; or otherwise protect national security.

- **Financial Stewardship**

  The Navy has a fundamental responsibility to be effective stewards of the taxpayer's money. Alternatives that unnecessarily duplicate existing functions and create inefficiencies, without substantial benefit to the U.S., do not meet this burden. Moving all EA-18G "Growler" squadrons or any portion thereof to another airfield is therefore not a responsible use of taxpayer dollars. The Navy recognizes that alternatives outside the scope of what Congress has approved or funded must still be evaluated if they are reasonable. However, unnecessarily duplicating existing functions and delaying rapid deployment of additional EA-18G "Growler" aircraft to the fleet is not reasonable for the reasons described herein.

2.4.3 Relocating EA-18G "Growler" Squadrons to NAF El Centro

The current home basing of the AEA community at NAS Whidbey Island is a product of decades of decisions to continue investing in the AEA community at NAS Whidbey Island, each subject to environmental analysis captured in prior NEPA documents. Nevertheless, the 2018 Final EIS considered alternative locations suggested by the public, including NAF El Centro, and found in each case that these alternative locations were unreasonable or did not meet the purpose of and need for the Proposed Action.

The Navy has thoroughly reassessed the NAF El Centro alternative in view of the purpose of and need for the Proposed Action, as informed by the considerations in Section 2.2 of the 2018 Final EIS and the preceding discussion in this analysis, and has again concluded that relocating the AEA community, or any portion thereof, to NAF El Centro is not a reasonable alternative, would degrade the AEA community's overall effectiveness, and does not meet the purpose of and need for the Proposed Action. Accordingly, the Navy has again eliminated this alternative from detailed consideration.

NAF El Centro is a small air training facility located in south-central California, approximately 7 miles northwest of the city of El Centro in the Imperial Valley with a small permanent party presence of approximately 700 military and civilian personnel. It occupies approximately 2,690 acres of land in the western portion of the Imperial Valley and is located at the south end of the San Bernardino and San Jacinto Mountain ranges. The installation is within the Colorado Desert Region at an elevation of 43 feet below sea level. NAF El Centro is a Fleet Training Complex resourced to provide training detachment support with limited capability to provide transient support functions. Originally established in 1942, the Navy commissioned El Centro as a NAF in 1946. "Naval Air Facilities" are "Tier II" air bases under the Navy's three-tiered framework for air installations. Tier II air bases are designed to meet special requirements of naval aviation and support smaller numbers of naval aircraft. Permanently based naval aircraft are usually minimal, and the primary focus is on supporting detachment training. Detachment training refers to training conducted away from a homebase at non-local training ranges. Non-permanent naval personnel are in an unaccompanied (no spouses, children or other dependents) and transient status for short-term training evolutions.

Tier II installations are often in remote locations, are minimally manned (permanent party presence), and have limited personnel support facilities. Examples include NAF Atsugi, Japan and NAF Misawa, Japan. NAF El Centro was a MCAS El Centro) during World War II and then a Naval Auxiliary Air Station in 1946, serving as a storage pool for TD2 Devastator torpedo aircraft and home to the Navy's Parachute Experimental Division conducting aeronautical escape system testing, evaluation, and design. When the parachute mission ended in 1979, El Centro became a NAF once again.

Unlike Tier II facilities like NAF El Centro, Tier I installations have the necessary infrastructure and support functions to accommodate large numbers of personnel. Home basing the AEA community at NAF El Centro would require transitioning the air facility into a Tier I installation, which is well outside the scope of the Proposed Action. To put this in context, approximately 700 Navy personnel and civilians are permanently stationed at NAF El Centro. Seven to 12 squadrons and up to 1,600 personnel train at the facility asynchronously over the course of any given month. The action alternatives analyzed in the 2018 Final EIS anticipated a total augment of between 335 and 628 military and civilian personnel and between 459 and 860 dependent family members, for a total EA-18G "Growler" personnel loading at NAS Whidbey Island of between 4,439 and 4,732 personnel and between 6,086 and 6,487 dependents. If only the additional 35–36 EA-18G "Growler" aircraft considered in the 2018 Final EIS were home based at NAF El Centro, that alone would double the current permanent personnel presence. These numbers vastly exceed the current capacity of NAF El Centro to support. An augment of this size would require fundamental changes to the nature of the facility.

NAF El Centro currently serves as a training location for Navy and Marine Corps aviation detachments conducting aerial combat maneuvering, air-to-ground gunnery, bombing practice, and touch-and-go operations. EA-18G "Growler" detachments already use the airfield for transient training. Aviators from sister services and allies also train at the installation, in part due to the ideal flying weather year-round. There are no permanently based squadrons at NAF El Centro, though the facility is the temporary "winter home" (January–March) of the U.S. Navy Flight Demonstration Squadron (Blue Angels), consisting of 11 jets (only six are used during demonstration flights) and a team of 16 officers and approximately 138 support personnel who are permanently stationed at NAS Pensacola, Florida–not at NAF El Centro. During winter training, the pilots fly two practice sessions per day, 6 days a week, to meet the training requirement (120 training missions) needed to perform flight demonstrations safely. Training flights consist of approximately 88 low passes and numerous aerobatic aircraft maneuvers, which limits other airfield use during training. In addition to the Blue Angels, various U.S. aviation units, as well as British and Canadian air forces, use NAF El Centro for detachment training year-round. The predominant aircraft conducting transient detachment training at NAF El Centro are the Navy and Marine Corps FA-18C/D/E/F Hornet and Super Hornet, T-45 Goshawk, with some AV-8B Harriers, the EA-18G "Growler," MV-22 Osprey, C-130 Hercules, and a variety of rotary-wing aircraft. Unmanned aerial systems operations are also conducted at NAF El Centro. Home basing all or any number of EA-18G "Growler" squadrons at NAF El Centro would represent a significant increase in training airspace requirements in the Southern California/Arizona area where competition for training range time among the Services is high. Additionally, conducting FCLP operations at NAF El Centro would impede all other uses of the airfield for the duration of FCLP training, which would occur far more frequently with home-based EA-18G "Growler" squadrons.

The facility has two operating runways, 08/26 and 12/30. Runway 08/26 handles 96 percent of the traffic. The prevailing wind is from the west corresponding with Runway 26. Runway 08/26 is equipped with a FLOLS at each approach end and lighted "carrier deck" landing areas at both ends to facilitate FCLP operations. The NAF El Centro airfield is surrounded by Class D airspace that overlies a 4.9-mile radius of the airfield and extends from the ground surface to 2,500 feet above mean sea level. Airfield operations at NAF El Centro are restricted because of the airfield's proximity to the Imperial County Airport, located 4.5 miles east of the facility. The facility is also in a high-density general aviation and crop-dusting area.

The Navy published the current version of the Air Installations Compatible Use Plan for NAF El Centro in 2010 and a Joint Land Use Study in 2014. NAF El Centro has noise abatement procedures for assigned and transient aircraft to promote measures to minimize aircraft noise. Airfield restrictions used to minimize or abate noise from operations conducted at the NAF El Centro airfield include specific flight tracks for certain types of flight operations, as well as avoiding specific populated areas and cattle feed lots.

Relocation of the AEA community or any portion thereof to NAF El Centro fails to meet the purpose of and need for the Proposed Action, which demands effective and efficient augmentation of the AEA community to provide Combatant Commanders urgently needed assets to address EMS threats and protect U.S. forces. Relocating the AEA community, or some number of EA-18G "Growler" squadrons, to NAF El Centro would result in operational delays and negatively impact the effectiveness of the EA-18G "Growler" fleet in the short and long term. In addition, relocation of EA-18G "Growler" squadrons to NAF El Centro is contrary to the Navy's responsibility as stewards of taxpayer dollars. Duplication of facilities and resources involves unnecessary short-term construction costs and long-term maintenance costs that could be avoided by maximally using existing infrastructure and resources. Moreover, relocating the AEA community, or some number of EA-18G "Growler" squadrons, to NAF El Centro would also impose additional burdens on sailors and their families forced to relocate with no commensurate benefits.

- **Major Construction Requirements**. NAF El Centro is well-suited to support EA-18G "Growler" detachment training on a transient basis, but the facility is not resourced to support a large permanent party presence, particularly of the magnitude required to relocate EA-18G "Growler" squadrons to the facility. Any such relocation would require major infrastructure investment at significant cost to taxpayers and would involve duplication of existing manpower, training, and logistical resources. The Navy estimates the total cost for construction contracts to be hundreds of millions of dollars. To accommodate facility and infrastructure needed to support the EA-18G, the Navy may also need to acquire interest in property not currently owned by the Navy. Additional utilities projects would likely also be required. Such an undertaking is economically infeasible and would require action by Congress to authorize major military construction projects at El Centro and, more than likely, special appropriations beyond the annual military construction budget, which at this time is focused on shipyard infrastructure optimization to accommodate next generation surface vessels and submarines, and on upgrading military housing to improve the quality of life of service members. Although these factors are not dispositive, the time required to obtain congressional authorization, contract for major new construction, and to construct new facilities is inconsistent with the purpose of and need for the Proposed Action. Construction at NAF El Centro would not be limited to operational facilities; relocation of all or any number of squadrons will require new housing and new or upgraded support facilities to ensure an adequate quality of life for service members and their families. Construction would also include installation improvements such as additional parking capacity (the installation currently has 72 total parking spots). In the 2014 Final EIS for U.S. Navy F-35C West Coast Home Basing[25], the Navy looked at the existing capacity at NAF El Centro and

[25] The Navy incorporates this Final EIS by reference as a key document.

determined that 41 proposed construction projects consisting of 6.6 million square feet of construction, expansion, and modification would be required to home base 100 F-35C aircraft and accommodate approximately 2,975 military and civilian personnel and a corresponding increase of approximately 6,154 dependents. Home basing 118 total EA-18G "Growler" aircraft and over 4,000 personnel (and more than 6,000 dependents) at NAF El Centro would require a similar type and magnitude of investment. The construction, demolition, and land acquisition costs (purchase of approximately 450 acres and acquisition of restrictive easements on 55 acres) for home basing the F-35C at El Centro were estimated to be $793 million. Additional roadwork off-installation would also be necessary.

The Navy recognizes that alternatives outside the scope of what Congress has approved or funded must still be evaluated if they are reasonable, but the cost goes well beyond dollar figures. Any such investment requires years to execute. The time required to seek and obtain a congressional appropriation, particularly of this magnitude, accept bids and contract for military construction, complete necessary demolition projects, acquire new land or easements if necessary, and finally complete these projects, along with any additional on- or off-installation roadwork, and deliver additional AEA capability to the fleet does not meet the purpose of and need for the Proposed Action. Any alternative that would require this volume of military construction to replicate existing facilities is well beyond the scope of the Proposed Action, does not reflect good stewardship of taxpayer dollars, and is impractical. In addition, the amount of additional new construction alone could also result in more significant adverse environmental impacts, at least in the near term (years, nonetheless), than the continued use of existing facilities. In this respect, relocation of the AEA community or any portion thereof to NAF El Centro would not merely shift environmental impacts to a new location, which might be the case with any alternative site; relocation to NAF El Centro would result in additional environmental impacts that need not occur. The Navy needs to augment the EA-18G "Growler" fleet expeditiously to meet current operational demands driven by world events–not merely to plan for future demands. Accordingly, the Navy has concluded that largely duplicative construction of this magnitude, considering the cost in dollars and time, is not reasonable when all considerations described herein are carefully examined.

- **Sailor and Family Services**. NAF El Centro has limited capability to provide support to sailors and their families although it does have basic resources including morale, welfare, and readiness facilities. Enlisted barracks on the installation can house approximately 320 junior personnel in shared living spaces (two-person rooms); for families, there are 99 on-base privatized housing units. The installation has a small commissary, and Navy Exchange, as well as a small non-emergency branch medical clinic. The Navy would need to develop or upgrade these services, and others, to support a dramatic increase in personnel well beyond the current permanent party presence. For example, the 2014 F-35C Final EIS noted that although NAF El Centro has a combined medical and dental clinic on the installation, the medical clinic offered primary care services only (i.e., no hospitalization or urgent care) and was staffed by two physicians, one physician's assistant, and two administrative support personnel. Now, although total staffing has modestly increased to one physician's assistant, one civilian nurse, one aviation medical technician, one pharmacist, one lab technician, and eight administrative personnel, there are no permanent physicians on staff. The clinic serves approximately 85 active-duty personnel per month and would be quickly overwhelmed by the increase in personnel and dependents. The average daily patient load today is 10 to 15. Dental services are available for 1 week per month for active-duty personnel only; the clinic does not currently provide dental care to military dependents or to non-active-duty personnel. There is no capacity to respond to a mass-casualty incident such as an aircraft accident. The 2014 F-35C Final EIS proposed construction of a new medical and dental facility to increase the offering of health services at NAF El Centro. Similar increases in capacity for health services and other personnel support functions would be necessary to home base EA-18G "Growler" aircraft at NAF El Centro. Construction of these facilities is only a part of what would be required; these facilities would need to be adequately staffed with appropriately trained (and licensed, as required) personnel. There is no surplus of doctors, corpsmen, nurses, administrative assistants, and other technicians in the Navy from which to draw.

Similarly, the 2014 F-35C Final EIS also identified an existing deficit of 564 military family housing units at NAF El Centro. Currently, only 99 homes are available through military housing. The relocation of the entire EA-18G "Growler" community would exacerbate this shortage of military housing units. Housing off-installation is also difficult to obtain. Being in the Mojave Desert, in a relatively small community, finding safe and suitable housing in the local community is a challenge. A 2024 residential zone survey found aging properties in various stages of disrepair, including 461 properties without sidewalks, 275 without curbs, 230 without gutters, 551 without driveways, and 497 with inadequate site drainage due to obstructions or damaged, and/or missing curb gutters. In addition, El Centro has a limited supply of affordable housing for low to moderate income households, which would include a majority of enlisted personnel and some junior officers. Local schools may have capacity to enroll dependent children, but ensuring adequate staffing could be a problem given shrinking budgets. The local police department would also be strained with the increased population. Additionally, NAF El Centro's security services are limited, although it has a new fire station, which was constructed two decades after the military construction project was first submitted to Congress. The NAF El Centro Child Development Center currently has 101 enrollees and would likely reach maximum capacity were EA-18G "Growler" squadrons home based at the facility.

- **Airfield Capacity.** NAF El Centro is an indispensable asset for detachment training, including rotary-wing and undergraduate training squadrons, the Navy Flight Demonstration Squadron (Blue Angels), and British and Canadian air forces, all of whom depend on El Centro's current capabilities and continued availability. Home basing EA-18G "Growler" squadrons at NAF El Centro would consume airfield facilities and services, reducing availability of the El Centro training complex to its current users, and disrupting proven training practices and uses of training ranges. Airfield operations involving multiple types of aircraft flying patterns around the field that differ from the prescribed FCLP pattern and that extend flights beyond the normal pattern hinder FCLP execution. As explained in differentiating operations at OLF Coupeville from Ault Field, operations by non-FCLP aircraft degrade FCLP operations due to aircraft separation requirements, varying field lighting, topography requirements, and specific approach requirements. An inability to accomplish required training due to pattern congestion disrupts training schedules, increases operational costs to the Navy, and complicates pilot training.

- **Duplication of Existing Resources.** The personnel, facilities, and equipment necessary to support home basing of the AEA community, or a portion thereof, at NAF El Centro already exist at NAS Whidbey Island. Duplication of existing resources is contrary to the Navy's fiscal responsibility to taxpayers. Relocation of the AEA community to NAF El Centro would require a significant, and entirely avoidable, investment of time, taxpayer dollars, manpower, and resources. Infrastructure resources would need to be moved or duplicated, requiring major construction projects and equipment acquisition at considerable expense, including any support projects necessary to ensure adequate housing and quality of life for sailors and their families. The time required to obtain funds, contract, and construct facilities and acquire or move equipment to NAF El Centro is inconsistent with the purpose of and need for the Proposed Action. Even if only a portion of the AEA community moved to NAF El Centro, the Navy would have to duplicate resources required to support them if they do not exist at the facility or are inadequate to support the increased permanent party presence. And, once new facilities are constructed, operations out of a new airfield would result in significant life disruptions for sailors and their families currently at NAS Whidbey Island, who would be forced to relocate or live apart, potentially more than once during the various stages of training and operational deployment. Finally, if the Navy relocates only a portion of the AEA community, families at the alternative location would be separated from the considerable support networks at NAS Whidbey Island until such networks and resources can be established, and service members would be separated from their families when required to return to NAS Whidbey Island for training or services not available at the alternative location. As previously noted, NAS Whidbey Island is home to the EAWS and training squadron. The Navy would also underutilize and therefore fail to fully capitalize on existing infrastructure and resources at NAS Whidbey Island, as well as in local communities, whose economies would be severely impacted by the relocation. To ensure sustained use of existing facilities and resources at NAS Whidbey Island, the Navy would need to consider relocation of other Navy missions to Whidbey Island to make efficient use of the excess capacity.

- **Air Quality.** The 2018 Final EIS explained that NAF El Centro is in a Clean Air Act nonattainment area, citing air quality impacts as one of many factors the Navy evaluated in assessing the viability of the NAF El Centro alternative, which included public health concerns. Home basing the AEA community or any number of EA-18G "Growler" aircraft at NAF El Centro would have a greater impact to air quality in a region that is already in nonattainment or maintenance (formerly nonattainment) for multiple criteria pollutants. As described above, relocation of the AEA community or any portion thereof to NAF El Centro would not merely shift environmental impacts to a new location; relocation could have greater impacts on an area the USEPA has already determined does not meet National Ambient Air Quality Standards (NAAQS) for multiple criteria air pollutants, exacerbating air quality problems and complicating efforts to bring the area into attainment or maintain the area meeting the NAAQS, and exposing more personnel and dependents to sub-standard air quality that can have greater adverse implications for their health and for the readiness of the force. Moreover, as previously discussed, relocation would require major demolition and construction projects, further exacerbating air quality problems in the short-term. Nonattainment areas are defined as those areas that are not in compliance with the NAAQS for one or more of the six criteria pollutants (CO, sulfur dioxide, nitrogen dioxide, ozone [O_3] for which nitrogen oxides [NO_x],and volatile organic compounds [VOCs] are precursors, particulate matter less than or equal to 10 micrometers in diameter [PM_{10}], particulate matter less than or equal to 2.5 micrometers in diameter [$PM_{2.5}$], and lead). Maintenance areas are former nonattainment areas that have been redesignated to attainment areas. NAAQS represent the maximum levels of background pollution that the USEPA considers safe, with an adequate margin of safety, to protect public health and welfare.

  NAF El Centro is located within the Imperial County Air Pollution Control District (APCD). The Imperial County APCD maintains the following NAAQS designations:

- Moderate nonattainment for 24-hour and annual average $PM_{2.5}$
- Marginal nonattainment for 2015 ground-level O_3
- Maintenance for PM_{10}

Due to the Imperial County APCD's nonattainment status for multiple criteria pollutants, to home base EA-18G "Growler" aircraft at El Centro the Navy must perform a General Conformity Analysis. The first step in a conformity analysis is to analyze the total indirect and direct emissions from a federal action and compare them to *de minimis* emission thresholds. If the net change in emissions caused by the Proposed Action exceeds the *de minimis* threshold, the Navy must demonstrate that the proposed activity conforms to the most recent USEPA-approved State Implementation Plan (SIP).

As detailed in **Table 2-13**, the estimated emissions from implementation of Alternative 2A of the 2018 Final EIS would exceed the Imperial County APCD's de minimis thresholds applicable for VOCs, NOx, PM_{10}, and $PM_{2.5}$. Accordingly, the Navy would need to ensure the home basing of EA-18G "Growler" aircraft at NAF El Centro conforms to the State's SIP; in other words, the home basing would not (1) cause or contribute to any new violation of a NAAQS, (2) increase the frequency or severity of any existing violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. In sum, home basing EA-18G "Growler" aircraft at NAF El Centro would exacerbate air quality problems and complicate efforts to bring the area into attainment or maintain the area meeting the NAAQS. In comparison, the air quality in the Olympic-Northwest Washington Intrastate Air Quality Control Region is and historically has been in attainment for all NAAQS and the above requirement does not apply.

Table 2-13 Estimated Air Pollutant Emissions from Preferred Alternative 2A of 2018 Final EIS

Alternative	Estimated Air Pollutant Emissions at NAF El Centro from Homebasing of EA-18G "Growler" Aircraft (tons/year)					
	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Baseline[1]	244.18	1,200.28	210.55	27.01	119.74	116.06
Alternative 2A[2]	904.45	2,824.34	706.95	59.37	395.70	304.90
2A Net Change	660.27	1,624.06	496.4	32.36	275.96	188.84
de minimis Threshold	100	NA	100	100	100	100
Exceed *de minimis*?	Yes	NA	Yes	No	Yes	Yes

Legend: VOC = volatile organic compounds; CO = carbon monoxide; NO_x = nitrogen oxides; SO_2 = sulfur dioxide; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; NA = not applicable.

Notes: [1]Baseline emissions are from Table 4.3-4 of the 2014 F-35C EIS and represent the baseline emissions thresholds at NAF El Centro in 2014.
[2]Emissions data for Action Alternative 2A is from Table 4.4-8 of the 2018 Final EIS. Action Alternative 2A is the Alternative selected by the Navy in the 2019 ROD.

- **Impacted Population.** Although NAF El Centro is located in the Mojave Desert and the city of El Centro, California is relatively small, the population in and around NAF El Centro that would likely be most impacted by EA-18G "Growler" operations is much larger than the population impacted in and around the NAS Whidbey Island complex. The population in the city of El Centro alone, according to 2023 U.S. Census estimates, is approximately 43,772. Accounting for other communities within a 10-mile radius of NAF El Centro, the population estimate exceeds

70,000. By contrast, the largest city on Whidbey Island and the nearest city to Ault Field, Oak Harbor, is estimated to have a population of approximately 24,016. The total population in the North Whidbey Island Census County Division is estimated to be 40,814 according to the 2020 Decennial Census. Near the OLF, the Town of Coupeville is estimated to have a population of 1,928, and the total population in the Central Whidbey Island Census County Division is estimated in the 2020 Decennial Census to be 13,605.[26]

2.4.4 Increasing FCLP Detachments to NAF El Centro

The Navy also examined increasing training detachments of EA-18G "Growler" squadrons to proposed alternative locations, including NAF El Centro, but determined doing so would not be sustainable operationally as a long-term solution because it would reduce aircraft service life due to transit requirements to and from detachment locations, increase the time personnel spend away from home and their families during the critical months leading to a deployment, and also require aircraft maintenance personnel trained and qualified to conduct EA-18G "Growler" aircraft maintenance to temporarily relocate, making them unavailable to support the squadrons remaining at NAS Whidbey Island during the duration of the detachment. Significantly increasing FCLP detachments also increases operational, training and life-cycle costs. Finally, NAF El Centro has 580 beds for transient personnel, which limits the installation's ability to accommodate additional detachments. Accordingly, conducting a significantly increased amount of additional training at NAF El Centro is not reasonable. These impacts to operational readiness explain why Navy policy is to co-locate an OLF with each Navy air installation that has carrier-based aircraft.

3.0 Conclusions

Greenhouse Gas Emissions. Findings from this amended evaluation indicate that the Preferred Alternative 2A would result in an increase in EA-18G "Growler" GHG emissions annually (including EA-18G "Growler" emissions below 3,000 feet AGL and within the air space above 3,000 feet AGL). The EA-18G "Growler" GHG emissions above 3,000 feet AGL added to the 2018 Final EIS-reported level represent 125 percent of net increase above the GHG emissions below 3000 feet AGL in the 2018 Final EIS.

The net increase from the Proposed Action would nominally increase local and regional GHG emissions and contribute to global GHG concentrations but would not result in any meaningful adverse GHG impact on global scale.

Avian. Findings from this amended analysis indicate that Preferred Alternative 2A is not likely to result in significant adverse effects on Washington State-listed species or their habitats. Stressors from the Preferred Alternative would be intermittent and brief, and would not disturb normal breeding, feeding, and nesting behaviors of individuals to a degree that would cause significant effects on their populations.

Childhood Learning. Findings from this amended analysis indicate that both the No Action and Preferred Alternative 2A scenarios show potential impacts on childhood learning. Crescent Harbor Elementary School (S02) would experience the greatest outdoor noise exposure level of 67 dB $L_{eq(8h)}$ for the No Action scenario and 69 dB $L_{eq(8h)}$ for Preferred Alternative 2A. Both of these cases may result in a 1-month delay in reading comprehension as estimated by RANCH. Coupeville Elementary School (S03)

[26] These estimates define the population likely to be most impacted by EA-18G Growler airfield operations at NAF El Centro and NAS Whidbey Island, not the reach of all impacts.

would experience the largest increase in noise exposure from 51 to 57 dB $L_{eq(8h)}$, which also may cause a 1-month delay in reading comprehension.

Although the evidence is weaker regarding other learning impacts, students at schools that would be exposed to a measurable increase in noise due to the Preferred Alternative 2A relative to No Action (such as Crescent Harbor Elementary School [S02], Coupeville Elementary School [S03], and schools near Central Whidbey neighborhood [R03]) could experience negative impacts to long-term memory, reading comprehension, mathematics test scores, and failure rates. However, as evidenced by State assessment score data, schools impacted by the Preferred Alternative have maintained assessment scores within one percentage point from or above the State score. Further, such impacts would be partially mitigated by NAS Whidbey Island's efforts to reduce operations during key academic testing periods at schools.

El Centro. Relocating all or any portion of the AEA community to NAF El Centro would degrade the community's overall effectiveness and does not meet the purpose of and need for the Proposed Action. The NAF El Centro alternative jettisons the AEA community's nearly 50-year history and continual capital and infrastructure investments at NAS Whidbey Island, especially in view of infrastructure improvements in 2005 and 2008 to allow for the introduction of EA-18G "Growler" aircraft. The NAF El Centro alternative also fails to effectively and efficiently augment the AEA community in support of mission requirements. This alternative is neither practical nor economically feasible and is contrary to the Navy's fiscal stewardship responsibilities to the American public. Additionally, this alternative does not minimize adverse environmental impacts or enhance the quality of the human environment. In fact, home basing the AEA community or any number of EA-18G "Growler" aircraft at NAF El Centro would have a greater impact to air quality in a region that is already in nonattainment or maintenance for multiple criteria pollutants and would expose more personnel and dependents to already sub-standard air quality that can have serious implications for their health and for the readiness of the force. The Proposed Action also has the potential to affect a larger population under this alternative. Furthermore, the NAF El Centro alternative is inconsistent with and contrary to Navy policy to maximize efficiency of operations by co-locating operational squadrons with support functions, training ranges, and airfields for squadron-level training, fails to maximize existing resources, and would result in unreasonable duplication of functions and infrastructure at significant cost and delay, while creating unnecessary inefficiencies and detrimentally affecting operational readiness. These and other operational impacts increase the risk to mission accomplishment. Finally, the NAF El Centro alternative would impose additional and unnecessary burdens on sailors and their families. Accordingly, the Navy has eliminated this alternative from detailed consideration and does not carry it forward.

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Appendix A
Technical GHG Information

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EA-18G "Growler" GHG Emissions Calculation Summary

1) Flight Hours Above 3000 feet AGL

>3000 ft AGL	No Action	Alternative 2A
Total Annual Flight Hours	16095.1	19297.8

Source: Micah Downing from Blue Ridge Research

2) Jet Fuel and EA-18G "Growler" Emission Factors (lb/1000lbs) for Each GHG

Fuel Based Emission Factor	CO_2	CH_4	N_2O	CO_2e
Jet Fuel (lb/1000lb) [1]	3203.44	0.1347	0.02628	3214.64
EA-18G Cruise	3191.00	0.1342	0.0262	3202.16
EA-18G Cruise Normalized Profile	1	0.00004	0.00001	1.00350

Source: [1] Jet fuel emission factors are based on Air Force 2023 Air Emissions Guide for Air Force Mobile

3) Total EA-18G "Growler" CO_2 and CO_2e Emissions (< 3000 feet AGL and > 3000 feet AGL)

Total EA-18G "Growler" CO_2 Emissions	No Action	Alt 2A
Operations <3000 ft AGL (MT CO_2/yr)	87,730	126,132

Source: NAS Whidbey Island. 2018a. NAS Whidbey Island complex "Growler" FEIS, Volume 1.

Total GHG Emissions < 3000 ft AGL Mobile Emissions	CO_2 (MT/Year)	CH_4 (MT/Year)	N_2O (MT/Year)	CO_2e (MT/Year)
No Action	87,730	3.69	0.72	88,037
Alternative 2A	126,132	5.30	1.03	126,573

>3000 ft AGL Fuel Use	No Action	Alt 2A
Total Annual EA-18G "Growler" Flight Hours	16,095.1	19,297.8
Pounds of Fuel	166,391,144	199,500,656

Total EA-18G "Growler" GHG Emissions > 3000 ft AGL	CO_2 (MT/Year)	CH_4 (MT/Year)	N_2O (MT/Year)	CO_2e (MT/Year)
No Action	240,837	10.13	1.98	241,679
Alternative 2A	288,760	12.14	2.37	289,770

Total Combined EA-18G "Growler" GHG Emissions (<3000 ft AGL + >3000 ft AGL)	CO_2 (MT/Year)	CH_4 (MT/Year)	N_2O (MT/Year)	CO_2e (MT/Year)
No Action	328,567	13.82	2.70	329,716
Alternative 2A	414,892	17.45	3.40	416,343

4) Total Net Change in EA-18G "Growler" GHG Emissions

Total Net Change in GHG Emissions	CO_2 (MT/Year)	CH_4 (MT/Year)	N_2O (MT/Year)	CO_2e (MT/Year)
Alternative 2A - No Action	86,325	3.63	0.71	86,627.02