Eastern Washington Airspace Extension Environmental Assessment

Draft
January 2024

DRAFT

ENVIRONMENTAL ASSESSMENT

FOR

EASTERN WASHINGTON

AIRSPACE EXTENSION

January 2024

This page intentionally left blank.

ABSTRACT

Lead Agency: United States Department of the Navy
Cooperating Agency: Federal Aviation Administration
Title of Proposed Action: Eastern Washington Airspace Extension
Designation: Environmental Assessment
Affected Region: Northeastern Washington State
Action Proponent: United States Pacific Fleet
Date: 12 January 2024
Point of Contact: Katherine Jesser, Environmental Planner
Naval Facilities Engineering Systems Command Northwest, EV23
1101 Tautog Circle
Silverdale, WA 98315

The U.S. Department of the Navy (hereinafter referred to as the Navy) has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality Regulations and Navy regulations for implementing NEPA. The Navy is the lead agency for this EA pursuant to NEPA (42 United States Code 4321, et. seq) section 107(a) and 40 Code of Federal Regulations section 501.7. The Federal Aviation Administration (FAA) is a cooperating agency pursuant to NEPA section 107(a)(3), as amended by the Fiscal Responsibility Act of 2023, and 40 Code of Federal Regulations 1501.8. The FAA has jurisdiction by law and expertise in the establishment of new airspace under FAA Order 1050.1F and Joint Order 7400.2P. The purpose of the Proposed Action is to enhance training and operational readiness of Commander, Electronic Attack Wing, U.S. Pacific Fleet aircrew by maintaining aircrew skills, providing the ability to accommodate future training requirements, and maximizing training opportunities in the Northwest Training Range Complex (NWTRC).

This EA evaluates potential environmental impacts associated with three alternatives:

- No Action Alternative, under which the Okanogan and Roosevelt Military Operations Areas (MOAs) and the Molson, Methow, and Republic Air Traffic Control Assigned Airspace (ATCAA) would remain the same as analyzed in the 2010 NWTRC Environmental Impact Statement/Overseas Environmental Impact Statement. This alternative does not meet the purpose and need of the Proposed Action.
- Alternative 1 (Preferred Alternative) includes a new Okanogan D MOA and a Mazama ATCAA as an extension to the existing airspace. Alternative 1 includes a redistribution of the number of sorties for the Okanogan and Roosevelt MOAs and associated ATCAAs, with no proposed increase to the total number of sorties over those analyzed in the 2010 NWTRC Environmental Impact Statement/Overseas Environmental Impact Statement.
- Alternative 2 consists of the addition of the Okanogan D MOA and Mazama ATCAA that would occur under Alternative 1, and also considers an increase in the capacity of training. This alternative allows for the greatest flexibility for the Navy to maintain readiness when considering potential changes in the national security environment.

A thorough analysis of environmental resources determined that implementation of any of the alternatives would not result in significant impacts on air quality; biological resources; cultural resources; American Indian traditional resources; public health and safety; and socioeconomics, environmental justice, and children's environmental health and safety risk.

EXECUTIVE SUMMARY

Proposed Action

The United States (U.S.) Department of the Navy (Navy), Commander, U.S. Pacific Fleet, has prepared this Environmental Assessment (EA) to comply with the National Environmental Policy Act (NEPA), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations parts 1500–1508), and Department of the Navy Procedures for Implementing NEPA (32 Code of Federal Regulations part 775). This EA satisfies the requirements of NEPA.

This EA analyzes the potential impacts of actions associated with the extension of existing Special Activity Airspace by establishing an extension of the Military Operations Area (MOA) and Air Traffic Control Assigned Airspace (ATCAA). These new MOA and ATCAA would be in northeastern Washington State, to include a new Okanogan D MOA and overlying Mazama ATCAA. The EA also analyzes the impacts of associated redistribution of the number of military aircraft sorties occurring within the existing and proposed airspace. Existing airspace adjacent to where the Okanogan D MOA and Mazama ATCAA are proposed in eastern Washington include the Okanogan MOA and the associated overlying Molson and Methow ATCAAs, and the Roosevelt MOA and associated overlying Republic ATCAA. The existing Okanogan and Roosevelt MOAs are split into sections for scheduling purposes. The Okanogan MOA consists of section A, which overlies section B to the west and C to the east. The Roosevelt MOA consists of section A, which overlies section B in the west. The extension of airspace to the existing MOAs and ATCAAs in the eastern Washington airspace would increase electronic warfare and air combat maneuver training capabilities for Commander, Electronic Attack Wing, U.S. Pacific Fleet (CVWP), and would help compensate for past training airspace reduction by the Federal Aviation Administration (FAA) that occurred in 2020.

In accordance with the guidelines described in the Memorandum of Understanding (MOU) between the FAA and the Department of Defense Concerning Environmental Review of Special Use Airspace Actions, dated September 23, 2019, the FAA will establish new airspace under the FAA Order 1050.1F and Joint Order 7400.2P. Congress has charged the FAA with administering all navigable airspace in the public interest as necessary to ensure the safety of aircraft and the efficient use of such airspace (49 United States Code section 40103 [b] [1]). This EA will serve as the NEPA analysis required for the airspace extension for the FAA and the Navy.

Background

In 2010, the Navy completed the Northwest Training Range Complex (NWTRC) Environmental Impact Statement/Overseas Environmental Impact Statement, which analyzed ship, submarine, and aircraft training and testing activities, including aircraft training in the existing Okanogan and Roosevelt MOAs and the Molson, Methow, and Republic ATCAAs. In 2014, the Navy completed the Pacific Northwest Electronic Warfare Range EA, which analyzed the operation of Mobile Electronic Warfare Training System vehicle-mounted emitters on U.S. Forest Service lands to facilitate training within the area underlying the Okanogan and Roosevelt MOAs.

In 2018, the FAA sent a letter to the Air Traffic Control Officer at Naval Air Station Whidbey Island, detailing a Safety Review outlining safety concerns in the southern section of the Molson ATCAA known as the Molson South High ATCAA. These safety concerns were a direct result of having to reroute aircraft

that were climbing or descending in the same geographic area that the military aircrew used for training. This led the FAA to make the decision to reduce the Molson South High ATCAA's (now the Methow ATCAA) ceiling from 50,000 feet mean sea level to 23,000 feet mean sea level.

Due to the Navy's training airspace being reduced, the Navy began discussions with the FAA to find a solution to regain training airspace. During the course of negotiations, the Navy was able to reach an agreement with the FAA to establish the Methow ATCAA and extend the southern border of the Molson North (or Molson ATCAA as it was renamed and referred to in this document) by 5 nautical miles. This adjustment to airspace boundaries and altitudes was accomplished through an Administrative Airspace Action by the FAA. This still resulted in an overall reduction in the usable airspace, prompting the airspace proposal for the Okanogan D MOA and Mazama ATCAA.

Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to enhance training and operational readiness of CVWP aircrew by maintaining aircrew skills, providing the ability to accommodate future training requirements, and maximizing training opportunities in the NWTRC. Current vertical and horizontal airspace dimensions of the Okanogan and Roosevelt MOAs and associated Molson, Methow, and Republic ATCAAs do not fully meet the training and operational readiness requirements of CVWP. The Proposed Action is needed to further the Navy's execution of its congressionally mandated roles and responsibilities under 10 United States Code section 8062.

Alternatives Considered

The Navy is considering two action alternatives that meet the purpose and need for the Proposed Action and a No Action Alternative. Alternative 1 (Preferred Alternative) would include the addition of the Okanogan D MOA and the overlying Mazama ATCAA, with a redistribution in training sorties within the existing Okanogan and Roosevelt MOAs. Alternative 1 does not propose any increase to overall airspace sorties. Alternative 2 consists of the addition of Okanogan D MOA and the overlying Mazama ATCAA that would occur under Alternative 1. In addition, Alternative 2 considers an increase in the capacity of training activities. This alternative allows for the greatest flexibility for the Navy to maintain readiness when considering potential changes in the national security environment. In the No Action Alternative, the Proposed Action would not occur, the airspace would remain unchanged and would not meet the purpose and need of the Proposed Action.

Summary of Environmental Resources Evaluated in the EA

The Council on Environmental Quality regulations, NEPA, and Navy instructions for implementing NEPA specify that an EA should address those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact.

This EA analyzes the potential impacts of actions associated with the addition of the Okanogan D MOA and Mazama ATCAA, and the redistribution of training sorties within the Okanogan and Roosevelt MOAs and associated ATCAAs. A full range of environmental issues were considered for evaluation at the beginning of the NEPA process. Since potential impacts were insignificant, negligible, or nonexistent, the following resources were not evaluated in this EA: marine resources, geology and soils, hazardous materials, water resources, and traffic and infrastructure. A summary of impacts for resource areas carried forward for analysis is provided below.

The following resources were considered to have potential impact because of the Proposed Action and are addressed in Chapter 3 (Affected Environment and Environmental Consequences) of this EA: air quality; biological resources; cultural resources; American Indian traditional resources; public health and safety; and socioeconomics, environmental justice, and children's environmental health and safety risk. Noise is not considered a resource in this EA, but is considered an impact category, and is addressed in each applicable resource section.

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

Table ES-1 provides a tabular summary of the potential impacts on the resources associated with each of the alternative actions for analysis.

Table ES-1: Summary of Potential Impacts on Resource Areas Pending Analysis

Resource Area	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Air Quality	No significant Impacts	No significant Impacts	No significant Impacts
Biological Resources	No significant Impacts	No significant Impacts	No significant Impacts
Cultural Resources	No significant Impacts	No significant Impacts	No significant Impacts
American Indian Traditional Resources	No significant Impacts	No significant Impacts	No significant Impacts[1]
Public Health and Safety	No significant Impacts	No significant Impacts	No significant Impacts
Socioeconomics, environmental justice, and children's environmental health and safety risk	No significant Impacts	No significant Impacts	No significant Impacts

[1] The Navy does not anticipate significant impacts on American Indian Traditional Resources but has invited local tribes to participate in Government-to-Government consultations.

Public Involvement

Public involvement included the development of project notification materials and participation through outreach efforts through the final phase of the EA and Finding of No Significant Impact. The Navy is soliciting public comments on the Draft EA during a 42-day public review period, including two virtual public meetings on February 13, 2024, and February 15, 2024. Three federally recognized tribes from Washington State were invited to participate in Government-to-Government consultations, and the Navy also held regulatory agency briefings with the U.S. Fish and Wildlife Service.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

Abbreviations and Acronyms

Acronym/ Abbreviation	Definition
µg/m^3	micrograms per cubic meter
ACM	Air Combat Maneuver
AGL	Above Ground Level
ATCAA	Air Traffic Control Assigned Airspace
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CVWP	Commander, Electronic Attack Wing, U.S. Pacific Fleet
CWA	Clean Water Act
dB	decibel(s)
dBA	A-weighted decibel(s)
DCAST	Data Collection and Scheduling Tool
DNL	day-night average sound level
DoD	Department of Defense
DPS	Distinct Population Segment
E	endangered
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESN	East Cascades North
EW	Electronic Warfare
FAA	Federal Aviation Administration
FR	Federal Register
FRA	Fiscal Responsibilities Act
ft.	foot/feet
GHG	greenhouse gas
GWP	global warming potential
HAP	Hazardous Air Pollutant
HC	Total Hydrocarbons
hr	hour
IFR	Instrument Flight Rules
L_{max}	Maximum Received Sound Level
MBTA	Migratory Bird Treaty Act
MOA	Military Operations Area
MOU	Memorandum of Understanding
MSL	mean sea level
MTR	Military Training Route
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NASWI	Naval Air Station Whidbey Island
Navy	U.S. Department of the Navy
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NM^2	square nautical miles
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOTAM	Notice to Air Missions

Acronym/ Abbreviation	Definition
NRHP	National Register of Historic Places
NWTRC	Northwest Training Range Complex
O_3	ozone
OEIS	Overseas Environmental Impact Statement
OSHA	Occupational Safety and Health Administration
Pb	lead
PCE	Primary Constituent Element
PCT	Pacific Crest Trail
PM	particulate matter
$PM_{2.5}$	fine particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	fine particulate matter less than or equal to 10 microns in diameter
PNT	Pacific Northwest National Scenic Trail
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
PT	proposed threatened
ROG	reactive organic gas(es)
ROI	Region of Influence
SAA	Special Activity Airspace
SO_2	sulfur dioxide
SOP	Standard Operating Procedure
SIP	State Implementation Plan
tpy	tons per year
U.S.	United States
U.S.C.	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VFR	Visual Flight Rules
VOC	Volatile Organic Compounds

1 Purpose and Need

1.1 INTRODUCTION

Commander, United States Pacific Fleet, a command of the United States (U.S.) Department of the Navy (hereinafter, referred to as the Navy), is requesting the Federal Aviation Administration (FAA) establish an extension to existing Special Activity Airspace[1] (SAA) in eastern Washington to meet mission readiness requirements for the Commander, Electronic Attack Wing, U.S. Pacific Fleet (CVWP). Under the Proposed Action, the FAA would establish an extension to existing vertical and lateral airspace dimensions to the west of the existing airspace over northeastern Washington State. The Proposed Action would also include a redistribution of the current CVWP training flight sorties published in the 2010 Northwest Training Range Complex (NWTRC) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS), hereinafter referred to as NWTRC EIS/OEIS, to accurately characterize how CVWP is projecting to use the airspace.

The airspace for analysis in this Environmental Assessment (EA) is part of the larger NWTRC. In 2010, the Navy completed the NWTRC EIS/OEIS, which analyzed potential impacts associated with aircraft training in the Okanogan and Roosevelt Military Operations Areas[2] (MOAs) and the Molson and Republic Air Traffic Control Assigned Airspace[3] (ATCAA). While the NWTRC EIS/OEIS and Record of Decision also analyzed the Chinook and Olympic MOAs in Washington State, no changes are proposed in those areas as part of the Proposed Action, and analysis of those areas are not included in this EA. The analysis in this EA is limited to the Okanogan and Roosevelt MOAs, the Molson, Methow, and Republic ATCAAs, and the Okanogan D MOA and Mazama ATCAA as a part of the Proposed Action (Figure 1.1-1 and Figure 1.1-2).

The Navy has prepared this EA in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] sections 4321-4370h) as amended by the Fiscal Responsibility Act of 2023 (FRA) and as implemented by the Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] parts 1500-1508) and Navy regulations for implementing NEPA (32 CFR part 775). The Navy is the lead agency for the Proposed Action and is responsible for the scope and content of this EA. The FAA is a cooperating agency as defined under NEPA (as amended by section 107(a)(3) of FRA) and CEQ regulations (40 CFR section 1501.8) due to its expertise and regulatory authority over federal aviation and the establishment of the MOA and ATCAA. The FAA will conduct an independent review of the Proposed Action and issue its own decision, such as a Finding of No Significant Impact and Record of Decision.

[1] SAA is airspace with defined dimensions within the National Airspace System wherein limitations may be imposed upon operations for national defense, homeland security, public interest, or public safety (Federal Aviation Administration, 2023b).
[2] A MOA is airspace established outside of Class A airspace to separate or segregate certain non-hazardous military flight activities from instrument flight rules aircraft and to identify for visual flight rules aircraft where these activities are conducted (Federal Aviation Administration, 2023d).
[3] ATCAA is airspace of defined vertical and lateral limits, assigned by Air Traffic Control, for the purpose of providing air traffic segregation between the specified activities being conducted within the assigned airspace and other instrument flight rules traffic (Federal Aviation Administration, 2023c).

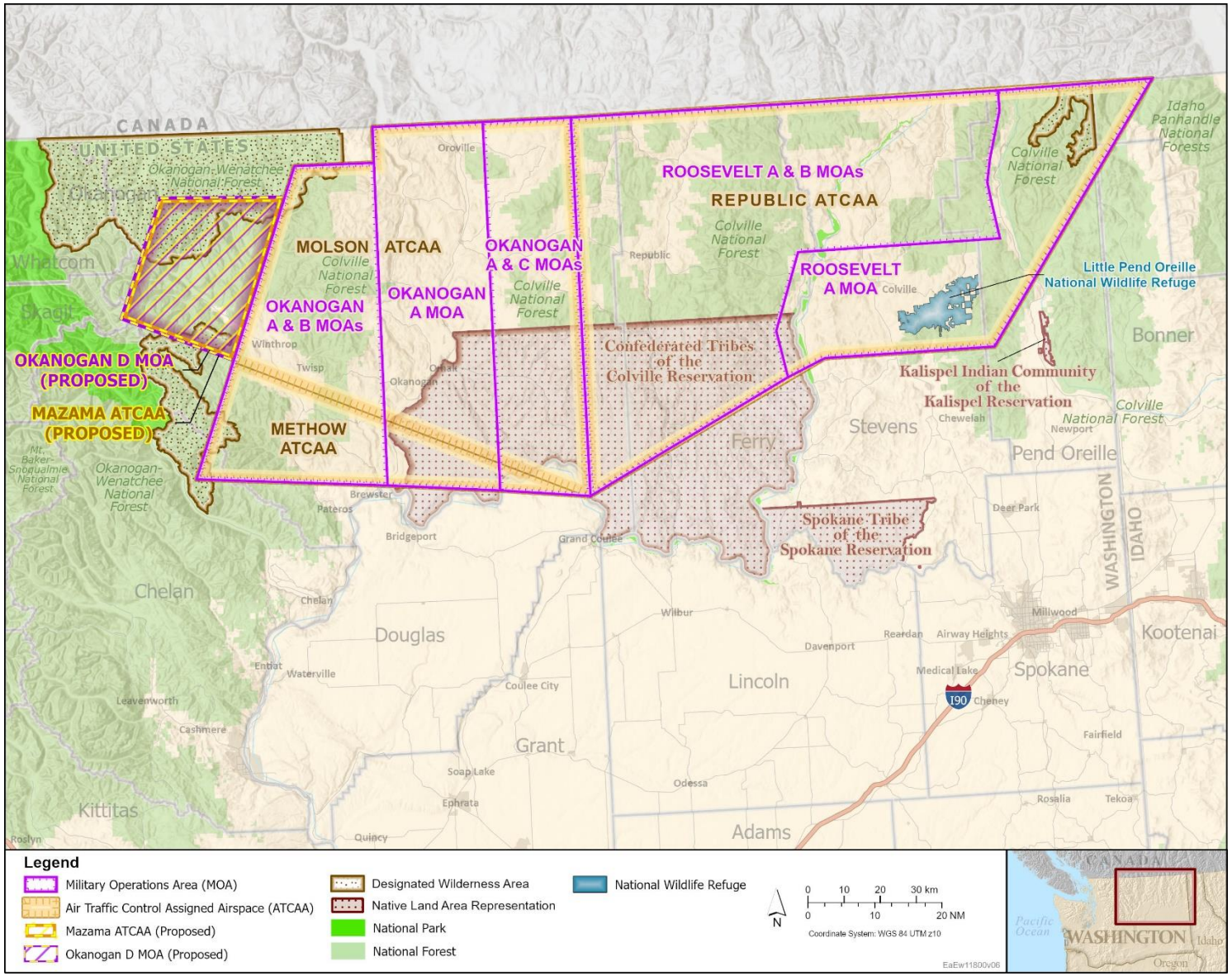

Figure 1.1-1: Existing and Proposed MOAs and ATCAAs in the Action Area

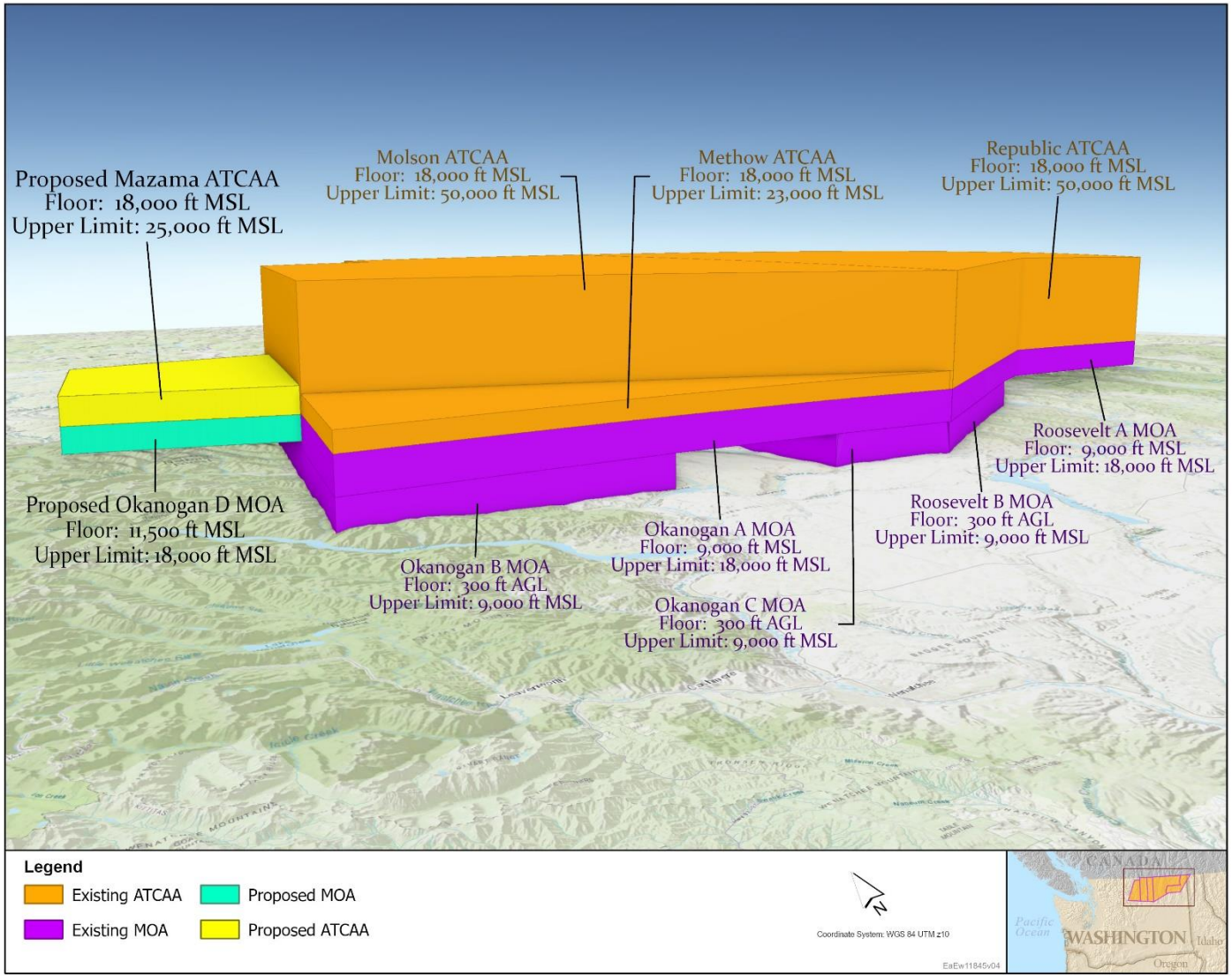

Figure 1.1-2: Existing and Proposed Airspace Altitude Limits

1.2 BACKGROUND

All navigable airspace in the U.S. is regulated by the FAA by direction of Congress (49 U.S.C. section 40103 [b] [1]). The FAA designated the airspace in eastern Washington in 1977 for use by the military for training purposes. Figure 1.1-1 and Figure 1.1-2 show the location of the existing and proposed airspace as well as airspace floors (lower limit) and ceilings (upper limits). Definitions of the airspace terms used throughout this document are provided in Appendix A (Glossary).

Beginning in 2007 the Navy initiated a transition from EA-6B Prowler aircraft to EA-18G Growler at Naval Air Station Whidbey Island (NASWI). The transition between aircraft spanned nine years, culminating in 2015 and ultimately resulted in the EA-18G replacing the EA-6B and becoming the primary military aircraft using the Okanogan and Roosevelt MOAs and the associated ATCAA airspace. The type and number of sorties within the airspace has remained the same following the transition from the EA-6B to the EA-18G. For the type of training activities currently conducted in the airspace, there are typically two sorties (or aircraft) per training event. Each training event lasts approximately one hour within the MOAs and ATCAAs, not including the transit to and from NASWI where aircraft are primarily based. The primary military aircraft using this airspace is the EA-18G, with occasional use by other Navy and Department of Defense (DoD) aircraft.

In 2018, the FAA sent a letter to the Air Traffic Control Officer at NASWI detailing a Safety Review outlining safety concerns in the southern portion of the airspace in eastern Washington known as the Molson South High ATCAA. Civilian and commercial air traffic in the Pacific Northwest had been increasing in recent years and had placed military aircraft in confliction with other incoming civilian and commercial aircraft landing at Seattle-Tacoma International Airport, King County International Airport-Boeing Field, and Vancouver International Airport, as well as other Pacific Northwest regional airports. This led the FAA to make the decision in 2020 to reduce the Molson South High ATCAA's (now the Methow ATCAA) ceiling from 50,000 feet (ft.) mean sea level (MSL) to 23,000 ft. MSL.

Due to the training airspace being reduced, the Navy began discussions with the FAA to find a solution to add airspace to better meet training requirements. In May 2021, the Navy proposed the creation of the new Okanogan D MOA and overlying Mazama ATCAA to the FAA. The FAA sent a memorandum in November 2022 that included a Study of Aeronautical Effects in response to the Navy's proposal, in which the FAA determined that the Okanogan D MOA and Mazama ATCAA would have minor impacts on the National Airspace System (NAS). The FAA concluded the impact of the proposal was acceptable based on its analysis of air traffic patterns in and around the airspace, and further determined that no significant mitigations were necessary. The Navy's proposal is one of the alternatives carried forward in Section 2.3 (Alternatives Carried Forward for Analysis).

1.3 LOCATION

The Action Area includes the existing and proposed Okanogan and Roosevelt MOAs; the Methow, Molson, Republic, and Mazama ATCAAs; and the underlying land beneath the airspace, which includes northeastern Washington state and northwestern Idaho along the U.S.-Canadian border. The Okanogan and Roosevelt MOAs are broken up into sections for scheduling purposes. The Okanogan A MOA section overlies the Okanogan B MOA and Okanogan C MOAs, and the Methow ATCAA and Molson ATCAA overlie sections A, B, and C of the Okanogan MOA (Figure 1.1-1). The Okanogan MOA, Methow ATCAA, and Molson ATCAA are in airspace above Okanogan, Chelan, and Douglas counties (Figure 1.1-1). The airspace is also above the designated Pasayten and Lake Chelan-Sawtooth National Wilderness Areas (Figure 1.1-1). The Roosevelt A section MOA overlies the Roosevelt B section MOAs, and the Republic

ATCAA overlies both section A and B of the Roosevelt MOA (Figure 1.1-1). The Roosevelt MOA and Republic ATCAA are in airspace above Okanogan, Ferry, Stevens, and Pend Oreille counties. The Roosevelt MOA and Republic ATCAA are also above Boundary and Bonner counties in northwestern Idaho and overlie the designated Salmo-Priest Wilderness area in Washington State (Figure 1.1-1). The Okanogan MOA, Roosevelt MOA, and the Molson, Methow, and Republic ATCAAs overlie the Colville Indian Reservation (Figure 1.1-1).

The proposed Okanogan D MOA and overlying Mazama ATCAA are located west of the existing Okanogan MOA and are predominately above western Okanogan County, with a small area above eastern Skagit County and northern Chelan County. The Okanogan D MOA and Mazama ATCAA also overlie the western portion of the designated Pasayten and Lake Chelan-Sawtooth National Wilderness Areas. The Okanogan D MOA would have a floor of 11,500 ft. MSL, a ceiling of 18,000 ft. MSL, and an area of 393 square nautical miles (NM^2) (520 square miles) (Figure 1.1-2). The Mazama ATCAA would overlie the same area as the Okanogan D MOA and would have a floor of 18,000 ft. MSL up to 25,000 ft. MSL (Figure 1.1-2). Coordinates for the proposed airspace are provided in Table 1.3-1.

Table 1.3-1: Latitudes and Longitudes of Proposed Airspace Extension

Latitude	Longitude
Okanogan D MOA/Mazama ATCAA Location	
N 48°26'00.00"	W 120°18'18.00"
N 48°32'48.05"	W 120°43'19.43"
N 48°50'25.50"	W 120°33'46.08"
N 48°49'51.60"	W 120°05'36.99"

Notes: MOA = Military Operations Area, ATCAA = Air Traffic Control Assigned Airspace

1.4 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to enhance training and operational readiness of CVWP aircrew by maintaining aircrew skills, providing the ability to accommodate future training requirements, and maximizing training opportunities in the NWTRC. Current vertical and horizontal airspace dimensions of the Okanogan and Roosevelt MOAs and associated Molson, Methow, and Republic ATCAAs do not fully meet the training and operational readiness requirements of CVWP. The redistribution of sorties accounts for the differences between EA-6B and EA-18G training activities. EA-18Gs typically fly at higher altitudes, and redistributing the sorties amongst the existing and proposed MOAs enables more effective use of the airspace. The Proposed Action is needed to further the Navy's execution of its congressionally mandated roles and responsibilities under 10 U.S.C. section 8062.

10 U.S.C. section 8062: "The Navy, within the Department of the Navy, includes, in general, naval combat and service forces and such aviation as may be organic therein. The Navy shall be organized, trained, and equipped for peacetime promotion of the national security interests and prosperity of the United States and for prompt and sustained combat incident to operations at sea. It is responsible for the preparation of naval forces necessary for the duties described in the preceding sentence except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Navy to meet the needs of war."

1.5 SCOPE OF ENVIRONMENTAL ANALYSIS

This EA includes an analysis of potential environmental impacts associated with two action alternatives and the No Action Alternative. The environmental analysis presented in this EA focuses on the specific environmental resources and topics that could reasonably be affected by the Proposed Action. Only those resources with a potential for impacts under the Proposed Action are analyzed in this EA, specifically: air quality; biological resources; cultural resources; American Indian traditional resources; public health and safety; and socioeconomics, environmental justice, and children's environmental health and safety risk. The analysis of noise in this EA is addressed as an impact category and not a resource area. In this EA, the Navy analyzes direct, indirect, cumulative, short-term, long-term, irreversible, and irretrievable impacts. The action area for each resource analyzed varies, depending on how the Proposed Action interacts with or impacts the resource. For instance, the analysis of recreation will be more localized to frequently used hiking and camping areas, whereas the analysis of noise in the environment will expand out to include the Action Area, which could be impacted by airborne noise. Chapter 3 (Affected Environment and Environmental Consequences) provides information on resources evaluated in this EA.

This EA evaluates the impacts of adding airspace in eastern Washington, as well as a redistribution of the number of military training sorties within the Okanogan and Roosevelt MOAs. The Navy is the lead agency for the Proposed Action and is responsible for the scope and content of this EA. The FAA is a cooperating agency as defined under NEPA (as amended by section 107(a)(3) of FRA) and CEQ regulations (40 CFR section 1501.8) due to its expertise and regulatory authority over air traffic in the United States. As a cooperating agency, the FAA participates in the development of information and preparation of environmental analyses, including portions of this EA which the FAA has jurisdiction or special expertise. The FAA has determined the analyses contained in this EA are sufficient to fulfill NEPA responsibilities in support of its aeronautical study and approval for the airspace changes.

1.6 KEY DOCUMENTS

Key documents describing similar actions, analyses, or impacts that may apply to this Proposed Action are incorporated into this EA by reference. Documents incorporated by reference in part or in whole include the following:

- *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest-Related Species within the Range of the Northern Spotted Owl*. (Northwest Forest Plan). (U.S. Department of Agriculture, 1994)
- *Final Northwest Training Range Complex Environmental Impact Statement/Overseas Environmental Impact Statement* (U.S. Department of the Navy, 2010)
- *Biological Opinion for U.S. Pacific Fleet Northwest Training Range Complex in the Northern Pacific Coastal Waters off the States of Washington, Oregon, and California and Activities in Puget Sound and Airspace over the State of Washington, 01EWFW00-201 7-IC-0385* (U.S. Fish and Wildlife Service, 2010)
- *Final Environmental Assessment for Pacific Northwest Electronic Warfare Range* (U.S. Department of the Navy, 2014)
- *Section 106 Handbook: How to Assess the Effects of FAA Actions on Historic Properties under Section 106 of the National Historic Preservation Act* (Federal Aviation Administration, 2015)
- *Biological Evaluation for Navy Training within the Okanogan and Roosevelt Military Operations Areas* (U.S. Department of the Navy, 2016)

- *U.S. Fish and Wildlife Service Letter of Concurrence for the Continuation of Navy Training in the Okanogan and Roosevelt Military Operations Area Airspace, 01EWFW00-2016-I-1238.* (U.S. Fish and Wildlife Service, 2017)
- *Environmental Impact Statement for EA-18-G Growler Airfield Operations at Naval Air Station Whidbey Island Complex and Record of Decision* (U.S. Department of the Navy, 2018a, 2019)
- *Final Northwest Training and Testing Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement* (U.S. Department of the Navy, 2020)
- *2020 Decennial Census of Population and Housing* (U.S. Census Bureau, 2020)

1.7 RELEVANT LAWS AND REGULATIONS

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

- NEPA (42 U.S.C. section 4321 et seq.) as amended by the FRA of 2023
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR parts 1500–1508)
- Navy regulations for implementing NEPA (32 CFR part 775)
- Clean Air Act (CAA) (42 U.S.C. section 7401 et seq.)
- Clean Water Act (33 U.S.C. section 1251 et seq.)
- National Historic Preservation Act (NHPA) (54 U.S.C. section 300101 et seq.)
- National Forest Management Act of 1976 (16 U.S.C sections 1600 and 1604)
- Wilderness Act of 1964 (16 U.S.C sections 1131–1136)
- Endangered Species Act (ESA) (16 U.S.C. section 1531 et seq.)
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. section 703 et seq.)
- Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. section 668 et seq.)
- Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. section 9601 et seq.)
- Emergency Planning and Community Right-to-Know Act (42 U.S.C. section 11001 et seq.)
- Energy Independence and Security Act of 2007 (42 U.S.C. section 17001 et seq.)
- Resource Conservation and Recovery Act (42 U.S.C. section 6901 et seq.)
- Pollution Prevention Act of 1990 (42 U.S.C. section 13101 et seq.)
- Federal Aviation Act of 1958 (49 U.S.C. section 1301 et seq.)
- Toxic Substances Control Act (15 U.S.C. section 2601 et seq.)
- FAA Order 1050.1F Environmental Impacts: Policies and Procedures
- FAA Order Job Order 7400.2P Procedures for Handling Airspace Matters
- Executive Order (EO) 12088, *Federal Compliance with Pollution Control Standards*
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*
- EO 13007, *Accommodation of Sacred Sites*
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*
- EO 13175, *Consultation and Coordination with Indian Tribal Governments*

- EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*
- EO 13693, *Planning for Federal Sustainability in the Next Decade*
- EO 13834, *Efficient Federal Operations*
- EO 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*
- EO 14008, *Tackling the Climate Crisis at Home and Abroad*
- EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*

A description of the Proposed Action's consistency with these laws, policies, and regulations, as well as the names of regulatory agencies responsible for their implementation, is presented in Chapter 5 (Other Considerations as Required by NEPA).

1.8 PUBLIC AND AGENCY PARTICIPATION

Regulations from the CEQ direct agencies to involve the public in preparing and implementing their NEPA procedures. The Navy has prepared this Draft EA to inform the public of the Proposed Action and to allow the opportunity for public review and comment. FAA regulations require 30 days' notice be provided prior to a public meeting; therefore, the Navy is releasing the Draft EA for a 42-day public review period. Two virtual public meetings will be held during the review period. The public review period begins with a public notice published in The Spokesman Review, The Statesman Examiner, The Okanogan Valley Gazette-Tribune, and The Methow Valley News. The notice describes the Proposed Action; solicits public comments on the Draft EA; provides dates of the public comment period, and location and dates of the public meetings; and announces that CD copies and hardcopies of the Draft EA are available for review at the following public locations: The Okanogan Public Library, The Twisp Public Library, The Colville Public Library, The Oroville Public Library, and The Oak Harbor Public Library. A digital version of the Draft EA is also available on the Naval Facilities Engineering Systems Command Northwest NEPA website at https://pacific.navfac.navy.mil/NWNEPA. Additional public notices include a postcard mailer, which is distributed to various elected officials, government agencies, federally recognized tribes, non-governmental organizations, and the public within the Action Area.

As part of this EA process, the Navy invited Government-to-Government consultations with the following federally recognized tribes from Washington State: The Confederated Tribes of the Colville Reservation, the Spokane Tribe of Indians, and the Kalispel Tribe of Indians. The Navy also held regulatory agency briefings with the U.S. Fish and Wildlife Service (USFWS).

After evaluating the Final EA, the designated official will decide whether a Finding of No Significant Impact is appropriate or whether the Proposed Action would generate significant impacts requiring preparation of an EIS.

2 Description of the Proposed Action and Alternatives

2.1 Description of the Proposed Action

This EA analyzes the potential impacts of actions associated with the addition and operation of a new Okanogan D MOA and Mazama ATCAA. This new airspace is proposed to be west of the current Okanogan and Roosevelt MOAs and the Molson, Methow, and Republic ATCAAs in eastern Washington State. The Proposed Action would also include a redistribution of the overall number of training sorties occurring within the existing Okanogan and Roosevelt MOAs and associated ATCAAs to accurately characterize usage of the airspace.

2.1.1 Description of the Current Airspace

The Okanogan and Roosevelt MOAs currently provide military aircraft maneuver and training space in eastern Washington and northwestern Idaho as a part of the NWTRC. The Molson, Methow, and Republic ATCAAs also provide training space to military aircraft in northeastern Washington and northwestern Idaho. Descriptions of this SAA are provided in Table 2.1-1.

Table 2.1-1: Special Activity Airspace in Eastern Washington and Northwestern Idaho Summary

Airspace	NM^2	Lower Limit	Upper Limit
Okanogan MOAs (sections: A, B, & C)	4,339	A: 9,000 ft. MSL B: 300 ft. AGL C: 300 ft. AGL	A: 18,000 ft. MSL B: 9,000 ft. MSL C: 9,000 ft. MSL
Molson ATCAA		18,000 ft. MSL	50,000 ft. MSL
Methow ATCAA		18,000 ft. MSL	23,000 ft. MSL
Roosevelt MOA (sections: A & B)	5,319	A: 9,000 ft. MSL B: 300 ft. AGL	A: 18,000 ft. MSL B: 9,000 ft. MSL
Republic ATCAA		18,000 ft. MSL	50,000 ft. MSL
TOTAL	**9,658**		

Notes: NM^2 = square nautical miles, MOA = Military Operations Area, ATCAA = Air Traffic Control Assigned Airspace, MSL = mean sea level, AGL = above ground level.

2.1.2 Naval Air Station Whidbey Island and Electronic Attack Wing Squadron Training

The MOAs and ATCAAs are used by CVWP to train military aircrews based primarily out of NASWI in western Washington. The primary aircraft using this airspace is the EA-18G, an aircraft platform designed to suppress enemy air defense systems. There are 14 operational Navy Electronic Attack Squadrons and one training squadron at NASWI that fly the EA-18G. The Electronic Attack Squadrons deploy with both East and West Coast Carrier Air Wings, as well as to Joint air bases.

NASWI is also the location of the Electronic Attack Weapons School, which provides comprehensive, formal training to EA-18G aircrew and extensive weapons-related training to EA-18G ordnance and maintenance personnel. The Electronic Attack Weapons School staff is responsible for providing a graduate level curriculum that prepares EA-18G squadrons for deployment around the world.

CVWP performs many types of training as described and analyzed in the 2010 NWTRC EIS/OEIS and in the Pacific Northwest Electronic Warfare Range EA, including the following:

- Air Combat Maneuvers. Aircrews maneuver against simulated threats to gain a tactical advantage. These are basic flight maneuvers in which aircrew engage in offensive and defensive maneuvering against each other, at distances within and beyond visual range. During air combat maneuver engagements, no ordnance is fired, but countermeasures such as flares may be used. These events typically involve two aircraft; however, based upon the training requirement, events may involve multiple aircraft.
- Electronic Warfare. Aircraft control or impede an adversary's ability to use its electronic systems, thereby creating vulnerabilities in the enemy's operations. Some of these training events may involve additional aircraft. Electronic Warfare Operations can be active or passive, offensive or defensive. Aircraft may practice employing simulated or actual jamming of the electromagnetic spectrum against simulated threat search radars.

2.2 ALTERNATIVE SELECTION SCREENING FACTORS

NEPA's implementing regulations (40 CFR 1502.14) provide guidance on the consideration of alternatives to a federally proposed action and require exploration and objective evaluation of reasonable alternatives. Only those alternatives determined to be reasonable and to meet the purpose and need require detailed analysis. Potential alternatives that meet the purpose and need were evaluated against the following screening factors:

- Be of a suitable size to support training to meet operational readiness requirements for CVWP while reducing the risk of potentially hazardous situations associated with multiple aircraft in the same operating area.
- Meet the Navy's need to enhance realistic training and readiness in the designated airspace.
- Fill the gaps in training that Live Virtual and Constructive technologies cannot.
- Allow for flexibility in scheduling use of the airspace.
- Comply with the provisions of FAA Order 1050.1F.

2.3 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

Based on the reasonable alternative screening factors and meeting the purpose and need for the Proposed Action, the Navy has identified two action alternatives to be analyzed within this EA. The No Action Alternative is also carried forward for analysis in this EA, as required by NEPA.

2.3.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur. The locations and areas of the Okanogan A/B/C MOAs and Molson and Methow ATCAAs, and Roosevelt A/B MOAs and Republic ATCAA would remain the same (Figure 2.3-1), and there would be no redistribution of the number of flights or flight profiles in the Okanogan or Roosevelt MOAs from the 2010 NWTRC EIS/OEIS (Table 2.3-1). The No Action Alternative would not meet the purpose and need for the Proposed Action; however, as required by NEPA, the No Action Alternative is carried forward for analysis in this EA. The No Action Alternative will be used to analyze the consequences of not undertaking the Proposed Action, not simply conclude no impact, and will serve to establish a comparative baseline for analysis. Table 2.3-1 depicts the current sorties, and Figure 2.3-1 depicts the current airspace configurations.

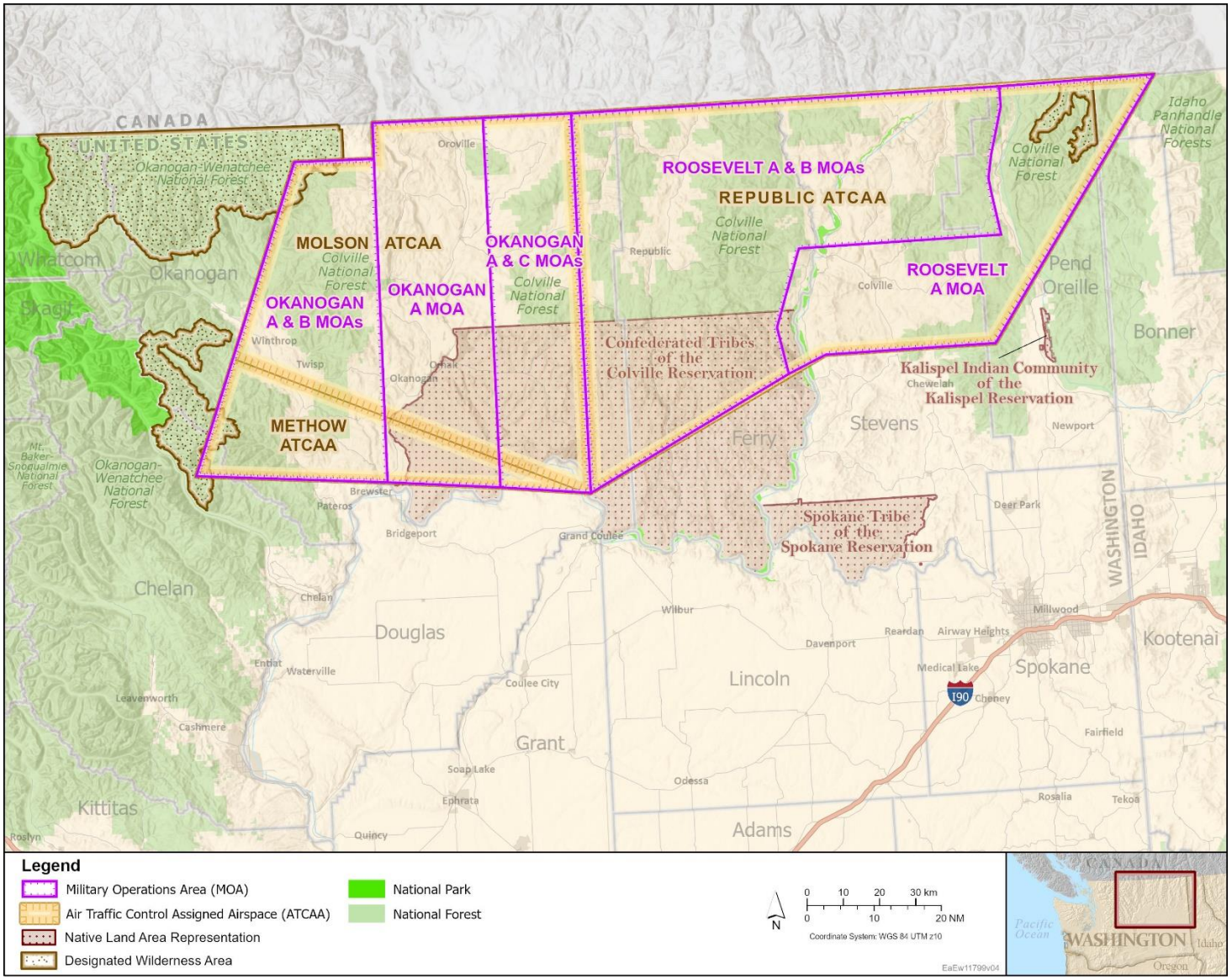

Figure 2.3-1: No Action Alternative

Table 2.3-1: Summary of Aircraft Types and Annual Sorties in Select MOAs and ATCAAs for the No Action Alternative, Alternative 1 (Preferred Alternative), and Alternative 2

	No Action Alternative		Alternative 1 (Preferred Alternative)		Alternative 2	
Aircraft Type	**Existing Okanogan MOAs and Overlying ATCAAs**	**Existing Roosevelt MOAs and Overlying ATCAA**	**Okanogan MOAs and Overlying ATCAAs**	**Roosevelt MOAs and Overlying ATCAA**	**Okanogan MOAs and Overlying ATCAAs**	**Roosevelt MOAs and Overlying ATCAA**
Growler EA-18G	2,939	1,310	2,500	1,800	2,800	2,000
Other Navy users*	47	66	20	10	25	15
Total	**2,986**	**1,376**	**2,520**	**1,810**	**2,825**	**2,015**

Notes: ATCAA = Air Traffic Control Assigned Airspace, MOA = Military Operations Area

2.3.2 Alternative 1 – Addition of the Okanogan D MOA and Mazama ATCAA With a Redistribution of Training Sorties Within the Existing Airspace (Preferred Alternative)

Alternative 1 (Preferred Alternative) consists of the extension of the airspace through the establishment of a new Okanogan D MOA and Mazama ATCAA (Table 2.3-2 and Figure 2.3-2). In addition, Alternative 1 would redistribute the number of flights and flight profiles within the Okanogan and Roosevelt MOAs (Table 2.3-1). The overall total number of annual sorties would decline slightly from what was analyzed in the 2010 NWTRC EIS/OEIS. The total number of annual sorties in the Okanogan MOAs and overlying ATCAAs would decrease, and the number of annual sorties in the Roosevelt MOAs and overlying ATCAA would increase by the same amount. The EA-6B is no longer flown by the Navy and has been replaced by the EA-18G. Thus, the analysis in Chapter 3 (Affected Environment and Environmental Consequences) of this EA is based off the use of the EA-18G for training sorties.

The Okanogan D MOA and Mazama ATCAA would be located to the west of existing airspace. The Okanogan D MOA would have a floor of 11,500 ft. MSL, a ceiling of 18,000 ft. MSL, and an area of 393 NM^2 (Figure 2.3-2). The Mazama ATCAA would overlie the same area as the Okanogan D MOA and would have a floor of 18,000 ft. MSL and a ceiling of 25,000 ft. MSL (Figure 2.3-2). The Okanogan D MOA and Mazama ATCAA would be in airspace predominately above western Okanogan County and a very small area in the airspace above eastern Skagit County and northern Chelan County and would also overlie the western portion of the designated Pasayten and Lake Chelan-Sawtooth National Wilderness Areas (Figure 2.3-2).

Table 2.3-2: Proposed Special Activity Airspace in Eastern Washington

Airspace	NM^2	Lower Limit	Upper Limit
Okanogan MOA (D)	393	11,500 ft. MSL	18,000 ft. MSL
Mazama ATCAA		18,000 ft. MSL	25,000 ft. MSL

Notes: NM^2 = square nautical miles, MOA = Military Operations Area, ATCAA = Air Traffic Control Assigned Airspace, ft. = feet, MSL = Mean Sea Level

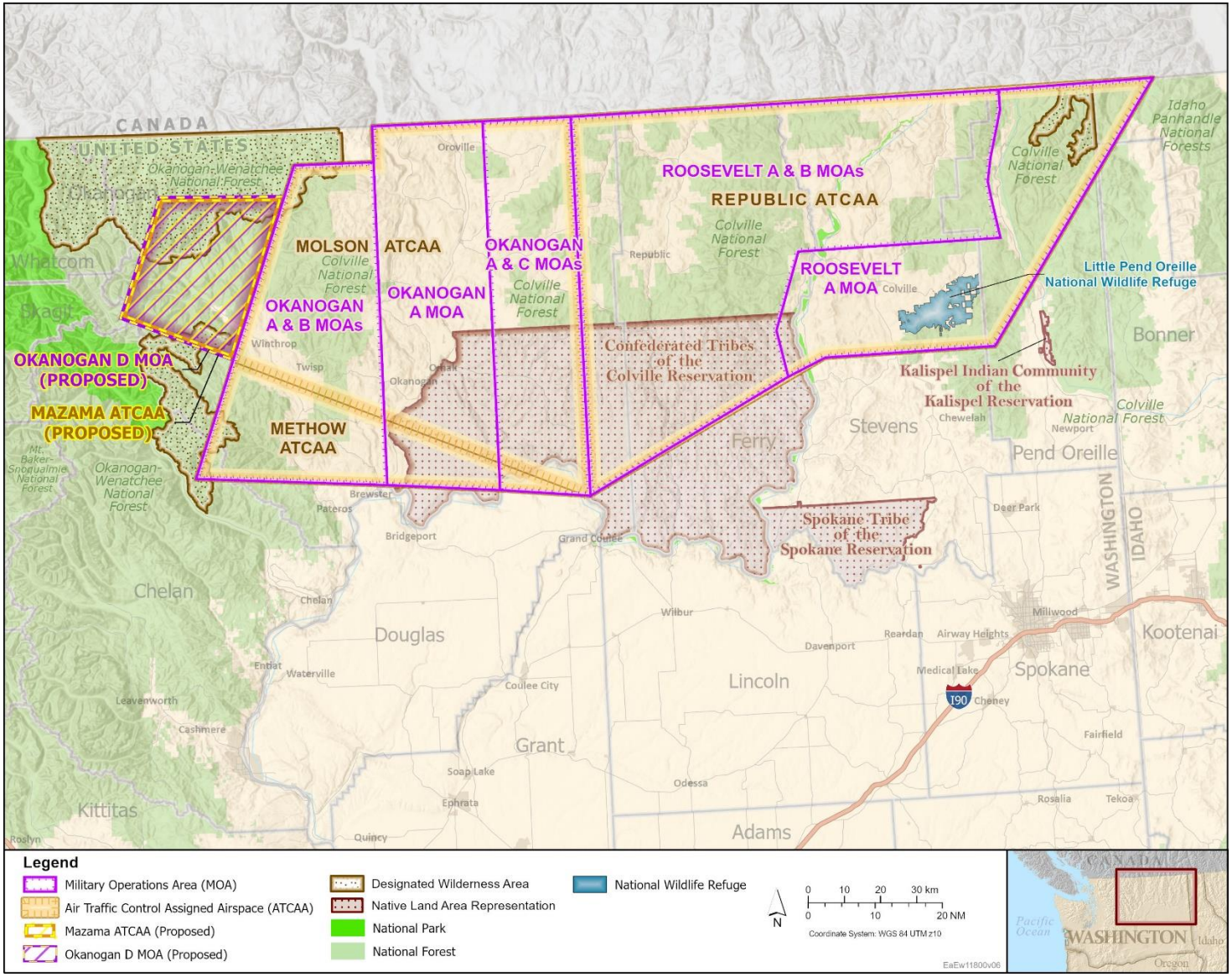

Figure 2.3-2: Action Alternative 1 (Preferred Alternative)

2.3.3 Alternative 2 – Addition of the Okanogan D MOA and Mazama ATCAA and Increased Training Capacity

Alternative 2 consists of the addition of Okanogan D MOA and the overlying Mazama ATCAA that would occur under Alternative 1 (Table 2.3-1 and Figure 2.3-2). Alternative 2 also considers an increase in the total number of annual sorties. This alternative allows for the greatest flexibility for the Navy to maintain readiness when considering potential changes in the national security environment (Table 2.3-1).

2.4 Alternatives Considered but Not Carried Forward for Detailed Analysis

The following alternatives were considered for the airspace extension by the Navy but were not carried forward for detailed analysis in this EA as they either did not meet the purpose and need for the project or did not satisfy the reasonable alternative screening factors presented in Section 2.2 (Alternative Selection Screening Factors), which includes FAA approval.

2.4.1 Reinstatement of the Former Molson South High ATCAA

As was discussed in Section 1.2 (Background), the Molson South High ATCAA was removed by the FAA due to air traffic concerns in 2020. The reinstatement of the Molson South High ATCAA is not being pursued as an alternative in this EA.

2.4.2 Roosevelt C MOA and Republic ATCAA Extension

In October 2021, the Navy proposed to the FAA the extension of the Roosevelt MOAs through an extension of the Roosevelt C MOA and the Republic ATCAA to the east of the current Roosevelt MOA and Republic ATCAA (Figure 2.4-1). The FAA considered and was amenable to the extension but countered that accepting it would require the entire Republic ATCAA ceiling be reduced from 50,000 ft. to 32,000 ft., which would result in a reduction in size of the overall available training space. Therefore, the Navy withdrew the proposal because the lateral airspace gained from the extension would not outweigh the loss of vertical airspace.

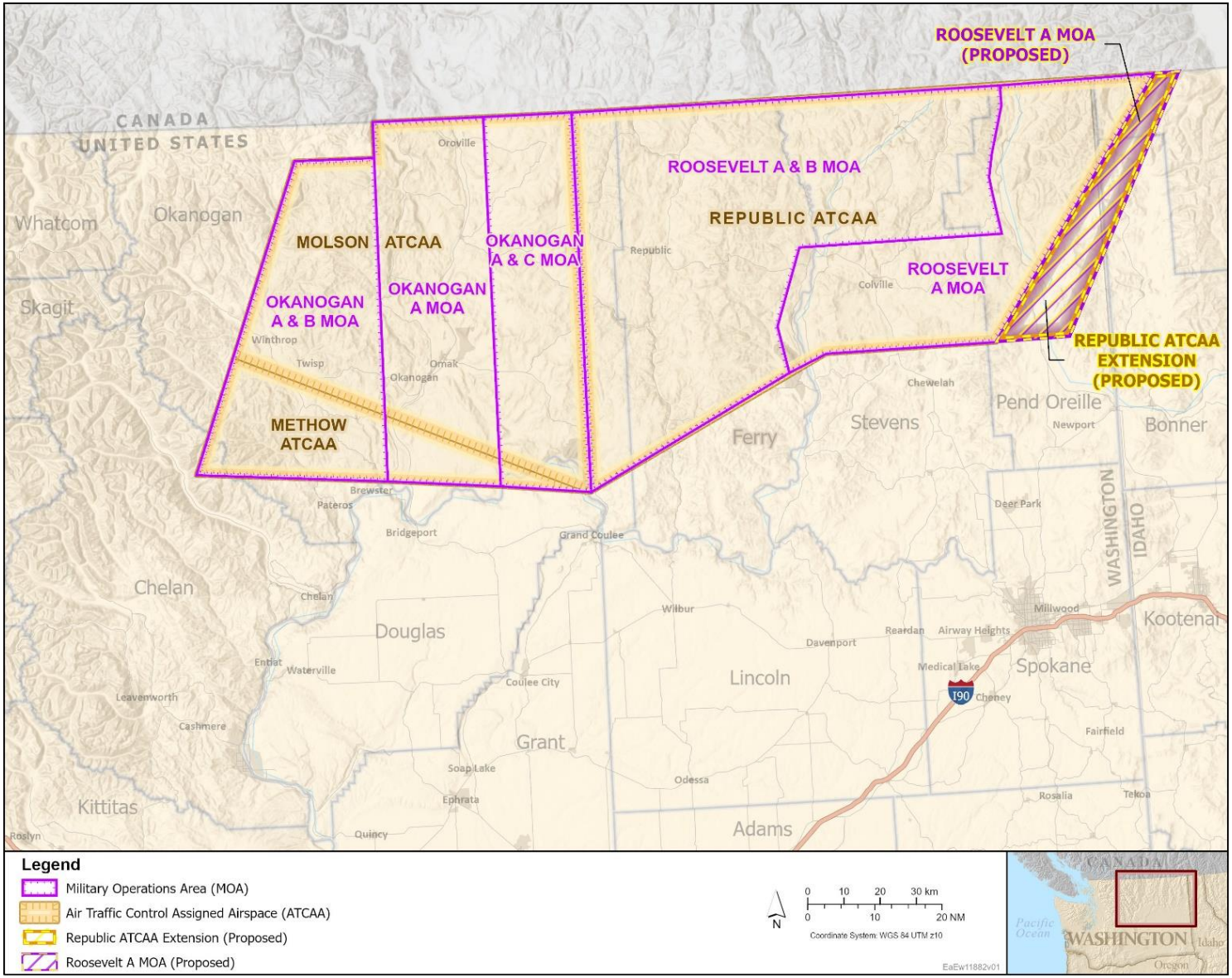

Figure 2.4-1: Roosevelt C MOA and Republic ATCAA Extension Not Carried Forward for Analysis

2.5 BEST MANAGEMENT PRACTICES INCLUDED IN THE PROPOSED ACTION

Best management practices (BMPs) are incorporated into the Proposed Action in this document. BMPs are existing policies, practices, and measures that the Navy uses to reduce the environmental impacts of designated activities, functions, or processes. Although BMPs mitigate potential impacts by avoiding, minimizing, or reducing/eliminating impacts, BMPs are distinguished from potential mitigation measures because BMPs are (1) existing requirements for the Proposed Action; (2) ongoing, regularly occurring practices; or (3) not unique to this Proposed Action. In other words, the BMPs identified in this document are inherently part of the Proposed Action and are not potential mitigation measures proposed as a function of the NEPA environmental review process for the Proposed Action. BMPs include actions required by federal or state law or regulation. The recognition of the BMPs within the Proposed Action prevents unnecessarily evaluating impacts that are unlikely to occur.

2.5.1 LOW ALTITUDE TRAINING

Existing CVWP standard operating procedures address noise from aircraft overflights and provide BMPs to minimize noise impacts within the Action Area. Specifically, low altitude training must avoid populated areas to the maximum extent possible and must be performed during daylight no earlier than 30 minutes after sunrise and no later than 30 minutes before sunset.

2.5.2 FLARE USE

As stated above in Section 2.1.2 (Naval Air Station Whidbey Island and Electronic Attack Wing Squadron Training), during air combat maneuver engagements, countermeasures such as flares may be used in certain training areas with certain restrictions. Historically, flares have not been used in the Action Area due to the nature of the training that takes place within the Okanogan and Roosevelt MOAs and the Molson, Methow, and Republic ATCAAs. However, flare use is not strictly prohibited. Use of illumination flares is not permitted. If the use of self-protection flares is required in future training, their use would be authorized under the following conditions:

1. Planned use must be coordinated with the appropriate Wing Operations Officer, NWTRC Range Public Relations and indicated in the “Remarks” on the NASWI Range Data Collection and Scheduling Tool (DCAST) Schedule.

2. Fire Season Restrictions may be implemented within the NWTRC depending on prevailing conditions:
    I. Fire Season Restrictions are typically in effect from April 15 through October 15 each year and are seasonal and weather dependent. When in effect, no flares are authorized over land.
    II. If flare use is approved, NASWI instruction restricts the altitude for each flare type.

3 Affected Environment and Environmental Consequences

This chapter describes the relevant environmental conditions for resources potentially affected by the Proposed Action as described in Chapter 2 (Description of Proposed Action and Alternatives).

Several resource areas and potential impacts were considered for evaluation at the outset of the process. However, consistent with NEPA, CEQ regulations, and Navy procedures for implementing NEPA, the description of the affected environment focuses only on those resources potentially subject to impact. As such, certain resource areas were eliminated from detailed study within the EA because research revealed that the Proposed Action is unlikely to have any potential environmental impacts on these resources, or that impacts would be negligible. Because the entirety of the Proposed Action is limited to aircraft in flight, and there will be no discharge of hazardous materials into the environment, the following resource areas were not evaluated in this EA: marine resources, geology and soils, hazardous materials, water resources, and traffic and infrastructure.

The following resource areas were considered to have potential impact as a result of the Proposed Action and are addressed in this chapter of the EA: air quality; biological resources; cultural resources; American Indian traditional resources; public health and safety; and socioeconomics, environmental justice, and children's environmental health and safety risk. These resources are further described and analyzed in Sections 3.1 through 3.6. Noise is considered an impact category in this EA, not a resource area, and is addressed in the resource chapters for biological resources, cultural resources, American Indian traditional resources, public health and safety, and socioeconomics and environmental justice. Aircraft noise modeling and analysis is included as Appendix B (Noise Analysis for the Eastern Washington Airspace Extension). Due to the lack of significant impacts on the resource areas analyzed in this EA, there are no mitigation procedures that are necessary for the Proposed Action.

Consultation and resource area data collection included liaison with or access to the following agencies: Okanogan-Wenatchee National Forest, Colville National Forest, the Washington State Department of Archeology and Historic Preservation, the Washington State Historic Preservation Office, U.S. Navy Pacific Fleet, NASWI, and other organizations and agencies as appropriate. Initial tribal correspondence occurred during August 2023. Formal tribal notification of the availability of the Draft EA for review and comment occurred on January 12, 2024. Appendix D (Correspondence) has more information regarding correspondence with public agencies, governments, and other organizations.

3.1 AIR QUALITY

Congress passed the Clean Air Act (CAA) in 1970 and its amendments in 1977 and 1990 to improve air quality and reduce air pollution, set regulatory limits on air pollutants, and ensure basic health and environmental protection from air pollution. Air pollution damages the health of people, plants, animals, and water bodies as well as the exteriors of buildings, monuments, and statues. It also creates haze or smog that reduces visibility and interferes with aviation. Air quality is defined by ambient concentrations of specific air pollutants the U.S. Environmental Protection Agency (EPA) determined may affect the health or welfare of the public or environment. The six major pollutants of concern are called "criteria pollutants":

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Ozone (O_3), which is represented as the precursor pollutants nitrogen oxides (NO_x) and volatile organic compounds (VOC)
- Sulfur dioxide (SO_2)
- Particulate matter (with an aerodynamic size less than or equal to 10 microns [PM_{10}] and with an aerodynamic size less than or equal to 2.5 microns [$PM_{2.5}$]).

Criteria air pollutants are classified as either primary or secondary pollutants based on how they are formed in the atmosphere. Primary air pollutants are emitted directly into the atmosphere from the source of the pollutant. Secondary air pollutants are those formed through atmospheric chemical reactions that usually involve primary air pollutants (or pollutant precursors) and normal constituents of the atmosphere. For example, ozone is a secondary pollutant that is formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors (VOCs, NO_x, and suspended PM_{10}). Some criteria air pollutants, including PM_{10} and $PM_{2.5}$, are a combination of primary and secondary pollutants.

3.1.1 REGULATORY SETTING

3.1.1.1 Criteria Pollutants and National Ambient Air Quality Standards

The CAA required the EPA to establish National Ambient Air Quality Standards (NAAQS) for criteria pollutants (Table 3.1-1). States may also establish their own ambient air quality standards that are more stringent than those set by federal law. The state of Washington has adopted the federal standards as codified in Washington Administrative Code Chapters 173-476, with the addition of an annual and 24-hour standard for SO_2. The Washington Ambient Air Quality Standard for SO_2 (annual) requires that the average concentration for sulfur oxides not exceed 0.02 parts per million by volume (ppmv) in a calendar year, and (twenty-four-hour) requires that the 24-hour average concentration for SO_2 not exceed 0.14 ppmv more than once per calendar year (Washington State Legislature, 2016). The state of Idaho has also adopted the federal standards as incorporated by reference in Idaho Administrative Rules, 58.01.01 – Rules for the Control of Air Pollution in Idaho Section 107 (3)(b) (Idaho Department of Environmental Quality, 2022).

Table 3.1-1: National Ambient Air Quality Standards

Pollutant		Primary/Secondary	Averaging Time	Level	Form
Carbon monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead		primary and secondary	Rolling 3-month period	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb(2)	Annual mean
Ozone		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (particulate matter)	$PM_{2.5}$	primary	1 year	12.0 µg/m^3	Annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m^3	Annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur dioxide (SO_2)		primary	1 hour	75 ppb(4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

[1] In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 micrograms per cubic meter as a calendar quarter average) also remain in effect.

[2] The level of the annual nitrogen dioxide standard is 0.053 parts per million. It is shown here in terms of parts per billion for the purposes of clearer comparison to the 1-hour standard level.

[3] Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) ozone standards additionally remain in effect in some areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) ozone (O_3) standards.

[4] The previous sulfur dioxide standards (0.14 parts per million 24-hour and 0.03 parts per million annual) would additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous sulfur dioxide standards (40 Code of Federal Regulations section 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.

Notes: PM_{10} = particulate matter ≤ 10 microns in diameter, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, ppb = parts per billion, ppm = parts per million, µg/m^3 = micrograms per cubic meter.

Source: (U.S. Environmental Protection Agency, 2016b), last updated March 15, 2023

These standards set specific concentration limits for criteria pollutants in the outdoor air that are designed to aid in protecting public health and the environment. Areas with air pollution problems typically have one or more criteria pollutants consistently present at levels that exceed the NAAQS.

Ambient air quality is reported as the atmospheric concentrations of specific air pollutants at a particular time and location. The units of measure are expressed as a mass per unit volume (e.g., micrograms per cubic meter [$\mu g/m^3$] of air) or as a volume fraction (e.g., parts per million by volume). The ambient air pollutant concentrations measured at a particular location are determined by the pollutant emissions rate, local meteorology, and atmospheric chemistry. Wind speed and direction, the vertical temperature gradient of the atmosphere, and precipitation patterns affect the dispersal, dilution, and removal of air pollutant emissions from the atmosphere.

If the air quality in a geographic area meets or is cleaner than the national standard, it is called an attainment area (designated "attainment/unclassifiable"). Maintenance areas are those previously designated as a nonattainment area and subsequently redesignated to attainment. Nonattainment areas for some criteria pollutants are further classified as shown below, depending upon the severity of their air quality problem, to facilitate their management:

- ozone—marginal, moderate, serious, severe, and extreme
- carbon monoxide—moderate and serious
- particulate matter—moderate and serious

States, through their air quality management agencies, are required under the CAA to prepare a State Implementation Plan to demonstrate how the nonattainment and maintenance areas would achieve and maintain the NAAQS.

3.1.1.2 Hazardous Air Pollutants

In addition to the six criteria pollutants, the EPA currently designates 188 substances as hazardous air pollutants (HAPs) under the federal CAA. HAPs are air pollutants known or suspected to cause cancer or other serious health effects, or adverse environmental and ecological effects (U.S. Environmental Protection Agency, 2016a). NAAQS are not established for these pollutants; however, the EPA has developed rules and control standards that limit emissions of HAPs from specific stationary (National Emissions Standards for Hazardous Air Pollutants) and mobile sources (Mobile Source Air Toxics). These emissions control standards are intended to achieve the maximum degree of reduction in emissions of the HAPs, taking into consideration the cost of emissions control, non-air-quality health and environmental impacts, and energy requirements. These emissions are typically one or more orders of magnitude smaller than concurrent emissions of criteria air pollutants.

For the Proposed Action, HAPs are generated, in addition to criteria air pollutants, by combustion of fuels. Emissions of HAPs are intermittent and dispersed over a large area. Because only small quantities of HAPs are emitted into the lower atmosphere, which is well mixed in the air space and far from any sensitive receptors, the potential for exposure is very low, and the risk presented by the emissions is similarly very low. A quantitative evaluation of hazardous air pollutant emissions is thus not warranted and was not conducted.

3.1.1.3 Greenhouse Gases

The EPA specifically identified the most important greenhouse gases (GHGs) directly emitted by humans as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several fluorine-containing

halogenated substances, including hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride (U.S. Environmental Protection Agency, 2009). These gases influence global climate by trapping heat in the atmosphere that would otherwise escape to space. The heating effect of these gases is considered the probable cause of global warming observed over the last 50 years (U.S. Environmental Protection Agency, 2023d) and contributes significantly to climate change. GHGs have varying global warming potential (GWP). GWP is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time (usually 100 years), relative to the emissions of 1 ton of CO_2 (U.S. Environmental Protection Agency, 2023b). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main GHGs that are the most common GHGs that result from human activity include CH_4, which is estimated to have a GWP of 27–30 over 100 years; N_2O, which has a GWP of 273. CO_2; and to a lesser extent, CH_4 and N_2O, which are products of combustion and are generated from stationary combustion sources as well as vehicles, aircraft, and vessels. High GWP gases include GHGs that are used in refrigeration/cooling systems, such as chlorofluorocarbons and hydrofluorocarbons.

There currently are no regulatory thresholds of significance for GHG emissions; however, the CEQ has released interim guidance on when and how Federal agencies should consider GHG emissions and climate change in NEPA analyses (Council on Environmental Quality, 2023). The guidance emphasizes when conducting climate change analyses in NEPA reviews, agencies should consider the following: (1) the potential effects of a proposed action on climate change, including by assessing both GHG emissions and reductions from the proposed action; and (2) the effects of climate change on a proposed action and its environmental impacts.

The guidance states that federal agencies should quantify the reasonably foreseeable direct and indirect GHG emissions of their proposed actions and reasonable alternatives (as well as the no-action alternative). The guidance also recommends that "agencies provide additional context for GHG emissions, including through the use of the best available social cost of GHG estimates, to translate climate impacts into the more accessible metric of dollars, allow decision makers and the public to make comparisons, help evaluate the significance of an action's climate change effects, and better understand the tradeoffs associated with an action and its alternatives." (Council on Environmental Quality, 2023).

3.1.2 ANALYSIS FRAMEWORK

The air quality impact evaluation comprises two analyses: (1) the CAA General Conformity Analysis; and (2) an analysis under NEPA. The generated air emissions would be evaluated in one or more of the three identified analysis categories, based on the geographical and spatial locations where emissions occur and CAA air quality status (nonattainment, maintenance, or attainment) of those respective locations, as well as pollutants emitted, type of emission source, and levels of emissions. The air emissions generated by the Proposed Action are from aircraft operations only.

3.1.2.1 General Conformity

Section 176(c)(1) of the CAA, commonly known as the General Conformity Rule, requires federal agencies to ensure that their actions conform to applicable implementation plans for achieving and maintaining the NAAQS for criteria pollutants for nonattainment and maintenance areas. Federal actions are required to conform with the approved State Implementation Plan for those areas of the United States designated as nonattainment or maintenance areas for any criteria air pollutants under the CAA (40 CFR parts 51 and 93 Subpart B). The purpose of the General Conformity Rule is to ensure that applicable federal activities do not cause or contribute to new violations of the NAAQS, do not worsen existing violations of the NAAQS, and do not delay attainment of the NAAQS. A conformity

review must be completed for every applicable Navy action that generates emissions to determine and document whether a proposed action requires a conformity determination to comply with the General Conformity Rule. The Proposed Action occurs in an attainment area and does not include emissions of pollutants in any areas that are in nonattainment or maintenance of those pollutants; therefore, the action is not subject to the General Conformity Rule.

3.1.2.2 National Environmental Policy Act

Analysis of health-based air quality impacts under NEPA includes estimates of criteria air pollutants, HAPs, and greenhouse gases occurring as result of a federal action occurring onshore out to the U.S. territorial sea limits (within 12 nautical miles) for all construction or transport activities or those that involve vessels in U.S. territorial seas. In determining the total direct and indirect emissions caused by the action, agencies must project the future emissions in the area with the action versus the future emissions without the action, which NEPA entitles "the Baseline Condition/Affected Environment." Total direct and indirect emissions consider all emission increases and decreases that are reasonably foreseeable and are possibly controllable through an agency's continuing program responsibility to affect emissions.

For nonattainment and maintenance criteria pollutants, the conformity *de minimis* levels are useful as NEPA analysis screening thresholds to determine significance. For these pollutants, the General Conformity "*de minimis*" thresholds are identical to "major source" thresholds applicable to new stationary sources under the federal CAA. As such, they represent reasoned decisions under two regulatory programs as quantities that represent thresholds of increased concern. The thresholds are lowered as the air quality of a nonattainment or maintenance area worsens. For example, the threshold for an ozone precursor is 10 tons per year (tpy) in an extreme nonattainment area, but 100 tpy in a moderate nonattainment area.

The Prevention of Significant Deterioration (PSD) Program was adopted in the CAA under 40 CFR part 52.21. The PSD Program applies to major stationary sources of air pollutants located in attainment areas, requiring that a source demonstrates that it does not significantly deteriorate the air quality in attainment areas. Under PSD, a "major source" is defined as a facility that emits equal to or greater than 250 tons of a criteria pollutant or regulated precursor. As such, in attainment areas, the major emitting facility threshold of 250 tpy of a pollutant is the threshold of increased concern; therefore, this threshold is also a suitable screening threshold. In NEPA terms, the foregoing means that the thresholds serve as screening level thresholds of significance. That is, where emissions of a pollutant are below the threshold for a nonattainment, attainment, or maintenance area, as applicable, they would not be significant absent compounding factors, such as proximity of sensitive receptors. Where those emissions exceed the applicable threshold discussed above, they demand a harder look at factors such as region of dispersal. It should be noted that the thresholds are conservative in that they are designed to apply to stationary sources. However, the Navy is conservatively applying them to sources that may be diffused and dispersed. It should also be noted that by increasing and decreasing with the air quality of a region, these thresholds consider other activities in the region in the past and present. As such they are measures of cumulative impacts.

3.1.2.3 Greenhouse Gases

The Proposed Action is anticipated to release GHGs into the atmosphere. GHG emissions have a global impact regardless of where they are emitted. These emissions were quantified using the Navy's Aircraft Emission Support Office (AESO) Memorandum Reports for individual aircraft categories. The 3,000 feet

above ground level (AGL), which is the default mixing height above which criteria pollutants and HAPs emissions would not affect the ambient air quality, does not apply to GHG. Therefore, GHG emissions were calculated for all altitudes.

3.1.3 AFFECTED ENVIRONMENT

Okanogan D MOA and Mazama ATCAA are proposed in eastern Washington. The Okanogan MOA, Methow ATCAA, and Molson ATCAA are in airspace above Okanogan, Chelan, and Skagit Counties. The Roosevelt MOA and Republic ATCAA are in airspace above Okanogan, Ferry, Stevens, and Pend Oreille Counties in Washington State, and Bonner and Boundary Counties in Idaho. The aircraft are based at NASWI, which is located in Island County. For air resource analysis, these areas are subject to regulations promulgated by the Washington Department of Ecology and the Idaho Department of Environmental Quality. All the affected counties in the state of Washington are classified as attainment/unclassified for the NAAQS for all pollutants. Spokane County, which is a maintenance area for CO and PM_{10}, is not part of the Study Area. The Sandpoint Area in Bonner County, Idaho, is a maintenance area for the 1987 PM_{10} NAAQS. As shown in Figure 1.1-1, the Sandpoint Area is not part of the Action Area. Boundary County in Idaho is in attainment for the NAAQS for all pollutants (U.S. Environmental Protection Agency, 2023c).

3.1.4 ENVIRONMENTAL CONSEQUENCES

3.1.4.1 Sources of Emissions

The only emissions associated with the Proposed Action are aircraft emissions from redistributing of sorties under Alternative 1 (Preferred Alternative) and redistribution of sorties and addition of aircraft activities under Alternative 2. Aircraft emissions were quantified using the Navy's Aircraft Emission Support Office Memorandum Reports for individual aircraft categories. Appendix C (Air Quality Example Calculations) contains a detailed description of methodologies and emission factors used to calculate the emissions. For the purposes of assessing air quality effects under NEPA, all activities involving the use of aircraft at or below 3,000 ft. were included in emissions estimates for the criteria pollutants. In accordance with EPA guidance (U.S. Environmental Protection Agency, 1992), 40 CFR 93.153(c)(2), 3,000 feet AGL is the default mixing height above which emissions would not affect the ambient air quality. For GHG, emissions from activities below above 3,000 ft. were calculated.

3.1.4.2 Baseline Emissions

Baseline emissions were estimated for aircraft activities within the Okanogan and Roosevelt MOAs. Aircraft types and total annual sorties are based on the data analyzed in the 2010 NWTRC EIS/OEIS and presented in Table 2-2 of that EIS/OEIS. Table 3.1-2 summarizes the baseline emissions for Okanogan and Roosevelt MOAs.

Table 3.1-2: Okanogan and Roosevelt MOAs – Baseline Emissions

Mission Type	Annual Sorties	Time below 3,000 ft. (hour)	Emissions (ton/year)					
			CO	NO_x	VOC	SO_x	PM	CO_2, MT/year
EA-18G								
Air Combat Maneuvers	105	0	0.00	0.00	0.00	0.00	0.00	1,566
Electronic Warfare	293	22	0.08	1.68	0.02	0.04	0.75	6,584
Subtotal	398	22	0.08	1.68	0.02	0.04	0.75	8,151
EA-6B								
Air Combat Maneuvers	1,013	63	1.39	1.82	0.26	0.10	2.81	12,327
Electronic Warfare	2,838	284	6.24	8.14	1.16	0.44	12.59	34,543
Subtotal	3,851	348	7.63	9.95	1.42	0.54	15.40	46,870
Other Navy users (modeled as half F/A-18 and half F-35)								
Air Combat Maneuvers	30	0	0.00	0.00	0.00	0.00	0.00	284
Electronic Warfare	83	6	0.04	0.26	0.00	0.01	0.11	1,108
Subtotal	113	6	0.04	0.26	0.00	0.01	0.11	1,392
Total Baseline Emissions			**7.75**	**11.89**	**1.44**	**0.59**	**16.26**	**56,413**

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, VOC = volatile organic compounds, PM = particulate matter, SO_x = oxides of sulfur, CO_2 = carbon dioxide, MT = metric ton, ft. = feet

3.1.4.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The locations and areas of the Okanogan A/B/C MOAs and Molson and Methow ATCAAs, and Roosevelt A/B MOAs and Republic ATCAA would remain the same (Figure 2.3-1), and there would be no redistribution of the number of flights or flight profiles in the Okanogan or Roosevelt MOAs from the 2010 NWTRC EIS/OEIS (Table 2.3-1). Therefore, there would be no significant impacts on air quality.

Table 3.1-3 summarizes the No Action Alternative emissions. These emissions are different than the baseline emissions because, as shown in Table 3.1-2, the baseline emissions included EA-6B aircraft operations. Since then, the Navy has fully transitioned from EA-6B Prowler aircraft to EA-18G Growler. The emission characteristics and some of the activity data are different for two aircraft types. The No Action Alternative emissions reflect these differences. The change in emissions is primarily due to the following:

- EA-6B has higher emission rates for CO, volatile organic compounds, and PM compared to EA-18G.
- EA-18G has higher emission rates for NO_x and CO_2 compared to EA-6B.

Table 3.1-3: Okanogan and Roosevelt MOAs – No Action Alternative Emissions

Mission Type	Annual Sorties	Time below 3,000 ft. hr	Emissions (ton/year)					
			CO	NOx	VOC	SO_x	PM	CO_2, MT/year
EA-18G								
Air Combat Maneuvers	1,117	0	0.00	0.00	0.00	0.00	0.00	16,723
Electronic Warfare	3,132	235	0.87	17.91	0.17	0.45	7.96	70,294
Subtotal	4,249	235	0.87	17.91	0.17	0.45	7.96	87,017
Other Navy users (modeled as half F/A-18 and half F-35)								
Air Combat Maneuvers	30	0	0.00	0.00	0.00	0.00	0.00	284
Electronic Warfare	83	5	0.04	0.26	0.00	0.01	0.11	1,108
Subtotal	113	5	0.04	0.26	0.00	0.01	0.11	1,392
Total No Action Alternative Emissions			**0.91**	**18.17**	**0.17**	**0.46**	**8.07**	**88,409**
Baseline Emissions			**7.75**	**11.89**	**1.44**	**0.59**	**16.26**	**56,413**
Difference			**-6.84**	**6.28**	**-1.27**	**-0.14**	**-8.19**	**31,996**

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, VOC = volatile organic compounds, PM = particulate matter, SO_x = oxides of sulfur, CO_2 = carbon dioxide, MT = metric ton, ft. = feet, hr = hour

3.1.4.4 Alternative 1

Alternative 1 (Preferred Alternative) would include the addition of the Okanogan D MOA and the overlying Mazama ATCAA, with a redistribution of the number of flights and flight profiles within the existing Okanogan and Roosevelt MOAs. Alternative 1 proposes a slight decrease to overall airspace sorties. Table 3.1-4 summarizes Alternative 1 emissions, which show a decrease in all pollutant emissions, except for NO_x and CO_2, compared to the baseline, and a negligible change in emissions compared to No Action Alternative emissions due to slight differences in the total number of sorties.

3.1.4.4.1 National Environmental Policy Act Impacts from Criteria Pollutants

Alternative 1 (Preferred Alternative) would include the addition of the Okanogan D MOA and the overlying Mazama ATCAA, with a redistribution of the number of flights and flight profiles within the existing Okanogan and Roosevelt MOAs. Alternative 1 proposes a slight decrease to overall airspace sorties. As noted in Table 3.1-4, the estimated emissions for Alternative 1 (Preferred Alternative) are well below the applicable PSD major thresholds used as screening level thresholds of significance for attainment areas.

3.1.4.4.2 Greenhouse Gases

Implementation of Alternative 1 (Preferred Alternative) would contribute directly to emissions of GHGs from the combustion of fossil fuels associated with aircraft operations. The GHG emissions from implementing Alternative 1 would be the same as the GHG emissions for the No Action Alternative. Appendix C (Air Quality Example Calculations) contains the detailed calculations.

Implementation of Alternative 1 (Preferred Alternative) would not result in significant impacts on air quality since the estimated emissions are well below all applicable thresholds.

Table 3.1-4: Okanogan and Roosevelt MOAs – Alternative 1 (Preferred Alternative) Emissions

Mission Type	Annual Sorties	Time below 3,000 ft. hr	Emissions (ton/year)					
			CO	NOx	VOC	SO_x	PM	CO_2, MT/year
EA-18G								
Air Combat Maneuvers	1,131	0	0.00	0.00	0.00	0.00	0.00	16,924
Electronic Warfare	3,169	238	0.88	18.12	0.17	0.45	8.06	71,137
Subtotal	4,300	238	0.88	18.12	0.17	0.45	8.06	88,061
Other Navy users (modeled as half F/A-18 and half F-35)								
Air Combat Maneuvers	8	0	0.00	0.00	0.00	0.00	0.00	75
Electronic Warfare	22	2	0.01	0.07	0.00	0.00	0.03	294
Subtotal	30	2	0.01	0.07	0.00	0.00	0.03	370
Total Alternative 1 Emissions			**0.89**	**18.19**	**0.17**	**0.46**	**8.09**	**88,431**
Baseline Emissions			**7.75**	**11.89**	**1.44**	**0.59**	**16.26**	**56,413**
Difference (ALT 1 - Baseline)			**-6.85**	**6.30**	**-1.27**	**-0.14**	**-8.17**	**32,018**
No Action Alternative Emissions			**0.91**	**18.17**	**0.17**	**0.46**	**8.07**	**88,409**
Difference (ALT 1 - No Action Alternative)			**0.02**	**0.02**	**0.00**	**0.00**	**0.02**	**22**

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, VOC = volatile organic compounds, PM = particulate matter, SO_x = oxides of sulfur, CO_2 = carbon dioxide, MT = metric ton, ft. = feet, hr = hour

3.1.4.5 Alternative 2

Alternative 2 consists of the addition of the Okanogan D MOA and Mazama ATCAA that would occur under Alternative 1. Alternative 2 also considers an increase in the capacity of training flights. Table 3.1-5 summarizes Alternative 2 emissions, which shows higher emissions than Alternative 1, a decrease in all pollutant emissions, except for NO_x and CO_2, compared to the baseline, and a slight increase compared to No Action Alternative emissions.

Table 3.1-5: Okanogan and Roosevelt MOAs – Alternative 2 Emissions

Mission Type	Annual Sorties	Time below 3,000 ft. hr	Emissions (ton/year)					
			CO	NOx	VOC	SO_x	PM	CO_2, MT/year
EA-18G								
Air Combat Maneuvers	1,262	0	0.00	0.00	0.00	0.00	0.00	18,892
Electronic Warfare	3,538	265	0.99	20.23	0.19	0.51	9.00	79,409
Subtotal	4,800	265	0.99	20.23	0.19	0.51	9.00	98,301
Other Navy users (modeled as half F/A-18 and half F-35)								
Air Combat Maneuvers	11	0	0.00	0.00	0.00	0.00	0.00	101
Electronic Warfare	29	2	0.01	0.09	0.00	0.00	0.04	392
Subtotal	40	2	0.01	0.09	0.00	0.00	0.04	493
Total Alternative 2 Emissions			**1.00**	**20.32**	**0.19**	**0.51**	**9.03**	**98,793**
Baseline Emissions			**7.75**	**11.89**	**1.44**	**0.59**	**16.26**	**56,413**
Difference (ALT 2 - Baseline)			**-6.75**	**8.43**	**-1.25**	**-0.08**	**-7.22**	**42,381**
No Action Alternative Emissions			**0.91**	**18.17**	**0.17**	**0.46**	**8.07**	**88,409**
Difference (ALT 2 - No Action Alternative)			**0.09**	**2.15**	**0.02**	**0.05**	**0.96**	**10,385**

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, VOC = volatile organic compounds, PM = particulate matter, SO_x = oxides of sulfur, CO_2 = carbon dioxide, MT = metric ton, ft. = feet, hr = hour

3.1.4.5.1 National Environmental Policy Act Impacts from Criteria Pollutants

Alternative 2 consists of the addition of the Okanogan D MOA and Mazama ATCAA that would occur under Alternative 1. Alternative 2 also considers an increase in the capacity of training flights. As noted in Table 3.1-5, the estimated emissions for Alternative 2 are well below the applicable PSD major thresholds used as screening level thresholds of significance for attainment areas.

3.1.4.5.2 Greenhouse Gases

Implementation of Alternative 2 would contribute directly to emissions of GHGs from the combustion of fossil fuels associated with aircraft operations. Compared to the No Action Alternative, the GHG emissions from implementing Alternative 2 would increase by approximately 12 percent. This is due to the proposed increase in training flights. Appendix C (Air Quality Example Calculations) contains the detailed calculations. The increase in GHG emissions represents a negligible incremental contribution to global GHG emissions and climate change.

Implementation of Alternative 2 would not result in significant impacts on air quality since the estimated emissions are well below all applicable thresholds.

3.2 BIOLOGICAL RESOURCES

For this EA, biological resources are defined as the plants and animals, including special-status species, and their habitats that occur within areas under the proposed Okanogan D MOA and Mazama ATCAA and under existing airspace (Okanogan and Roosevelt MOAs and Methow, Molson, and Roosevelt ATCAAs). For this EA, the term "special status" refers to all animal species that are listed or proposed for listing by the USFWS under the Endangered Species Act (ESA) or have been given special status by the U.S. Forest Service (Sensitive Species). The Environmental Consequences section presents an analysis of the potential impacts on biological resources with implementation of the No Action Alternative, Alternative 1, and Alternative 2. Terrestrial plants and invertebrates and aquatic plants and animals are not included in this assessment as there would be no ground-disturbing activities and the proposed aircraft activities and overflights would not impact plants, invertebrates, or aquatic habitat. In addition, because the Proposed Action involves only aircraft overflights with no ground-disturbing activities, reptiles are not addressed given they typically rely on ground vibrations to detect prey and predators, and their hearing acuity would not detect noise from aircraft overflights.

3.2.1 REGULATORY SETTING

Regulatory requirements that are applicable to the Proposed Action in the project area are listed below. A discussion of the project's compliance with applicable regulations is provided in Section 5.1 (Consistency with Other Federal, State, and Local Laws, Plans, Policies, and Regulations).

3.2.1.1 Endangered Species Act

The federal ESA (16 U.S.C. sections 1531–1544) protects federally listed threatened and endangered plant and animal species and associated designated critical habitat. Threatened species include those species that are likely to become endangered in the future. Endangered species are those species in danger of extinction throughout all or a major portion of their range. Critical habitat is the specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection. Critical habitat may also include areas that were not occupied by the species at the time of listing but are essential to its conservation.

The ESA authorizes the determination and listing of species as endangered and threatened and designation of critical habitat and provides regulatory protection for listed species and critical habitat. Each federal agency, in consultation with and with the assistance of the Secretary of the Interior pursuant to section 7(a)(2) of the ESA, is required to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat of such species. Federal agencies are to use the best scientific and commercial data available in meeting these requirements.

In the analysis for potential effects to ESA-listed species and associated critical habitat from the Proposed Action, the Navy has presented effects of the action using definitions specified in the *Endangered Species Act Consultation Handbook* (U.S. Fish and Wildlife Service & National Marine Fisheries Service, 1998). Terms used in the effects analysis are defined in 50 CFR part 402.17. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. "May affect" with respect to a species is the appropriate conclusion when an ESA-listed species might be exposed to a reasonably foreseeable consequence of the proposed action and could respond to that exposure. For critical habitat, "may affect" is the appropriate conclusion if an essential physical or biological feature may be exposed. Discountable effects are those extremely unlikely to occur. Insignificant effects relate to the size of the impact and should never reach the scale where an adverse effect would occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects.

As stated in Section 2.3 (Alternatives Carried Forward for Analysis), the Navy has identified Alternative 1 as the Preferred Alternative. Section 2.3.2 (Alternative 1 – Addition of the Okanogan D MOA and Mazama ATCAA with a Redistribution of Training Sorties Within the Existing Airspace [Preferred Alternative]). Per section 7(a)(2) of the ESA, the Navy will consult with the USFWS regarding implementation of the Preferred Alternative and the potential impacts on ESA-listed species, designated critical habitat, and species proposed for listing. The outcome of the consultation, including any terms and conditions as well as BMPs, will be incorporated into the Final EA.

3.2.1.2 Migratory Bird Treaty Act

Over 1,000 species of birds are protected in the United States under the MBTA of 1918 (16 U.S.C. sections 703–712; Ch. 128; 13 July 1918; 40 Stat. 755 as amended). A migratory bird is any species or family of birds that live or reproduce in or migrate across international borders at some point during their annual life cycle. The MBTA establishes federal responsibilities for the protection of nearly all species of birds, eggs, and nests.

In 2006, the USFWS and U.S. DoD signed a Memorandum of Understanding (MOU) to promote conservation of migratory birds (U.S. Department of Defense, 2006). The conservation of migratory bird populations by federal agencies is mandated by EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. In February 2007, 50 CFR part 21.15 was promulgated and stated that the Armed Forces may take migratory birds incidental to military readiness activities provided that, for those ongoing or proposed activities that the Armed Forces determine may result in a significant adverse effect on a population of a migratory bird species, the Armed Forces must confer and cooperate with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate such significant adverse effects. Military readiness activities, as defined in Public Law 107314, section 315(f) in the 2003 National Defense Authorization Act, includes all training and operations of the Armed Forces

that relate to combat, and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. In April 2007, further guidance was issued by the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics on implementing the MOU to Promote the Conservation of Migratory Birds between the USFWS and DoD in accordance with EO 13186. This guidance covers all DoD-sponsored actions, including natural resources management, routine maintenance and construction, industrial activities, and hazardous waste cleanups.

In December 2017, the U.S. Department of the Interior issued M-Opinion 37050 (U.S. Department of the Interior, 2017), which concluded that the take of migratory birds from an activity is not prohibited by the MBTA when the underlying purpose of that activity is not the take of a migratory bird. USFWS interprets the M-Opinion to mean that the MBTA's prohibition on take does not apply when the take of birds, eggs, or nests occurs as a result of an activity, the purpose of which is not to take birds, eggs, or nests. On January 7, 2021, the USFWS issued a final rule (86 Federal Register [FR] 1134), effective February 8, 2021, determining that the MBTA's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same, applies only to actions directed at migratory birds, their nests, or their eggs. However, the USFWS delayed the implementation of the final MBTA rule until March 8, 2021, in conformity with the Congressional Rule Act (86 FR 8715). On October 4, 2021, the USFWS published a final rule revoking the January 7, 2021, rule (86 FR 54642). This final rule was effective December 3, 2021.

3.2.1.3 Bald and Golden Eagle Protection Act

In addition to the MBTA, bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. section 668). The Act states that no one, without a permit issued by the Secretary of the Interior, may take bald or golden eagles, including their parts, nests, or eggs. Take is defined as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." In addition, BGEPA further defines disturbance as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

3.2.2 AFFECTED ENVIRONMENT

The region of influence (ROI) for biological resources for the Proposed Action consists of the areas underlying the existing and proposed airspace (Figure 1.1-1). These areas may be subject to potential impacts from aircraft overflights and the associated noise from aircraft operations.

3.2.2.1 Birds

The North American Bird Conservation Initiative is an endeavor to increase the effectiveness of bird conservation at the continental level and currently includes the United States, Canada, and Mexico. The USFWS has adopted bird conservation regions as the smallest geographic scale at which they identify Birds of Conservation Concern (U.S. Fish and Wildlife Service, 2008; U.S. North American Bird Conservation Initiative, 2000).

The existing and proposed airspace extension includes parts of two bird conservation regions—Region 9 (Great Basin) and Region 10 (Northern Rockies). Region 9 is a large and complex region that includes the Northern Basin and Range, Columbia Plateau, and the eastern slope of the Cascade Range and spans portions of California, British Columbia, Idaho, Nevada, Oregon, Utah, and Washington. This area is dry due to its position in the rain shadow of the Cascade Range and the Sierra Nevada. Grasslands, sagebrush, and other shrubs dominate the flats and lowlands, with piñon-juniper woodlands and open ponderosa pine forests on higher slopes. Wetlands and ponding basins provide habitat for many migrating and resident waterfowl, such as the American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicanus*), willet (*Tringa semipalmata*), and Wilson's phalarope (*Phalaropus tricolor*). The region is also important for breeding mountain plover (*Charadrius montanus*) and snowy plover (*Charadrius nivosus*). Most of North American breeding white-faced Ibis (*Plegadis chihi*) and California gulls (*Larus californicus*) nest in marshes and lakes scattered across the region. Region 10 encompasses the more mountainous regions of the northern Rocky Mountains. Species of note include high priority forest birds, such as the flammulated owl (*Psiloscops flammeolus*), black-backed woodpecker (*Picoides arcticus*), olive-sided flycatcher (*Contopus cooperi*), Townsend's warbler (*Setophaga townsendi*), and rufous hummingbird (*Selasphorus rufus*) (U.S. North American Bird Conservation Initiative, 2021).

3.2.2.2 Mammals

Many small mammals are found under the existing and proposed extended airspace including coast mole (*Scapanus orarius*), voles (*Microtus* spp.), bushy-tailed woodrat (*Neotoma cinerea*), American pika (*Ochotona princeps*), North American deermouse (*Peromyscus maniculatus*), mountain cottontail (*Sylvilagus nuttallii*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), American badger (*Taxidea taxus*), long-tailed weasel (*Mustela frenata*), hoary bat (*Lasiurus cinereus*), California myotis (*Myotis californicus*), and silver-haired bat (*Lasionycteris noctivagans*). Larger ungulates include mule deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus canadensis nelsoni*), and moose (*Alces americanus*). Larger carnivorous species include black bear (*Ursus americanus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and cougar (*Felis concolor*).

3.2.2.3 Special-Status Species

Special-status species that occur beneath existing and proposed airspace are listed in Table 3.2-1.

The Sensitive Species list of Region 6 of the U.S. Forest Service lists 11 bird species as sensitive and that occur in either the Okanogan-Wenatchee National Forest or the Colville National Forest beneath the existing and proposed airspace (Table 3.2-1). In addition, the ESA-listed northern spotted owl (*Strix occidentalis caurina*) and yellow-billed cuckoo (*Coccyzus americanus*) are found in the ROI.

The Sensitive Species list of Region 6 of the U.S. Forest Service lists eight mammals as sensitive and that occur in either the Okanogan-Wenatchee National Forest or the Colville National Forest beneath the existing and proposed airspace (Table 3.2-1). In addition, four species are listed under the federal ESA and may occur in the ROI: grizzly bear (*Ursus arctos horribilis*), Canada lynx (*Lynx canadensis*), gray wolf (*Canis lupus*), and North American wolverine (*Gulo luscus*). These species are discussed below.

Table 3.2-1: Special-Status Species Underlying the Proposed Airspace Extension

Common Name (Scientific Name)	USFWS Status	USFS Status[1]	State Status[1]	Occurrence under Proposed Airspace[1,2]	Occurrence under Existing Airspace[1,2]	CH under Proposed Airspace	CH under Existing Airspace
Birds							
American white pelican (*Pelecanus erythrorhynchos*)	-	S	T	Yes	Yes	NA	
Bald eagle (*Haliaeetus leucocephalus*)	BGEPA	S	-	Yes	Yes	NA	
Common loon (*Gavia immer*)	-	S	-	Yes	Yes	NA	
Gray flycatcher (*Empidonax wrightii*)	-	S	-	Yes	No	NA	
Great gray owl (*Strix nebulosa*)	-	S	-	Yes	Yes	NA	
Harlequin duck (*Histrionicus histrionicus*)	-	S	-	Yes	Yes	NA	
Lewis's woodpecker (*Melanerpes lewis*)	-	S	-	Yes	Yes	NA	
Long-billed curlew (*Numenius americanus*)	-	S	-	Yes	Yes	NA	
Northern goshawk (*Accipiter gentilis*)	-	S	-	Yes	Yes	NA	
Northern spotted owl (*Strix occidentalis caurina*)[3]	T, CH	-	-	Yes	Yes	Yes	Yes
Sandhill crane (*Grus canadensis*)	-	S	E	Yes	Yes	NA	
Yellow-billed cuckoo (*Coccyzus americanus*)[9]	T, CH	-	E	No	Yes	CH not within the Action Area	
White-headed woodpecker (*Picoides albolarvatus*)	-	S	-	Yes	Yes	NA	

Table 3.2-1: Special-Status Species Underlying the Proposed Airspace Extension (continued)

Common Name (Scientific Name)	USFWS Status	USFS Status[1]	State Status[1]	Occurrence under Proposed Airspace[1,2]	Occurrence under Existing Airspace[1,2]	CH under Proposed Airspace	CH under Existing Airspace
Mammals							
Bighorn sheep (*Ovis canadensis*)	-	S	-	Yes	Yes	NA	
Canada lynx (*Lynx canadensis*)[5]	T, CH	-	-	Yes	Yes	Yes	Yes
Cascade red fox (*Vulpes cascadensis)*	-	S	-	Yes	No	NA	
Gray wolf (*Canis lupis*)[6]	E	S	E	Yes	Yes	No	No
Grizzly bear (*Ursus arctos horribilis*)[7]	T	-	-	Yes	Yes	NA	
Little brown bat (*Myotis lucifugus*)	-	S	-	Yes	Yes	NA	
Mountain goat (*Oreamnos americanus*)	-	S	-	Yes	No	NA	
North American wolverine (*Gulo luscus*)[8]	T	-	-	Yes	Yes	NA	
Pygmy shrew (*Sorex hoyi*)	-	S	-	No	Yes	NA	
Red-tailed chipmunk (*Neotamias ruficaudus*)	-	S	-	No	Yes	NA	
Western gray squirrel (*Sciurus griseus*)	-	S	T	Yes	Yes	NA	

Notes: - = not listed, CH = critical habitat, E = endangered, NA = not applicable, S = Sensitive, T = threatened, USFS = U.S. Forest Service, Region 6, USFWS = U.S. Fish and Wildlife Service

Sources: [1](Nature Mapping Foundation, 2023); [2](U.S. Forest Service, 2019); [3]55 Federal Register (FR) 26114, 86 FR 62606; [4]79 FR 59992, 86 FR 20798; [5]65 FR 16053, 79 FR 54782; [6]43 FR 9607; [7]40 FR 31734; [8]78 FR 7864.

3.2.2.3.1 Northern Spotted Owl

The northern spotted owl was listed in 1990 as threatened throughout its range primarily due to loss and adverse modification of suitable habitat as a result of timber harvesting, habitat changes that are exacerbated by catastrophic events such as fire, volcanic eruption, disease, and wind storms (55 FR 26114). Recent reviews have more specifically identified competition with the barred owl (*Strix varia*), and fire in the relatively dry east Cascades and Klamath provinces of California and Oregon (where other northern subspecies occur) as greater threats than previously considered. New potential threats of unknown magnitude to the subspecies include West Nile virus and the sudden oak death tree disease (U.S. Fish and Wildlife Service, 2011). Populations of the northern spotted owl are declining over time, with populations in Washington highlighting this trend (Franklin et al., 2021; Hollenbeck et al., 2018).

Over half of the nesting/roosting habitat occurs in the central (core) portions of the owl's range, within the Western Cascades of southern Oregon and Northern California (Franklin et al., 2021). Northern spotted owls generally inhabit older forested habitats that are characterized by dense canopy closure because they contain the structural characteristics required for nesting, roosting, and foraging. Although they are known to nest, roost, and feed in a wide variety of habitats, northern spotted owls prefer a multi-layered, multi-species canopy with moderate to high canopy closure. Typically, forests do not attain these characteristics until they are at least 150–200 years old (Hollenbeck et al., 2018).

Spotted owl nest locations have been documented up to about 5,000 ft. in parts of the Cascade Range. Within the Cascade Range, the density of spotted owls is generally higher in the south and becomes sparse north of Lake Chelan, the Skagit River, and underlying the proposed Okanogan D MOA (Buchanan, 2023).

A total of 2.9 million acres of northern spotted owl critical habitat was designated within Washington State in 2012 (77 FR 71876). Critical Habitat Unit 7 (East Cascades North [ECN]), and specifically the ECN-1 subunit, occurs within the ROI. The ECN–1 subunit consists of approximately 102,000 acres in Whatcom, Skagit, and Okanogan counties and comprises lands managed by the U.S. Forest Service (Figure 3.2-1). ECN–1 is located primarily in the watershed of the Methow River and includes a small portion of the upper Skagit River watershed. Ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*) forest are dominant at low elevations, Douglas-fir/grand fir (*Abies grandis*) mixed conifer forest are characteristic of mid-elevations, and higher elevations support forests of silver fir (Abies alba), hemlock (*Tsuga heterophylla*), and subalpine fir (*Abies lasiocarpa*).

At the time of critical habitat designation, the USFWS identified four primary constituent elements (PCEs) that are specific elements of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species (77 FR 71876). The PCEs for northern spotted owl critical habitat are listed below:

- PCE 1: Forest types that may be in early-, mid-, or late-seral stages and that support the northern spotted owl across its geographical range.
- PCE 2: Habitat that provides for nesting and roosting.
- PCE 3: Habitat that provides for foraging.
- PCE 4**:** Habitat to support the transience and colonization phases of dispersal.

Of the 2.9 million acres of northern spotted owl critical habitat within Washington, 6,700 acres underlies the current Okanogan A and B MOAs, and an additional 51,566 acres would be under the proposed Okanogan D MOA (Figure 3.2-1).

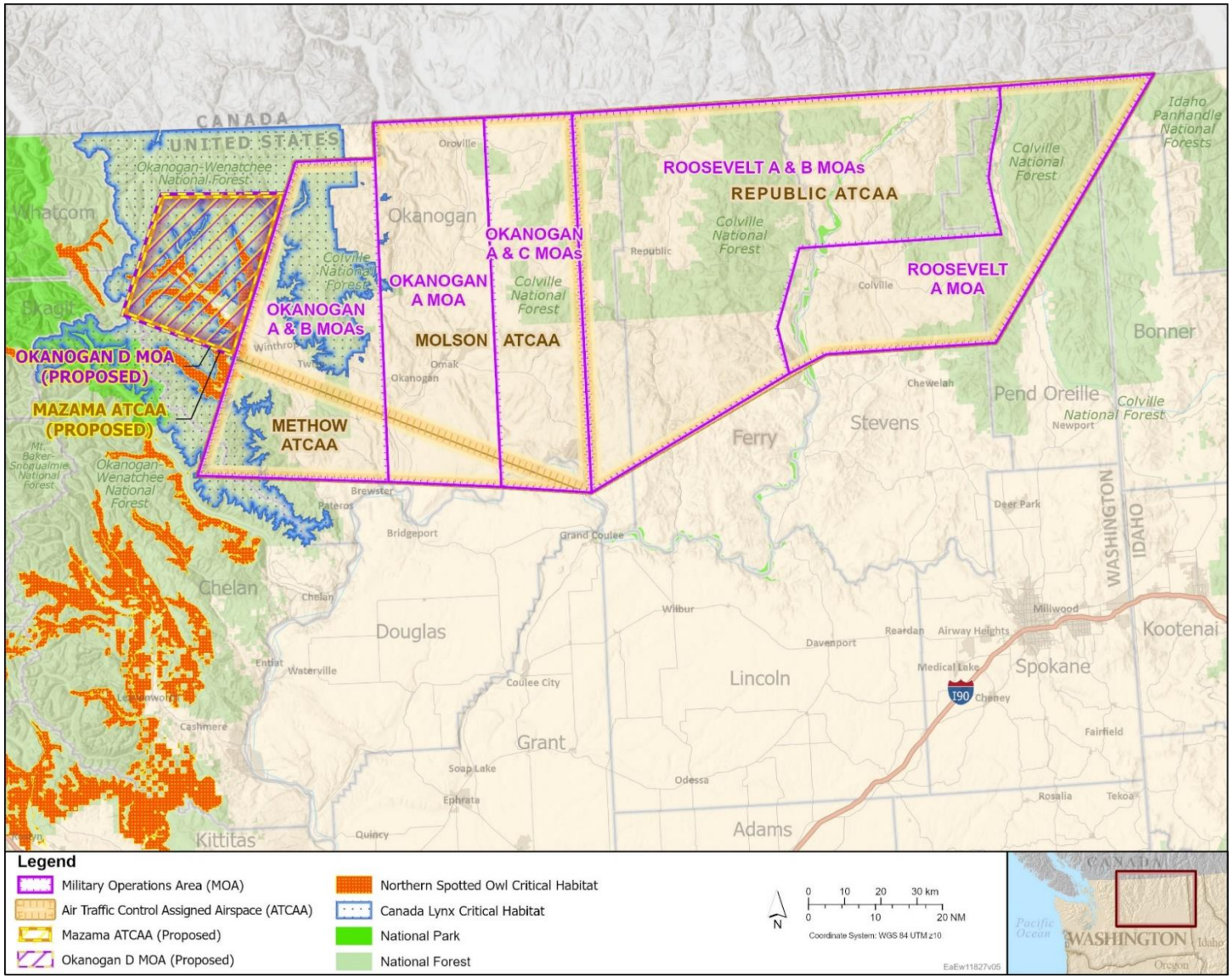

Figure 3.2-1: Designated Critical Habitat for the Northern Spotted Owl and Canada Lynx Within the ROI

3.2.2.3.2 Yellow-billed Cuckoo

The yellow-billed cuckoo was listed as a threatened species in 2014, due primarily to habitat loss and degradation within its riparian habitat (79 FR 59992). The yellow-billed cuckoo is a Neotropical migrant that winters in South America and breeds in North America. The geographical breeding range of the cuckoo in western North America (i.e., Western Distinct Population Segment) formerly included suitable habitat within the low- to moderate-elevation areas west of the crest of the Rocky Mountains in Canada, Mexico, and the United States, including the upper and middle Rio Grande, the Colorado River Basin, the Sacramento and San Joaquin River systems, the Columbia River system, and the Fraser River. Currently, the species no longer breeds in western Canada and the northwestern continental United States (Washington, Oregon, and Montana) (79 FR 59992).

Although the yellow-billed cuckoo has not been confirmed as breeding in Washington state since 1940 and is considered by the Washington Department of Fish and Wildlife as functionally extirpated in the state (Washington Department of Fish and Wildlife, 2023a). Based on Washington Department of Fish and Wildlife records, there have been 20 sightings of cuckoos in Washington since the 1950s, with 19 occurring from 1974 to 2016 at an average rate of one sighting every 2.3 years. Of the 20 records, 16 occurred in eastern Washington. All or nearly all of the birds recorded since the 1950s were very likely non-breeding vagrants or migrants (Washington Department of Fish and Wildlife, 2023b). In addition, per USFWS records, cuckoos have also been observed in Stevens County within the Little Pend Oreille National Wildlife Refuge (underlying the existing Roosevelt A MOA) in 2012, 2017, and 2019, and within Okanogan County northeast of Winthrop (underlying the proposed Okanogan D MOA) in 2015 (U.S. Fish and Wildlife Service, 2023). Therefore, there have been a total of 24 sightings of yellow-billed cuckoos in Washington state since the 1950s.

Critical habitat has been designated in Arizona, California, Colorado, Idaho, New Mexico, Texas, and Utah (86 FR 20798); therefore, yellow-billed cuckoo critical habitat does not occur within the ROI.

3.2.2.3.3 Grizzly Bear

The grizzly bear is federally listed as threatened in 1975 (40 FR 31734). Grizzly bears were once present across much of western North America, but extensive habitat loss and direct killing of individual bears through most of the 1900s reduced range and numbers of grizzly bears to 2 percent of their historical levels (Ransom et al. 2023). The decreases in historical range, the isolated nature of existing populations, the building of roads and trails in formerly secure grizzly bear habitat, and livestock practices on National Forests contributed to the decline in grizzly bear populations. Their current range is now estimated to be 6 percent of their historical range and includes Alaska, western and northern Canada, and the northern Rocky Mountains through the Selkirk Mountains in northwest Idaho and northeast Washington (U.S. Fish and Wildlife Service Grizzly Bear Recovery Office, 2022).

Currently, grizzly bears primarily occur only in four ecosystems or recovery zones: the Northern Continental Divide in northwest central Montana, Greater Yellowstone, Cabinet-Yaak in northwest Montana and northeast Idaho, and Selkirk in northeastern Washington and northern Idaho (Figure 3.2-2). There are no known populations in the North Cascades in north-central Washington State and the Bitterroot ecosystem of central Idaho, and no known populations outside these defined ecosystems. The grizzly bear is considered extirpated from the North Cascades ecosystem, a portion of which underlies the existing Okanogan A and B MOAs and Methow and Molson ATCAAs, and the proposed Okanogan D MOA/Mazama ATCAA (Figure 3.2-2). In 2019, approximately 44 bears were estimated to occur within the Selkirk Recovery Zone in the northeastern corner of Washington (Ransom et al., 2023; U.S. Fish and Wildlife Service Grizzly Bear Recovery Office, 2022).

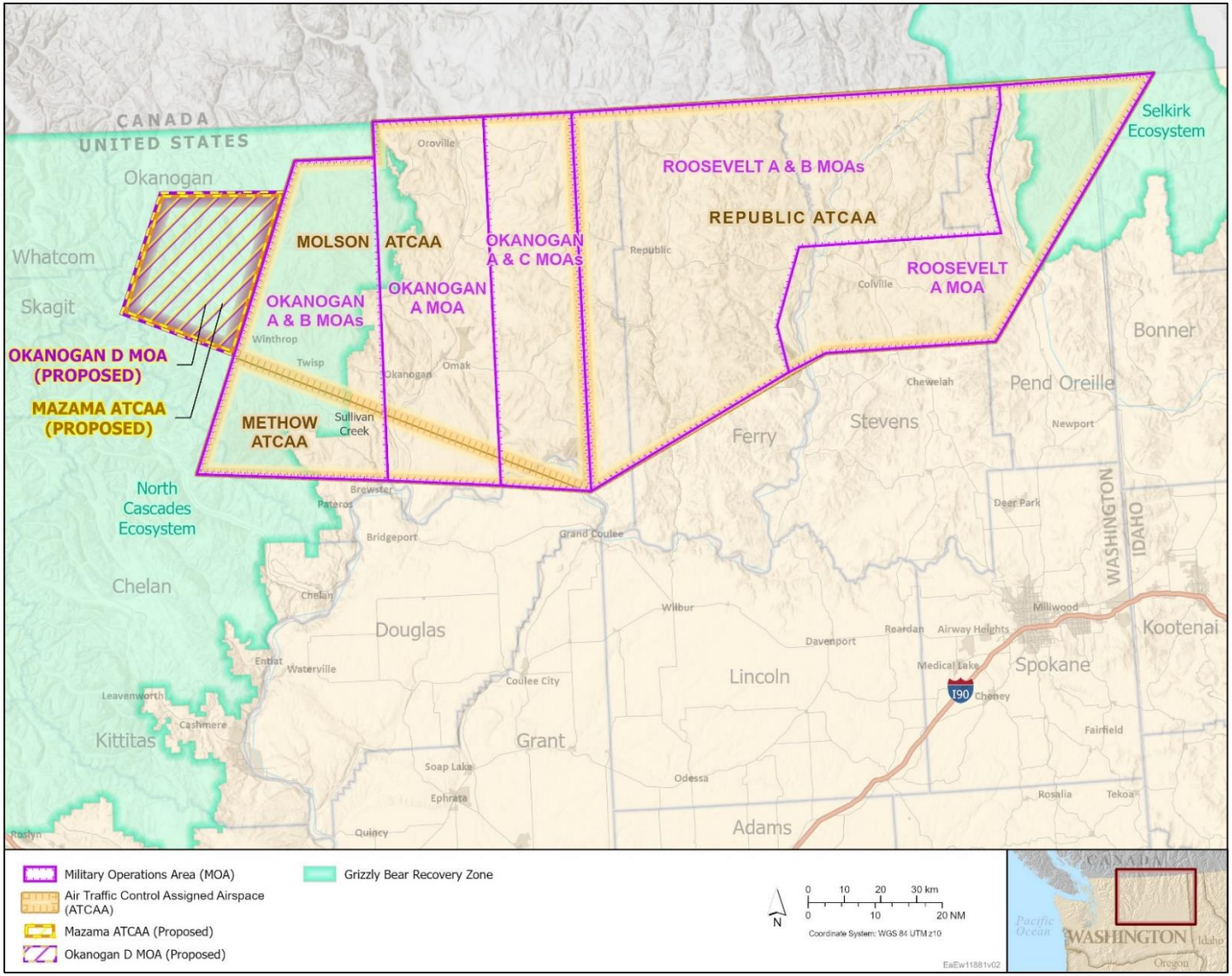

Figure 3.2-2: Grizzly Bear Recovery Zones Within the ROI

In 2017, the USFWS and National Park Service released a Draft EIS assessing a number of alternatives to recover the grizzly bear population in the North Cascades. However, in July 2020 the USFWS and National Park Service announced that they would discontinue the proposal to develop and implement a Grizzly Bear Restoration Plan for the North Cascades Ecosystem (U.S. Fish and Wildlife Service Grizzly Bear Recovery Office, 2022). In September 2023, the USFWS published a proposed rule to establish a nonessential experimental population of the grizzly bear within the U.S. portion of the North Cascades Ecosystem in the State of Washington under section 10(j) of the ESA (88 FR 67193) (Figure 3.2-2).

3.2.2.3.4 Gray Wolf

The gray wolf is listed as federally endangered in the western two-thirds of Washington. The Northern Rocky Mountains Distinct Population Segment (the population segment east of Highway 97) was delisted in 2009 and is no longer protected under the ESA (Figure 3.2-3) (74 FR 15123). Wolves were formerly common throughout most of Washington but declined rapidly from being aggressively killed during the expansion of ranching and farming between 1850 and 1900. They were eliminated as a breeding species from the state by the 1930s.

Gray wolves are highly social and form packs consisting of a breeding male and female, pups from the current year and previous years, and sometimes other individuals. Typical pack size in the northern U.S. Rockies is 5–10 animals. Packs defend territories that generally average 193–386 square miles. One litter, usually numbering four to six pups, is born each year in April. The primary prey of wolves is elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), and moose (*Alces alces*). In western North America, the species preferred habitat is generally found in forests and nearby open habitats characterized by lower elevations and gentle terrain, especially during winter (Washington Department of Fish and Wildlife, 2015).

In 2008, wolves and wolf pups began to naturally return to northeastern Washington from packs in British Columbia. By 2011, the Washington Department of Fish and Wildlife developed a recovery plan for the gray wolf, which established three wolf recovery areas (Eastern Washington, Northern Cascades, and Southern Cascades and Northwest Coast) (Wiles et al., 2011). Currently, there are 41 uniquely named packs in Washington, and to date, recovery goals had been met in the Northern Cascades and Eastern Washington Wolf Recovery Regions (Washington Department of Fish and Wildlife, 2022).

Within the ROI, the ESA-listed gray wolf population occurs only in the Northern Cascades Recovery Region, which underlies the existing Okanogan A and B MOAs and the proposed Okanogan D MOA (Figure 3.2-3). Six wolf packs totaling approximately 38 individuals occur under the existing Okanogan A & B MOAs: Chopaka (2 individuals), Loup (10 individuals), Chewuch (10 individuals), Lookout (6 individuals), Navarre (5 individuals), and Sullivan Creek (5 individuals) (Figure 3.2-4) (Washington Department of Fish and Wildlife, 2022). Only the Chewuch and Lookout wolf packs are known to occur under the proposed Okanogan D MOA/Mazama ATCAA.

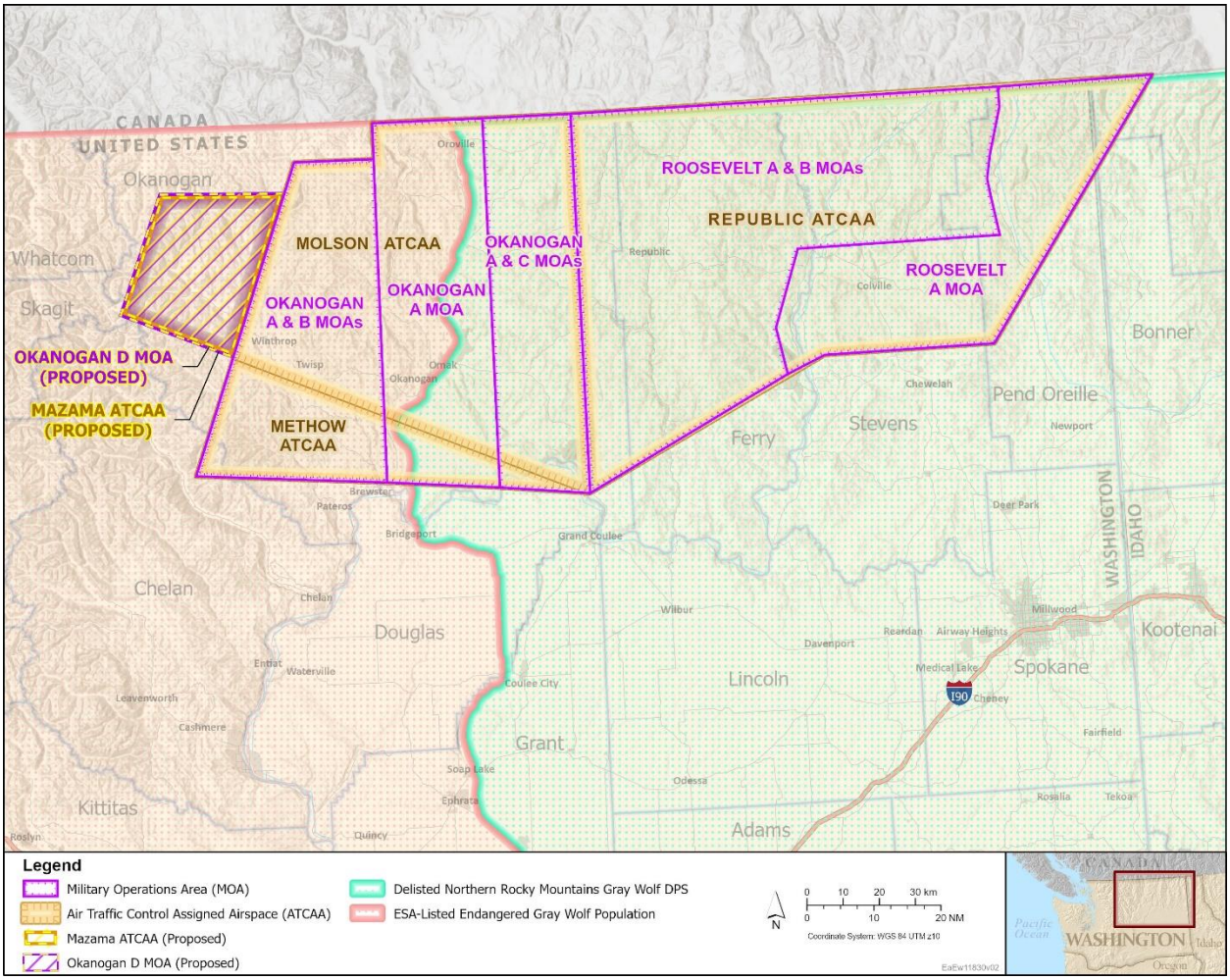

Figure 3.2-3: Current Status of Gray Wolf Populations in Northern Washington State

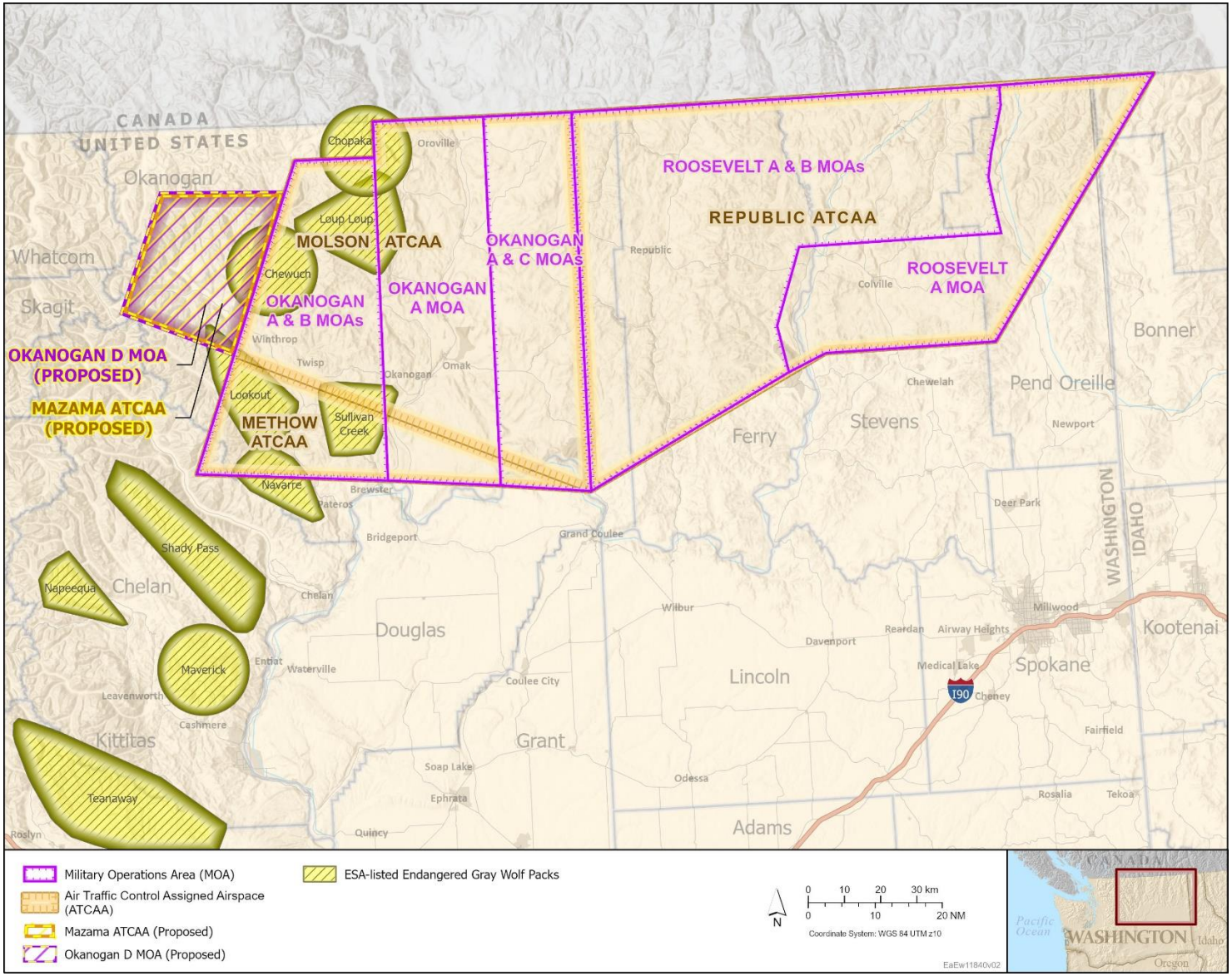

Figure 3.2-4: Gray Wolf Packs Within the ROI

3.2.2.3.5 Canada Lynx

The Canada lynx was federally listed as threatened in 2000 (65 FR 16052). Lynx in the United States are at the southern margins of more dense populations in Canada and Alaska. At the time of listing, the range of the lynx was defined as the forested portions of 14 states: 4 in the Northeast Region, 3 in the Great Lakes Region, and 7 in the West Region. However, resident and breeding populations occurred only in Washington, Montana, Maine, Wyoming, and Minnesota. Introduced lynx are also breeding in Colorado (Interagency Lynx Biology Team, 2013).

Lynx are best known for their unique association with a single prey item, the snowshoe hare (*Lepus americanus*). The density of lynx populations oscillates in relation to the density of snowshoe hare. Lynx habitat in Washington includes subalpine and boreal coniferous forests higher than 4,600 ft. in elevation that have substantial accumulations of snow during the late fall, winter, and early spring. Lynx typically hunt for snowshoe hares in early successional forest, where hares are most abundant. Females commonly use mature forest stands for denning, and their den sites are often located in tangled piles of fallen trees (Washington Department of Fish and Wildlife, 2015).

Historically, lynx were found in Okanogan County, south through Chelan County and across Ferry, Steven, and Pend Oreille counties to Idaho. Washington contains one of the last and largest Canada lynx populations in the United States. Washington State represents approximately 0.5 percent of the total area occupied by lynx. However, Washington may support a significant proportion of the resident populations of lynx in the United States (79 FR 54782). A small population of a few dozen Canada lynx occupies high-elevation forests in the North Cascades, primarily north of Lake Chelan and east of Ross Lake, including the Pasayten Wilderness and Loomis State Forest underlying the existing Okanogan A and B MOAs and proposed Okanogan D MOA. A few individuals also occur in eastern Washington in the Kettle River Mountain Range in Ferry County and the Selkirk Mountains in Pend Oreille County underlying the Roosevelt A and B MOAs (Conservation Northwest, 2021).

Critical habitat for Canada lynx was designated in 2006 and amended in 2014 (79 FR 54782) (Figure 3.2-1). Per the final rule designating critical habitat (79 FR 54782), the PCE specific to lynx critical habitat in the United States is boreal forest landscapes supporting a mosaic of differing successional forest stages and containing the following:

a. Presence of snowshoe hares and their preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow, and mature multistoried stands with conifer boughs touching the snow surface;
b. winter conditions that provide and maintain deep fluffy snow for extended periods of time;
c. sites for denning that have abundant coarse woody debris, such as downed trees and root wads; and
d. matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range.

The North Cascades Critical Habitat Unit consists of 1,174,000 acres located in north-central Washington in portions of Chelan and Okanogan counties and includes mostly Okanogan-Wenatchee National Forest lands as well as Bureau of Land Management lands in the Spokane District and Loomis State Forest lands (Figure 3.2-1) (79 FR 54782). This area is the only area in the Cascades region of the lynx's range that is known to support breeding lynx populations. There are 315,803 acres of designated Canada lynx critical habitat underlying the current Okanogan A and B MOAs and Methow ATCAA, and an additional 258,677 acres of designated Canada lynx habitat would be under the proposed Okanogan D MOA/Mazama ATCAA.

3.2.2.3.6 North American Wolverine

The North American wolverine was listed as a threatened species under the ESA on November 30, 2023. During the late 1800s and early 1900s, the wolverine population declined or was extirpated in much of the lower 48 states, which has been attributed to unregulated trapping and habitat degradation (88 FR 83726).

Wolverines commonly occur in boreal forest, taiga, and tundra ecosystems. In Washington, they occupy alpine and subalpine forest habitats. Wolverine populations are characterized by naturally low densities in North America. Wolverines consume a variety of prey, and seasonal switching of prey is commonly observed (U.S. Fish and Wildlife Service, 2018).

Wolverines occur in the remote mountainous areas of the Cascades and in northeastern Washington. In the Cascade Range, wolverines occupy high-elevation landscapes from North Cascades National Park and Okanogan-Wenatchee National Forest, south to Mount Adams on the Gifford Pinchot National Forest. Wolverines were extirpated from Washington in the mid-1900s as a result of predator control and persecution; however, they became reestablished in the North Cascades beginning in the 1990s and in the South Cascades (i.e., south of Interstate 90) by 2008. Reproduction has been documented in the Northern Cascades since 2005, and litters of wolverine kits were photographed in the vicinity of Mount Rainier National Park in 2018 and 2020. The population in the Cascades is probably less than 25 individuals; however, this population appears to be relatively stable. Wolverines that occupy the North Cascades region are known to move from Washington into British Columbia (U.S. Fish and Wildlife Service, 2018; Washington Department of Fish and Wildlife, 2023a).

3.2.3 Environmental Consequences

3.2.3.1 Evaluation Criteria and Stressors

The Navy has identified one stressor type for assessing potential impacts on biological resources resulting from implementation of the No Action Alternative, Alternative 1 (Preferred Alternative), and Alternative 2: noise from aircraft overflights within the ROI.

Distance from the noise source (aircraft) to a receptor (e.g., a bird or mammal) is a primary determiner of the received level of noise. Because the aircraft operate at varying altitudes within the allowed airspace dimensions and due to the varying terrain elevations beneath the airspace, specific received levels and durations are not possible to calculate. However, these variables were all considered to derive the Day-Night Average Sound Level (DNL) and Onset-Rate Adjusted Day-Night Average Sound Level, as explained in Appendix B (Noise Analysis for the Eastern Washington Airspace Extension). In addition, maximum received noise levels (L_{max} A-weighted decibels [dBA]) were also calculated for the primary aircraft (EA-18G) at various altitudes with respect to a potential receptor on the ground.

For comparison, the Navy also evaluated a Baseline of activities involving aircraft that are no longer in active Navy service. This baseline considers flight activities in the Okanogan and Roosevelt MOAs in 2010 when an analysis was conducted in the NWTRC EIS/OEIS (U.S. Department of the Navy, 2010). The 2010 NWTRC EIS/OEIS included both EA-6B aircraft and EA-18G aircraft. At this time the Navy was transitioning from the EA-6B to the EA-18G, and the 2010 flight activities were comprised predominantly of EA-6B aircraft. For a Baseline comparison, the analysis included in Appendix B (Noise Analysis for the Eastern Washington Airspace Extension) indicates a range of DNL from 40.8 dBA at the lower elevations to 62.7 dBA at the higher elevations.

The proposed Okanogan D MOA would have a floor of 11,500 ft. MSL and a ceiling of 18,000 ft. MSL, and the Mazama ATCAA (overlying the same area as the proposed Okanogan D MOA) would have a floor of

18,000 ft. MSL and a ceiling up to 25,000 ft. MSL. However, based on proposed flight profiles, approximately 80 percent of proposed flights throughout the existing Okanogan and Roosevelt MOAs would be at or above 15,000 ft. MSL, or above 10,000 ft. AGL. All of these facts were utilized in the noise modeling analysis conducted to estimate baseline and proposed noise levels (Appendix B, Noise Analysis for the Eastern Washington Airspace Extension).

3.2.3.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The locations and areas of the Okanogan A/B/C MOAs and Molson and Methow ATCAAs, and Roosevelt A/B MOAs and Republic ATCAA would remain the same (Figure 2.3-1), and there would be no redistribution of the number of flights or flight profiles in the Okanogan or Roosevelt MOAs from the 2010 NWTRC EIS/OEIS (Table 2.3-1). Therefore, there would be no significant impacts on biological resources.

3.2.3.2.1 Potential Impacts on Wildlife

Numerous studies have documented that wild animals respond to human-made noise, including low-altitude aircraft overflights (Bowles, 1995; Lamp, 1989; Larkin et al., 1996; Manci et al., 1988; National Park Service, 1994). The manner in which animals respond to overflights depends on several factors, including life-history characteristics of the species, characteristics of the noise source, loudness, how suddenly the sound occurs (onset rate), distance from the noise source, the presence or absence of associated visual stimuli, and previous exposure to the sound. Noise from aircraft overflights may cause physiological or behavioral responses that reduce the animals' fitness or ability to survive. Researchers have documented a range of behavioral responses to overflights, ranging from indifference to extreme panic. Common behavioral responses include alert behavior, startle response, flying or running away, and increased vocalizations (Grubb & Bowerman, 1997; Krausman et al., 1998; Larkin et al., 1996; National Park Service, 1994; Weisenberger et al., 1996). In some instances, behavioral responses could interfere with breeding, raising young, foraging, habitat use, and physiological energy budgets, particularly when an animal continues to respond to repeated exposures.

Most studies have focused on ungulates and birds, while little or no research has been conducted on carnivorous mammals, small mammals, reptiles, and amphibians. While difficult to measure in the field, some behavioral responses are likely accompanied by physiological responses, such as increased heart rate, or stress. Chronic stress can compromise the general health of animals, but a strong and consistent behavioral or physiological response is not necessarily indicative of negative consequences to individuals or to populations (Bowles, 1995; Larkin et al., 1996; National Park Service, 1994). For example, many of the reported behavioral and physiological responses to noise are within the range of normal adaptive responses to external stimuli, such as predation, that wild animals face on a regular basis. Unless repeatedly exposed to loud noises or simultaneously exposed to synergistic stressors, it is possible that individuals would return to homeostasis almost immediately after exposure, and the individual's overall metabolism and energy budgets would not be affected. If the individual does not recover before another exposure, physiological responses could be cumulative and lead to reduced fitness. It is also possible that an individual would have an avoidance reaction (i.e., move away from the noise source) to repeated exposure. Studies have also shown that animals can become habituated to noise following frequent exposure and cease to respond behaviorally to the noise (Bowles, 1995; Larkin et al., 1996; National Park Service, 1994). Aircraft noise is generally thought to be most detrimental during periods of stress such as winter, gestation, and nesting (Pepper et al., 2003).

In addition to noise level, the frequency and regularity of the noise also affect species sensitivity. That is, different types of noise sources produce varied effects on different species. Noise from aircraft overflights may not produce the same response from a wildlife species as noise from a land-based source such as a vehicle, chainsaw, or gunshot. Wildlife species often do not react to a noise source when unaccompanied by a visual cue, but often do react to the visual component associated with that noise source. For example, birds may not react to just the sound of a chainsaw, but when that sound is coupled with a human walking near the bird, the bird will flush. This is also shown in reactions by various species to aircraft overflights (airplanes and helicopters). An overflight with just a sound component does not elicit a strong response, but if an animal hears and then sees the aircraft, it will more likely flush and move away (Bowles, 1995; Krausman et al., 1993; Manci et al., 1988).

A primary concern with implementation of the Proposed Action is that low-altitude overflights may cause physiological or behavioral responses that reduce the animals' fitness or ability to survive. High-noise events (like a low-altitude aircraft overflight) may cause animals to startle or engage in escape or avoidance behaviors, such as flushing or running away. These activities impose an energy cost that, over the long term, may affect survival or growth. In addition, the animals may spend less time engaged in necessary activities like feeding, foraging, or caring for their young because they spend time in noise-avoidance activity. However, most of the effects of noise are mild enough that they may never be detectable as changes in population size or population growth against the background of normal variation (Bowles, 1995). Many other environmental variables (e.g., predators, weather, changing prey base, ground-based human disturbance) may influence reproductive success and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region.

Existing aircraft activities within the ROI, comprised predominantly of EA-18G aircraft and no EA-6B aircraft, make up the No Action Alternative. It is notable that mission profiles have changed since the introduction of the EA-18G; flights now are generally conducted at higher altitudes than when the EA-6B was the predominant aircraft.

Based on the previous review of the effects of noise and jet aircraft overflights on wildlife, wildlife exposed to low-altitude aircraft overflights under the No Action Alternative could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Based on the noise modeling results described in Appendix B (Noise Analysis for the Eastern Washington Airspace Extension), the range of DNL would decrease slightly compared to the levels assessed in 2017, when the flight activity was determined to have no significant impact on ESA-listed species. The No Action Alternative DNL estimates are provided in Table 3.2-2.

Table 3.2-2: Predicted Day Night Average Sound Level (DNL dBA) by Terrain Elevation in the Action Area

Terrain Elevation (ft. AGL)	% of Area – Proposed Action	Range of Predicted Day Night Average Sound Level (DNL)		
		No Action Alternative	Alternative 1	Alternative 2
0–1,000	0.7	37.2–46.8	37.2–46.2	37.7–46.7
1,000–2,000	10.6	38.0–47.1	38.0–46.5	38.5–47.0
2,000–3,000	24.8	38.8–47.6	38.8–47.0	39.3–47.5
3,000–4,000	32.1	39.7–48.3	39.7–47.7	40.2–48.2
4,000–5,000	19.4	40.7–48.5	40.7–47.9	41.2–48.4
5,000–6,000	8.2	41.8–48.8	41.8–48.2	42.3–48.7
6,000–7,000	3.5	43.1–49.1	43.1–48.5	43.6–49.0
> 7,000	0.7	44.7–49.9	44.7–49.3	45.2–49.8

Notes: ft. = feet, AGL = above ground level

Proposed aircraft overflights would result in short-term and widely dispersed noise events within existing and proposed airspace. As an aircraft in flight gains altitude, the received noise level drops, often becoming indistinguishable from the background noise. The duration of exposure to fixed-wing aircraft noise would be very brief (seconds).

In addition, maximum received noise levels (L_{max} dBA) were also calculated for the primary aircraft (EA-18G) at various altitudes (i.e., distances) from a receptor on the ground (Table 3.2-3).

Table 3.2-3: Maximum Noise Level for the EA-18G for Different Distances from a Receptor

Distance to aircraft (ft.)	*L_{max} (dBA)*		*Distance to aircraft (ft.)*	*L_{max} (dBA)*
2,000	96.6		9,000	73.2
3,000	91.2		10,000	70.4
4,000	86.8		11,000	68.9
5,000	83.1		12,000	67.0
6,000	80.4		13,000	65.1
7,000	77.9		14,000	63.9
8,000	75.0		15,000	62.4

Notes: ft. = feet, L_{max} = maximum noise level, dBA = A-weighted decibel(s)

Aircraft overflights in the existing Okanogan and Roosevelt MOAs are not expected to result in chronic stress based on the short duration and infrequency of exposure because of the following:

1. Noise levels (DNL) in the airspace are lower than historic averages.
2. There is an overall lack of concentration of flights at a given altitude, area, and power setting.
3. There would be a relatively small number of low-altitude overflights (approximately one/day) and a relatively brief amount of time (seconds) that aircraft would be at lower altitudes.
4. Exposures would be intermittent and infrequent as training activities consist of non-continuous events.
5. The probability of an animal or specific location (e.g., nest, den) experiencing overflights more than once per day would be low due to the random nature of flight within the airspace and the large area of land overflown.
6. Short-term behavioral responses would not be expected to affect individual animal fitness or have population-level effects.
7. Individual animals would be expected to recover quickly from these responses.

3.2.3.2.2 Potential Impacts on Special-Status Species

In 2017, the Navy received concurrence from the USFWS Central Washington Field Office that aircraft flights over the existing Okanogan and Roosevelt MOAs would not adversely affect ESA-listed species (northern spotted owl, grizzly bear, gray wolf, Canada lynx, woodland caribou); designated critical habitat for the northern spotted owl, Canada lynx, and woodland caribou; and the proposed threatened North American wolverine. The USFWS determined that due to their elevation, short frequency and intermittent duration, aircraft noise would be sufficiently brief so that exposures to individuals would be immeasurable and discountable and therefore not result in adverse effects. Furthermore, proposed training activities are comprised predominantly of EA-18G aircraft, with no EA-6B aircraft (the primary aircraft assessed in the 2017 analysis (U.S. Fish and Wildlife Service, 2017)). It is notable that mission profiles have changed since the introduction of the EA-18G; flights now are generally conducted at higher altitudes than when the EA-6B was the predominant aircraft.

Fixed-wing aircraft overflights under the No Action Alternative would result in continued short-term and widely dispersed noise events within existing MOAs in accordance with current aircraft training operations. Accordingly, the Navy concludes that the No Action Alternative would not significantly impact biological resources.

3.2.3.3 Alternative 1 – Addition of the Okanogan D MOA and Mazama ATCAA With a Redistribution in Training Sorties Within the Existing Airspace (Preferred Alternative)

The Okanogan D MOA would have a floor of 11,500 ft. MSL, a ceiling of 18,000 ft. MSL, and an area of 393 NM2. The Mazama ATCAA would overlie the same area as the Okanogan D MOA and would have a floor of 18,000 ft. MSL up to 25,000 ft. MSL (Figure 2.3-2). The average elevation in the mountainous terrain beneath the Okanogan D MOA is approximately 5,000 ft. MSL. Therefore, given the floor of the proposed Okanogan D MOA is 11,500 ft. MSL and the proposed flight profiles for aircraft within the existing and proposed airspace extension, aircraft flight time below 4,000 ft. AGL would only occur approximately 322 times per year (during 7.5 percent of all annual sorties), or approximately 1.2 sorties per day would include flight time below 4,000 ft. AGL.

Alternative 1 (Preferred Alternative) consists of the extension of the airspace through the establishment of a new Okanogan D MOA and Mazama ATCAA. In addition, Alternative 1 would redistribute the number of flights and flight profiles currently within existing MOAs and ATCAAs to include the proposed Okanogan D MOA and Mazama ATCAA (Table 2.3-1). In addition, as shown in Table 2.3-1, the total number of proposed sorties within the ROI (within existing airspace and the proposed Okanogan D MOA) would decrease slightly from the 2017 analysis (U.S. Fish and Wildlife Service, 2017)—4,362 total sorties in the existing airspace in 2017 and 4,330 total sorties under the current Proposed Action within the ROI (i.e., including the proposed Okanogan D MOA).

3.2.3.3.1 Potential Impacts on Wildlife

Wildlife would be exposed to new levels of noise from fixed-wing aircraft in the proposed Okanogan D MOA and Mazama ATCAA, which would be in airspace predominately above western Okanogan County and a small areas above eastern Skagit County and northeastern Chelan County, and would also overlie the western portion of the designated Pasayten and Lake Chelan-Sawtooth National Wilderness Areas (see Figure 2.3-2). As with the No Action Alternative, wildlife exposed to low-altitude aircraft overflights under Alternative 1 could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Aircraft overflights in the Okanogan and Roosevelt MOAs, including the addition of Okanogan D MOA are not expected to result in chronic stress based on the short duration and infrequency of exposure because of the following:

1. Noise levels (DNL) in the airspace are lower than historic averages, and are slightly lower than noise modeled for the No Action Alternative.
2. There is an overall lack of concentration of flights at a given altitude, area, and power setting.
3. There would be a relatively small number of overflights below 4,000 ft. AGL (approximately one/day) and a relatively brief amount of time (seconds) that aircraft would be at lower altitudes.
4. Exposures would be intermittent and infrequent as training activities consist of non-continuous events.
5. The probability of an animal or specific location (e.g., nest, den) experiencing overflights more than once per day would be low due to the random nature of flight within the airspace and the large area of land overflown;
6. Short-term behavioral responses would not be expected to affect individual animal fitness or have population-level effects.
7. Individual animals would be expected to recover quickly from these responses.

3.2.3.3.2 Potential Impacts on Special Status Species

As the Preferred Alternative, the Navy will consult with the USFWS for activities that may potentially affect ESA-listed species and designated critical habitat in accordance with section 7(a)(2) of the ESA. In addition to the information contained in the USFWS Washington Fish and Wildlife Office's letter of concurrence for similar actions within the Okanogan and Roosevelt MOAs, the Navy conducted a literature review that included current species status information for the northern spotted owl (and critical habitat), yellow-billed cuckoo, grizzly bear, gray wolf, Canada lynx (and critical habitat), and wolverine beneath the proposed Okanogan D MOA and Mazama ATCAA. The literature review included updated information for species beneath the existing MOAs, along with a review of the most current understanding of the potential impacts of aircraft overflights on wildlife.

Northern Spotted Owl and Designated Critical Habitat. The potential exposure of spotted owls to aircraft overflights is limited to a corridor along the Chewuch River on the west edge of the Okanogan A and B MOAs and below the proposed Okanogan D MOA. This area represents the northeastern extent of the species' range in Washington. Spotted owl habitat in this area is extremely fragmented due periodic wildfires that have burned east and west of the Chewuch River over the last 15–20 years. Critical habitat is designated in the East Cascades North Unit within the ROI.

The 2016 consultation between the Navy and USFWS addressing the proposed Northwest Training and Testing program and aircraft operations over spotted owls on the Olympic Peninsula concluded that jet overflights would not result in adverse effects to spotted owls. This was based on a number of studies that assessed jet overflights over spotted owl territories and nests (Johnson & Reynolds, 2002); U.S. Air Force (2012) as cited in U.S. Fish and Wildlife Service (2016). A review of the best available information supported the conclusion that spotted owls are not likely to respond to aircraft overflights by flying or by exhibiting other behaviors that are indicative of significant stress unless they are approached very closely.

Johnson and Reynolds (2002) assessed the behavioral responses of roosting spotted owls exposed to aircraft overflights that passed at greater than 1,500 ft. AGL. Behaviors of spotted owls during 25-second fly-by periods ranged from "no response" (no body movements) to "intermediate response" (sudden movement of head, wing, or body). No spotted owls flushed from their day roosts in response to the aircraft overflights.

The 2012 U.S. Air Force study conducted a total of 282 military jet aircraft overflight experiments during the course of the six-year study (U.S. Fish and Wildlife Service, 2016). Aircraft during these experiments

approached as close as 253 ft. AGL, including 33 jet aircraft overflights that passed within a distance of ≤500 ft. AGL. Flight responses by spotted owls were not elevated above normal rates in response to military aircraft overflights. Flushing or other high intensity responses (e.g., hopping from a nest) by spotted owls were only likely to be elicited at distances much closer to spotted owls than military jet aircraft are expected to be.

Based on these findings, any exposure of spotted owls to sound from the proposed aircraft overflights is likely to result in only minor behavioral responses that are considered to be insignificant (i.e., would never reach a magnitude where take of the spotted owl is likely to occur). This conclusion is based on the relative low numbers of owls under existing MOAs and the proposed Okanogan D MOA, the unlikely occurrence of low-altitude overflights (approximately one/day), and the relatively brief amount of time (seconds) that aircraft would be at lower altitudes. In addition, the 2017 LOC that addressed affects from aircraft training operations within the existing airspace within the Action Area concluded that effects from aircraft overflights on spotted owls were discountable (U.S. Fish and Wildlife Service, 2017). Under the current Proposed Action, the addition of the Okanogan D MOA with a floor of 11,500 ft. MSL, well above the floor of existing airspace within the ROI, would not result in increased exposure of spotted owls to aircraft overflights.

Proposed aircraft overflights would only introduce noise into the environment and not result in any physical impact on spotted owl critical habitat or the associated PCEs. However, the Proposed Action would expose spotted owl prey to noise from aircraft operations and possibly impact foraging opportunities by spotted owls. In addition, given the short duration of potential exposure, owls and their prey would likely quickly return to normal behavior such that effects would be insignificant.

Although overflights proposed under Alternative 1 (Preferred Alternative) may affect northern spotted owls and designated critical habitat, effects are likely to be both discountable (unlikely to occur) and insignificant (not measurable). This conclusion is also based on the relative low numbers of owls under existing MOAs and the proposed Okanogan D MOA, the unlikely occurrence of low-altitude overflights, and the relatively brief amount of time that aircraft would be at lower altitudes.

Yellow-billed Cuckoo. Aircraft maneuvers in the proposed Okanogan D MOA and existing Roosevelt A MOA would occur over areas where the cuckoo has been irregularly observed since the 1950s. Overflights under the Proposed Action within the Roosevelt A MOA and proposed Okanogan D MOA may affect yellow-billed cuckoos within suitable habitat. Potential effects are likely to be both discountable (unlikely to occur) and insignificant (not measurable). This conclusion is based on the relatively low sightings of cuckoos (22 since the 1950s) underlying the existing and proposed airspace; the unlikely occurrence of overflights low enough to illicit a response; and the relatively brief amount of time that aircraft would be at lower altitudes.

Grizzly Bear. Aircraft maneuvers in the Okanogan MOAs, including the proposed Okanogan D MOA, would occur over the North Cascades Recovery Zone and the Selkirk Recovery Zone. The grizzly bear is considered extirpated from the North Cascades Ecosystem (U.S. Fish and Wildlife Service Grizzly Bear Recovery Office, 2022). Overflights under the Proposed Action within the Roosevelt MOA may affect grizzly bears within the Selkirk Recovery Zone located in northeastern Washington and northwestern Idaho. Potential effects are likely to be both discountable (unlikely to occur) and insignificant (not measurable). This conclusion is based on the relatively low numbers (44) of grizzly bears within the Selkirk Recovery Zone that are spread out between northeastern Washington and northwestern Idaho, and British Columbia, which are outside the ROI, and none under the proposed Okanogan D MOA; the unlikely occurrence of low-altitude overflights (approximately one/day); and the relatively brief amount of time that aircraft would be at lower altitudes (seconds).

Although overflights proposed under Alternative 1 (Preferred Alternative) may affect grizzly bears, effects are likely to be both discountable (unlikely to occur) and insignificant (not measurable). This conclusion is based on the relatively low numbers of grizzly bears under the existing Roosevelt MOAs and none beneath the proposed airspace, the unlikely occurrence of low-altitude overflights (approximately one/day), and the relatively brief amount of time (seconds) that aircraft would be at lower altitudes.

Gray Wolf. Currently, six wolf packs totaling approximately 38 individuals occur under the existing the Okanogan A and B MOAs: Chopaka, Loup Loup, Chewuch, Lookout, Navarre, and Sullivan Creek (Washington Department of Fish and Wildlife, 2022). Only the Chewuch and Lookout wolf packs are known to occur under the proposed Okanogan D MOA.

Overflights under Alternative 1 may affect gray wolves because wolves and their prey are likely to be exposed to sound from aircraft overflights. However, given the relatively low number of wolves that live under the MOAs, exposure of individual or packs of wolves is discountable (unlikely to occur). In addition, due to the unlikely occurrence of low-altitude overflights (approximately one/day) and the short duration of potential exposure (seconds), wolves would likely quickly return to normal behavior such that effects would be insignificant. Such temporary disturbances are not expected to result in any reductions to prey availability for gray wolves, and effects to gray wolves are expected to be insignificant.

Canada Lynx and Designated Critical Habitat. Under Alternative 1, Canada lynx may be exposed to noise from low-flying aircraft in the Okanogan and Roosevelt MOAs, including the proposed Okanogan D MOA under the Proposed Action. Overflights under the Proposed Action may affect lynx because lynx and their prey are likely to be exposed to sound from aircraft overflights. However, given the relatively low number of lynx that live under the MOAs, exposure of individuals is discountable (unlikely to occur). In addition, given the short duration of potential exposure (seconds), lynx and their prey would likely quickly return to normal behavior. Such temporary disturbances are not expected to result in any reductions to prey availability for lynx, and effects to Canada lynx are expected to be insignificant.

Proposed aircraft overflights would only introduce noise into the environment and not result in any physical impact on lynx critical habitat or the associated PCE. However, the Proposed Action would expose lynx prey to noise from aircraft operations and possibly affect foraging opportunities by lynx. Given the short duration of exposure to each flight, Canada lynx and their prey would briefly move and return to normal behavior. Such temporary disturbances are not expected to result in any reductions in prey availability for Canada lynx, and effects are expected to be insignificant (not measurable).

North American Wolverine. Overflights under the Proposed Action may affect North American wolverine because wolverine and their prey are likely to be exposed to sound from low-altitude flights within the Okanogan and Roosevelt MOAs, including the proposed Okanogan D MOA. However, due to the unlikely occurrence of low-altitude overflights (approximately one/day) and the short duration of exposure to each flight (seconds), North American wolverine and their prey would briefly move and return to normal behavior such that effects would be insignificant. Such temporary disturbances are not expected to result in any reductions to prey availability for North American wolverine, and effects are expected to be insignificant (not measurable).

3.2.3.3.3 Summary of Potential Impacts Under Alternative 1

Fixed-wing aircraft overflights under Alternative 1 (Preferred Alternative) would result in short-term, localized increases in noise levels within the proposed Okanogan D MOA. Beneath the existing Okanogan and Roosevelt MOAs, wildlife would experience similar but slightly lower sound levels to the No Action Alternative (Table 3.2-2) because flight tracks would be spread out over a wider area. Accordingly, the Navy concludes that Alternative 1 would not significantly impact biological resources.

3.2.3.4 Alternative 2 – Addition of the Okanogan D MOA and Mazama ATCAA and Increased Training Capacity

Because of the approximately 12 percent increase in fixed-wing aircraft sorties under Alternative 2, average sound levels would be slightly higher than under Alternative 1 (Preferred Alternative) but would remain similar to the No Action Alternative sound levels (see Table 3.2-2). As an aircraft in flight gains altitude, the received noise level drops, often becoming indistinguishable from the background noise. The duration of exposure to fixed-wing aircraft noise would be very brief (seconds).

3.2.3.4.1 Potential Impacts on Wildlife

Impacts on wildlife with implementation of Alternative 2 would be similar as those previously discussed for Alternative 1. Wildlife exposed to low-altitude aircraft overflights under Alternative 2 could exhibit short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. Aircraft overflights in the Okanogan and Roosevelt MOAs, including the addition of Okanogan D MOA, are not expected to result in chronic stress based on the short duration and infrequency of exposure because of the following:

1. Noise levels (DNL) in the airspace are lower than historic averages.
2. There is an overall lack of concentration of flights at a given altitude, area, and power setting
3. The relatively small number of overflights below 4,000 ft. AGL (approximately one/day) and the relatively brief amount of time (seconds) that aircraft would be at lower altitudes.
4. Exposures would be intermittent and infrequent as training activities consist of non-continuous events.
5. The probability of an animal or specific location (e.g., nest, den) experiencing overflights more than once per day would be low due to the random nature of flight within the airspace and the large area of land overflown.
6. Short-term behavioral responses would not be expected to affect individual animal fitness or have population-level effects.
7. Individual animals would be expected to recover quickly from these responses.

3.2.3.4.2 Potential Impacts on Special-Status Species

Activities proposed under Alternative 2 would likely have the same effect on ESA-listed species as activities analyzed under Alternative 1 (Preferred Alternative). Accordingly, noise generated from proposed aircraft activities within the Okanogan D MOA and existing Okanogan and Roosevelt MOAs would not significantly impact special-status species underlying the MOAs.

3.2.3.4.3 Summary of Potential Impacts Under Alternative 2

Fixed-wing aircraft overflights under Alternative 2 would result in short-term, localized increases in noise levels within the proposed Okanogan D MOA. Beneath the existing Okanogan and Roosevelt MOAs, wildlife would experience similar sound levels as the No Action Alternative (Table 3.2-2) because, while increasing in number, flight sorties would be spread out over a wider area. Accordingly, the Navy concludes that Alternative 2 would not significantly impact biological resources.

3.3 CULTURAL RESOURCES

This section describes cultural resources underlying the Okanogan and Roosevelt MOAs; the Molson, Methow, and Republic ATCAAs; and the proposed Okanogan D MOA and Mazama ATCAA.

The term cultural resources applies broadly to a variety of resources subject to consideration under NEPA, NHPA, Archeological Resources Protection Act, Native American Graves Protection and Repatriation Act, EO 13007 (*Accommodation of Sacred Sites*), and similar laws. Included are historic properties as defined under NHPA. Historic properties consist of districts, sites, buildings, structures, or objects that are listed or eligible for listing in the National Register of Historic Places (NRHP). Under NEPA, the consideration of cultural resource issues may include properties that do not meet NRHP criteria, such as cemeteries and certain sacred sites (Council on Environmental Quality and Advisory Council on Historic Preservation, 2013).

Cultural resources information relevant to this EA was derived from a variety of available sources, including previous environmental documents and reports; the National Register Information System (managed by the National Park Service); online maps and data; and published sources, as cited.

3.3.1 REGULATORY SETTING

Cultural resources are governed by federal laws and regulations, including the NHPA, Archeological and Historic Preservation Act, American Indian Religious Freedom Act, Archeological Resources Protection Act, and Native American Graves Protection and Repatriation Act. A federal agency's responsibility for protecting historic properties is defined primarily by section 106. Section 106 requires federal agencies to consider the effects of their undertakings on historic properties. Key implementing regulations include the Protection of Historic Properties (36 CFR part 800); the Criteria for Evaluation (36 CFR section 60.4); and the Curation of Federally Owned and Administered Archeological Collections (36 CFR part 79).

3.3.2 AFFECTED ENVIRONMENT

The affected environment includes known cultural resources located underneath the existing and proposed airspace. All NRHP sites under the existing and proposed airspace are listed below in Table 3.3-1. The Navy has not identified any cultural resources that are unlisted but eligible for listing in the NRHP within the affected environment, nor any other types of cultural resources, such as sacred sites. This information is subject to consultation with the Washington State Historic Preservation Office and may be updated as a result of consultation.

Table 3.3-1: NRHP Sites under Existing and Proposed Airspace

Resource	NRHP Site Number	Location
Early Winters Ranger Station Work Center	86000841	Okanogan D MOA/Mazama ATCAA
Waring, Guy, Cabin	82004268	Okanogan B MOA
Lost Lake Guard Station	86000814	Okanogan A MOA
Ansorge Hotel	79002530	Roosevelt B MOA
Washington Hotel	79002550	Roosevelt A MOA
Creaser Hotel	82004211	Roosevelt B MOA
Curlew School	80003998	Roosevelt B MOA
Larson, Lewis P., House	79002549	Roosevelt A MOA
Northport School	79002561	Roosevelt B MOA
Keller House	79002559	Roosevelt A MOA
McCauley, H. M., House	79002560	Roosevelt A MOA
Metaline Falls School	88001518	Roosevelt A MOA
Winslow, Colburn T., House	90000670	Roosevelt A MOA
US Post Office--Okanogan Main	91000650	Okanogan A MOA
US Post Office--Omak Main	91000651	Okanogan A MOA
Bonaparte Mountain Cabin	81000588	Okanogan A MOA
US Post Office--Colville Main	91000644	Roosevelt A MOA
Okanogan County Courthouse	95000805	Okanogan A MOA
Colville Flour Mill	95000809	Roosevelt A MOA
United States Border Station	96001634	Roosevelt A MOA
Opera House and I. O. O. F. Lodge	97000319	Roosevelt A MOA
Pend Oreille Mines and Metals Building	97001081	Roosevelt A MOA
Collins Building	98001418	Roosevelt A MOA
Fairweather--Trevitt House	00000975	Roosevelt B MOA
Rickey Block	95000807	Roosevelt A MOA
Slagle, Jesse W. & Elizabeth, House	11000279	Roosevelt B MOA
St. Paul's Mission	74002259	Roosevelt A MOA
U.S. Inspection Station--Ferry, Washington	14000611	Roosevelt B MOA
U.S. Inspection Station--Laurier, Washington	14000612	Roosevelt B MOA
Meyers Falls Power Plant Historic District	95000808	Roosevelt A MOA
Chief Joseph Memorial	74001970	Roosevelt B MOA
Smith, Hiram F., Orchard	75001863	Okanogan A MOA
Curlew Bridge	82004210	Roosevelt B MOA
Idaho and Wash. Northern RR Bridge	82004270	Roosevelt A MOA
Orient Bridge	82004297	Roosevelt B MOA
Red Mountain Railroad Bridge	82004296	Roosevelt B MOA
Red Mountain Railroad Bridge	82004296	Okanogan A MOA
Okanogan Project: Conconully Reservoir Dam	74001969	Okanogan A MOA
Enloe Dam and Powerplant	78002764	Roosevelt A MOA
Columbia River Bridge at Kettle Falls	95000260	Roosevelt B MOA
Barstow Bridge	95000263	Roosevelt B MOA
Columbia River Bridge at Northport	95000624	Okanogan B MOA

Notes: NRHP = National Register of Historic Places, ATCAA = Air Traffic Control Assigned Airspace, MOA = Military Operations Area

3.3.3 ENVIRONMENTAL CONSEQUENCES

This section evaluates potential impacts on cultural resources that may result from implementation of the No Action Alternative and action alternatives. With the proposed changes in the airspace, the Proposed Action may introduce noise that could have the potential to impact cultural resources. While there is no precise threshold for determining impacts, very high noise, in extreme cases, could cause direct physical harm to certain resource types while less intense noise levels can also impact resources, such as altering the setting. Visual impacts on cultural resources are not anticipated as a result of the Proposed Action.

3.3.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The locations and areas of the Okanogan A/B/C MOAs and Molson and Methow ATCAAs, and Roosevelt A/B MOAs and Republic ATCAA would remain the same (Figure 2.3-1), and there would be no redistribution of the number of flights or flight profiles in the Okanogan or Roosevelt MOAs from the 2010 NWTRC EIS/OEIS (Table 2.3-1). Therefore, there would be no significant impacts on cultural resources.

3.3.3.2 Alternative 1 (Preferred Alternative)

As listed in Table 3.3-1 and shown on Figure 3.3-1, there is one NRHP listed site beneath the proposed Okanagan D MOA and Mazama ATCAA and 41 NRHP-listed sites under the existing Okanagan and Roosevelt MOAs. Under Alternative 1 (Preferred Alternative), these areas would experience a change in the existing noise conditions from Navy aircraft overflights. Based on the noise analysis presented in Appendix B (Noise Analysis for the Eastern Washington Airspace Extension), the maximum DNL sound levels that would occur from aircraft activity under the proposed Okanogan D MOA and Mazama ATCAA is 45.7 dBA. The maximum DNL for the entire Action Area would be 49.3 dBA, 0.6 dBA less than under the No Action Alternative. In addition, the maximum DNLs would be experienced only at the highest ground elevations (elevations above 8,000 ft.), which are a very small percentage of overall ground elevations under the existing and proposed SAA. Under Alternative 1, the introduction of noise associated with aircraft activity under the proposed Okanagan D MOA and Mazama ATCAA would not be at a level that would result in physical harm (vibration-related) to the NRHP-listed or future listed sites, and overall noise levels underlying the existing Okanagan and Roosevelt MOAs would be less than those under the No Action Alternative. In addition, while there may be changes in the setting under the proposed Okanagan D MOA and Mazama ATCAA associated with new aircraft activity, it is not expected to have a significant impact based on the maximum noise exposure of 45.7 dBA. Therefore, there would be no significant impacts on cultural resources under Alternative 1.

3.3.3.3 Alternative 2

Under Alternative 2, impacts would be the same as those described under Alternative 1. However, the maximum DNL sound levels that would occur from aircraft activity in the proposed Okanogan D MOA and Mazama ATCAA would be 47.1 dBA. Despite being a 1.4 dBA increase from Alternative 1 (Preferred Alternative), the introduction of noise associated with aircraft activity under the proposed Okanagan D MOA and Mazama ATCAA would not be at a level that would result in physical harm (vibration-related) to the NRHP-listed or and future potentially listed sites and overall noise levels underlying the Okanagan and Roosevelt MOAs would still be slightly less (0.1 DNL) than those under the No Action Alternative. Therefore, there would be no significant impacts on cultural resources under Alternative 2.

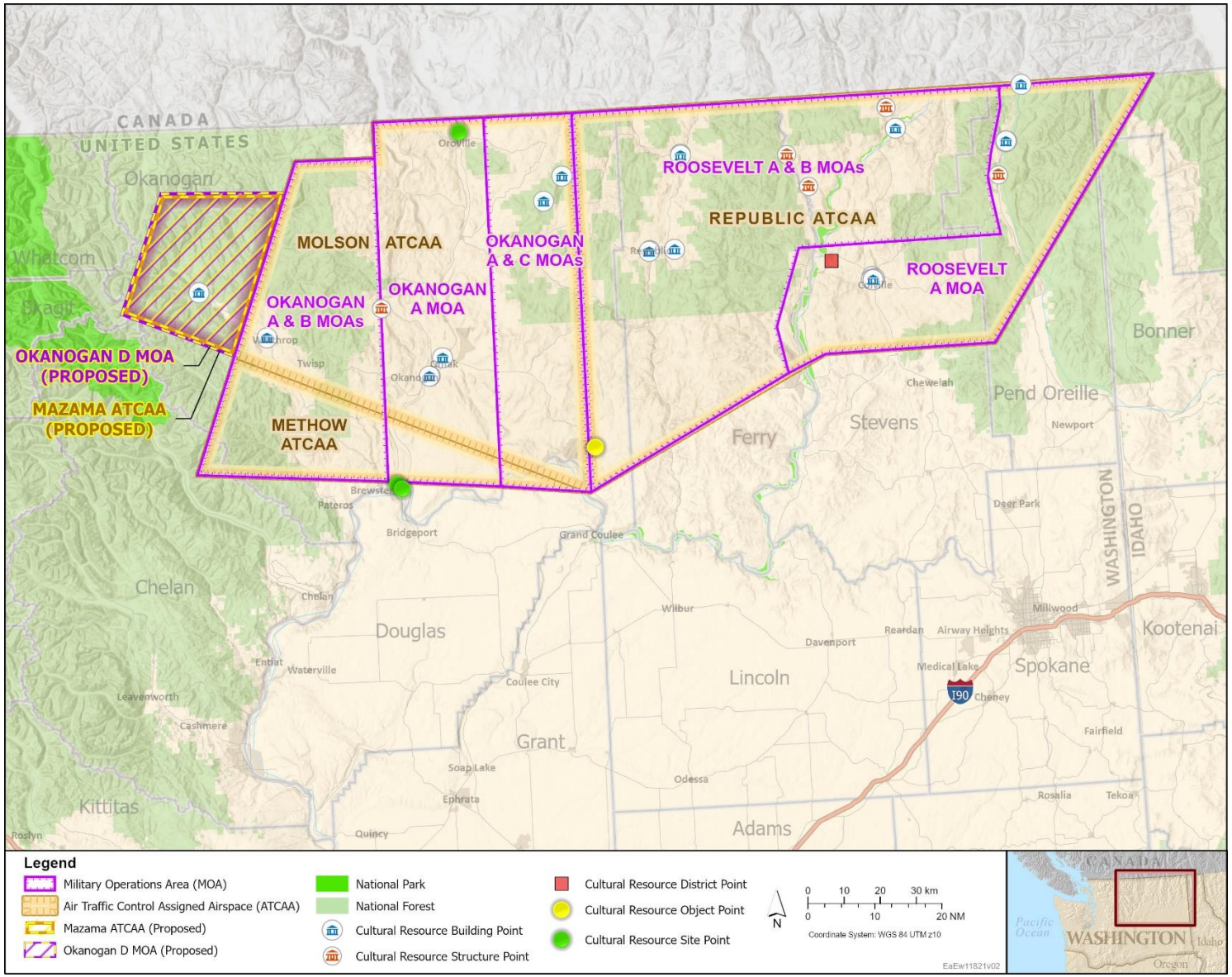

Figure 3.3-1: NRHP Sites under Existing and Proposed Airspace

3.4 AMERICAN INDIAN TRADITIONAL RESOURCES

Protected tribal resources, as defined in DoD Instruction 4710.02, DoD Interactions with Federally Recognized Tribes (U.S. Department of Defense, 2018), are "those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by or reserved by or for Indian tribes through treaties, statutes, judicial decisions, or EOs, including Tribal trust resources." Tribal trust resources are Indian lands or treaty rights to certain resources. These resources include plants, animals, and locations associated with hunting, fishing, and gathering activities for subsistence or ceremonial use. For the purposes of this section, the term "traditional resources" will be used to encompass protected tribal resources.

3.4.1 REGULATORY SETTING

Consultation with Native American tribes is conducted government-to-government with federally recognized tribes, as reaffirmed by EO 13175, *Consultation and Coordination with Indian Tribal Governments*. The Navy conducts government-to-government consultation in accordance with Secretary of the Navy Instruction 11010.14B, *Department of the Navy Policy for Consultation with Federally Recognized Indian Tribes, Alaska Native Tribal Entities, and Native Hawaiian Organizations*; and Commander, Navy Region Northwest Instruction 11010.14A, *Policy for Consultation with Federally Recognized American Indian and Alaska Native Tribes* (May 10,2021).

3.4.2 AFFECTED ENVIRONMENT

The Navy has identified no protected tribal resources located under the proposed Okanogan D MOA and Mazama ATCAA. This information is subject to consultation with the affected Tribes and may be updated as a result of consultation.

The Colville Indian Reservation, which is approximately 1.4 million acres, underlies the existing Okanogan A, Okanagan C, Roosevelt A, and Roosevelt B MOAs, and the Methow, Molson, and Republic ATCAAs (Figure 2.3-2). The Confederated Tribes of the Colville Reservation is the federally recognized tribe that governs the Colville Indian Reservation (established in 1872). Twelve bands compose the tribe: Chelan, Chief Joseph Band of Nez Perce, Colville, Entiat, Lakes, Methow, Moses-Columbia, Nespelem, Okanogan, Palus, San Poil and Wenatchi.

The Spokane Tribe of Indians is the federally recognized tribe that governs the Spokane Indian Reservation (established in 1881). The Kalispel Tribe of Indians is the federally recognized tribe that governs the Kalispel Indian Reservation (established in 1914). The Spokane and Kalispel Indian Reservations (Figure 2.3-2) do not underlie any of the existing or proposed airspace.

3.4.3 ENVIRONMENTAL CONSEQUENCES

This section evaluates how and to what degree the proposed activities described in Chapter 2 (Description of Proposed Action and Alternatives) could impact American Indian traditional resources in the Action Area. The specific analysis considers proposed aircraft activities and associated changes in noise levels in relation to American Indian traditional resources. The Confederated Tribes of the Colville Reservation, Spokane Tribe of Indians, and Kalispel Tribe of Indian have been invited to government-to-government consultations so the Navy can carefully consider and evaluate the extent of any potential impacts on American Indian traditional resources.

3.4.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The locations and areas of the Okanogan A/B/C MOAs and Molson and Methow ATCAAs, and Roosevelt A/B MOAs and Republic ATCAA would remain the same (Figure 2.3-1), and there would be no redistribution of the number of flights or flight profiles in the Okanogan or Roosevelt MOAs from the 2010 NWTRC EIS/OEIS (Table 2.3-1). Therefore, there would be no significant impacts on American Indian traditional resources.

3.4.3.2 Alternative 1 (Preferred Alternative)

No significant impacts on American Indian traditional resources would occur as result of the establishment of the Okanogan D MOA and Mazama ATCAA because the Navy has not identified any American Indian traditional resources underlying the proposed airspace. This information is subject to consultation with the affected Tribes and may be updated as a result of consultation.

Based on the noise analysis presented in Appendix B (Noise Analysis for the Eastern Washington Airspace Extension), the maximum DNL for the entire Action Area would be 49.3 dBA, 0.6 dBA less than under the No Action Alternative. Proposed redistribution of the number of flights and flight profiles in the Okanogan and Roosevelt MOAs and associated ATCAAs is not expected to have significant impacts on American Indian traditional resources because noise levels would be less than baseline noise levels. Therefore, there would be no significant impacts on American Indian traditional resources under Alternative 1. The Navy has invited Government-to-Government consultations with local federally recognized tribes.

3.4.3.3 Alternative 2

Under Alternative 2, impacts would be the same as those described under Alternative 1. Based on the noise analysis presented in Appendix B (Noise Analysis for the Eastern Washington Airspace Extension), despite there being a 0.5 dBA increase in noise levels from Alternative 1 (Preferred Alternative), it would still be slightly less (0.1 DNL) than those under the No Action Alternative. Therefore, there would be no significant impacts on American Indian traditional resources under Alternative 2. The Navy has invited government-to-government consultations with local federally recognized tribes.

3.5 PUBLIC HEALTH AND SAFETY

This discussion of public health and safety includes consideration for any activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. The primary goal is to identify and prevent potential accidents or impacts on the public.

A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage. Public health and safety within this EA includes information pertaining to community emergency services, and operational safety.

Emergency services are organizations that ensure public health and safety by addressing different emergencies. The three main emergency service functions are police, fire and rescue service, and emergency medical service.

Operational safety may refer to the actual use of existing airspace, or training activities and potential risks to inhabitants or users of adjacent or nearby land and airspace. Safety measures are often implemented through designated safety zones, warnings areas, or other types of designations.

3.5.1 REGULATORY SETTING

Aircraft safety is based on the physical risks associated with aircraft flight. Military aircraft fly in accordance with Federal Aviation Administration Regulations part 91, *General Operating and Flight Rules* (U.S. Department of Transportation & Federal Aviation Administration, 2023), which govern such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes. These rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. In addition, naval aviators must also adhere to the flight rules, air traffic control, and safety procedures provided in Navy guidance. The FAA issues a Notice to Air Missions (NOTAM) to disseminate information on upcoming or ongoing military training exercises with airspace restrictions. Operators of civilian and commercial aircraft are responsible for being aware of any NOTAMs that are in effect.

Navy Requirements outlined in the Office of the Chief of Naval Operations Instruction 3500.39D, *Operational Risk Management* (U.S. Department of the Navy, 2018b), provide a process to maintain readiness in peacetime and achieve success in combat while safeguarding people and resources. The FAA is responsible for ensuring safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. In order to fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. The primary safety concern with regard to military training flights is the potential for aircraft mishaps to occur, which could be caused by mid-air collisions with other aircraft or objects, weather difficulties, mechanical failures, pilot error, or bird/wildlife air strike hazards.

3.5.2 AFFECTED ENVIRONMENT

3.5.2.1 Airspace

Military, commercial, institutional, and recreational activities take place simultaneously in the Action Area and have coexisted safely for decades because there are FAA regulations, and DoD and Navy policies and practices for safe use and operation of SAA.

By establishing a MOA as airspace of defined dimensions identified by an area on the surface of the earth 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, the FAA considers the compatibility of the activities with other users in the vicinity (Federal Aviation Administration, 2023a). The FAA also coordinates ATCAA, which is of defined vertical and lateral limits, to provide air traffic separation between the specified activities being conducted within the airspace and other air traffic. The procedures governing operations within these areas are specified in letters of agreement between local military authorities and the Air Traffic Control facility.

Navy procedures on planning and managing SAA are provided in Office of the Chief of Naval Operations Instruction 3770.2L, Airspace Procedures and Planning (U.S. Department of the Navy, 2017). Scheduling and planning procedures for training operations in the Action Area are issued through NASWI.

There is generally no recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through several measures which include but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training to those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate

and well-defined responsibilities to the users and managers of the airspace. When these safety measures are implemented, risks are minimized, even though they can never be eliminated.

Weather conditions dictate whether pilots (general aviation, commercial, or military) fly under visual flight rules (VFR) or instrument flight rules (IFR). Under VFR, the weather is favorable, and the pilot is required to remain clear of clouds by specified distances to ensure separation from other aircraft using see and avoid procedures. Such favorable conditions are referred to as visual meteorological conditions. Pilots flying under VFR must be able to see outside the cockpit, control the aircraft's attitude, navigate, and avoid obstacles and other aircraft based on visual cues. Pilots flying under VFR assume responsibility for their separation from all other aircraft and are generally not assigned routes or altitudes by air traffic control. During unfavorable weather, referred to as visual meteorological conditions, and as required by FAA airspace regulations, pilots will follow IFR. Factors such as visibility, cloud distance, cloud ceilings, and weather phenomena cause visual conditions to drop below the minimums required to operate by visual flight referencing. IFR are the regulations and restrictions a pilot must comply with when flying in weather conditions that restrict visibility. Pilots can fly under IFR in visual meteorological conditions; however, pilots cannot fly under VFR in instrument meteorological conditions.

The Navy ensures the health and safety of the public by considering a location when planning activities, scheduling and notifying potential users of an area, and ensuring that an area is clear of nonparticipants. The Navy also has a proactive and comprehensive program of compliance with applicable standards and implementation of safety management systems.

Aircrews involved in a training exercise are aware that nonparticipating aircraft are not precluded from entering the area and may not comply with NOTAMs. Aircrews are directed to fly under IFR to the greatest extent possible while in MOAs, regardless of the meteorological conditions. Flying under IFR in ATCAAs is required by FAA regulations. A qualified safety officer is assigned to each event or exercise and can terminate activities if unsafe conditions exist.

3.5.2.2 Noise

A detailed description of current noise conditions and noise levels that would result from the Proposed Action is available in Appendix B (Noise Analysis for the Eastern Washington Airspace Extension).

Long, repeated exposure to noises exceeding 85 decibels (dB) has been found to result in noise-induced hearing loss (National Institute on Deafness and Other Communication Disorders, 2017). The louder the noise, the shorter the time necessary for the noise to result in noise-induced hearing loss. The Occupational Safety and Health Administration (OSHA) has established duration thresholds for various noise levels to protect people in the workplace from experiencing noise-induced hearing loss. (Occupational Safety and Health Administration, 2008). According to OSHA, people can be exposed to 90 dB for eight hours a day without experiencing noise-induced hearing loss. The OSHA standard uses a 5 dB exchange rate. This means that when the noise level is increased by 5 dB, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. For example, if the 90 dB exposure for 8 hours per day is being used, as previously mentioned as the baseline, then the exposure time for sound levels of 110 dB is 30 minutes per day before experiencing noise-induced hearing loss (i.e., increasing the noise level by 20 dB, or four times 5 dB, cuts the allowable exposure time in half, four times, from 8 hours to 4 hours to 2 hours to 1 hour to 30 minutes) (Occupational Safety and Health Administration). OSHA has also determined that noises above 140 dB are not safe for any duration of time (Occupational Safety and Health Administration, 2008). Although OSHA standards are technically applicable to the workplace environment, they are useful as a measure of comparison to

determine if noise would result in health impacts in other settings. Loud noise below the OSHA standards does not directly impact human health, but a possible secondary impact from loud noises and vibrations is elevated levels of stress, which can occasionally impact a person's health by causing annoyance, impairing sleep, and impacting cognitive performance (Schomer, 2005; Stansfeld & Matheson, 2003; U.S. Department of Defense, 2009). Regarding these nonauditory health effects, studies have been conducted to examine the nonauditory health effects of aircraft noise exposure, focusing primarily on stress response, blood pressure, birth weight, mortality rates, cardiovascular health, and impairment of cognitive performance in children.

Exposure to noise levels higher than those normally produced by aircraft operating in the existing and proposed MOA and overlying ATCAAs, can elevate blood pressure and stress hormone levels. However, the response to such loud noise is typically short in duration: after the noise goes away, the physiological effects reverse, and levels return to normal. In the case of repeated exposure to aircraft noise, the connection is not as clear. The common factor in most studies is the chronic nature of noise that is required to result in any of the effects except for annoyance. Also, the chronic levels required for these effects are well in excess of the levels expected in the vicinity of the Action Area as a result of Navy flight activities (Basner et al., 2014; Correia et al., 2013; Evans et al., 1998; Haralabidis et al., 2008; Schomer, 2005; Stansfeld & Matheson, 2003).

3.5.3 ENVIRONMENTAL CONSEQUENCES

This section evaluates how and to what degree the activities described in Chapter 2 (Description of the Proposed Action and Alternatives) could impact public health and safety. Potential public health and safety impacts were evaluated assuming continued implementation of the Navy's current safety procedures for training activities in the Action Area.

3.5.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The locations and areas of the Okanogan A/B/C MOAs and Molson and Methow ATCAAs, and Roosevelt A/B MOAs and Republic ATCAA would remain the same (Figure 2.3-1), and there would be no redistribution of the number of flights or flight profiles in the Okanogan or Roosevelt MOAs from the 2010 NWTRC EIS/OEIS (Table 2.3-1). Therefore, there would be no significant impacts on public health and safety.

3.5.3.1.1 Airspace

The Navy has been training in this area for decades with no aircraft-related mishaps that would indicate any unacceptable risk to the public. The MOAs where the flight training would continue to occur alert non-participants to the potential for high volumes of training or unusual aerial activity. MOAs are not restricted airspace, but pilots must use caution to avoid collisions while flying in the airspace. ATCAAs are in Class A airspace, requiring all non-participant aircraft to fly under instrument flight rules and be in communications with air traffic controllers, providing an additional level of safety in the prevention of mid-air collisions.

Physical interactions could occur, but the standard operating procedures that are in place ensure the safe execution of training activities. In addition, communication channels that the Navy uses to inform the public of upcoming training events would alert non-participants of where and when training events would occur so that they may avoid these areas.

3.5.3.1.2 Noise

According to the noise analysis conducted (Appendix B, Noise Analysis for the Eastern Washington Airspace Extension) and as shown in Table 3.5-1, the maximum DNL (an average of noise level over a 24-hour period) that would occur from aircraft activity under the No Action Alternative is 49.9 dBA. The maximum DNL would be experienced only at the highest ground elevations (elevations above 8,000 ft., making up less than 0.03 percent of the total Action Area). The majority of the Action Area (76 percent) is between 2,000 and 5,000 ft. elevation, where maximum DNL noise levels would be between 38.4 and 48.5 dBA. Below 2,000 ft. elevation, which makes up approximately 11 percent of the Action Area, the maximum DNL noise levels would be between 37.2 and 46.9 dBA. According to OSHA, people can be exposed to noise levels up to 90 dBA for 8 hours per day, and up to 110 dBA for 30 minutes per day, before experiencing noise induced hearing loss.

The highest possible Maximum Received Noise Level (L_{max}) a person would potentially be exposed to is 108.7 dBA (refer to Table 4-9 in Appendix B, Noise Analysis for the Eastern Washington Airspace Extension, for a full list of L_{max} values). For this to occur, an aircraft would have to be operating at 97 percent engine power, traveling at 360 knots, and located directly above a person at an altitude of 2,000 ft. Because the flight activities are dispersed throughout the airspace, persons on the ground experience noise events with a wide range of L_{max} values. In this setting, overflights with the highest possible L_{max} (i.e., aircraft passes directly overhead at the lowest permitted altitude and the highest engine power setting) are relatively rare. The potential for a person to be in the vicinity of aircraft while operating at the given parameters and producing maximum noise levels is limited because there is an overall lack of concentration of flights at a given altitude, area, and power setting; aircraft would be at lower altitudes for a relatively brief amount of time; and at lower altitudes, aircraft speeds and power settings would be in the lower range, producing less noise. In the event a person is exposed to the highest possible L_{max}, exposure would be short in duration (only a couple of seconds) and not exceed OSHA standards.

Therefore, there would be no significant impacts on public health and safety.

Table 3.5-1: Predicted Day Night Average Sound Level by Terrain Elevation in the Action Area

Terrain Elevation (Feet)	% of Area	Range of Predicted Day Night Average Sound Level (DNL)		
		No Action Alternative	Alternative 1	Alternative 2
0–1,000	0.7	37.2–46.8	37.2–46.2	37.7–46.7
1,000–2,000	10.6	38.0–47.1	38.0–46.5	38.5–47.0
2,000–3,000	24.8	38.8–47.6	38.8–47.0	39.3–47.5
3,000–4,000	32.1	39.7–48.3	39.7–47.7	40.2–48.2
4,000–5,000	19.4	40.7–48.5	40.7–47.9	41.2–48.4
5,000–6,000	8.2	41.8–48.8	41.8–48.2	42.3–48.7
6,000–7,000	3.5	43.1–49.1	43.1–48.5	43.6–49.0
> 7,000	0.7	44.7–49.9	44.7–49.3	44.8–49.8

3.5.3.2 Alternative 1 (Preferred Alternative)

Under Alternative 1 (Preferred Alternative), the Proposed Action would occur, establishing the new Okanogan D MOA and Mazama ATCAA (Figure 2.3-2), and there would be a redistribution of the number of flights and flight profiles within the Okanogan and Roosevelt MOAs (Table 2.3-1). The total number of sorties, however, would remain unchanged from what was analyzed in the 2010 NWTRC EIS/OEIS.

3.5.3.2.1 Airspace

Despite the introduction of Navy training activities into the proposed airspace, the total number of sorties in the entire Action Area would remain unchanged, and the types of flight activities themselves would be similar to those currently conducted. The new airspace would be over similar terrain where there is a small amount of air traffic. The proposed MOA only overlays one uncontrolled airport, which does not have any associated instrument procedures. The Navy would continue to adhere to its standard operating procedures, resulting in the continued safe execution of training activities.

3.5.3.2.2 Noise

Western Okanogan County, a small part of Skagit County and Chelan County, and the western portion of the designated Pasayten and Lake Chelan-Sawtooth National Wilderness Areas, would be beneath the newly established Okanagan D MOA and Mazama ATCAA. Under Alternative 1 (Preferred Alternative), these areas would experience a change in existing environmental conditions due to noise exposure from Navy aircraft overflights. The maximum DNL sound levels that would occur from aircraft activity in the new Okanogan D MOA and Mazama ATCAA would be 45.7 dBA. The maximum DNL for the entire Action Area would be 49.3 dBA, 0.6 dBA less than under the No Action Alternative. In addition, the maximum DNLs would be experienced only at the highest ground elevations (elevations above 8,000 ft.), which are a very small percentage of overall ground elevations under the Action Area. The highest possible L_{max} a person would potentially be exposed to remains consistent with the highest possible L_{max} under the No Action Alternative, and the likelihood of exposure remains low based upon the reasons provided under the No Action Alternative.

Under Alternative 1 (Preferred Alternate), noise levels remain similar to noise levels under the No Action Alternative and do not exceed OSHA standards. Therefore, there would be no significant impacts on public health and safety under Alternative 1.

3.5.3.3 Alternative 2

Alternative 2 consists of the addition of the Okanogan D MOA and the overlying Mazama ATCAA that occur under Alternative 1 (Figure 2.3-2). Alternative 2 also considers an approximately 12 percent increase in the capacity of training throughout all the Okanogan and Roosevelt MOAs that allows for the greatest flexibility for the Navy to maintain readiness when considering potential changes in the national security environment (Table 2.3-1).

3.5.3.3.1 Airspace

While there is an increase in overall training sorties under Alternative 2, the increased sorties would not result in more crowded airspace, but in more frequent use of the airspace. The Navy would continue to follow established standard operating procedures and inform the public of upcoming training events to alert non-participants of where and when training events would occur. For these and all the other reasons stated above under Alternative 1, the proposed activities under Alternative 2 would not result in increased safety risks.

3.5.3.3.2 Noise

Under Alternative 2, western Okanogan County, a small part of Skagit County and Chelan County, and the western portion of the designated Pasayten and Lake Chelan-Sawtooth National Wilderness Areas would be beneath the newly established Okanagan D MOA and overlying Mazama ATCAA. These areas would experience a change in existing environmental conditions due to noise exposure from Navy aircraft overflights. However, the maximum DNL sound levels that would occur from aircraft activity in

the new Okanogan D MOA and Mazama ATCAA is 47.1 dBA. Despite being a 1.4 dBA increase from Alternative 1 (Preferred Alternative), the maximum DNL under Alternative 2 from aircraft activity remains within OSHA standards. The maximum DNL for the entire Action Area would be 49.8 dBA, a 0.1 dBA decrease from the No Action Alternative, which remains well within OSHA standards. In addition, the maximum DNLs would be experienced only at the highest ground elevations (elevations above 8,000 ft.), which are a very small percentage of overall ground elevations under the Action Area. In addition, the highest possible $_{Lmax}$ a person would potentially be exposed to remains consistent with the highest possible L_{max} under the No Action Alternative, and the likelihood of exposure remains low based upon the reasons provided under the No Action Alternative. Under Alternative 2, noise levels remain within OSHA standards. Therefore, there would be no significant impacts on public health and safety under Alternative 2.

3.6 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE

In the context of NEPA, socioeconomics is defined as the economic and social conditions of the region potentially affected by the Proposed Action. The conditions describing socioeconomics include the population, demographics, employment opportunities, income, industries, housing, schools, and public finances of the surrounding community. The purpose of socioeconomic analysis is to assess the potential impacts of the Proposed Action on the human environment related to these conditions. Not all the conditions listed above would be affected by the establishment of the proposed Okanogan D MOA and Mazama ATCAA, and redistribution of the overall number or types of training sorties occurring within the Action Area.

The alternatives were evaluated based on the potential for and the degree to which training activities could impact socioeconomic resources. The potential for impacts depends on the likelihood that the training activities would interact with public activities or infrastructure. If there is potential for this interaction, factors considered to estimate the degree to which an exposure could impact socioeconomic resources include whether there could be an impact on livelihood, quality of experience, resource availability, income, or employment. If there is no expected potential for the public to interface with an activity, the impacts would be considered negligible.

The alternatives were also reviewed for any disproportionately high and adverse effects on any low-income populations or minority populations, and children's environmental health risks and safety risks, in accordance with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, respectively.

The U.S. EPA's Environmental Justice Screening and Mapping Tool was considered when analyzing the impacts on environmental justice. However, based on the nature of the Proposed Action and negligible impact it would have on the surrounding communities, it was not used extensively or represented in this analysis.

3.6.1 REGULATORY SETTING

The EPA defines Environmental Justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (U.S. Environmental Protection Agency, 2023a).

EO 12898 requires each federal agency to identify and address, as appropriate, disproportionately high, and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions. The CEQ has emphasized the importance of incorporating environmental justice review in the analyses conducted by federal agencies under the NEPA and of developing protective measures that avoid disproportionate environmental effects on minority populations and low-income populations. Consistent with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), the Navy's policy is to identify and address any disproportionately high and adverse human health and environmental effects of its actions on minority populations and low-income populations.

Environmental health and safety risks to children are defined as those that are attributable to products or substances a child is likely to come into contact with or ingest, such as air, food, water, soil, and products that children use or to which they are exposed.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to "make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

Designated National Wilderness Areas, which are present beneath the Action Area, enjoy the protections as set forth in the Wilderness Act of 1964 (16 U.S.C. sections 1131–1136). Specifically, "there shall be no commercial enterprise and no permanent road within any wilderness area," and "no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area." The Wilderness Act defines a wilderness as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions."

3.6.2 AFFECTED ENVIRONMENT

The area of interest for assessing potential impacts on socioeconomic resources, environmental justice, and children's environmental health and safety risks, is the Action Area and the communities and lands beneath it, as described in Section 1.3 (Location). The Action Area, within which the existing airspace was established in 1977 and where the Navy has flown similar types of training activities for more than 40 years, occupies airspace above Okanogan, Chelan, Douglas, Ferry, Stevens, and Pend Oreille counties in Washington state, and Boundary and Bonner counties in northwestern Idaho.

Table 3.6-1 breaks down the percentage of families, and all people, below the poverty line by county throughout the Action Area. In Okanogan, Chelan, Douglas, Ferry, Stevens and Pend Oreille counties, a higher percentage of incomes (families, all people, or both) are below the poverty line when compared to the Washington State average. It is the same case for families and all people in Boundary and Bonner counties in Idaho. These statistics show that when compared to the entirety of Washington and Idaho, the counties beneath the existing and proposed airspace are home to a larger percentage of low-income populations than the rest of their respective states. (U.S. Census Bureau, 2021)

All eight counties beneath the Action Area are predominantly white and have a similar or higher population percentage of white persons in comparison to their respective states. However, there are instances in which some counties have a higher population percentage of a minority group than the state. Okanogan, Ferry, Stevens, and Pend Oreille all have a higher population percentage of American Indian and Alaskan Native persons than Washington state. Okanogan, Chelan, and Douglas counties have a higher population percentage of Hispanic or Latino persons than Washington State. (U.S. Census Bureau, 2020)

A full breakdown of income statistics and population demographics by county and state are presented in Table 3.6-1 and Table 3.6-2.

Table 3.6-1: Percent of Families and All People Whose Income is Below the Poverty Line

County	Families		All People	
	Number below the poverty line	Percent below the poverty line	Below the poverty line	Percent below the poverty line
Okanogan	6,231	14.8%	8,463	20.1%
Chelan	6,642	8.4%	8,461	10.7%
Douglas	3,177	7.4%	4,165	9.7%
Ferry	624	8.7%	1,077	15%
Stevens	3,855	8.3%	5,991	12.9%
Pend Oreille	884	6.6%	1,501	11.2%
Boundary	1,495	12.4%	2,098	17.4%
Bonner	3,816	8.1%	5,512	11.7%
State of Washington	500,843	6.5%	770,528	10.0%
State of Idaho	137,933	7.5%	209,658	11.4%

Source: U.S. Census Bureau (2021)

The Action Area also includes several additional socioeconomic resources, including land-based recreational and tourism activities. Designated wilderness areas exist beneath the Action Area, including the Pasayten and Lake Chelan-Sawtooth National Wilderness Areas, and the Salmo-Priest Wilderness area, managed by the U.S. Forest Service. The Pasayten and Lake Chelan-Sawtooth National Wilderness Areas are located within Okanogan-Wenatchee National Forest, and the Salmo-Priest Wilderness is located within Colville National Forest. Activities in these wilderness areas include but are not limited to hiking, horseback riding, camping, and nature viewing.

Table 3.6-2: Action Area Population Demographics

County	Population %							
	White	Black or African American	American Indian and Alaskan Native	Asian	Native Hawaiian and Pacific Islander	Other race	Two or more races	Hispanic or Latino (of any race)
Okanogan	65.6%	0.4%	11.6%	0.7%	0.1%	11.8%	9.8%	19.5%
Chelan	69.9%	0.4%	1%	1%	0.2%	16.8%	10.7%	28%
Douglas	64.8%	0.3%	1.6%	1%	0.1%	17.9%	14.2%	34.1%
Ferry	71.3%	0.4%	18.2%	0.6%	0.2%	1.3%	8%	2.9%
Stevens	84.6%	0.3%	5.8%	0.6%	0.2%	1.3%	7.1%	3.6%
Pend Oreille	88.1%	0.4%	3%	0.6%	0.1%	1.4%	6.5%	3.3%
Boundary	88.9%	0.2%	1.4%	0.6%	0.1%	2.5%	6.3%	5.7%
Bonner	91.1%	0.3%	0.7%	0.5%	0.1%	1.1%	6.1%	3.2%
State of Washington	66.6%	4%	1.6%	9.5%	0.8%	6.7%	10.9%	13.7%
State of Idaho	82.1%	0.9%	1.4%	1.5%	0.2%	5.6%	8.3%	13%

Source: U.S. Census Bureau (2020)

3.6.3 ENVIRONMENTAL CONSEQUENCES

This analysis focuses on the evaluation of impacts on socioeconomic resources from physical disturbance and interaction stressors. Interactions include training activities that may not physically interact with socioeconomic resources but interact in a way that affects the resources. Visual impacts on socioeconomic resources are not anticipated as a result of the Proposed Action.

3.6.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The locations and areas of the Okanogan A/B/C MOAs and Molson and Methow ATCAAs, and Roosevelt A/B MOAs and Republic ATCAA would remain the same (Figure 2.3-1), and there would be no redistribution of the number of flights or flight profiles in the Okanogan or Roosevelt MOAs from the 2010 NWTRC EIS/OEIS (Table 2.3-1). Therefore, there would be no significant impacts on socioeconomics and environmental justice.

Existing aircraft overflights from air combat maneuver training activities and electronic warfare training activities occurring in the existing Okanogan and Roosevelt MOAs produce airborne acoustics and have the potential to disturb land-based recreational and tourism activities (e.g., hiking) in the Okanogan-Wenatchee National Forest and Colville National Forest, and other areas in the vicinity of the Action Area. The Navy has been conducting aircraft activities in the Action Area for decades, and while airborne acoustics from aircraft overflights are likely to be heard and may disturb some visitors to these areas, natural sounds are the predominantly occurring sounds in the vicinity of the Action Area.

According to the noise analysis conducted (Appendix B, Noise Analysis for the Eastern Washington Airspace Extension), the maximum DNL (an average of noise level over a 24-hour period) under the No Action Alternative would be 49.9 dBA. For comparison, the FAA states that the DNL of a quiet suburban residential area is around 50 dBA (Federal Aviation Administration, 2022a). In addition, the maximum DNL would be experienced only at the highest ground elevations (elevations above 8,000 ft., making up less than 0.03 percent of the total Action Area). OSHA standards dictate that most land uses are considered compatible with DNLs of less than 65 dBA.

The highest possible L_{max} a person would potentially be exposed to is 108.7 dBA (refer to Table 4-9 in Appendix B, Noise Analysis for the Eastern Washington Airspace Extension, for a full list of L_{max} values), which is the same as discussed in Section 3.5.3.1.2 (Noise).

While noise levels can be measured and noise sources can be compared to each other using established metrics, the perception of a noise by individuals and their reaction to the same noise heard simultaneously may vary widely. While some visitors to a natural setting like the Wilderness Areas mentioned above may be disturbed by an aircraft overflight, others may not register the event or, if they do notice it, may not consider it to be significant.

Nevertheless, occasional disturbances from military aircraft have been occurring in this area for several decades and are not expected to have lasting impacts on broader socioeconomic resources. Therefore, environmental impacts on socioeconomic resources under the No Action Alternative would be negligible. Because impacts are negligible, there are no disproportionately high impacts or adverse effects on any low-income populations or minority populations. The Navy's safety measures that protect adults from potential health and safety impacts also protect children. Therefore, the No Action Alternative would not disproportionately expose children to environmental health or safety risks.

3.6.3.2 Alternative 1 (Preferred Alternative)

Alternative 1 (Preferred Alternative) consists of the extension of the airspace through the establishment of a new Okanogan D MOA and Mazama ATCAA (Figure 2.3-2). In addition, Alternative 1 would redistribute the number of flights and flight profiles within the Action Area (Table 2.3-1). Despite the introduction of Navy aircraft training activities in the proposed Okanagan D MOA and overlying Mazama ATCAA, and redistribution of the number of flights and flight profiles in the Action Area, the total number of sorties would remain unchanged from what was analyzed in the 2010 NWTRC EIS/OEIS.

Western Okanogan County, a small part of Skagit County and Chelan County, and the western portion of the designated Pasayten and Lake Chelan-Sawtooth National Wilderness Areas would be beneath the newly established Okanagan D MOA and Mazama ATCAA (Figure 2.3-2). Under Alternative 1 (Preferred Alternative), these areas would experience a change in existing environmental conditions due to noise exposure from Navy aircraft overflights. The maximum DNL from aircraft activity in the Okanagan D MOA and Mazama ATCAA would be 45.7 dBA. The maximum DNL for the entire Action Area under Alternative 1 (Preferred Alternative) would be 49.3 dBA, a 0.6 dBA decrease from the No Action Alternative. Visitors to National Forest and wilderness areas on weekends or at night would rarely hear an EA-18G, or other aircraft, because training flights typically occur Monday through Friday during daylight hours. The maximum DNL would be experienced only at the highest ground elevations (elevations above 8,000 ft.), which are a very small percentage of overall ground elevations under the Action Area. Since the maximum DNL in the Action Area remains within OSHA standards for all land uses, airborne acoustics from Navy Aircraft overflights would cause minimal, if any, disturbance to land-based recreational and tourism activities. In addition, the highest possible L_{max} a person would potentially be exposed to remains consistent with the highest possible L_{max} under the No Action Alternative, and the likelihood of exposure remains low based upon the reasons provided under No Action Alternative.

Therefore, there would be no significant environmental impacts on socioeconomic resources under Alternative 1. Because impacts are negligible, there are no disproportionately high impacts or adverse effects on any low-income populations or minority populations. The Navy's safety measures that protect adults from potential health and safety impacts also protect children. Therefore, Alternative 1 (Preferred Alternative) would not disproportionately expose children to environmental health or safety risks.

3.6.3.3 Alternative 2

Alternative 2 consists of the addition of the Okanogan D MOA and the overlying Mazama ATCAA that would occur under Alternative 1 (Figure 2.3-2). Alternative 2 also considers an increase in the capacity of training, this allows for the greatest flexibility for the Navy to maintain readiness when considering potential changes in the national security environment (Table 2.3-1).

Under Alternative 2, the areas beneath the newly established Okanogan D MOA and Mazama ATCAA would experience a change in existing environmental conditions due to noise exposure from Navy aircraft overflights. The maximum DNL for the Okanagan D MOA and Mazama ATCAA would be 47.1 dBA, a 1.4 dBA increase from Alternative 1 (Preferred Alternative) but still within OSHA standards and similar to that of a quiet suburban residential area. Visitors to National Forest and wilderness areas on weekends or at night would rarely hear an EA-18G, or other aircraft, because training flights typically occur Monday through Friday and during daylight hours. In addition, the maximum DNL would be experienced only at the highest ground elevations (elevations above 8,000 ft.), which are a very small percentage of overall ground elevations under the Action Area. Since the DNL remains within OSHA

standards for all land uses, airborne acoustics from Navy Aircraft overflights would cause minimal, if any, disturbance to land-based recreational and tourism activities.

Alternative 2 also considers an increase in the capacity of training. The Okanogan MOAs would undergo a 12 percent increase in training sorties, and the Roosevelt MOAs would see an 11 percent increase in training sorties. The maximum DNL for the entire Action Area under Alternative 2 would be 49.8 dBA, a 0.5 dBA increase from Alternative 1 (Preferred Alternative) and a 0.1 dBA decrease from the No Action Alternative, which remains consistent with OSHA standards and compatible with all land uses. In addition, the highest possible L_{max} a person would potentially be exposed to remains consistent with the highest possible L_{max} under the No Action Alternative, and the likelihood of exposure remains low based upon the reasons provided under No Action Alternative. While noise levels can be measured and noise sources can be compared to each other using established metrics, the perception of a noise by individuals and their reaction to the same noise heard simultaneously may vary widely.

Therefore, there would be no significant environmental impacts on socioeconomic resources under Alternative 2. Because impacts are negligible, there are no disproportionately high impacts or adverse effects on any low-income populations or minority populations. The Navy's safety measures that protect adults from potential impacts also protect children. Therefore, Alternative 2 would not disproportionately expose children to environmental health or safety risks.

3.7 Summary of Potential Impacts on Resources and Impact Avoidance and Minimization

A summary of the potential impacts associated with each alternative is provided in Table 3.7-1. No impact avoidance and minimization measures are proposed for the Proposed Action due to impacts being assessed to be negligible. DoD, Navy, and FAA regulations, policies, and standard operating procedures ensure the safe execution of training activities.

Table 3.7-1: Summary of Potential Impacts on Resource Areas

Resource Area	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Air Quality	Under the No Action Alternative, emissions are different than the baseline emissions due to the transition from EA-6B Prowlers to EA-18G Growlers, but no significant impacts on air quality are expected.	Under Alternative 1, there would be a decrease in all pollutant emissions except NO_x compared to the baseline, and no change in emissions compared to the No Action Alternative. All emissions are well below applicable thresholds. Thus, no significant impacts on air quality are expected.	Under Alternative 2, emissions increase in comparison to Alternative 1 and the No Action Alternative but decrease compared to the baseline. The increase in emissions represents a negligible contribution to global GHG emissions and climate change. Thus, no significant impacts on air quality are expected.
Biological Resources	The No Action Alternative would result in continued short-term, localized noise events beneath the existing MOAs. Wildlife exposure to low-altitude aircraft overflights would be infrequent and short in duration, and could result in short-term behavioral or physiological responses, but not to the extent where the general health of individuals or populations would be compromised. No significant impacts on biological resources are expected.	Alternative 1 would result in a small decrease in short-term localized noise events beneath the proposed and existing MOAs. Wildlife exposure to low-altitude aircraft overflights would be infrequent and short in duration and could result short-term behavioral or physiological responses, but not to the extent where general health of individuals or populations would be compromised. No significant impacts on biological resources are expected.	Under Alternative 2, impacts would be the same as those described under Alternative 1. Thus, no significant impacts on biological resources are expected.
Cultural Resources	Under the No Action Alternative, no significant impacts on cultural resources are expected.	Under Alternative 1, NRHP listed sites underneath the proposed and existing MOAs would experience a change in existing noise conditions. Noise would not be at a level that would result in physical harm (vibration related) to the NRHP-listed or future potentially listed sites. Thus, no significant impacts are expected to cultural resources.	Under Alternative 2, impacts would be the same as those described under Alternative 1. Thus, no significant impacts on cultural resources are expected.

Table 3.7-1: Summary of Potential Impacts on Resource Areas (continued)

Resource Area	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
American Indian Traditional Resources	Under the No Action Alternative, no significant impacts on American Indian traditional resources are expected.	Under Alternative 1, noise levels would be less than the baseline. Thus, no significant impacts on American Indian traditional resources are expected.	Under Alternative 2, impacts would be the same as those described under Alternative 1. Thus, no significant impacts on American Indian traditional resources are expected.[1]
Public Health and Safety	Under the No Action Alternative, SOPs in place ensure the safe execution of training activities. In addition, noise levels are within OSHA standards. Thus, no significant impacts on public health and safety are expected.	Under Alternative 1, noise levels would be reduced slightly compared to those under the No Action Alternative and do not exceed OSHA standards. In addition, SOPs in place ensure the safe execution of training activities. Thus, no significant impacts on public health and safety are expected.	Under Alternative 2, impacts would be the same as those described under Alternative 1. Thus, no significant impacts on public health and safety are expected.
Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risk	Under the No Action Alternative, noise from aircraft overflights would remain within OSHA standards. Occasional disturbances from military aircraft have been occurring in the action area for decades and are not expected to have lasting impacts. Thus, no significant impacts on socioeconomics are expected. Because no significant impacts are expected on socioeconomics or public health and safety, there are no expected impacts on environmental justice, and children's environmental health risk.	Under Alternative 1, noise from aircraft overflights would remain within OSHA standards and airborne acoustics would cause minimal disturbance to land based recreational and tourism activities. Thus, no significant impacts are expected on socioeconomics. Because no significant impacts are expected on socioeconomics or public health and safety, there are no expected impacts on environmental justice, and children's environmental health risk.	Under Alternative 2, impacts would be the same as those described under Alternative 1. Thus, no significant impacts are expected on socioeconomics. Because no significant impacts are expected on socioeconomics or public health and safety, there are no expected impacts on environmental justice, and children's environmental health risk.

[1] The Navy has invited Government-to-Government consultations with local federally recognized tribes

Notes: NO_x = Nitrogen Oxides, NRHP = National Register of Historic Places, OSHA = Occupational Safety and Health Administration, SOP = Standard Operating Procedure

4 Cumulative Impacts

This chapter (1) defines cumulative impacts; (2) describes past, present, and reasonably foreseeable future actions relevant to cumulative impacts; (3) analyzes the incremental interaction the Proposed Action may have with other actions; and (4) evaluates cumulative impacts potentially resulting from these interactions.

4.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives of NEPA, CEQ regulations, and CEQ guidance. Cumulative impacts are defined in 40 CFR 1508.1(g) as "effects on the environment that results from the incremental effects of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from actions with individually minor but collectively significant effects taking place over a period of time."

To determine the scope of environmental impact analyses, agencies shall consider cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact analysis document.

In addition, CEQ and U.S. EPA have published guidance addressing implementation of cumulative impact analyses—*Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (Council on Environmental Quality, 2005) and Consideration of Cumulative Impacts in *Environmental Protection Agency Review of NEPA Documents* (U.S. Environmental Protection Agency, 1999). CEQ guidance entitled Considering Cumulative Impacts Under NEPA (Council on Environmental Quality, 1997) states that cumulative impact analyses should

"…determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative impacts of other past, present, and future actions...identify significant cumulative impacts…[and]…focus on truly meaningful impacts."

Cumulative impacts are most likely to arise when a relationship or synergism exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts. To identify cumulative impacts, the analysis needs to address the following three fundamental questions.

- Does a relationship exist such that affected resource areas of the proposed action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the proposed action and another action could be expected to interact, would the proposed action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

4.2 SCOPE OF CUMULATIVE IMPACTS ANALYSIS

The scope of the cumulative impacts analysis involves the geographic extent of the effects of the Proposed Action. For this EA, the Eastern Washington SAA and its proposed extension delimits the geographic extent of the cumulative impacts analysis. In general, the Action Area would include those areas previously identified in Chapter 3 (Affected Environment and Environmental Consequences) for the respective resource areas. The time frame for cumulative impacts analyzed in this EA is not bound by a specific future time frame, but rather centers on the timing of the Proposed Action, which is undefined. The FAA limits its analysis of cumulative impacts to five years. The cumulative impact analysis can include activities that occurred in the past, are occurring in the present, and will continue to occur.

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. Beyond determining that the geographic scope and time frame for the actions interrelate to the Proposed Action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for EISs and EAs, management plans, land use plans, and other planning related studies.

4.3 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

This section focuses on past, present, and reasonably foreseeable future actions that occur within or potentially impact resources analyzed in the Action Area. Using the first fundamental question included in Section 4.1 (Definition of Cumulative Impacts), in determining which projects to include in the cumulative impacts analysis, a preliminary determination was made as to whether a relationship exists such that the affected resource areas of the Proposed Action might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the action was not carried forward into the cumulative impacts analysis. In accordance with CEQ guidance (Council on Environmental Quality, 2005), these actions considered but excluded from further cumulative effects analysis are not cataloged here because the intent is to focus the analysis on the meaningful actions relevant to inform decision making. Actions included in this cumulative impacts analysis were determined to affect resource areas that the Proposed Action would also affect and are listed and briefly described in Table 4.3-1.

Table 4.3-1: Cumulative Action Evaluation

Project	*Project Description*	*Project Timeframe*		
		Past	*Present*	*Future*
Pacific Northwest Electronic Warfare (EW) Range	In 2014, the Navy completed the Pacific Northwest EW EA, which analyzed the operation of Mobile Electronic Warfare Training System vehicle-mounted emitters on U.S. Forest Service land to facilitate training within the area underlying the Okanogan and Roosevelt MOAs.	X	X	X
Copperstone Planned Development	The project is a planned development located east of the Methow river in Methow in the south westernmost boundary of the existing Okanogan MOA. The development includes 56 single-family homes within a 277.5-acre plot (LDC, 2023). A proposed Planned Development Application in April 2023 described the proposed subdivision and responded to public comments. Public concerns addressed included water, traffic, wildlife, air quality, and cultural resources. A State Environmental Policy Act checklist was provided by Burma Shores, LLC, on March 22, 2023, evaluating potential impacts on environmental resources (Burma Shores LLC, 2023). Based on preliminary public comments, the proposed development could have cumulative impacts, when combined with the Proposed Action, on air quality and wildlife.			X
Pacific Northwest National Scenic Trail (PNT) Comprehensive Plan EA	The U.S. Forest Service developed a Comprehensive Plan for the PNT, a 1,200-mile trail that crosses through the existing and proposed Okanogan and Roosevelt MOAs (U.S. Department of Agriculture, 2023). The project may have cumulative impacts, when combined with the Proposed Action, on socioeconomics and environmental justice.			X

Notes: EA = Environmental Assessment, MOA = Military Operations Area

4.3.1 OTHER ONGOING ACTIVITIES

4.3.1.1 Military Training Routes

Military Training Routes (MTRs) are designated corridors for low-altitude, high-speed training activities. Military Aircraft using MTRs are exempt from the FAA speed restriction of 250 knots below 10,000 ft. MTRs are comprised of a centerline that goes from each defined point on the route. Typically, 5-nautical mile buffers exist on either side of the centerline (10-nautical miles wide route) (Aeronautical Information Publication, 2023). Low-altitude, high-speed military aircraft may cause noise disturbance to community members, individuals recreating in wilderness areas, and wildlife. Two MTR corridors exist beneath the eastern Washington MOAs. Instrument Route 348 (IR348) passes through the northern portion of the Action Area, including the eastern portion of the proposed Okanogan D MOA. Instrument Route IR327/IR328 traverses beneath the southwestern portion of the Roosevelt MOA and beneath the southeastern corner of the Okanogan MOA.

It should be noted that MTRs are not part of this Proposed Action and are established separately by the FAA. MTRs overlap with the proposed airspace addressed in this EA in some areas, but the two cannot be utilized at the same time and are scheduled independently.

4.3.1.2 Tourism and Recreation

Three national forests are underneath the existing and proposed MOAs: Colville, Okanogan, and Kaniksu National Forests. Small portions of Wenatchee and Mt. Baker National Forests are within the project area. Three wilderness areas are underneath the existing and proposed MOAs: Pasayten, Lake Chelan-Sawtooth, and Salmo-Priest. Recreational activities such as hiking, camping, and fishing are common in these areas. Additionally, portions of the Pacific Crest Trail (PCT) and Pacific Northwest National Scenic Trail (PNT) are underneath the MOAs.

4.3.1.3 National Forest Management Plans

As required by the National Forest Management Act of 1976, each national forest administrative unit has its own land and resource management plan. The plans are intended to be strategic and programmatic in nature. They are intended to have a 15-year life and amendments are utilized to accommodate changes in the landscape and advances in knowledge, science, and technology. The Colville National Forest land and resource management plan was published in 1988 and has benefited from amendments and supplementation by the Northwest Washington Forestry Coalition by creation of timber management, restoration, and wilderness protection plans. The Okanogan National Forest Land and Resource(s) Management Plan was developed in 1989. The Wenatchee and Mt. Baker Forest Plans were developed in 1990. Kaniksu National Forest is included in the Idaho Panhandle National Forests Land Management Plan developed in 1987. This plan was superseded by the 2015 management plan. These plans are tools that provide framework and broad guidance for making management decisions.

4.3.1.4 Federal Aviation Administration Aeronautical Study

In November 2022, the FAA completed a study evaluating potential impacts on the NAS. The FAA determined two minor impacts on the NAS. Air Traffic Service route, T332, is adjacent to the proposed MOA, and one Air Traffic Service route that intersects the ATCAA. NAS routes would be useable while sorties are in occurrence, posing no significant hazard to airspace. The FAA determined the impacts to be minor and acceptable (Federal Aviation Administration, 2022b).

4.4 CUMULATIVE IMPACT ANALYSIS

Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources included for analysis, quantifiable data is not available, and a qualitative analysis was undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made regarding cumulative impacts related to this EA where possible. The analytical methodology presented in Chapter 3 (Affected Environment and Environmental Consequences), which was used to determine potential impacts on the various resources analyzed in this document, was also used to determine cumulative impacts.

4.4.1 AIR QUALITY

4.4.1.1 Relevant Past, Present, and Future Actions

Actions that are relevant to the cumulative impacts on air quality in the ROI include 2014 Electronic Warfare (EW) Range EA, MTRs, and the Copperstone Development.

4.4.1.2 Cumulative Impact Analysis

Climate change is a global concern, and GHG are a concern from a cumulative perspective because individual sources of GHG are not large enough to have an appreciable impact on climate change. The CEQ provided interim guidance for evaluating cumulative effects of climate change and GHG emissions,

stating: “In evaluating a proposed action’s cumulative climate change effects, an agency should consider the proposed action in the context of the emissions from past, present, and reasonably foreseeable actions. When assessing cumulative effects, agencies should also consider whether certain communities experience disproportionate cumulative effects, thereby raising environmental justice concerns” (Council on Environmental Quality, 2023). Currently, there are not formally adopted NEPA thresholds of significance for GHG emissions. Formulating such thresholds is problematic, as it is difficult to determine what level of proposed emissions would substantially contribute to global climate change. The Proposed Action would redistribute military aircraft sorties occurring within the existing and proposed airspace. The Proposed Action would not increase the number of sorties. Therefore, no additional emissions would result from the Proposed Action and thus would not result in any significant cumulative impacts on greenhouse gas emissions.

The Department of the Navy released a climate action plan in May 2022 to “build a climate-ready force” (U.S. Department of the Navy, 2022). The plan outlies two Performance Goals: build climate resilience and reduce climate threat. The Department of the Navy aims to have 100 percent zero emission vehicles, 50 percent reduction in building emissions, and divert 50 percent of waste from landfills by 2025; reduce emissions 65 percent by 2030; and have 100 percent carbon pollution-free green energy by 2030 (U.S. Department of the Navy, 2022).

The 2014 EW Range EA analyzed impacts on air quality from emissions from the operation of mobile emitter vehicles. Total emissions from mobile emitters in the Okanogan and Roosevelt MOAs were evaluated to be 0.23 tons of PM_{10} annually. These emissions were evaluated to not be regionally significant as they would be approximately 0.0031 percent of the regional emissions (U.S. Pacific Fleet, 2014) (Table 4.4-1). Further, emissions from mobile emitters would be contained within north-central Washington (Central and Eastern Air Basin), where the emitters would be operated. As such, the Proposed Action would not have cumulative impacts on top of those already present from the 2014 EW Range EA.

The proposed Copperstone Development would generate dust and emissions from equipment during construction. Dust emissions would be managed during construction (LDC, 2023). Impacts on air quality from the construction and operation of the Copperstone Development would be minor and localized to Methow (located on the southwestern corner of the existing Okanogan MOA). As such, actions from the development would have no cumulative impacts on air quality when combined with the Proposed Action.

MTRs impacts on air quality are short term and infrequent. Such activities do not have a measurable impact on air quality within the MOAs, and cumulative impacts would be negligible.

Cumulative air quality resource impacts from past, present, and future actions within the ROI would be less than significant for the reasons stated above. Therefore, there are no cumulative impacts on air quality associated with the implementation of the Proposed Action when added to effects of the other past, present, and reasonably foreseeable projects.

Table 4.4-1: Summary of Annual Air Emissions for EW EA

Emission Source	Emissions, tons/year				
	CO	NOx	HC	SOx	PM_{10}
Mobile Emitters	0.93	3.26	0.09	0.22	0.23

Notes: (1) HC = total hydrocarbons, CO = carbon monoxide, NOx = nitrogen oxides, SOx = sulfur oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter

(2) Emissions are representative of only those emissions incurred in the existing Okanogan and Roosevelt MOAs under the 2014 EW Range EA.

4.4.2 BIOLOGICAL RESOURCES

4.4.2.1 Relevant Past, Present, and Future Actions

Actions relevant to cumulative impacts on biological resources include the 2014 EW Range EA and the Copperstone development. Biological resources that would be primarily impacted include birds and terrestrial animals impacted by noise disturbance.

4.4.2.2 Cumulative Impact Analysis

The 2014 EW Range EA evaluates the impact of mobile emitters on birds and mammals. It was determined that disturbances from mobile emitters would have no direct or indirect changes that would have a significant impact on species. Mobile emitters associated with the project would be implemented primarily in the Olympic Peninsula, outside of the Action Area. As such, impacts from mobile emitters electromagnetic field would have a minimal, short-term, and recoverable impact on birds and mammals (U.S. Pacific Fleet, 2014).

The Copperstone development construction may contribute to cumulative noise impacts on wildlife. Construction activities would occur for at least three years. Long-term noise from motor-vehicles, humans, and pets would be minimal. The project would comply with all federal, state, and local noise regulations (LDC, 2023). The proposed development would be in the existing MOA and likely have no measurable cumulative impact on wildlife when combined with the Proposed Action.

Based upon the analysis in Section 3.2 (Biological Resources), and the reasons summarized above, the incremental contribution of the Proposed Action to cumulative impacts on bird populations would be low. Therefore, there are no cumulative impacts on biological resources associated with the implementation of the Proposed Action when added to effects of the other past, present, and reasonably foreseeable projects.

4.4.3 CULTURAL RESOURCES

Cumulative noise and visual impacts are not anticipated. In addition, the Proposed Action does not involve construction, digging, or other practices that would affect cultural resources. Therefore, there are no cumulative impacts on cultural resources associated with the implementation of the Proposed Action when added to effects of the other past, present, and reasonably foreseeable projects.

4.4.4 AMERICAN INDIAN TRADITIONAL RESOURCES

Based on the analysis in Section 3.4 (American Indian Traditional Resources), implementation of the Proposed Action is not expected to have any effects on American Indian traditional resources.

Therefore, there are no cumulative impacts on American Indian traditional resources associated with the implementation of the Proposed Action when added to effects of the other past, present, and reasonably foreseeable projects.

4.4.5 PUBLIC HEALTH AND SAFETY

Activities occurring under the 2010 NWTRC EIS/OEIS would not change under the extension of the Eastern Washington SAA. Based on the analysis in Section 3.5 (Public Health and Safety), noise levels under the Proposed Action would remain similar to current levels and would not exceed OSHA standards. In addition, standard operating procedures in place ensure the safe execution of training activities. Therefore, there are no cumulative impacts on public health and safety associated with the implementation of the Proposed Action when added to effects of the other past, present, and reasonably foreseeable projects.

4.4.6 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE

Three national forests underlie the existing airspace: Okanogan National Forest, Colville National Forest, and Kaniksu National Forest. Small portions of Mt. Baker National Forest and Wenatchee National Forest are within the Action Area. Pasayten, Salmo-Priest, and Lake Chelan-Sawtooth Wilderness areas are present within the Action Area. In addition to protected areas, the PCT and PNT underlie the existing and proposed airspace. A small portion of the PCT enters the southwestern corner of the proposed Okanogan D MOA. Portions of the PNT runs along the northern boundary of the proposed and existing airspace. Sorties associated with the Proposed Action and MTRs may disturb visitors in the National Forests and Wilderness areas. Similar aircraft overflight noise disturbances are evaluated in the 2020 NWTT Supplemental EIS/OEIS within the Olympic MOA with regards to Olympic National Park (U.S. Pacific Fleet et al., 2020). The study concluded that the perception of overflight noise is highly variable depending on natural ambient noise, elevation, and location within these spaces. Airborne acoustics from aircraft overflights over the eastern Washington SAA may potentially impact recreational and tourism activities. Impacts on tourism and recreation impacts would be brief and not an impact on the overall long-term enjoyment of recreational areas.

The PNT EA evaluated the impacts of visitation and population increase on “gateway” communities. Increases in tourism and population to communities along the trail during peak months increases economic demands (U.S. Department of Agriculture, 2023). Sortie noise over gateway communities may disturb tourists in these areas. However, for reasons stated in the previous paragraph, negative impacts on gateway communities are unlikely. As such, the Proposed Action would not have any cumulative socioeconomic impact on PNT gateway communities.

All other cumulative socioeconomic impacts from past, present, and future actions would be less than significant because the overall number of sorties would decrease slightly under the Preferred Alternative from what was analyzed in the 2010 NWTRC EIS/OEIS. Therefore, there are no cumulative impacts on socioeconomics and environmental justice associated with the implementation of the Proposed Action when added to effects of the other past, present, and reasonably foreseeable projects.

5 Other Considerations Required by NEPA

5.1 Consistency with Other Federal, State, and Local Laws, Plans, Policies, and Regulations

Based on the evaluation with respect to consistency and statutory obligations, the Navy's Proposed Action for the Eastern Washington EA does not conflict with the objectives or requirements of federal, state, regional, or local plans, policies, or legal requirements. Table 5.1-1 summarizes environmental compliance requirements that were considered in preparing this EA.

Table 5.1-1: Other Environmental Compliance Requirements Considered in Preparing this EA

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Clean Air Act (CAA) (42 U.S.C. section 7401 et seq.) CAA General Conformity Rule (40 CFR part 93[B]) State Implementation Plan (SIP)	United States Environmental Protection Agency (EPA)/State of Washington	The CAA is the comprehensive federal law that regulates air emissions from stationary and mobile sources. The Proposed Action would not conflict with attainment and maintenance goals established in SIPs. A CAA conformity determination would not be required because emissions attributable to the alternatives including the Proposed Action would be below *de minimis* thresholds.
Clean Water Act (CWA) (33 U.S.C. section 1251 et seq.)	EPA/State of Washington	The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. No permits are required under the CWA sections 401, 402, or 404(b)(1) as the Proposed Action does not include construction, demolition, or discharge of pollutants into waters of the U.S.
Endangered Species Act (ESA) (16 U.S.C. section 1531 et seq.)	U.S. Fish and Wildlife Service (USFWS)	The ESA established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend. The Navy is consulting with USFWS to determine impacts.

Table 5.1-1: Other Environmental Compliance Requirements Considered in Preparing this EA (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Migratory Bird Treaty Act (16 U.S.C. sections 703–712)	USFWS	The Migratory Bird Treaty Act prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. The 2003 National Defense Authorization Act provides that the Armed Forces may take migratory birds incidental to military readiness activities provided that, for those ongoing or proposed activities that the Armed Forces determine may result in a significant adverse effect on a population of a migratory bird species, the Armed Forces confer and cooperate with the Service to develop and implement appropriate conservation measures to minimize or mitigate such significant adverse effects. The Proposed Action will not have significant adverse effects at the population level.
Bald and Golden Eagle Protection Act (16 U.S.C. section 668–668d)	U.S. Forest Service (USFS)	This Act prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. Implementation of the Proposed Action would not result in an adverse effect on Bald or Golden Eagles as their protection is defined in the Bald and Golden Eagle Protection Act.
National Historic Preservation Act (36 CFR part 800)	Navy/State Historic Preservation Office	The Proposed Action would not result in any negative impacts, change, or alter cultural resources of surrounding areas. The Navy is consulting with the Washington State Historic Preservation Office to determine impacts.
EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (58 FR 7269 [16 February 1994])	Navy	The Proposed Action would not disproportionately affect minority and low-income populations.

Table 5.1-1: Other Environmental Compliance Requirements Considered in Preparing this EA (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (62 FR 19885 [23 April 1997])	Navy	The Proposed Action would not result in environmental health risks and safety risks that may disproportionately affect children.
EO 13175, *Consultation and Coordination with Indian Tribal Governments*	Navy	The Navy is consulting with tribal governments regarding the Proposed Action.
EO 12088, *Federal Compliance with Pollution Control Standards*	Navy	The Proposed Action would not result in any exceedance of pollution control standards.
EO 13007, *Accommodation of Sacred Sites*	Navy	The Proposed Action would not result in any direct or indirect impacts on sacred sites.
EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*	Navy	This order directs agencies to implement environmentally conscious goals in regard to energy, water, commerce, chemicals and toxic materials, and transportation. The Proposed Action complies with the goals of this order.
EO 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*	Navy	The Proposed Action would not have a significant impact on public health and safety.
EO 14008, *Tackling the Climate Change Crisis at Home and Abroad*	Navy	The Proposed Action would comply with the policy's goals.
EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*	Navy	The Proposed Action would not result in any disproportionately high and adverse human health or environmental effects on minority or low-income populations.
Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. section 9601 et seq.)	Navy	The Proposed Action would not deal with contaminated sites or pose threats of contamination.
Emergency Planning and Community Right-to-Know Act (42 U.S.C. section 11001 et seq.)	Navy	The Proposed Action is consistent with the Emergency Planning and Community Right-to-Know Act.
Energy Independence and Security Act of 2007 (42 U.S.C. section 17001 et seq.)	Navy	The Proposed Action is consistent with the Energy Independence and Security Act of 2007.
Resource Conservation and Recovery Act (42 U.S.C. section 6901 et seq.)	Navy	The Proposed Action is consistent with the Resource Conservation and Recovery Act.

Table 5.1-1: Other Environmental Compliance Requirements Considered in Preparing this EA (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Pollution Prevention Act of 1990 (42 U.S.C. section 13101 et seq.)	Navy	The Proposed Action is consistent with Pollution Prevention Act of 1990.
Federal Aviation Act of 1958 (49 U.S.C. section 1301 et seq.)	Navy	The Proposed Action is consistent with the Federal Aviation Act of 1958.
Toxic Substances Control Act (15 U.S.C. section 2601 et seq.)	Navy	The Proposed Action would not deal with toxic substances or pose threats of contamination.
Federal Aviation Administration (FAA) Order 1050.1F Environmental Impacts: Policies and Procedures	Navy/FAA	The Proposed Action would comply with the FAA Order 1050.1F policies and procedures.
FAA Order Job Order (JO) 7400.2P Procedures for Handling Airspace Matters	Navy	The Proposed Action would comply with FAA Order JO 7400.2P Procedures for Handling Airspace Matters.

Notes: U.S.C. = United States Code, CFR = Code of Federal Regulations, FR = Federal Register, EO = Executive Order

5.2 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered destruction of natural resources that could limit the range of potential uses of that environment.

Implementation of the Proposed Action would not involve any additional human labor or non-renewable resources and would not result in significant irreversible or irretrievable commitment of resources.

6 List of Preparers

6.1 U.S. Department of the Navy

Andrea Balla-Holden (U.S. Pacific Fleet, Environmental Readiness Division)
B.S., Fisheries
Years of Experience: 30

Jenny Dellert (Naval Facilities Engineering Systems Command Northwest)
M.A., Anthropology (emphasis is Archaeology)
B.A., Anthropology-Archaeology
Years of Experience: 25

Amy Fowler (Naval Facilities Engineering Systems Command Northwest)
B.S., Ecology
Years of Experience: 8

Dave Grant (Naval Facilities Engineering Systems Command Northwest)
M.A., Anthropology (Nautical Archaeology)
Years of Experience: 35

Matthew Hamilton (Naval Facilities Engineering Systems Command Northwest)
B.S., Mechanical Engineering
Years of Experience: 34

Katherine Jesser (Naval Facilities Engineering Systems Command Northwest)
B.S., Environmental Science and Resource Management (Wildlife Conservation)
Years of Experience: 5

Cindi Kunz (Naval Facilities Engineering Systems Command Northwest)
M.S., Wildlife Science
B.S., Wildlife Science
Years of Experience: 38

Erin Lietzan (SAIC Contract Support, U.S. Pacific Fleet, Naval Air Station Whidbey Island)
M.S., Sustainable Natural Resources
B.S., Oceanography
Years of Experience: 11

Kent Mathes (Naval Air Station Whidbey Island)
M., Business Administration
M.A., National Security and Strategic Studies
M. Cert., Organizational Leadership
M.S., Human Resource Management
B.S., Geography
Years of Experience: 36

John Mosher (U.S. Pacific Fleet, Environmental Readiness Division)
B.S., Geology
Years of Experience: 37

Danielle Page-Pattison (Naval Facilities Engineering Systems Command Northwest)
M.A., Anthropology (emphasis is Archaeology)
Years of Experience: 30

Tiffany Selbig (Naval Facilities Engineering Systems Command Northwest)
B.S., Environmental Science
Years of Experience: 15

Stephanie Sleeman (Naval Facilities Engineering Systems Command Northwest)
M.E.S., Environmental Science
B.A., Environmental Policy and Planning
Minor, Marine Science
Years of Experience: 17

Jennifer Steele (Naval Facilities Engineering Systems Command Northwest)
M.S., Coastal and Oceanographic Engineering
M. Cert., Environmental Policy and Management
B.S., Marine Sciences
Years of Experience: 11

6.2 CONTRACTORS

Micah Downing (Blue Ridge Research & Consulting)
Ph.D., Mechanical Engineering
M.S., Applied Science
B.S., Physics
Years of Experience: 35

Laura Egendorf (ManTech International)
B.A., English
Years of Experience: 28

Joseph Greenspan (ManTech International)
B.S., Economics
Years of Experience: 1

Massie Hatch, PE, CPP (M.S. Hatch Consulting, LLC)
M.S., Mechanical Engineering
B.S., Mechanical Engineering
Years of Experience: 33

Taylor Houston (ManTech International)
M.B.A.
B.S., Natural Resource Management
Years of Experience: 24

Mackenzie Lyon (ManTech International)
B.S., Environmental, Soil, & Water Science
Years of Experience: 2

Allison Turner, Certified Public Participation Practitioner by the International Association of Public Participation (ManTech International)
M.E.S.M., Environmental Science & Management
B.A., Social Science emphasis in Environment
Years of Experience: 23

Brian Wauer (ManTech International)
B.S., Administrative Management
B.S., Industrial Management
Years of Experience: 39

Lawrence Wolski (ManTech International)
M.S., Marine Sciences
B.S., Biology
Years of Experience: 23

7 References

Aeronautical Information Publication. (2023). *ENR 5.2 Military Exercise and Training Areas*. Retrieved September 27, 2023, from https://www.faa.gov/air_traffic/publications/atpubs/aip_html/part2_enr_section_5.2.html.

Basner, M., W. Babisch, A. Davis, M. Brink, C. Clark, S. Janssen, and S. Stansfeld. (2014). Auditory and non-auditory effects of noise on health. *NIH Public Access Policy 393* 1325–1332. DOI:10.1016/S0140-6736(13)61613-X

Bowles, A. E. (1995). Chapter 8: Responses of Wildlife to Noise. In R. L. Knight & K. J. Gutzwiller (Eds.), *Wildlife and Recreationists: Coexistence Through Management and Research*. Washington, DC: Island Press.

Buchanan, J. B. (2023). *Periodic Status Review for the Northern Spotted Owl*. Olympia, WA: Washington Department of Fish and Wildlife.

Burma Shores LLC. (2023). *Copperstone Development SEPA Checklist*. Winthrop, WA: Burma Shores, LLC.

Conservation Northwest. (2021). *Canada Lynx*. Retrieved October 18, 2023, from https://conservationnw.org/our-work/wildlife/canada-lynx.

Correia, A. W., J. L. Peters, J. I. Levy, S. Melley, and F. Dominici. (2013). Residential exposure to aircraft noise and hospital admissions for cardiovascular diseases: Multi-airport retrospective study. *The BMJ 347*. DOI:10.1136/bmj.f5561

Council on Environmental Quality. (1997). *Considering Cumulative Effects Under the National Environmental Policy Act*. Washington, DC: Council on Environmental Quality.

Council on Environmental Quality. (2005). *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*. Washington, DC: Executive Office of the President, Council on Environmental Quality.

Council on Environmental Quality. (2023). *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*. Washington, DC: Council on Environmental Quality.

Council on Environmental Quality and Advisory Council on Historic Preservation. (2013). *NEPA and NHPA Handbook for Integrating NEPA and Section 106*. Washington, DC: Council on Environmental Quality.

Evans, G. W., M. Bullinger, and S. Hygge. (1998). Chronic noise exposure and physiological response: A prospective study of children living under environmental stress. *Psychological Science 9* (1): 75–77. DOI:10.1111/1467-9280.00014

Federal Aviation Administration. (2015). *Section 106 Handbook: How to Assess the Effects of FAA Actions on Historic Properties under Section 106 of the National Historic Preservation Act*. Washington, DC: Federal Aviation Administration.

Federal Aviation Administration. (2022a). *Community Response to Noise*. Retrieved August 29, 2023, from https://www.faa.gov/regulations_policies/policy_guidance/noise/community.

Federal Aviation Administration. (2022b). *Proposed Okanogan D Military Operations Area and Mazama Air Traffic Control Assigned Airspace Aeronautical Study*. Seattle, WA: Seattle Air Traffic Control Center.

Federal Aviation Administration. (2023a). *Aeronautical Information Manual Official Guide to Basic Flight Information, Chapter 3 - Airspace*. Washington, DC: Federal Aviation Administration.

Federal Aviation Administration. (2023b). *Pilot/Controller Glossary*. Retrieved December 20, 2023, from https://www.faa.gov/air_traffic/publications/atpubs/pcg_html/glossary-s.html#:~:text=SPECIAL%20ACTIVITY%20AIRSPACE%20(SAA)%2D,public%20interest%2C%20or%20public%20safety.

Federal Aviation Administration. (2023c). *Pilot/Controller Glossary: Glossary Section A*. Retrieved October 18, 2023, from https://www.faa.gov/air_traffic/publications/atpubs/pcg_html/glossary-a.html#$ATC%20ASSIGNED%20AIRSPACE.

Federal Aviation Administration. (2023d). *Pilot/Controller Glossary: Glossary Section M*. Retrieved October 18, 2023, from https://www.faa.gov/air_traffic/publications/atpubs/pcg_html/glossary-m.html#$MILITARY%20OPERATIONS%20AREA.

Franklin, A. B., K. M. Dugger, D. B. Lesmeister, R. J. Davis, J. D. Wiens, G. C. White, J. D. Nichols, J. E. Hines, C. B. Yackulic, and C. J. Schwarz. (2021). Range-wide declines of northern spotted owl populations in the Pacific Northwest: A meta-analysis. *Biological Conservation 259* 109168.

Grubb, T. G. and W. W. Bowerman. (1997). Variations in breeding bald eagle responses to jets, light planes and helicopters. *Journal of Raptor Research 31* (3): 213–222.

Haralabidis, A. S., K. Dimakopoulou, F. Vigna-Taglianti, M. Giampaolo, A. Borgini, M.-L. Dudley, G. Pershagen, G. Bluhm, D. Houthuijs, W. Babisch, M. Velonakis, K. Katsouyanni, and L. Jarup. (2008). Acute effects of night-time noise exposure on blood pressure in populations living near airports. *European Heart Journal 29* 658–664. DOI:10.1093/eurheartj/ehn013

Hollenbeck, J. P., S. M. Haig, E. D. Forsman, and J. D. Wiens. (2018). Geographic variation in natal dispersal of Northern Spotted Owls over 28 years. *The Condor: Ornithological Applications 120* (3): 530-542. DOI:10.1650/CONDOR-17-164.1

Idaho Department of Environmental Quality. (2022). *Rules for the Control of Air Pollution in Idaho*. Boise, ID: Idaho Department of Environmental Quality, Air Quality Division.

Interagency Lynx Biology Team. (2013). *Canada Lynx Conservation Assessment and Strategy 3rd Edition*. Missoula, MT: U.S. Department of Agriculture Forest Service, U.S. Department of the Interior Fish and Wildlife Service, U.S. Department of the Interior Bureau of Land Management, and U.S. Department of the Interior National Park Service.

Johnson, C. L. and R. T. Reynolds. (2002). *Responses of Mexican Spotted Owls to Low-Flying Military Jet Aircraft*. Fort Collins, CO: U.S. Department of Agriculture.

Krausman, P. R., M. C. Wallace, C. L. Hayes, and D. W. DeYoung. (1998). Effects of jet aircraft on mountain sheep. *Journal of Wildlife Management 62* (4): 1246–1254.

Krausman, P. R., M. C. Wallace, M. J. Zine, L. R. Berner, C. L. Hayes, and D. W. DeYoung. (1993). *The Effects of Low-Altitude Aircraft on Mountain Sheep Heart Rate and Behavior* (AL/OE-TR-1993-0184). Tucson, AZ: University of Arizona.

Lamp, R. E. (1989). *Monitoring the Effects of Military Air Operations at Naval Air Station Fallon on the Biota of Nevada*. Reno, NV: Nevada Department of Wildlife.

Larkin, R. P., L. L. Pater, and D. J. Tazlk. (1996). *Effects of Military Noise on Wildlife: A Literature Review* (USACERL Technical Report 96/21). Champaign, IL: U.S. Army Construction Engineering Research Laboratories.

LDC. (2023). *Copperstone Subdivision Planned Development Application Project Narrative*. Okanogan, WA: Okanogan County Planning and Development Department.

Manci, K. M., D. N. Gladwin, R. Villella, and M. G. Cavendish. (1988). *Effects of Aircraft Noise and Sonic Booms on Domestic Animals and Wildlife: A Literature Synthesis* (NERC-88/29). Fort Collins, CO: U.S. Fish and Wildlife Service, National Ecology Research Center.

National Institute on Deafness and Other Communication Disorders. (2017). *Noise-Induced Hearing Loss*. Retrieved from https://www.nidcd.nih.gov/health/noise-induced-hearing-loss.

National Park Service. (1994). *Report on Effects of Aircraft Overflights on the National Park System* (Report to Congress prepared pursuant to Public Law 100-191, the National Parks Overflights Act of 1987). Washington, DC: National Park Service.

Nature Mapping Foundation. (2023). *Washington Wildlife Distribution Maps*. Retrieved September 19, 2023, from www.naturemappingfoundation.org/natmap/maps/wa/.

Occupational Safety and Health Administration. (2008). *Standard Number 1910.95 - Occupational noise exposure*. Washington, DC: U.S. Department of Labor.

Occupational Safety and Health Administration. (2023). *Occupational Noise Exposure*. Retrieved 9/27/2023, 2023, from https://www.osha.gov/noise#:~:text=The%20National%20Institute%20for%20Occupational%20Safety%20and%20Health%20(NIOSH)%20has,occupational%20noise%20induced%20hearing%20loss.

Pepper, C. B., M. A. Nascarella, and R. J. Kendall. (2003). A review of the effects of aircraft noise on wildlife and humans, current control mechanisms, and the need for further study. *Environmental Management 32* (4): 418–432. DOI:10.1007/s00267-003-3024-4

Ransom, J. I., A. L. Lyons, K. C. Hegewisch, and M. Krosby. (2023). An integrated modeling approach for considering wildlife reintroduction in the face of climate uncertainty: A case for the North Cascades grizzly bear. *Biological Conservation 279* 109947.

Schomer, P. D. (2005). Criteria for assessment of noise annoyance. *Noise Control Engineering Journal 53* (4): 132–144.

Stansfeld, S. A. and M. P. Matheson. (2003). Noise pollution: Non-auditory effects on health. *British Medical Bulletin 68* 243-257. DOI:10.1093/bmb/ldg033

U.S. Census Bureau. (2020). *Decennial Census: Profile of General Population and Housing Characteristics*. Retrieved from https://data.census.gov/table?g=040XX00US53_050XX00US53007,53017,53019,53047,53051,53065&d=DEC+Demographic+Profile.

U.S. Census Bureau. (2021). *American Community Survey: Selected Economic Characteristics*. Retrieved from https://data.census.gov/table/ACSDP5Y2021.DP03?q=DP03&g=040XX00US53_050XX00US53007,53017,53019,53047,53051,53065.

U.S. Department of Agriculture. (1994). *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest-Related Species Within the Range of the Northern Spotted Owl*. Washington, DC: U.S. Department of Agriculture.

U.S. Department of Agriculture. (2023). *Pacific Northwest National Scenic Trail Comprehensive Plan*. Portland, OR: U.S. Department of Agriculture, Pacific Northwest Region.

U.S. Department of Defense. (2006). *Memorandum of Understanding Between the U.S. Department of Defense and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds*. Washington, DC: U.S. Department of Defense.

U.S. Department of Defense. (2009). *Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics - Guide to Using Supplemental Metrics*. Washington, DC: Noise Working Group.

U.S. Department of Defense. (2018). *Department of Defense Instruction 4710.02: DoD Interactions with Federally Recognized Tribes*. Washington, DC: U.S. Department of Defense.

U.S. Department of the Interior. (2017). *Memorandum M-37050. The Migratory Bird Treaty Act Does Not Prohibit Incidental Take*. Washington, DC: U.S. Department of the Interior, Office of the Solicitor.

U.S. Department of the Navy. (2010). *Northwest Training Range Complex Environmental Impact Statement/Overseas Environmental Impact Statement*. Silverdale, WA: Naval Facilities Engineering Command, Northwest.

U.S. Department of the Navy. (2014). *Final Environmental Assessment for the Pacific Northwest Electronic Warfare Range*. Silverdale, WA: Naval Facilities Engineering Command, Northwest.

U.S. Department of the Navy. (2016). *Biological Evaluation for Navy Training within the Okanogan and Roosevelt Military Operations Areas*. Silverdale, WA: Naval Facilities Engineering Command, Northwest.

U.S. Department of the Navy. (2017). *Department of the Navy Airspace Procedures and Planning*. Washington, DC: Office of the Chief of Naval Operations.

U.S. Department of the Navy. (2018a). *Final Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex, WA*. Oak Harbor, WA: U.S. Pacific Fleet.

U.S. Department of the Navy. (2018b). *OPNAV Instruction 3500.39D*. Washington, DC: U.S. Department of the Navy.

U.S. Department of the Navy. (2019). *Record of Decision for the Final Environmental Impact Statement (EIS) for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex, Island County, Washington*. Washington, DC: Department of Defense.

U.S. Department of the Navy. (2020). *Final Northwest Training and Testing Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement*. Oak Harbor, WA: U.S. Department of the Navy.

U.S. Department of the Navy. (2022). *Department of the Navy Climate Action 2030*. Washington, DC: Office of the Assistant Secretary of the Navy for Energy, Installations, and Environment.

U.S. Department of Transportation and Federal Aviation Administration. (2023). *14 CFR Part 91: General Operating and Flight Rules*. Washington, DC: U.S. Department of Transportation.

U.S. Environmental Protection Agency. (1992). *Procedures for Emission Inventory Preparation*. Washington, DC: U.S. Environmental Protection Agency.

U.S. Environmental Protection Agency. (1999). *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*. Washington, DC: Office of Federal Activities.

U.S. Environmental Protection Agency. (2009). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2007*. Washington, DC: U.S. Environmental Protection Agency.

U.S. Environmental Protection Agency. (2016a). *Hazardous Air Pollutants*. Retrieved January 11, 2016, from https://www.epa.gov/haps.

U.S. Environmental Protection Agency. (2016b). *National Ambient Air Quality Standards*. Washington, DC: U.S. Environmental Protection Agency.

U.S. Environmental Protection Agency. (2023a). *Environmental Justice*. Retrieved December 20, 2023, from https://www.epa.gov/environmentaljustice.

U.S. Environmental Protection Agency. (2023b). *Greenhouse Gas Emissions: Understanding Global Warming Potentials*. Retrieved September 1, 2023, from https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#:~:text=The%20Global%20Warming%20Potential%20(GWP,carbon%20dioxide%20(CO2.

U.S. Environmental Protection Agency. (2023c). *Idaho Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants*. Retrieved from https://www3.epa.gov/airquality/greenbook/anayo_id.html.

U.S. Environmental Protection Agency. (2023d). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021*. Washington, DC: U.S. Environmental Protection Agency.

U.S. Fish and Wildlife Service. (2008). *Birds of Conservation Concern 2008*. Arlington, VA: U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management.

U.S. Fish and Wildlife Service. (2010). *Biological Opinion for U.S. Pacific Fleet Northwest Training Range Complex in the Northern Pacific Coastal Waters off the States of Washington, Oregon, and California and Activities in Puget Sound and Airspace over the State of Washington, USA*. Lacey, WA: Washington Fish and Wildlife Office.

U.S. Fish and Wildlife Service. (2011). *Revised recovery plan for the northern spotted owl (Strix occidentalis caurina)*. Portland, OR: U.S. Fish and Wildlife Service.

U.S. Fish and Wildlife Service. (2016). *Biological Opinion on the U.S. Navy's Proposed Northwest Training and Testing Program that Occurs in the Offshore Waters of Northern California, Oregon, and Washington, the Inland Waters of Puget Sound, and Portions of the Olympic Peninsula*. Lacey, WA: U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office.

U.S. Fish and Wildlife Service. (2017). *U.S. Fish and Wildlife Service Letter of Concurrence for the Continuation of Navy Training in the Okanogan and Roosevelt Military Operations Area Airspace, 01EWFW00-2016-I-1238*. Wenatchee, WA: U.S. Department of the Interior.

U.S. Fish and Wildlife Service. (2018). *Species Status Assessment for the North American Wolverine (Gulo gulo luscus)*. Lakewood, CO: U.S. Fish and Wildlife Service, Mountain-Prairie Region.

U.S. Fish and Wildlife Service (2023, November 13). Yellow-billed cuckoo presence in Washington. Personal correspondence between Julie Campbell Hansen and Adam Griesemer.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. (1998). *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act*. Washington, DC: U.S. Fish and Wildlife Service and National Marine Fisheries Service.

U.S. Fish and Wildlife Service Grizzly Bear Recovery Office. (2022). *Species Status Assessment for the Grizzly Bear (Ursus arctos horribilis) in the Lower-48 States*. Missoula, MT: U.S. Fish and Wildlife Service.

U.S. Forest Service. (2019). *Region 6 Regional Forester Special Status Species List*. Portland, OR: U.S. Forest Service, Pacific Northwest Region.

U.S. North American Bird Conservation Initiative. (2000). *Bird Conservation Region Descriptions*. Arlington, VA: U.S. Fish and Wildlife Service, Division of Bird Habitat Conservation.

U.S. North American Bird Conservation Initiative. (2021). *Bird Conservation Regions Map*. Retrieved 10/25/23, from https://nabci-us.org/resources/bird-conservation-regions-map/.

U.S. Pacific Fleet. (2014). *Pacific Northwest EW Range Environmental Assessment*. Washington, DC: U.S. Department of the Navy.

U.S. Pacific Fleet, Naval Sea Systems Command, and Naval Air Systems Command. (2020). *Northwest Training and Testing Activities Final Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement*. Washington, DC: U.S. Department of the Navy.

Washington Department of Fish and Wildlife. (2015). *Washington's State Wildlife Action Plan 2015 Update*. Olympia, WA: Washington Department of Fish and Wildlife.

Washington Department of Fish and Wildlife. (2022). *Wolf packs in Washington*. Retrieved September 19, 2023, from https://wdfw.wa.gov/species-habitats/at-risk/species-recovery/gray-wolf/packs.

Washington Department of Fish and Wildlife. (2023a). *Wolverine (Gulo gulo luscus)*. Retrieved September 19, 2023, from https://wdfw.wa.gov/species-habitats/species/gulo-gulo-luscus.

Washington Department of Fish and Wildlife. (2023b). *Yellow-billed cuckoo (Coccyzus americanus)*. Retrieved November 17, 2023, from https://wdfw.wa.gov/species-habitats/species/coccyzus-americanus.

Washington State Legislature. (2016). *Washington Administrative Code Chapter 173-476: Ambient Air Quality Standards*. Olympia, WA: Washington State Legislature.

Weisenberger, M. E., P. R. Krausman, M. C. Wallace, D. W. De Young, and O. E. Maughan. (1996). Effects of simulated jet aircraft noise on heart rate and behavior of desert ungulates. *Journal of Wildlife Management 60* (1): 52–61.

Wiles, G. J., H. L. Allen, and G. E. Hayes. (2011). *Wolf Conservation and Management Plan*. Olympia, WA: Washington Department of Fish and Wildlife, Wildlife Program.

This page intentionally left blank.

Appendix A: Glossary

Appendix A Glossary

Term	Definition
Above Ground Level (AGL)	Altitude expressed in feet measured above ground level.
Air Traffic Control (ATC)	A service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.
Air Traffic Control Assigned Airspace (ATCAA)	Airspace of defined vertical/lateral limits, assigned by ATC, for the purpose of providing air traffic segregation between the specified activities being conducted within the assigned airspace and other instrument flight rules air traffic.
Ceiling	The highest altitude of a particular section of airspace.
Floor	The lowest altitude of a particular section of airspace.
Instrument Flight Rules	Rules governing the procedures for conducting instrument flight.
Mean Sea Level (MSL)	Altitude expressed in feet measured from MSL.
Military Operations Area (MOA)	A MOA is airspace established outside of Class A airspace to separate or segregate certain non-hazardous military flight activities from instrument flight rules aircraft and to identify visual flight rules aircraft where these activities are conducted.
Military Training Route (MTR)	Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots indicated airspeed.
National Airspace System (NAS)	The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. Included are system components shared jointly with the military.
Notice to Air Missions (NOTAM)	A notice containing information (not known sufficiently in advance to publicize by other means) concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) the timely knowledge of which is essential to personnel concerned with flight operations.
Sortie	A single military aircraft training flight from takeoff to landing.

Term	Definition
Special Activity Airspace (SAA)	Airspace with defined dimensions within the NAS wherein limitations may be imposed upon operations for national defense, homeland security, public interest, or public safety. Special activity airspace includes but is not limited to the following: ATCAA, Altitude Reservations, MTR, Air Refueling Tracks and Anchors, Temporary Flight Restrictions, and Special Security Instructions. Special Use Airspace is a subset of Special Activity Airspace.
Standard Operating Procedure (SOP)	An established procedure to be followed in carrying out a given operation or in a given situation to provide for the safety of personnel and equipment, as well as the success of the training activities.
Visual Flight Rules	Rules that govern the procedures for conducting flight under visual conditions.

Appendix B: Noise Analysis for the Proposed Eastern Washington Airspace Extension

Noise Analysis for the Proposed Eastern Washington Airspace Extension

January 2024

Prepared for:

ManTech
420 Stevens Avenue, Suite 100
Solana Beach, CA 92075

Subcontract Number:
31185-23-FP-T-29011

Prepared by:
Benjamin Manning, M.S.
Micah Downing, Ph.D.

Blue Ridge Research and Consulting, LLC
29 N Market St, Suite 700
Asheville, NC 28801
(p) 828.252.2209
(f) 831.603.8321
BlueRidgeResearch.com

Report Number:
BRRC 23-21

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

List of Figures

List of Tables

List of Acronyms

ACM	Air Combat Maneuvers
ADNL	A-Weighted Day-Night Average Sound Level
$ADNL_r$	A-Weighted Onset-Rate Adjusted Day-Night Average Sound Level
AGL	Above Ground Level
ATCAA	Air Traffic Control Assigned Airspace
BFM	Basic Fighter Maneuvers
dB	Decibels
dBA	A-Weighted Sound Level
CAS	Close Air Support
CVWP	Commander, Electronic Attack Wing, U.S. Pacific Fleet
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPR	Engine Pressure Ratio
ETR	Engine Temperature Variation
EW	Electronic Warfare
F	Fahrenheit Temperature Scale
FAA	Federal Aviation Administration
FL	Flight Level
Ft	Feet
HP	Horsepower
Hz	Hertz
In-Hg	Inches of Mercury
IR	Instrument Route
L_{Amax}	Maximum A-weighted Sound Level
L_{dn}	A-Weighted Day-Night Average Sound Level
L_{dnr}	A-Weighted Onset-Rate Adjusted Day-Night Average Sound Level
MOA	Military Operations Area
MOB	Main Operating Base
MR_NMap	MOA and Route NoiseMap Model
MSL	Mean Sea Level
MTR	Military Training Route
NAA	No Action Alternative
NAS	Naval Air Station
NC	Engine Core Speed
NM	Nautical Mile
NWTRC	Northwest Training Range Complex
OEIS	Overseas Environmental Impact Statement
PAAs	Proposed Action Alternatives
PACFLT	United States Pacific Fleet
ROD	Record of Decision

RPM	Rotations Per Minute
SAA	Special Activity Airspace
Sq NM	Square Nautical Mile
U.S.	United States

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 1. INTRODUCTION

This noise analysis supports the Environmental Assessment (EA) for the potential addition of the Okanogan D Military Operations Area (MOA) and proposed Mazama Air Traffic Control Assigned Airspace (ATCAA). The primary purpose of this report is to present the aircraft noise associated with training operations under the No Action Alternative (NAA) (the existing conditions), Baseline Analysis (the previous noise study with the EA-6B Prowler aircraft), and the Proposed Action Alternatives (PAAs).

1.1 PURPOSE

Commander, United States Pacific Fleet (PACFLT), a Command of the United States (U.S.) Navy (hereinafter, referred to as the Navy), is requesting the Federal Aviation Administration (FAA) establish an extension to existing Special Activity Airspace (SAA)[1] in eastern Washington State to meet mission readiness requirements for Commander, Electronic Attack Wing, U.S. Pacific Fleet (CVWP). Under the Proposed Action, the FAA would establish an extension to existing vertical and lateral airspace dimensions to the west of the existing airspace over northeastern Washington State. The Proposed Action would also include a redistribution of the current CVWP training flight sorties published in the 2010 Northwest Training Range Complex (NWTRC) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) (Navy 2010), hereinafter referred to as NWTRC EIS/OEIS, to accurately characterize how CVWP is projecting to use the airspace.

The airspace in this EA is part of the larger NWTRC. In 2010, the Navy completed the NWTRC EIS/OEIS, which analyzed potential impacts associated with aircraft training in the Okanogan and Roosevelt MOAs and the Molson and Republic ATCAAs. While the NWTRC EIS/OEIS and Record of Decision (ROD) also analyzed the Chinook and Olympic MOAs in Washington State, no changes are proposed in those areas as part of the Proposed Action, and analysis of those areas are not included in this EA. The analysis in this EA is limited to the Okanogan and Roosevelt MOAs; the Molson, Methow, and Republic ATCAAs; and the Okanogan D MOA and Mazama ATCAA as a part of the Proposed Action (Figure 1-1).

[1] SAA consists of airspace of defined dimensions within the National Airspace System wherein limitations may be imposed upon operations for national defense, homeland security, public interest, or public safety.

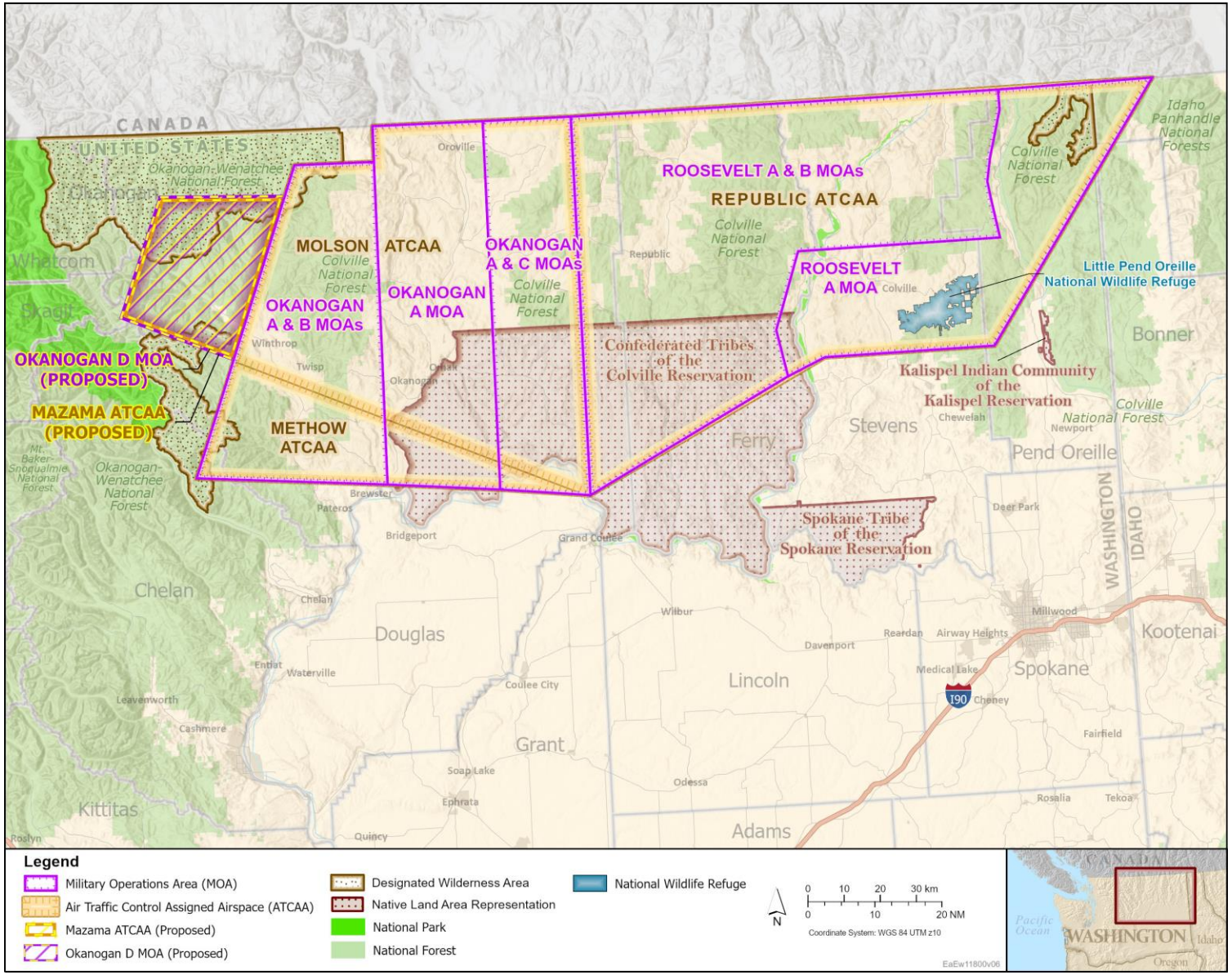

Figure 1-1: Existing and Proposed MOAs and ATCAAs in the Action Area

1.2 DESCRIPTION OF THE STUDY AREA

All navigable airspace in the U.S. is regulated by the Federal Aviation Administration (FAA) by direction of Congress (49 U.S.C. Section 40103 [b] [1]). This EA analyzes the potential impacts of actions associated with the extension of existing airspace by establishing an extension in the form of a MOA and in the form of an ATCAA. In 1977, the FAA designated the airspace in eastern Washington for use by the Navy for training purposes. Descriptions of the MOAs and ATCAAs are provided in Table 1-1. The Existing No Action Alternative contains the following: Okanogan A, B, and C MOAs; the Molson and Methow ATCAAs above the Okanogan MOAs; the Roosevelt A and B MOAs; and the Republic ATCAA above the Roosevelt MOAs. Because the Okanogan B, Okanogan C, and Roosevelt B MOAs have airspace floors of 300 ft above ground level (AGL), airport avoidance areas exist within these MOAs.

Table 1-1. Existing Airspace Altitude Limits

	Airspace Name	Floor (ft MSL or ft AGL)	Ceiling (ft MSL)	Area (sq NM)	Avoidance Areas
No Action	Okanogan A MOA	9,000 ft MSL	17,999	3,437	
	Okanogan B MOA	300 ft AGL	8,999	1,267	Excludes the airspace 1,500 ft AGL and below within a 3 NM radius of Twisp Municipal Airport and Methow Valley State Airport
	Okanogan C MOA	300 ft AGL	8,999	979	Excludes the airspace 1,500 ft AGL and below within a 3 NM radius of the Hart Range Airport
	Roosevelt A MOA	9,000 ft MSL	17,999	4,160	
	Roosevelt B MOA	300 ft AGL	8,999	2,898	Excludes the Airspace 1,500 ft AGL and below within a 3 NM radius of Ferry County Airport
	Molson ATCAA (above Okanogan A/B/C MOA)	18,000 ft MSL	50,000	2,752	
	Methow ATCAA (above Okanogan A/B/C MOA)	18,000 ft MSL	22,999	683	
	Republic ATCAA (above Roosevelt A/B MOA)	18,000 ft MSL	50,000	4,160	
	AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; ft = feet; MOA = Military Operations Area; MSL = Mean Sea Level				

1.3 OVERVIEW OF SCENARIOS AND ANNUAL AIRCRAFT SORTIES

The Navy's Proposed Action is to request the FAA expand the Okanogan MOA airspace, with three alternatives under consideration along with a previous analysis baseline for comparison: (a) NAA (the existing conditions); (b) PAA 1, under which the FAA would create the new Okanogan D MOA from 11,500 ft above mean sea level (MSL) up to but not including 18,000 feet MSL and the Mazama ATCAA (directly above the Okanogan D MOA) from 18,000 ft MSL to 25,000 ft MSL; and (c) PAA 2, which has the same airspace units as PAA 1 but increases the number of sorties within the Okanogan and Roosevelt MOAs and overlying ATCAAs. Summarized descriptions of the PAAs are provided in the following bullets:

- Baseline: Operational Levels from the 2010 NWTRC EIS and Existing Airspace Units
- NAA: Present day (2023) levels with only the EA-18G and Existing Airspace Units
- PAA 1: Present day (2023) levels with only the EA-18G; includes the proposed Okanogan D MOA and Mazama ATCAA
- PAA 2: 12 percent increase in Okanogan A/B/C/D MOA sorties and 11 percent increase in Roosevelt A/B MOA sorties; includes the proposed Okanogan D MOA and Mazama ATCAA

Table 1-2 displays the PAA airspace units to create new Okanogan D MOA and Mazama ATCAA. Table 1-3 presents the modeled aircraft sorties within the eastern Washington airspace for each of the modeled scenarios. The noise modeling has the aircraft sorties distributed equally in area throughout the entire Okanogan and Roosevelt MOAs.

Table 1-2. Proposed Action Alternatives Airspace Units and Altitude Limits

	Airspace Name	Floor (ft MSL or ft AGL)	Ceiling (ft MSL)	Area (sq NM)	Avoidance Areas
Proposed Action Alternatives	Okanogan A MOA	9,000 ft MSL	17,999	3,437	
	Okanogan B MOA	300 ft AGL	8,999	1,267	Excludes the airspace 1,500 ft AGL and below within a 3 NM radius of Twisp Municipal Airport and Methow Valley State Airport
	Okanogan C MOA	300 ft AGL	8,999	979	Excludes the airspace 1,500 ft AGL and below within a 3 NM radius of the Hart Range Airport
	Okanogan D MOA	11,500 ft MSL	17,999	519	
	Roosevelt A MOA	9,000 ft MSL	17,999	4,160	
	Roosevelt B MOA	300 ft AGL	8,999	2,898	Excludes the Airspace 1,500 ft AGL and below within a 3 NM radius of Ferry County Airport
	Molson ATCAA (above Okanogan A/B/C MOA)	18,000 ft MSL	50,000	2,752	
	Methow ATCAA (above Okanogan A/B/C MOA)	18,000 ft MSL	22,999	683	
	Republic ATCAA (above Roosevelt A/B MOA)	18,000 ft MSL	50,000	4,160	
	Mazama ATCAA (above Okanogan D MOA)	18,000 ft MSL	25,000	519	
	AGL = above ground level; ATCAA = Air Traffic Control Assigned Airspace; FL = Flight Level; ft = feet; MOA = Military Operations Area; MSL = Mean Sea Level				

Table 1-3. Annual Aircraft Sorties in the Eastern Washington Airspace for the Modeled Scenarios

	NWTRC EIS (Baseline)		No Action Alternative		Alternative 1		Alternative 2	
Aircraft Type	Existing Okanogan MOAs and Overlying ATCAAs	Existing Roosevelt MOAs and Overlying ATCAAs	Existing Okanogan MOAs and Overlying ATCAAs	Existing Roosevelt MOAs and Overlying ATCAAs	Okanogan MOAs and Overlying ATCAAs	Roosevelt MOAs and Overlying ATCAAs	Okanogan MOAs and Overlying ATCAAs	Roosevelt MOAs and Overlying ATCAAs
EA-6B	2,584	1,267	0	0	0	0	0	0
EA-18G	355	43	2,939	1,310	2,500	1,800	2,800	2,000
Other Navy Users (modeled as 50% F/A-18 and 50% F-35)	47	66	47	66	20	10	25	15
Total	**2,986**	**1,376**	**2,986**	**1,376**	**2,520**	**1,810**	**2,825**	**2,015**

SECTION 2. NOISE METRICS AND MODELS

2.1 NOISE METRICS

Noise is one of the most prominent environmental issues associated with military training activities. The noise environment at military bases and training areas can include various types of noise sources that can either be classified as continuous noise (e.g., on-base vehicular traffic and aircraft training activities), or impulsive noise (e.g., weapons firing or detonation of explosives). Not all of these noise sources are directly associated with military training, such as civilian vehicular traffic or building heating, ventilation, and air conditioning system noise. However, military training activities typically dominate the noise environment around military bases and training areas.

The Day-Night Average Sound Level (DNL) is the federally recommended noise measure used for assessing long-term sound levels occurring during a 24-hour period. DNL (which is sometimes denoted by L_{dnr}) is an average sound level, expressed in decibels (dB), which is commonly used to assess aircraft noise exposures in communities in the vicinity of airfields (FICUN 1980, USEPA 1982, ANSI 2003). DNL values are related to compatible and incompatible land uses and do not directly relate to any singular sound event a human may hear. DNL includes a 10 dB adjustment for nighttime noise events. Acoustic daytime is defined as the period from 7 a.m. to 10 p.m., and acoustic nighttime is the period from 10 p.m. to 7 a.m. the following morning. The 10 dB adjustment accounts for the generally lower background sound levels and greater community sensitivity to noise during nighttime hours.

To accurately assess the impacts on humans from these different types of noise events, the DNL metric is used with different weighting factors that emphasize certain parts of the audio frequency spectrum. The normal human ear detects sounds in the range from 20 Hertz (Hz) to 20,000 Hz. It is most sensitive to sounds in the 1,000 to 4,000 Hz range. Community noise is assessed using a filter that approximates the frequency response of the human ear, adjusting low and high frequencies to match the sensitivity of the ear. This "A-weighting" filter is used to assess most community noise sources.

Aircraft noise generated in SAA is typically different from that associated with airfield operations. As opposed to patterned or continuous noise environments associated with airfields, overflights within SAA can be highly variable in occurrence and location. Individual military overflight events also differ from typical community noise events because noise from a low-altitude, high-airspeed flyover can have a sudden onset (i.e., exhibiting a rate of increase in sound level – onset rate – of up to 30 to 150 dB per second).

To represent these differences, the conventional DNL metric is adjusted to account for the "surprise" effect on humans from the sudden onset of aircraft noise events with an adjustment up to 11 dB above the normal Sound Exposure Level (Stusnick et al. 1992, Stusnick et al. 1993). Onset rates between 15 to 150 dB per second require an adjustment of 0 to 11 dB, while onset rates below 15 dB per second require no adjustment. The adjusted DNL is designated as the Onset-Rate Adjusted Day-Night Average Sound Level (L_{dnr}). L_{dnr} employs A-weighted sound levels.

Another noise metric that can provide additional information about the noise environment is the maximum noise level (L_{Amax}). The L_{Amax} is the highest A-weighted sound level measured during a single event where the sound level changes value with time (e.g., an aircraft overflight). The

L_{Amax} is unaffected by the number of training activities, and is affected by the several factors that are specific to a particular overflight (e.g., altitude, engine power setting, etc.). Due to the flight activities being dispersed throughout the airspace, persons on the ground experience noise events with a wide range of L_{Amax} values. In this setting, overflights with the highest possible L_{Amax} (i.e., the aircraft passes directly overhead at the lowest permitted altitude and highest engine power setting) are relatively rare.

Training airspace noise was assessed using the Department of Defense recommended noise metrics (FICUN 1980, U.S. Army 2007). Aircraft flight noise was assessed using the A-weighted Onset-Rate Adjusted Day-Night Average Sound Level ($ADNL_r$ or L_{dnr}). In addition, the aircraft flight noise was also assessed using the FAA-recommended DNL metric (L_{dn}).

2.2 COMPUTERIZED NOISE EXPOSURE MODELS

Calculated noise levels for aircraft operations were developed using the MOA and Route NoiseMap Model (MR_NMap) (Ikelheimer and Downing 2013). The Department of the Air Force developed this general-purpose computer model for calculating noise exposures occurring away from airbases, since aircraft noise is also an issue within MOAs and ranges, as well as along Military Training Routes (MTRs). This model expands the calculation of noise exposures away from airbases by using algorithms from both NoiseMap (Moulton 1992) and RouteMap (Bradley 1996). MR_NMap uses two primary noise models to calculate the noise exposure: track and area operations. Track operations are for operations that have a well-defined flight track, such as MTRs, aerial refueling, and strafing tracks. Area operations are for operations that do not have well-defined tracks, but occur within a defined area, such as air-to-air combat practice within a MOA.

For track operations, input requirements are the same as for RouteMap, but more than just MTRs can be modeled. For area operations, the model allows flexibility. If little is known about the airspace utilization within a MOA, then the MOA boundaries can simply be used, and the operations are uniformly distributed within the defined area. However, if more is known about how and where the aircraft fly within the MOA, subareas can be defined within the MOA to more accurately model the noise exposure.

Once the airspace is defined, the user must describe the mission types occurring within each airspace segment. Individual aircraft missions include the altitude distribution, airspeed, durations, and engine power settings. These individual profiles are coupled with airspace components and annual operational rates. After the airspace and operational parameters are defined, MR_NMap calculates the resulting L_{dn} or L_{dnr}. The model calculates these noise metrics for each airspace unit.

SECTION 3. AIRSPACE TRAINING ACTIVITIES

The EA-18G squadrons at Naval Air Station (NAS) Whidbey Island conduct Air Combat Maneuver (ACM) missions and Electronic Warfare (EW) missions within the eastern Washington airspace complex. The two mission types were also modeled for the previous baseline analysis of the EA-6B missions within the complex.

The EA-18G aircrews at NAS Whidbey Island developed distributions of missions in terms of both airspace used and annual sorties. For the NAA and PAA 1 conditions, current operational data were used for the annual sortie rates along with airspace utilization. Current airspace utilization logs were used to determine the number of annual sorties flown in the Okanogan MOAs and Roosevelt MOAs. For the Baseline scenario, the annual sorties come from the 2010 NWTRC EIS and includes the EA-6B aircraft that was used in the previous noise model for the EIS. For PAA 2, the EA-18G is projected to increase sorties by 12 percent in Okanogan MOAs and by 11 percent in Roosevelt MOAs. Table 3-1 provides the distribution of training mission sorties required for each mission types as well as the number of annual sorties across each of the modeled scenarios within the eastern Washington airspace. Another modeling parameter is the percentage of operations that occur during acoustic daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) for each mission type (also presented in the tables).

Table 3-1. Distribution of Mission Types and Annual Aircraft Sorties for Each Modeled Scenario

Scenario	Aircraft Type	Mission Type	Percentage of Mission Type	Acoustic Day (0700-2200)	Acoustic Night (2200-0700)	Annual Sorties Acoustic Day	Annual Sorties Acoustic Night	Total Annual Sorties
Baseline	EA-18G	ACM	26.3%	97.5%	2.5%	102	3	105
		EW	73.7%	97.5%	2.5%	286	7	293
	EA-6B	ACM	26.3%	97.5%	2.5%	988	25	1,013
		EW	73.7%	97.5%	2.5%	2,767	71	2,838
No Action	EA-18G	ACM	26.3%	97.5%	2.5%	1,090	28	1,131
		EW	73.7%	97.5%	2.5%	3,053	78	3,169
PAA 1	EA-18G	ACM	26.3%	97.5%	2.5%	1,103	28	1,131
		EW	73.7%	97.5%	2.5%	3,090	79	3,169
PAA 2	EA-18G	ACM	26.3%	97.5%	2.5%	1,230	32	1,262
		EW	73.7%	97.5%	2.5%	3,450	88	3,538

The annual number of events, sorties, and missions for the EA-18G (and EA-6B for the Baseline scenario) within the airspace for the Baseline, NAA, PAA 1, and PAA 2 are shown in Table 3-2 through Table 3-5. Each mission event can have multiple aircraft sorties (depending on the number of aircraft that perform each mission), and if those events go through multiple sections of the airspace, then additional sorties are recorded for each event. For noise modeling, the number of annual sorties is modeled, and the duration within each section of the airspace is calculated based on the relative airspace areas when a sortie is performed across multiple MOAs.

Other users utilize the eastern Washington airspace for their training, as well. These users include the Navy F/A-18 and F-35 aircraft displayed at the bottom of Table 1-3. Table 3-6 summarizes the annual sorties for these aircraft.

Table 3-2. Baseline EA-18G and EA-6B Sorties per Mission Type across Each MOA

	Mission Type	Okanogan MOAs		Roosevelt MOAs		Sum of Sorties
		%	Sorties	%	Sorties	
EA-18G	ACM	26.3%	93	26.3%	11	105
	EW	73.7%	262	73.7%	32	293
	TOTAL		**355**		**43**	***398***
	Mission Type	**Okanogan MOAs**		**Roosevelt MOAs**		**Sum of Sorties**
		%	**Sorties**	**%**	**Sorties**	
EA-6B	ACM	26.3%	680	26.3%	333	1,013
	EW	73.7%	1,904	73.7%	934	2,838
	TOTAL		**2,584**		**1,267**	***3,851***

Table 3-3. No Action Alternative EA-18G Sorties per Mission Type across each MOA

	Mission Type	Okanogan MOAs		Roosevelt MOAs		Sum of Sorties
		%	Sorties	%	Sorties	
EA-18G	ACM	26.3%	773	26.3%	345	1,117
	EW	73.7%	2,166	73.7%	965	3,132
	TOTAL		**2,939**		**1,310**	***4,249***

Table 3-4. Proposed Action Alternative 1 EA-18G Sorties per Mission Type across each MOA

	Mission Type	Okanogan MOAs		Roosevelt MOAs		Sum of Sorties
		%	Sorties	%	Sorties	
EA-18G	ACM	26.3%	657	26.3%	474	1,131
	EW	73.7%	1,843	73.7%	1,326	3,169
	TOTAL		**2,500**		**1,800**	***4,300***

Table 3-5. Proposed Action Alternative 2 EA-18G Sorties per Mission Type across each MOA

	Mission Type	Okanogan MOAs		Roosevelt MOAs		Sum of Sorties
		%	Sorties	%	Sorties	
EA-18G	ACM	26.3%	728	26.3%	520	1,248
	EW	73.7%	2,072	73.7%	1,480	3,552
	TOTAL		**2,800**		**2,000**	***4,800***

Table 3-6. Annual Sorties of Other Aircraft Types within the Eastern Washington Airspace

Aircraft Type	Baseline Annual Sorties		NAA Annual Sorties		PAA 1 Annual Sorties		PAA 2 Annual Sorties	
	Okanogan MOA	Roosevelt MOA	Okanogan MOA	Roosevelt MOA	Okanogan MOA	Roosevelt MOA	Okanogan MOA	Roosevelt MOA
KC-135	30	27	30	27	30	27	33	30
F-15	12	10	12	10	12	10	13	11
C-17	16	10	16	10	16	10	18	11
C-130	31	30	31	30	31	30	34	33
F-18E/F*	47	66	47	66	10	5	13	8
F-35*	0	0	0	0	10	5	12	7
Total	136	143	136	143	109	87	123	100

*F-18E/F and F-35 are Navy users

3.1 TRAINING MISSIONS DESCRIPTIONS

For the two training missions for the EA-18G (and EA-6B for the Baseline scenario) within the eastern Washington airspace, a composite profile was developed with pilot input and review. These profiles provide accurate modeling of the overall noise from the training missions. The operational parameters cover event duration, average airspeed, distributions in engine power, airspace utilization, and altitude. These parameters are listed in the following sections.

3.1.1 EA-18G Growler Air Combat Manuevers (ACM) Mission Profile

In ACM missions, aircrews maneuver against simulated threats to gain tactical advantage. These are basic flight maneuvers in which aircrew engage in offensive and defensive maneuvering against each other, at distances within visual range and beyond visual range. During ACM engagements, no ordnance is fired. ACM normally involves two aircraft operating with an average airspeed of 420 knots for 60 minutes in the 10,000 to 35,000 ft MSL altitude band. Table 3-7 provides the engine power distribution, which does not change among the scenarios. Table 3-8 lists the altitude distributions, which also does not change among the scenarios.

Table 3-7. Engine Power Distribution for EA-18G ACM Training Mission

Engine Power Mode (%NC)	Percent in Mode
Afterburner 97%	19.6%
Military Power 96%	28.3%
Cruise 88.6%	52.1%

%NC = Engine Core Speed

Table 3-8. Modeled Altitude Bands for EA-18G ACM Training Mission

Altitude Band	Okanogan MOAs	Roosevelt MOAs
300 ft AGL–500 ft AGL	0%	0%
500 ft AGL–1,500 ft MSL	0%	0%
1,500–10,000 ft MSL	0%	0%
10,000–15,000 ft MSL	18.4%	18.4%
15,000–35,000 ft MSL	81.6%	81.6%

3.1.2 EA-18G Growler Electronic Warfare (EW) Mission Profile

In EW missions, aircrews use systems to degrade the enemy's ability to use electronic equipment, such as communications systems and radar, and to confuse or deny them the ability to defend their forces and assets. EW is also used to detect enemy threats and counter their attempts to degrade the electronic capabilities of U.S. forces. Table 3-9 provides the engine power distribution, which does not change among the scenarios. Table 3-10 lists the altitude distributions for the EW mission profile, which also does not change among the scenarios. EW normally involves two aircraft for 90 minutes with an average airspeed of 360 knots in the 500 ft AGL to 35,000 feet MSL altitude band. Note that the Okanogan A MOA and Roosevelt A MOA floors are 9,000 feet MSL and the Proposed Action Okanogan D MOA floor is 11,500 ft MSL. For these MOAs, the percentages in the altitude bands below these floors in Table 3-10 are added to the 5,000–15,000 ft MSL altitude band.

Table 3-9. Engine Power Distribution for EA-18G EW Training Mission

Engine Power Mode (%NC)	Percent in Mode
Afterburner 97%	1.7%
Military Power 96%	9.7%
Cruise 88.6%	88.6%

%NC = Engine Core Speed

Table 3-10. Modeled Altitude Bands for EA-18G EW Training Mission

Altitude Band	Okanogan MOAs	Roosevelt MOAs
300 ft AGL–500 ft AGL	0%	0%
500 ft AGL–1,500 ft MSL	4%	4%
1,500–5,000 ft MSL	1%	1%
5,000–15,000 ft MSL	17%	17%
15,000–35,000 ft MSL	78%	78%

3.1.3 Baseline EA-6B Prowler Air Combat Maneuvers (ACM) Mission Profile

In ACM missions for the EA-6B for the Baseline scenario, flight activity consists primarily of single aircraft practice of "stalls and falls" as well as defensive tactics at altitude. The EA-6B did not conduct air-to-air tactics/presentations or Basic Fighter Maneuvers (BFM) like the current EA-18G operations. Formation flights were much less common, as opposed to the majority of EA-18G flights being multi-ship; and, when conducted these flights would focus on basic tactical formation sight picture, maneuvering as a formation and break-ups and rendezvous with lower power settings. The average EA-6B airspeed for ACM missions was 265 knots with 60-minute durations in the airspace in the 500 ft AGL to 30,000 feet MSL altitude band. Table 3-11 provides the baseline scenario EA-6B engine power distribution. Table 3-12 lists the baseline scenario EA-6B altitude distributions. Since Methow ATCAA (above Okanogan A/B/C MOAs) has a ceiling of 22,999 ft MSL, for the Okanogan sorties within the Methow ATCAA area, the 5 percent altitude band in 23,000 to 30,000 ft MSL is moved and added to the 9,000 to 23,000 ft MSL altitude band.

Table 3-11. Engine Power Distribution for Baseline EA-6B ACM Training Mission

Engine Power Mode (%RPM)	Percent in Mode
Military Power 95%	10%
Cruise 85%	90%

%RPM = percentage of the maximum allowed rotation speed

Table 3-12. Modeled Altitude Bands for Baseline EA-6B ACM Training Mission

Altitude Band	Okanogan MOAs	Roosevelt MOAs
300 ft AGL–500 ft AGL	0%	0%
500 ft AGL–9,000 ft MSL	20%	10%
9,000–23,000 ft MSL	75%	85%
23,000–30,000 ft MSL	5%	5%

3.1.4 Baseline EA-6B Prowler Electronic Warfare (EW) Mission Profile

In EW missions for the EA-6B for the Baseline scenario, the missions are mostly single aircraft in the MOAs practicing medium to low-level EW Close Air Support (CAS) missions for 60 minutes with an average airspeed of 300 knots in the 500 feet AGL to 30,000 feet MSL altitude band. Table 3-13 provides the engine power distribution for the EA-6B in the Baseline scenario for the EW missions. Table 3-14 lists the altitude distributions for the EA-6B in the Baseline scenario. Methow ATCAA (above Okanogan A/B/C MOAs) has a ceiling of 22,999 ft MSL; thus, for the Okanogan sorties within the Methow ATCAA area, the 5 percent altitude band in 23,000 to 30,000 ft MSL is moved and added to the 9,000 to 23,000 ft MSL altitude band. The EW mission is in the 500 ft AGL to 9,000 ft MSL altitude band for 10 percent more time than in the ACM mission.

Table 3-13. Engine Power Distribution for Baseline EA-6B EW Training Mission

Engine Power Mode (%RPM)	Percent in Mode
Military Power 95%	10%
Cruise 85%	90%

%RPM = percentage of the maximum allowed rotation speed

Table 3-14. Modeled Altitude Bands for Baseline EA-6B EW Training Mission

Altitude Band	Okanogan MOAs	Roosevelt MOAs
300 ft AGL–500 ft AGL	0%	0%
500 ft AGL–9,000 ft MSL	30%	20%
9,000–23,000 ft MSL	65%	75%
23,000–30,000 ft MSL	5%	5%

3.1.5 Other Aircraft Mission Profiles

Table 3-15 displays the mission profiles of the other aircraft that utilize the Okanogan and Roosevelt MOAs (as listed in Table 3-6). The altitude bands, average airspeed, duration within the airspace, engine power, and percent utilization in acoustic nighttime of these aircraft were derived from the 2020 F-35A Operational Beddown MOB-7 Air Force Reserve Command EIS airspace noise analysis. For the altitude bands that fall under the floor of Okanogan A, Okanogan D, and Roosevelt A MOAs, those band percentages are shifted to the first band above the MOA floor. For the altitude bands that are above the ATCAA ceilings of Methow and Mazama ATCAAs, those band percentages are shifted to the highest band under the ATCAA ceiling.

Table 3-15. Other Aircraft that Utilize the Eastern Washington Airspace Mission Parameters

Aircraft	Average Airspeed (kts)	Duration (min)	Engine Power	% Acoustic Nighttime (10 p.m. to 7 a.m.)	Altitude Band	% in Altitude Band
F/A-18E/F	400	60	92% NC	12%	500–2,000 ft AGL	9%
					2,000–3,000 ft AGL	7%
					3,000–5,000 ft AGL	13%
					5,000–10,000 ft AGL	50%
					10,000–18,000 ft AGL	17%
					18,000–30,000 ft AGL	4%
F-35A	425	90	90% ETR	0%	5,000–10,000 ft AGL	10%
					10,000–18,000 ft AGL	30%
					18,000–30,000 ft AGL	50%
					30,000–50,000 ft AGL	10%
F-15E	400	60	74% NC	12%	500–2,000 ft AGL	9%
					2,000–3,000 ft AGL	7%
					3,000–5,000 ft AGL	13%
					5,000–10,000 ft AGL	50%
					10,000–18,000 ft AGL	17%
					18,000–30,000 ft AGL	4%
C-17	250	60	1.25 EPR	0%	1,000–3,000 ft AGL	5%
					3,000–10,000 ft AGL	40%
					10,000–18,000 ft AGL	10%
					18,000–30,000 ft AGL	20%
					30,000–50,000 ft AGL	25%
C-130J	250	90	2200 HP	20%	500–1,000 ft AGL	26%
					1,000–3,000 ft AGL	6%
					3,000–10,000 ft AGL	48%
					10,000–18,000 ft AGL	10%
					18,000–30,000 ft AGL	10%
KC-135R	240	90	80.3% NC	18%	18,000–30,000 ft AGL	80%
					30,000–50,000 ft AGL	20%

%NC = Engine Core Speed; RPM = rotations per minute; ETR = Engine Temperature Variation; EPR = Engine Pressure Ratio; HP = Horsepower; FL = Flight Level

3.1.6 Atmospheric Data

The atmospheric data used within MR_NMap are displayed in Table 3-16Table 3-16. These are monthly averages over five years (2018–2022) at the Omak Airport (KOMK) weather station in

Omak, WA, which is located close to the center of the eastern Washington airspace complex. These data are used to determine the effect of atmospheric absorption that occurs during noise propagation. NoiseMap utilizes the daily average temperatures, relative humidity, and atmospheric pressure for each month to determine the appropriate values to represent the nominal acoustic absorption for a given year. For these monthly averages, the values for March are utilized to represent acoustical absorption for the year. It should be noted that these values represent the nominal acoustic absorption condition of the atmosphere and not the average weather conditions for the area.

Table 3-16. Atmospheric Data Inputs for MR_NMap

Month	Temperature (degrees F)	Pressure (in-Hg)	Relative Humidity (%)
January	29.9	30.2	84.5
February	29.2	30.1	69.2
March	41.1	29.9	56.0
April	50.3	30.0	44.5
May	60.5	29.9	46.7
June	68.0	29.9	42.6
July	77.2	29.9	31.0
August	75.4	29.9	33.0
September	64.0	30.0	44.9
October	50.2	30.1	57.8
November	35.2	30.2	76.0
December	28.2	30.1	79.6

F = Fahrenheit Temperature Scale; in-Hg = inches of mercury

SECTION 4. AIRCRAFT NOISE RESULTS

4.1 L_{DNR} RESULTS

Aircraft noise in this study is represented by annual average L_{dnr} values at various elevations (in 500 ft increments) under each portion of the MOAs. Because MR_NMap does not directly include terrain in the model, 500-ft elevation steps from 500 ft ground elevation to 8,500 ft ground elevation were modeled under the MOAs to account for the large variation in terrain elevations in the study area. These L_{dnr} values were developed from MR_NMap, as described in Section 2 (Noise Metrics and Models). From these operational parameter inputs, the resulting noise was calculated for the Baseline, NAA, PAA 1, and PAA 2 scenarios. PAA 1 introduces the Okanogan D MOA (with Mazama ATCAA directly over the MOA) to the west of Okanogan B MOA. PAA 2 also has the Okanogan D MOA but increases the aircraft sorties in the entirety of the airspace. The results align with the expected changes among the previous baseline conditions, current conditions (NAA), and the PAA 1 and PAA 2.

The individual scenario noise results are provided in Table 4-1 through Table 4-4. Note that MR_NMap assumes a uniform distribution in the airspace's area, and because the full extents of the Okanogan and Roosevelt MOAs are scheduled as single blocks each, the operations are distributed equally based on area throughout the MOAs and ATCAAs. The Baseline L_{dnr} noise is higher than the NAA because the Baseline EA-6B missions have altitude distributions with lower altitudes compared to the EA-18G. The operational tempo between the Baseline and NAA scenarios are similar, but there are 90 percent EA-6B sorties and 10 percent EA-18G sorties in the Baseline. The NAA scenario has no EA-6B sorties, as the EA-6B has been completely replaced by the EA-18G. The difference in noise levels between the EA-6B and the EA-18G along with the lower altitude distribution of the EA-6B contributes to higher L_{dnr} noise levels for the Baseline scenario. In the Okanogan MOAs, the range of differences between the Baseline and NAA is a 5.9 to 14.0 dBA decrease in the NAA (the difference increases with an increase in ground elevation), and the average decrease from the Baseline to the NAA is 8.5 dBA. In the Roosevelt MOAs, the range of differences between the Baseline and NAA is a 3.6 to 9.3 dBA decrease in the NAA (the difference increases with an increase in ground elevation), and the average decrease from the Baseline to the NAA is 4.9 dBA.

The PAA scenarios add Okanogan D MOA and Mazama ATCAA to the noise analysis. This addition of more airspace volume for training in the Okanogan MOAs spreads the NAA noise exposure into the new area under the Okanogan D MOA. While there is no change in operational tempo between the NAA and PAA 1 (both scenarios use current operational levels), the spread of noise exposure into the Okanogan D/Mazama ATCAA results in a net decrease of 0.6 dBA L_{dnr} under the Okanogan A/B/C MOAs. This 0.6 dBA decrease is consistent across all ground elevations under the existing Okanogan MOAs. For the noise exposure under the Roosevelt MOAs, there is no change in noise exposure between the NAA and PAA 1 scenarios since there are no new airspace units in the Roosevelt MOA. For the PAA 2 scenario, there is an 11 percent increase in EA-18G sorties and a 10 percent increase in other aircraft sorties in the Roosevelt MOAs. This increase results in a 0.5 dBA increase in L_{dnr} under the MOAs compared to the NAA and PAA 1. PAA 2 has a 12 percent increase in EA-18G sorties within the Okanogan MOAs along with a 10 percent increase in other aircraft sorties. This increase in sorties results in an increase of

0.5 dBA L_{dnr} over the PAA 1 scenario under the Okanogan MOAs and a 0.1 dBA decrease in L_{dnr} compared to the NAA scenario.

Table 4-1. Baseline Aircraft Noise Results in L_{dnr} (dBA) for 500 ft Step Ground Elevations

Location within Airspace	Ground Elevation of Analysis (ft)																
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
Okanogan A (Middle Part Only) and Methow ATCAA	45.0	45.4	45.9	46.3	46.8	47.3	47.8	48.3	48.9	49.5	50.2	50.9	51.6	52.5	53.5	54.7	56.8
Okanogan A (Middle Part Only) and Molson ATCAA	46.3	46.8	47.2	47.6	48.1	48.6	49.1	49.6	50.2	50.8	51.4	52.1	52.9	53.7	54.7	55.9	58.1
Okanogan B and Methow ATCAA	54.0	54.2	54.5	54.8	55.1	55.4	55.8	56.2	56.6	57.1	57.6	58.2	58.9	59.7	60.8	62.3	62.3
Okanogan B and Molson ATCAA	55.2	55.5	55.8	56.1	56.4	56.7	57.1	57.5	57.9	58.3	58.9	59.5	60.1	61.0	62.0	63.6	63.6
Okanogan C and Methow ATCAA	53.5	53.8	54.1	54.4	54.7	55.0	55.4	55.8	56.2	56.7	57.2	57.8	58.5	59.3	60.4	61.9	62.0
Okanogan C and Molson ATCAA	53.8	54.0	54.3	54.6	54.9	55.2	55.6	56.0	56.4	56.8	57.3	57.9	58.6	59.4	60.5	62.0	62.0
Okanogan D and Mazama ATCAA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roosevelt A (Right Side Only) and Republic ATCAA	40.8	41.2	41.6	42.1	42.5	43.0	43.5	44.0	44.6	45.2	45.8	46.5	47.3	48.2	49.2	50.4	52.5
Roosevelt B and Republic ATCAA	48.3	48.5	48.8	49.1	49.4	49.7	50.1	50.4	50.9	51.3	51.8	52.4	53.1	53.9	54.9	56.4	56.4

Table 4-2. No Action Alternative (NAA) Aircraft Noise Results in L_{dnr} (dBA) for 500 ft Step Ground Elevations

Location within Airspace	Ground Elevation of Analysis (ft)																
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
Okanogan A (Middle Part Only) and Methow ATCAA	39.0	39.4	40.0	40.4	40.8	41.3	41.7	42.2	42.7	43.4	44.0	44.6	45.3	46.2	47.0	48.1	49.4
Okanogan A (Middle Part Only) and Molson ATCAA	39.6	39.9	40.3	40.7	41.1	41.6	42.0	42.5	43.0	43.5	44.1	44.7	45.4	46.2	47.0	48.0	49.4
Okanogan B and Methow ATCAA	46.6	46.7	46.9	47.1	47.3	47.5	48.1	48.2	48.3	48.5	48.6	48.7	48.9	49.1	49.3	49.5	49.8
Okanogan B and Molson ATCAA	46.7	46.8	46.9	47.1	47.3	47.6	48.2	48.3	48.4	48.5	48.6	48.8	48.9	49.1	49.3	49.6	49.9
Okanogan C and Methow ATCAA	46.1	46.2	46.4	46.6	46.8	47.0	47.6	47.7	47.8	48.0	48.1	48.2	48.4	48.6	48.8	49.0	49.3
Okanogan C and Molson ATCAA	46.5	46.6	46.8	47.0	47.2	47.4	48.0	48.1	48.2	48.4	48.5	48.6	48.8	49.0	49.2	49.5	49.8
Okanogan D and Mazama ATCAA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roosevelt A (Right Side Only) and Republic ATCAA	37.2	37.6	38.0	38.4	38.8	39.3	39.7	40.2	40.7	41.2	41.8	42.4	43.1	43.8	44.7	45.7	47.0
Roosevelt B and Republic ATCAA	44.2	44.3	44.4	44.6	44.8	45.1	45.7	45.8	45.9	46.0	46.2	46.3	46.5	46.7	46.9	47.1	47.5

Table 4-3. Proposed Action Alternative 1 (PAA 1) Aircraft Noise Results in L_{dnr} (dBA) for 500 ft Step Ground Elevations

Location within Airspace	Ground Elevation of Analysis (ft)																
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
Okanogan A (Middle Part Only) and Methow ATCAA	38.4	38.8	39.4	39.8	40.2	40.7	41.1	41.6	42.1	42.8	43.4	44.0	44.7	45.5	46.4	47.5	48.8
Okanogan A (Middle Part Only) and Molson ATCAA	39.0	39.3	39.7	40.1	40.5	41.0	41.4	41.9	42.4	42.9	43.5	44.1	44.8	45.5	46.4	47.4	48.7
Okanogan B and Methow ATCAA	46.0	46.1	46.3	46.5	46.7	46.9	47.5	47.6	47.7	47.9	48.0	48.1	48.2	48.5	48.7	48.9	49.2
Okanogan B and Molson ATCAA	46.1	46.2	46.3	46.5	46.7	47.0	47.6	47.7	47.8	47.9	48.0	48.2	48.3	48.5	48.7	49.0	49.3
Okanogan C and Methow ATCAA	45.5	45.6	45.8	45.9	46.1	46.4	47.0	47.1	47.2	47.3	47.5	47.6	47.8	48.0	48.2	48.4	48.7
Okanogan C and Molson ATCAA	45.9	46.0	46.2	46.4	46.6	46.8	47.4	47.5	47.6	47.7	47.9	48.0	48.2	48.4	48.6	48.9	49.1
Okanogan D and Mazama ATCAA	37.9	38.3	38.6	39.0	39.5	39.9	40.3	40.7	41.1	41.7	42.1	42.6	43.1	43.8	44.3	44.9	45.7
Roosevelt A (Right Side Only) and Republic ATCAA	37.2	37.6	38.0	38.4	38.8	39.3	39.7	40.2	40.7	41.2	41.8	42.4	43.1	43.8	44.7	45.7	47.0
Roosevelt B and Republic ATCAA	44.2	44.3	44.4	44.6	44.8	45.1	45.7	45.8	45.9	46.0	46.2	46.3	46.5	46.7	46.9	47.1	47.5

Table 4-4. Proposed Action Alternative 2 (PAA 2) Aircraft Noise Results in L_{dnr} (dBA) for 500 ft Step Ground Elevations

Location within Airspace	Ground Elevation of Analysis (ft)																
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
Okanogan A (Middle Part Only) and Methow ATCAA	38.9	39.3	39.9	40.3	40.7	41.2	41.6	42.1	42.6	43.3	43.9	44.5	45.2	46.1	46.9	48.0	49.3
Okanogan A (Middle Part Only) and Molson ATCAA	39.4	39.8	40.2	40.6	41.0	41.5	41.9	42.4	42.9	43.4	44.0	44.6	45.3	46.0	46.9	47.9	49.2
Okanogan B and Methow ATCAA	46.5	46.7	46.8	47.0	47.2	47.4	48.0	48.1	48.2	48.4	48.5	48.6	48.8	49.0	49.2	49.4	49.7
Okanogan B and Molson ATCAA	46.6	46.7	46.9	47.0	47.2	47.5	48.1	48.2	48.3	48.4	48.5	48.7	48.8	49.0	49.2	49.5	49.8
Okanogan C and Methow ATCAA	46.0	46.1	46.3	46.5	46.7	46.9	47.5	47.6	47.7	47.8	48.0	48.1	48.3	48.5	48.7	48.9	49.2
Okanogan C and Molson ATCAA	46.4	46.6	46.7	46.9	47.1	47.3	47.9	48.0	48.1	48.3	48.4	48.5	48.7	48.9	49.1	49.4	49.7
Okanogan D and Mazama ATCAA	38.4	38.8	39.1	39.5	40.0	40.4	40.8	41.2	41.6	42.1	42.6	43.1	43.6	44.2	44.8	45.4	46.2
Roosevelt A (Right Side Only) and Republic ATCAA	37.7	38.1	38.5	38.9	39.3	39.7	40.2	40.7	41.2	41.7	42.3	42.9	43.6	44.3	45.2	46.2	47.5
Roosevelt B and Republic ATCAA	44.7	44.8	44.9	45.1	45.3	45.6	46.2	46.3	46.4	46.5	46.6	46.8	47.0	47.2	47.4	47.6	47.9

4.2 DNL RESULTS

The aircraft noise was also modeled for the DNL metric to follow FAA guidance. Table 4-5 through Table 4-8 provide the DNL results of the Baseline, NAA, and PAA scenarios. The DNL results follow the same trends as the L_{dnr} results. L_{dnr} results are only slightly higher than DNL for low-level operations. Across all ground elevations, the difference is less than 1 dBA, with most elevations under the MOAs seeing a 0.1 dBA difference. The largest differences occur for the Baseline scenario at the highest ground elevations because the EA-6B is closest to the ground at these higher elevations.

Table 4-5. Baseline Aircraft Noise Results in DNL (dBA) for 500 ft Step Ground Elevations

Location within Airspace	Ground Elevation of Analysis (ft)																
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
Okanogan A (Middle Part Only) and Methow ATCAA	45.0	45.4	45.9	46.3	46.8	47.3	47.8	48.3	48.9	49.5	50.2	50.9	51.6	52.5	53.5	54.7	56.5
Okanogan A (Middle Part Only) and Molson ATCAA	46.3	46.8	47.2	47.6	48.1	48.6	49.1	49.6	50.2	50.8	51.4	52.1	52.9	53.7	54.7	55.9	57.7
Okanogan B and Methow ATCAA	53.6	53.9	54.1	54.4	54.7	55.1	55.4	55.8	56.2	56.7	57.2	57.7	58.4	59.2	60.2	61.4	61.4
Okanogan B and Molson ATCAA	54.8	55.1	55.4	55.7	56.0	56.3	56.7	57.0	57.5	57.9	58.4	59.0	59.7	60.4	61.4	62.7	62.7
Okanogan C and Methow ATCAA	53.1	53.4	53.7	54.0	54.3	54.6	55.0	55.4	55.8	56.3	56.8	57.3	58.0	58.8	59.8	61.1	61.1
Okanogan C and Molson ATCAA	53.4	53.7	53.9	54.2	54.5	54.8	55.2	55.6	56.0	56.4	56.9	57.5	58.1	58.9	59.9	61.1	61.1
Okanogan D and Mazama ATCAA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roosevelt A (Right Side Only) and Republic ATCAA	40.8	41.2	41.6	42.1	42.5	43.0	43.5	44.0	44.6	45.2	45.8	46.5	47.3	48.2	49.2	50.4	52.1
Roosevelt B and Republic ATCAA	48.0	48.2	48.5	48.8	49.1	49.4	49.7	50.1	50.5	51.0	51.5	52.0	52.7	53.4	54.4	55.6	55.7

Table 4-6. No Action Alternative (NAA) Aircraft Noise Results in DNL (dBA) for 500 ft Step Ground Elevations

Location within Airspace	Ground Elevation of Analysis (ft)																
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
Okanogan A (Middle Part Only) and Methow ATCAA	39.0	39.4	40.0	40.4	40.8	41.3	41.7	42.2	42.7	43.4	44.0	44.6	45.3	46.2	47.0	48.1	49.4
Okanogan A (Middle Part Only) and Molson ATCAA	39.6	39.9	40.3	40.7	41.1	41.6	42.0	42.5	43.0	43.5	44.1	44.7	45.4	46.2	47.0	48.0	49.3
Okanogan B and Methow ATCAA	46.6	46.7	46.9	47.1	47.3	47.5	48.1	48.2	48.3	48.5	48.6	48.7	48.9	49.1	49.3	49.5	49.8
Okanogan B and Molson ATCAA	46.7	46.8	46.9	47.1	47.3	47.6	48.2	48.3	48.4	48.5	48.6	48.8	48.9	49.1	49.3	49.6	49.9
Okanogan C and Methow ATCAA	46.1	46.2	46.4	46.5	46.8	47.0	47.6	47.7	47.8	47.9	48.1	48.2	48.4	48.6	48.8	49.0	49.3
Okanogan C and Molson ATCAA	46.5	46.6	46.8	47.0	47.2	47.4	48.0	48.1	48.2	48.4	48.5	48.6	48.8	49.0	49.2	49.5	49.8
Okanogan D and Mazama ATCAA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roosevelt A (Right Side Only) and Republic ATCAA	37.2	37.6	38.0	38.4	38.8	39.3	39.7	40.2	40.7	41.2	41.8	42.4	43.1	43.8	44.7	45.7	47.0
Roosevelt B and Republic ATCAA	44.2	44.3	44.4	44.6	44.8	45.1	45.7	45.8	45.9	46.0	46.2	46.3	46.5	46.7	46.9	47.1	47.4

Table 4-7. Proposed Action Alternative 1 (PAA 1) Aircraft Noise Results in DNL (dBA) for 500 ft Step Ground Elevations

Location within Airspace	Ground Elevation of Analysis (ft)																
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
Okanogan A (Middle Part Only) and Methow ATCAA	38.4	38.8	39.4	39.8	40.2	40.7	41.1	41.6	42.1	42.8	43.4	44.0	44.7	45.5	46.4	47.5	48.8
Okanogan A (Middle Part Only) and Molson ATCAA	39.0	39.3	39.7	40.1	40.5	41.0	41.4	41.9	42.4	42.9	43.5	44.1	44.8	45.5	46.4	47.4	48.7
Okanogan B and Methow ATCAA	46.0	46.1	46.3	46.5	46.7	46.9	47.5	47.6	47.7	47.8	48.0	48.1	48.2	48.5	48.6	48.9	49.2
Okanogan B and Molson ATCAA	46.1	46.2	46.3	46.5	46.7	47.0	47.6	47.7	47.8	47.9	48.0	48.2	48.3	48.5	48.7	49.0	49.3
Okanogan C and Methow ATCAA	45.5	45.6	45.8	45.9	46.1	46.4	47.0	47.1	47.2	47.3	47.5	47.6	47.7	48.0	48.2	48.4	48.7
Okanogan C and Molson ATCAA	45.9	46.0	46.2	46.4	46.6	46.8	47.4	47.5	47.6	47.7	47.9	48.0	48.2	48.4	48.6	48.8	49.1
Okanogan D and Mazama ATCAA	37.9	38.3	38.6	39.0	39.5	39.9	40.3	40.7	41.1	41.7	42.1	42.6	43.1	43.8	44.3	44.9	45.7
Roosevelt A (Right Side Only) and Republic ATCAA	37.2	37.6	38.0	38.4	38.8	39.3	39.7	40.2	40.7	41.2	41.8	42.4	43.1	43.8	44.7	45.7	47.0
Roosevelt B and Republic ATCAA	44.2	44.3	44.4	44.6	44.8	45.1	45.7	45.8	45.9	46.0	46.2	46.3	46.5	46.7	46.9	47.1	47.4

Table 4-8. Proposed Action Alternative 2 (PAA 2) Aircraft Noise Results in DNL (dBA) for 500 ft Step Ground Elevations

Location within Airspace	Ground Elevation of Analysis (ft)																
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
Okanogan A (Middle Part Only) and Methow ATCAA	38.9	39.3	39.9	40.3	40.7	41.2	41.6	42.1	42.6	43.3	43.9	44.5	45.2	46.1	46.9	48.0	49.3
Okanogan A (Middle Part Only) and Molson ATCAA	39.4	39.8	40.2	40.6	41.0	41.5	41.9	42.4	42.9	43.4	44.0	44.6	45.3	46.0	46.9	47.9	49.2
Okanogan B and Methow ATCAA	46.5	46.7	46.8	47.0	47.2	47.4	48.0	48.1	48.2	48.4	48.5	48.6	48.8	49.0	49.2	49.4	49.7
Okanogan B and Molson ATCAA	46.6	46.7	46.8	47.0	47.2	47.5	48.1	48.2	48.3	48.4	48.5	48.7	48.8	49.0	49.2	49.5	49.8
Okanogan C and Methow ATCAA	46.0	46.1	46.3	46.4	46.7	46.9	47.5	47.6	47.7	47.8	48.0	48.1	48.3	48.5	48.7	48.9	49.2
Okanogan C and Molson ATCAA	46.4	46.5	46.7	46.9	47.1	47.3	47.9	48.0	48.1	48.3	48.4	48.5	48.7	48.9	49.1	49.4	49.6
Okanogan D and Mazama ATCAA	38.4	38.8	39.1	39.5	40.0	40.4	40.8	41.2	41.6	42.1	42.6	43.1	43.6	44.2	44.8	45.4	46.2
Roosevelt A (Right Side Only) and Republic ATCAA	37.7	38.1	38.5	38.9	39.3	39.7	40.2	40.7	41.2	41.7	42.3	42.9	43.6	44.3	45.2	46.2	47.5
Roosevelt B and Republic ATCAA	44.7	44.8	44.9	45.1	45.3	45.6	46.2	46.3	46.4	46.5	46.6	46.8	47.0	47.1	47.4	47.6	47.9

4.3 SUPPLEMENTAL AMBIENT SOUND LEVELS

Since flight operations do not currently occur within the proposed Okanogan D MOA, ambient noise levels within the area under the Okanogan D MOA are presented and compared to the PAA Okanogan D MOA L_{dnr} noise results in this section. Ambient noise levels as represented by L_{50} daytime were estimated by Lympany et al, 2022 for the entire U.S., and the map of the area under the Okanogan and Roosevelt MOAs is displayed in Figure 4-1. The ambient soundscape map was generated by the BRRC soundscape model developed through the U.S. Army Small Business Innovation Research project "Mapping ambient sound levels using physics-informed machine learning." The L_{50} is the median (average) sound level estimated to be occurring in the area. This metric can be compared to MR_NMap modeled DNL and L_{dnr} values to assess the potential change in the sound levels with the introduction of aircraft activity within in the Okanogan D MOA and Mazama ATCAA for the PAAs. Note in Figure 4-1 that the highest ambient L_{50} noise levels occur within cities and along highways and rivers. The ambient L_{50} noise levels under the Okanogan D MOA range from 23.1 to 46.6 dBA with an average L_{50} of 30.6 dBA. Comparing the modeled L_{dnr} to the average ambient noise level of 30.6 dBA under the Okanogan D MOA results in an increase of noise exposure by 7.3 to 15.1 dBA in PAA 1 and an increase of 7.8 to 15.6 dBA in PAA 2. The variance in noise exposure is due to the difference in modeled L_{dnr} between the low ground elevations of 500 ft (with the smallest difference between average ambient L_{50} and modeled L_{dnr}) and the high ground elevation of 8,500 ft (with the largest difference between average ambient L_{50} and modeled L_{dnr}).

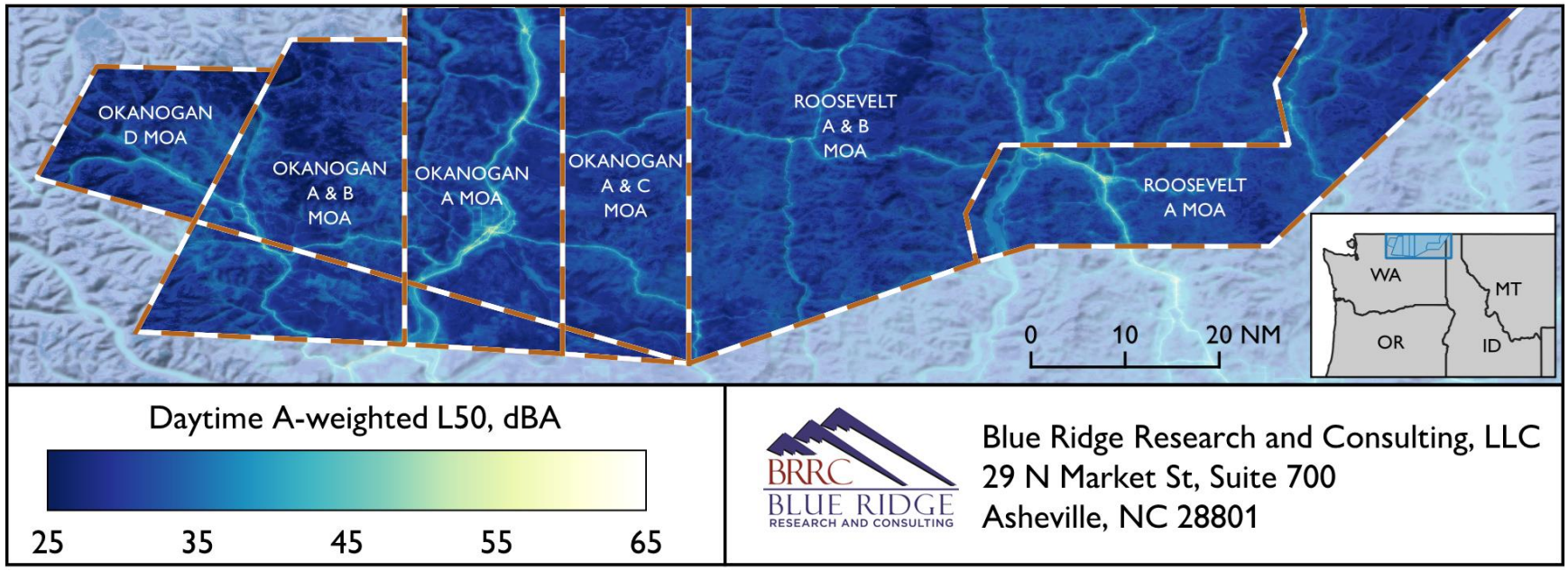

Figure 4-1. Daytime Ambient Noise Under the Eastern Washington MOAs

4.4 MAXIMUM NOISE LEVEL

Cumulative noise metrics, such as DNL, are well suited for general land use planning, but fall short of providing an understanding of the experience from individual events. In contrast, the maximum noise level (L_{max}) provides a simple metric to describe single noise events from flights conducted within the Action Area that people in the vicinity may experience. The L_{max} perceived on the ground are dependent on the elevation of the terrain below the aircraft. For the mission profiles in Section 3.1 (Training Mission Descriptions), the loudest event in terms of L_{max} only occurs when the aircraft is at a relatively high engine power (97 percent Compressor Stage Rotations Per Minute [NC]), flying at the lowest altitudes (2,000 AGL or less), and at a speed of 360 knots (Table 4-9). For ACM missions, aircraft would only spend 19.6 percent of the time at 97 percent NC (Table 3-7) and would be flying exclusively in the 10,000 to 35,000 ft MSL altitude band (Table 3-8). Aircraft performing EW missions only spend 1.7 percent of their flight time at 97 percent NC (Table 3-9) and spend 78 percent of time in the 15,000 to 35,000 ft. MSL altitude band, 17 percent of the time in the 5,000 ft. MSL to 15,000 ft. MSL, and a combined 5 percent of the time in the 500 ft. AGL to 5,000 ft. MSL altitude band (Table 3-10).

Table 4-9: Maximum Noise Level from the EA-18G for Different Distances and Engine Powers

Distance to aircraft (ft.)	***Engine Pwr 88.6% NC Cruise***	***Engine Pwr 96% NC Military***	***Engine Pwr 97% NC Afterburner***
	Airspeed: 360 knots	***Airspeed: 360 knots***	***Airspeed: 360 knots***
	L_{max} (dBA)	***L_{max} (dBA)***	***L_{max} (dBA)***
2,000	96.6	104.3	108.7
3,000	91.2	99.2	103.7
4,000	86.8	95.0	99.7
5,000	83.1	91.6	96.4
6,000	80.4	89.0	93.9
7,000	77.9	88.6	91.6
8,000	75.0	83.9	89.2
9,000	73.2	82.2	87.6
10,000	70.4	79.7	85.2
11,000	68.9	78.3	83.9
12,000	67.0	76.4	82.1
13,000	65.1	74.7	80.5
14,000	63.9	73.6	79.4
15,000	62.4	72.2	78.1

Notes: NC = Compressor Stage Rotations Per Minute (a measure of jet engine power setting), dBA = A-Weighted Sound Pressure Level, L_{max} = Maximum Received Noise Level

As an example, suppose a hiker is beneath the Okanogan D MOA at a terrain elevation of 3,500 ft. This is a likely situation, as 32.1 percent of the Action Area is over terrain between

3,000 and 4,000 ft. MSL (Table 3.5-1 in Section 3.5.3.1.2, Noise, of the EA). If an EA-18G aircraft flew directly overhead at 97 percent NC traveling at a speed of 360 knots, at the lowest permissible altitude within the Okanogan D MOA(the floor of the Okanogan D MOA airspace, 11,500 ft. MSL), the aircraft overflight would occur 8,000 ft. above the hiker, and the hiker would experience an 89.2 dBA exposure to the jet noise (referred to as L_{max} in Table 4-9). That is roughly the sound level the hiker might experience 5 meters from a busy roadway. However, the sound of the jet would be at this level for only an instant, decreasing rapidly as the jet flew away from the hiker, just as the sound of a truck would be at its peak noise level only for an instant, then decrease as it drove away.

As the hiker climbs in elevation, the loudest possible noise exposure from an EA-18G would increase as the hiker is moving up in elevation, closer to the floor of the Okanogan D MOA airspace. If the hiker was at 4,500 ft. terrain height, the noise level could potentially be as loud as 91.6 dBA.

SECTION 5. REFERENCES

ANSI. *American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 5: Sound Level Descriptors for Determination of Compatible Land Use.* American National Standards Institute, Inc. ANSI S12.9/Part 5-1998 (R 2003).

Bradley, K. A. *RouteMap Version 2.0: Military Training Route Noise Model User's Manual.* Brooks Air Force Base, TX: Armstrong Research Laboratory. AL/OE-MN-1996-0002, 1996.

FICUN. *Guidelines for Considering Noise in Land-Use Planning and Control.* Federal Interagency Committee on Urban Noise. August 1980.

Ikelheimer, B., and M. Downing. *MR_NMap Noise Model Improvements.* Blue Ridge Research and Consulting Technical Report, August 26, 2013.

Lympany, S., Calton, M., Cook, M., Gee, K., and Transtrum, M. "Mapping ambient sound levels using physics-informed machine learning," J. Acoust. Soc. Am. 152, A48–A49 (2022).

Moulton, C. M. *Air Force Procedure for Predicting Noise Around Airbases: Noise Exposure Model (NoiseMap) Technical Report.* Report AL-TR-1992-0059, 1992.

Stusnick et al. "Stusnick, E., K.A. Bradley, J.A. Molino, and G. DeMiranda." *The Effect of Onset Rate on Aircraft Noise Annoyance, Volume 2: Rented Home Experiment.* Wyle Laboratories Research Report WR 92-3, March 1992.

Stusnick et al. "Stusnick, E., K.A. Bradley, M.A. Bossi, J.A. Molino, and D.G. Rickert." *The Effect of Onset Rate on Aircraft Noise Annoyance, Volume 3: Hybrid Own-Home Experiment.* Wyle Laboratories Research Report WR 93-22, December 1993.

U.S. Army. "Army Regulation 200-1: Environmental Protection and Enhancement." Washington, D.C.: Headquarters Department of the Army, 2007.

U.S. Navy. "Northwest Training Range Complex Environmental Impact Statement." Washington, D.C.: Naval Facilities Engineering Systems Command, 2010.

USEPA. *Guidelines for Noise Impact Analysis.* U.S. Environmental Protection Agency. Report 550/9-82-105 and PB82-219205, 1982.

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix C: Air Quality Example Calculations

Eastern Washington Airspace Extension Environmental Assessment

TABLE OF CONTENTS

List of Figures

There are no figures in this appendix.

List of Tables

This page intentionally left blank.

Appendix C Air Quality Example Calculations

This appendix discusses emission factor development, calculations, and assumptions used in the air quality analyses presented in Section 3.1 (Air Quality) of the Eastern Washington Airspace Extension Environmental Assessment (EA).

C.1 Air Operations Emissions

Fleet training relevant to this EA utilizes various aircraft, including the E/A-18G, F/A-18, and F-35. Aircraft operations of concern are those that occur from ground level up to 3,000 feet (ft.) above ground level (AGL). For the purposes of assessing air quality effects under the National Environmental Policy Act, all activities involving the use of aircraft at or below 3,000 ft. AGL were included in emissions estimates for the criteria pollutants. In accordance with EPA guidance (U.S. Environmental Protection Agency, 1992), 40 Code of Federal Regulations part 93.153(c)(2), 3,000 ft. AGL is the default mixing height above which emissions would not affect the ambient air quality. For greenhouse gases, emissions from activities below and above 3,000 ft. AGL were calculated. The pollutant emission rate is a function of the aircraft engine's fuel flow rate and efficiency. Emissions for one complete training activity for a particular aircraft are calculated by knowing the specific engine pollutant emission factors for each mode of operation.

For this EA, emission factors for aircraft engines were obtained from the Navy's Aircraft Environmental Support Office memoranda. Using these data, as well as number of sorties, pollutant emissions were calculated by applying the equation below.

$$Emissions = NxFF \times EF \times ENG \times CF$$

Where:

Emissions = annual aircraft emissions (pounds [lb.]/yr.)

N = hours of operation of aircraft operations per year for each type of aircraft per activity (hr./yr.)

FF = fuel flow at a specified power setting (gal./hr./engine)

EF = pollutant emission factor by engine type and power setting (lb./1,000 gal. of fuel used)

ENG = number of engines per aircraft

CF = conversion factor (0.001)

C.2 Emissions Estimates Spreadsheets

Tables C-1 through C-9 provide the basis for emissions calculations for the Baseline, No Action Alternative, and Alternatives 1 and 2.

This page intentionally left blank.

Table C-1: Aircraft Engine Emissions Indices, Factors, and Sources

General Information						Emission Indices, lb./1,000 lb. fuel							Emissions Factors (lb./hr.)						References
Aircraft	**Engine Model**	**Engines (#)**	**Fuel Flow (lb./hr.)/Engine**	**Fuel Flow (gal./hr.)**	**Mode**	**CO**	**NO_x**	**HC**	**VOC**	**SO_x**	**PM**	**CO_2**	**CO**	**NOx**	**VOC**	**SOx**	**PM**	**CO_2**	**Source of Emissions Indices Information**
EA-18G	F414-GE-400 (2)	2	5,169	1,520	Approach	0.72	14.75	0.12	0.14	0.37	6.56	3,191.30	7.44	152.49	1.43	3.83	67.82	32,992	AESO Memorandum Report No. 9815 I, June 2017, Table 5
EA-6B	J52-P-408A (2)	2	4,227	1,243	Approach	5.19	6.77	0.84	0.97	0.37	10.48	3,173.88	43.88	57.23	8.17	3.13	88.60	26,832	AESO Memorandum Report No. 9917, Revision C, December 2009
FA-18E/F	F414-GE-400 (2)	2	5,169	1,520	Approach	0.72	14.75	0.12	0.14	0.37	6.56	3,191.30	7.44	152.49	1.43	3.83	67.82	32,992	AESO Memorandum Report No. 9815 I, June 2017, Table 5
General Information						**Emissions (lb./op)**													**References**
Aircraft	**Engine Model**	**Engines (#)**	**Fuel Flow (lb./op)**	**Fuel Flow (gal./op)**	**Mode**	**CO**	**NO_x**	**HC**	**VOC**	**SO_x**	**PM**	**CO_2**							**Source of Emissions Indices Information**
F-35	F135-PW-400	1	1,057	155	Military Takeoff	12.09	8.42	0.02	0.02	0.37	0.13	3,336.76							AESO Memorandum Report No. 2017-18 Revision A, December 2017, Table 1
F-35	F135-PW-400	1	1,220	179	Straight In Arrival	13.52	6.43	0.02	0.02	0.37	0.15	3,849.45							AESO Memorandum Report No. 2017-18 Revision A, December 2017, Table 1
F-35	F135-PW-400	1	629	93	Touch and Go – Carrier Pattern	0.47	9.96	0.003	0.003	0.37	0.08	1,986.01							AESO Memorandum Report No. 2017-18 Revision A, December 2017, Table 1
					Sum	26.08	24.81	0.04	0.05	1.11	0.36	9,172.22							

Notes: (1) Numbers may not add up due to rounding. (2) Emission factors for F/A-18 E/F were used to estimate from EA-18G. This is consistent with the approach use in previous EAs/EISs. (3) Fuel Sulfur Content is based on AESO Memorandum Report No. 2012-01 Revision H, JP-5, 2020.

Table C-2: Mission Distribution for Baseline

EA-18G Squadrons Mission Type Distributions					Okanogan MOAs						Roosevelt MOAs						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	105	42	1.0	26.3	93	0%	100%	0	93	26.3	11	0%	100%	0	11	105
EW	73.7%	293	120	1.5	73.7	262	5%	95%	20	373	73.7	32	5%	95%	2	45	293
Total	**Good**	**398**	**162**			**355**						**43**					**398**

EA-6B Squadrons Mission Type Distributions					Okanogan MOAs						Roosevelt MOAs						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	1,013	412	1.0	26.3%	680	7.5%	92.5%	51	629	26.3%	333	3.75%	96.25%	12	321	1,013
EW	73.7%	2,838	1,155	1.0	73.7%	1,904	11.25%	88.75%	214	1,690	73.7%	934	7.50%	92.50%	70	864	2,838
Total	**Good**	**3,851**	**1,567**			**2,584**						**1,267**					**3,851**

Half modeled as F/A-18 – used the same percentages and assumptions as Growler EA-18G					Okanogan MOAs						Roosevelt MOAs						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	15	42	1.0	26.3%	6	0%	100%	0	6	26.3%	9	0%	100%	0	9	15
EW	73.7%	42	120	1.5	73.7%	17	5%	95%	1	25	73.7%	24	5%	95%	2	35	42
Total	**Good**	**57**	**162**			**24**						**33**					**57**

Half modeled as F-35 – used the same percentages and assumptions as Growlers EA-18G					Okanogan MOAs						Roosevelt MOAs						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	15	42	1.0	26.3%	6	0%	100%	0	6	26.3%	9	0%	100%	0	9	15
EW	73.7%	42	120	1.5	73.7%	17	5%	95%	1	25	73.7%	24	5%	95%	2	35	42
Total	**Good**	**57**	**162**			**24**						**33**					**57**

Table C-3: Baseline Emissions

EA-18G			Emissions (lb/yr)							Emissions (ton/yr)					
Mission Type	**Annual Sorties**	**Total time, hr**	**Total time below 3,000 ft., hr.**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2**	**CO**	**NOx**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**
Air Combat Maneuvers	105	105	0	0.00	0.00	0.00	0.00	0.00	3,453,369	0.00	0.00	0.00	0.00	0.00	1,566
Electronic Warfare	293	440	22	163.75	3,354.60	31.39	84.15	1,491.94	14,515,967	0.08	1.68	0.02	0.04	0.75	6,584
EA-6B															
Mission Type	**Annual Sorties**	**Total time, hr**	**Total time below 3,000 ft., hr.**												
Air Combat Maneuvers	1,013	1,013	63	2,784.62	3,632.34	518.29	198.52	5,622.88	27,175,780	1.39	1.82	0.26	0.10	2.81	12,327
Electronic Warfare	2,838	2,838	284	12,473.11	16,270.32	2,321.59	889.22	25,186.56	76,154,181	6.24	8.14	1.16	0.44	12.59	34,543
F/A-18															
Mission Type	**Annual Sorties**	**Total time, hr**	**Total time below 3,000 ft., hr.**												
Air Combat Maneuvers	15	15	0	0.00	0.00	0.00	0.00	0.00	490,240	0.00	0.00	0.00	0.00	0.00	222
Electronic Warfare	42	62	3	23.25	476.22	4.46	11.95	211.80	2,060,684	0.01	0.24	0.00	0.01	0.11	935
F-35															
Mission Type	**Annual Sorties**		**Annual Sorties below 3,000 ft.**												
Air Combat Maneuvers	15		0	0.00	0.00	0.00	0.00	0.00	136,295	0.00	0.00	0.00	0.00	0.00	62
Electronic Warfare	42		2	55.55	51.66	0.10	2.31	0.75	381,936	0.03	0.03	0.00	0.00	0.00	173

Emissions (lb/yr)						Emissions (ton/yr)					
CO	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**
15,500	23,785	2,876	1,186	32,514	124,368,451	7.75	11.89	1.44	0.59	16.26	56,413

Notes: (1) Emission calculations for F-35 is different than the other aircraft because F-35 emission factors are in pounds per operation. Therefore, the number of operations below 3,000 feet were estimated. Criteria pollutant emissions below 3,000 feet above ground level are evaluated for NEPA purposes. GHG emissions are calculated for all elevations. (2) Numbers may not add up due to rounding.

Table C-4: Mission Distribution for the No Action Alternative

EA-18G Squadrons Mission Type Distributions					Okanogan MOAs						Roosevelt MOAs						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	1,117	464	1.0	26.3%	773	0%	100%	0	773	26.3%	345	0%	100%	0	345	1,117
EW	73.7%	3,132	1,299	1.5	73.7%	2,166	5%	95%	162	3,087	73.7%	965	5%	95%	72	1,376	3,132
Total	**Good**	**4,249**	**1,763**			**2,939**						**1,310**					**4,249**
Half modeled as F/A-18 – used the same percentages and assumptions as Growler EA-18G					**Okanogan MOAs**						**Roosevelt MOAs**						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	15	42	1.0	26.3%	6	0%	100%	0	6	26.3%	9	0%	100%	0	9	15
EW	73.7%	42	120	1.5	73.7%	17	5%	95%	1	25	73.7%	24	5%	95%	2	35	42
Total	**Good**	**57**	**162**			**24**						**33**					**57**
Half modeled as F-35 – used the same percentages and assumptions as Growlers EA-18G					**Okanogan MOAs**						**Roosevelt MOAs**						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	15	42	1.0	26.3%	6	0%	100%	0	6	26.3%	9	0%	100%	0	9	15
EW	73.7%	42	120	1.5	73.7%	17	5%	95%	1	25	73.7%	24	5%	95%	2	35	42
Total	**Good**	**57**	**162**			**24**						**33**					**57**

Table C-5: No Action Alternative Emissions

EA-18G				Emissions (lb/yr)						Emissions (ton/yr)					
Mission Type	**Annual Sorties**	**Total time, hr**	**Total time below 3,000 ft., hr.**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**
Air Combat Maneuvers	1,117	1,117	0	0.00	0.00	0.00	0.00	0.00	36,867,750	0.00	0.00	0.00	0.00	0.00	16,723
Electronic Warfare	3,132	4,697	235	1,748.17	35,813.27	335.07	898.37	15,927.80	154,970,715	0.87	17.91	0.17	0.45	7.96	70,294
F/A-18															
Mission Type	**Annual Sorties**	**Total time, hr**	**Total time below 3,000 ft., hr.**												
Air Combat Maneuvers	15	15	0	0.00	0.00	0.00	0.00	0.00	490,240	0.00	0.00	0.00	0.00	0.00	222
Electronic Warfare	42	62	3	23.25	476.22	4.46	11.95	211.80	2,060,684	0.01	0.24	0.00	0.01	0.11	935
F-35															
Mission Type	**Annual Sorties**		**Annual Sorties below 3,000 ft.**												
Air Combat Maneuvers	15		0	0.00	0.00	0.00	0.00	0.00	136,295	0.00	0.00	0.00	0.00	0.00	62
Electronic Warfare	42		2	55.55	51.66	0.10	2.31	0.75	381,936	0.03	0.03	0.00	0.00	0.00	173

Emissions (lb/yr)						Emissions (ton/yr)					
CO	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**
1,827	36,341	340	913	16,140	194,907,620	0.91	18	0	0	8	88,409

Notes: (1) Emission calculations for F-35 is different than the other aircraft because F-35 emission factors are in pounds per operation. Therefore, the number of operations below 3,000 feet were estimated. Criteria pollutant emissions below 3,000 feet above ground level are evaluated for NEPA purposes. GHG emissions are calculated for all elevations. (2) Numbers may not add up due to rounding.

Table C-6: Mission Distribution for Alternative 1

EA-18G Squadrons Mission Type Distributions					Okanogan MOAs						Roosevelt MOAs						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	1,131	464	1.0	26.3%	657	0%	100%	0	657	26.3%	473	0%	100%	0	473	1,131
EW	73.7%	3,169	1,299	1.5	73.7%	1,843	5%	95%	138	2,626	73.7%	1,327	5%	95%	99	1,890	3,169
Total	**Good**	**4,300**	**1,763**			**2,500**						**1,800**					**4,300**
Half modeled as F/A-18 – used the same percentages and assumptions as Growler EA-18G					**Okanogan MOAs**						**Roosevelt MOAs**						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	4	42	1.0	26.3%	3	0%	100%	0	3	26.3%	1	0%	100%	0	1	4
EW	73.7%	11	120	1.5	73.7%	7	5%	95%	1	11	73.7%	4	5%	95%	0	5	11
Total	**Good**	**15**	**162**			**10**						**5**					**15**
Half modeled as F-35 – used the same percentages and assumptions as Growlers EA-18G					**Okanogan MOAs**						**Roosevelt MOAs**						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	4	42	1.0	26.3%	3	0%	100%	0	3	26.3%	1	0%	100%	0	1	4
EW	73.7%	11	120	1.5	73.7%	7	5%	95%	1	11	73.7%	4	5%	95%	0	5	11
Total	**Good**	**15**	**162**			**10**						**5**					**15**

Table C-7: Alternative 1 Emissions

EA-18G				Emissions (lb/yr)						Emissions (ton/yr)					
Mission Type	**Annual Sorties**	**Total time, hr**	**Total time below 3,000 ft., hr.**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**
Air Combat Maneuvers	1,131	1,131	0	0.00	0.00	0.00	0.00	0.00	37,310,268	0.00	0.00	0.00	0.00	0.00	16,924
Electronic Warfare	3,169	4,754	238	1,769.16	36,243.13	339.09	909.15	16,118.98	156,830,802	0.88	18.12	0.17	0.45	8.06	71,137
F/A-18															
Mission Type	**Annual Sorties**	**Total time, hr**	**Total time below 3,000 ft., hr.**												
Air Combat Maneuvers	4	4	0	0.00	0.00	0.00	0.00	0.00	130,152	0.00	0.00	0.00	0.00	0.00	59
Electronic Warfare	11	17	1	6.17	126.43	1.18	3.17	56.23	547,084	0.00	0.06	0.00	0.00	0.03	248
F-35															
Mission Type	**Annual Sorties**		**Annual Sorties below 3,000 ft.**												
Air Combat Maneuvers	4		0	0.00	0.00	0.00	0.00	0.00	36,184	0.00	0.00	0.00	0.00	0.00	16
Electronic Warfare	11		1	14.75	13.71	0.03	0.61	0.20	101,399	0.01	0.01	0.00	0.00	0.00	46

Emissions (lb/yr)						Emissions (ton/yr)					
CO	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**
1,790	36,383	340	913	16,175	194,955,889	0.89	18	0	0	8	88,431

Notes: (1) Emission calculations for F-35 is different than the other aircraft because F-35 emission factors are in pounds per operation. Therefore, the number of operations below 3,000 feet were estimated. Criteria pollutant emissions below 3,000 feet above ground level are evaluated for NEPA purposes. GHG emissions are calculated for all elevations. (2) Numbers may not add up due to rounding.

Table C-8: Mission Distribution for Alternative 2

EA-18G Squadrons Mission Type Distributions					Okanogan MOAs						Roosevelt MOAs						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	1,262	464	1.0	26.3%	736	0%	100%	0	736	26.3%	526	0%	100%	0	526	1,262
EW	73.7%	3,538	1,299	1.5	73.7%	2,064	5%	95%	155	2,941	73.7%	1,474	5%	95%	111	2,100	3,538
Total	**Good**	**4,800**	**1,763**			**2,800**						**2,000**					**4,800**
Half modeled as F/A-18 – used the same percentages and assumptions as Growler EA-18G					**Okanogan MOAs**						**Roosevelt MOAs**						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	5	42	1.0	26.3%	3	0%	100%	0	3	26.3%	2	0%	100%	0	2	5
EW	73.7%	15	120	1.5	73.7%	9	5%	95%	1	13	73.7%	6	5%	95%	0	8	15
Total	**Good**	**20**	**162**			**12**						**8**					**20**
Half modeled as F-35 – used the same percentages and assumptions as Growlers EA-18G					**Okanogan MOAs**						**Roosevelt MOAs**						
Mission Type	**Percentage**	**Annual Sorties**	**Annual Events**	**Avg. time per A/C, hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Percentage**	**Sorties**	**Percent below 3,000 ft.**	**Percent above 3,000 ft.**	**Total time below 3,000 ft., hr.**	**Total time above 3,000 ft., hr.**	**Sum of Sorties**
ACM	26.3%	5	42	1.0	26.3%	3	0%	100%	0	3	26.3%	2	0%	100%	0	2	5
EW	73.7%	15	120	1.5	73.7%	9	5%	95%	1	13	73.7%	6	5%	95%	0	8	15
Total	**Good**	**20**	**162**			**12**						**8**					**20**

Table C-9: Alternative 2 Emissions

EA-18G				Emissions (lb/yr)						Emissions (ton/yr)					
Mission Type	**Annual Sorties**	**Total time, hr**	**Total time below 3,000 ft., hr.**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**
Air Combat Maneuvers	1,262	1,262	0	0.00	0.00	0.00	0.00	0.00	41,648,670.83	0.00	0.00	0.00	0.00	0.00	18,891.54
Electronic Warfare	3,538	5,306	265	1,974.87	40,457.45	378.52	1,014.86	17,993.3	175,066,941.44	0.99	20.23	0.19	0.51	9.00	79,409.12
F/A-18															
Mission Type	**Annual Sorties**	**Total time, hr**													
Air Combat Maneuvers	5	5	0	0.00	0.00	0.00	0.00	0.00	173,536.13	0.00	0.00	0.00	0.00	0.00	78.71
Electronic Warfare	15	22	1	8.23	168.57	1.58	4.23	74.97	729,445.59	0.00	0.08	0.00	0.00	0.04	330.87
F-35															
Mission Type	**Annual Sorties**		**Annual Sorties below 3,000 ft**												
Air Combat Maneuvers	5		0	0.00	0.00	0.00	0.00	0.00	48,245.88	0.00	0.00	0.00	0.00	0.00	21.88
Electronic Warfare	15		1	19.66	18.28	0.04	0.82	0.27	135,198.52	0.01	0.01	0.00	0.00	0.00	61.33

Emissions (lb/yr)						Emissions (ton/yr)					
CO	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2, MT/year**
2,003	40,644	380	1,020	18,069	217,802,038	1	20	0	1	9	98,793

Notes: (1) Emission calculations for F-35 are different than the other aircraft because F-35 emission factors are in pounds per operation. Therefore, the number of operations below 3,000 feet were estimated. Criteria pollutant emissions below 3,000 feet above ground level are evaluated for NEPA purposes. GHG emissions are calculated for all elevations. (2) Numbers may not add up due to rounding

This page intentionally left blank.

References

U.S. Environmental Protection Agency. (1992). *Procedures for Emission Inventory Preparation*. Washington, DC: U.S. Environmental Protection Agency.

This page intentionally left blank.