

**FINAL**

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**ENVIRONMENTAL IMPACT  
STATEMENT  
FOR PROPOSED ESTABLISHMENT AND  
MODIFICATION OF OREGON  
MILITARY TRAINING AIRSPACE  
(VOLUME I)**

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**OREGON AIR NATIONAL GUARD**

**NATIONAL GUARD BUREAU  
ASSET MANAGEMENT DIVISION**

**APRIL 2017**



### **PRIVACY ADVISORY**

As required by law, written or oral comments provided to Air National Guard Asset Management Division (NGB/A4AM) on the Draft Environmental Impact Statement (EIS) have been addressed in the Final EIS and made available to the public. Any personal information provided to NGB/A4AM has only been used to identify your intent to make a comment or to fulfill requests for copies of the Final EIS or associated documents. Private addresses have been compiled to develop a mailing list for those requesting copies of the Final EIS. However, only the names of the individuals making comments and their specific comments have been disclosed. Personal home addresses and phone numbers are not published in the Final EIS.

### **FINANCIAL DISCLOSURE STATEMENT**

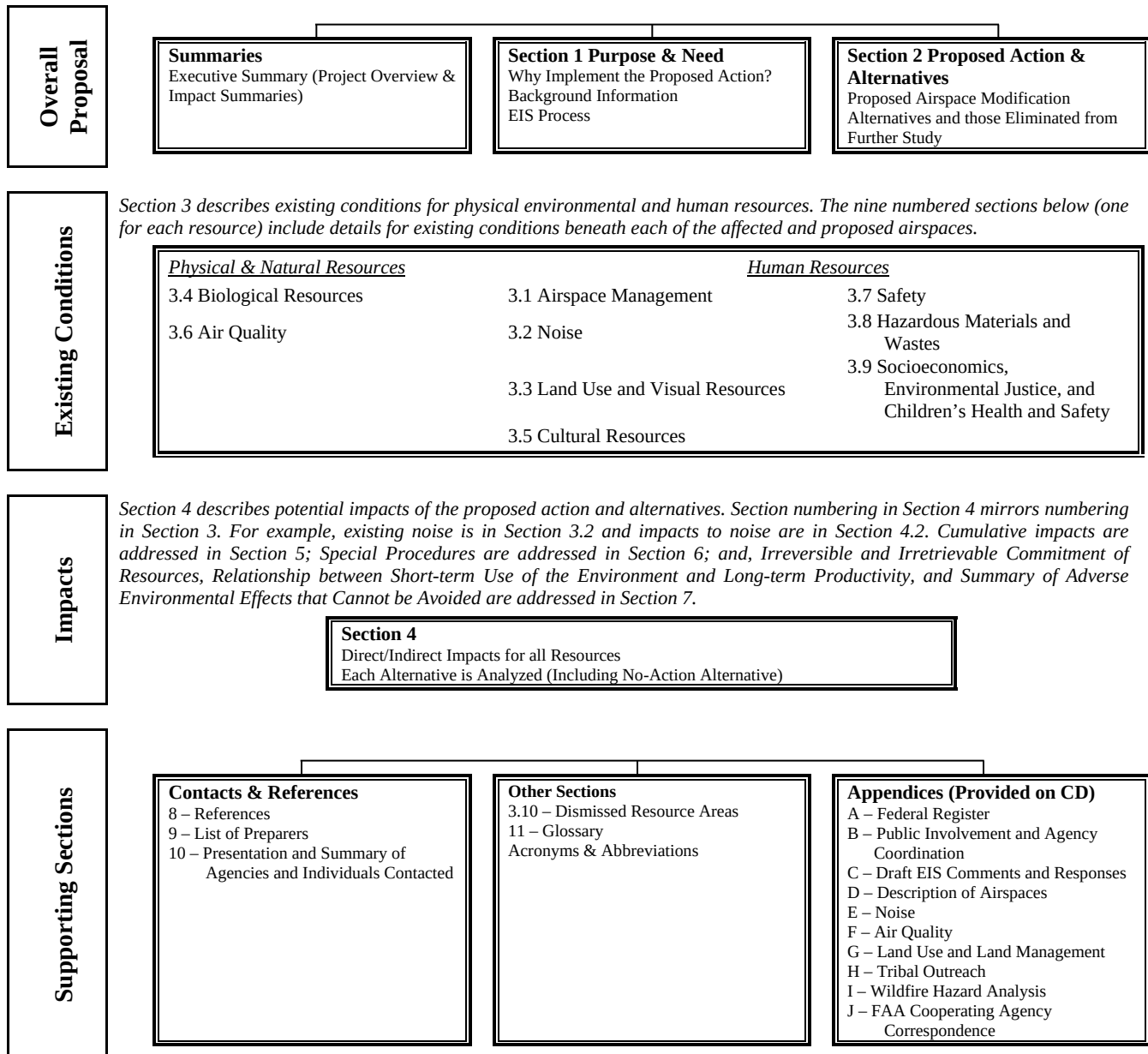
Per 40 Code of Federal Regulations (CFR) 1506.4(c) the Amec Foster Wheeler Environment & Infrastructure, Inc. has no financial or other interest in the outcome of the Proposed Action described and analysis in the Final EIS.

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## How to Read This EIS

This Environmental Impact Statement, or "EIS," addresses the potential effects of the proposed airspace modification for the Oregon Air National Guard. We have taken several steps to make the document easy to read while still providing an accurate analysis of the issues. We've shortened the text portion of the analysis, reduced the use of technical terms and abbreviations, and provided technical appendices and other supporting information.

***The guide below serves as a reference tool for you as you read this EIS.***



### **Frequently Asked Questions**

Where can I find a certain topic? Use the Table of Contents to locate the appropriate resource area.

What does an acronym (like "EIS") mean? A list of acronyms and abbreviations can be found after the Table of Contents.

What does a word or term mean? Definitions can be found in Section 11, *Glossary*.

Who do I contact for more information? Contact information is located on the cover.

Where can I find appendices? The appendices have been included on CD.



## EXECUTIVE SUMMARY

The Oregon Air National Guard (ANG) has prepared this Environmental Impact Statement (EIS) to evaluate the proposed establishment and modification of military training airspace primarily over coastal, central, and eastern Oregon. The Proposed Action includes modifications to existing Air Traffic Control Assigned Airspaces (ATCAAs) and Military Operations Areas (MOAs) as well as the establishment of new MOAs and ATCAAs intended to provide properly configured and located military airspace supporting efficient, *realistic, mission-oriented training*. The need for the Proposed Action is driven by several factors including travel distance and time required to access existing training airspace areas as well as the frequency of weather conditions that limit the availability of coastal airspace areas for operational training. Expanded and newly established airspace areas would be utilized for military training exercises by the 142d Fighter Wing (142 FW) and the 173d Fighter Wing (173 FW) of the Oregon ANG based in Portland and Klamath Falls, respectively. The Oregon ANG is an integral part of the U.S. Air Force (USAF) under the Department of Defense's (DoD's) Total Force Policy, which includes the 142 FW and 173 FW of the Oregon ANG as well as the airspace areas that they utilize.<sup>1</sup>

The 142 FW and the 173 FW operate F-15 Eagles, all-weather tactical fighter aircraft designed to gain and maintain air superiority in aerial combat. Recent improvements to the F-15's radar, along with other avionics upgrades and the growing reliance on stand-off Tactics, Techniques and Procedures (TTP) requires a larger airspace than currently exists in the airspace managed by both the 142 FW and 173 FW. Low Altitude Air-to-Air (Low A/A) is defined as performing realistic, mission oriented air-to-air operations while in a Low Altitude Training (LOWAT) certified low altitude block (i.e., at or below 1,000 feet AGL over land). This event also includes low altitude navigation, tactical formation, defensive maneuvering to avoid or negate threats (AFI 11-2F-15V3). The USAF Airspace Master Plan states that optimum airspace for LOWAT airspace must be large enough to permit realistic offensive and defensive tactics (USAF 1992). If the area is too small, pilots can be distracted from mission

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<sup>1</sup> Total Force Integration includes the sharing of resources between active duty, guard, and reserve units. This relationship often includes the sharing of equipment, aircraft, and infrastructure.

training objectives by the need to constantly monitor their proximity to airspace boundaries (via displays showing boundaries, pilot-to-pilot communication, and pilot-to-ground communication), special use land management areas, and other restrictions to flight operations. In addition, a smaller airspace area concentrates noise, air emissions, and other environmental effects of military overflights because it requires pilots to fly over the same area repeatedly. Developing military training airspace should consider the primary tenets of Air Force Instruction (AFI) 13-201, *Airspace Management*, which is to achieve better efficiency through Volume, Proximity, Time, and Attributes (VPTA). Having training airspace that achieves these criteria is critical to accomplish realistic mission oriented training and better stewardship of resources.

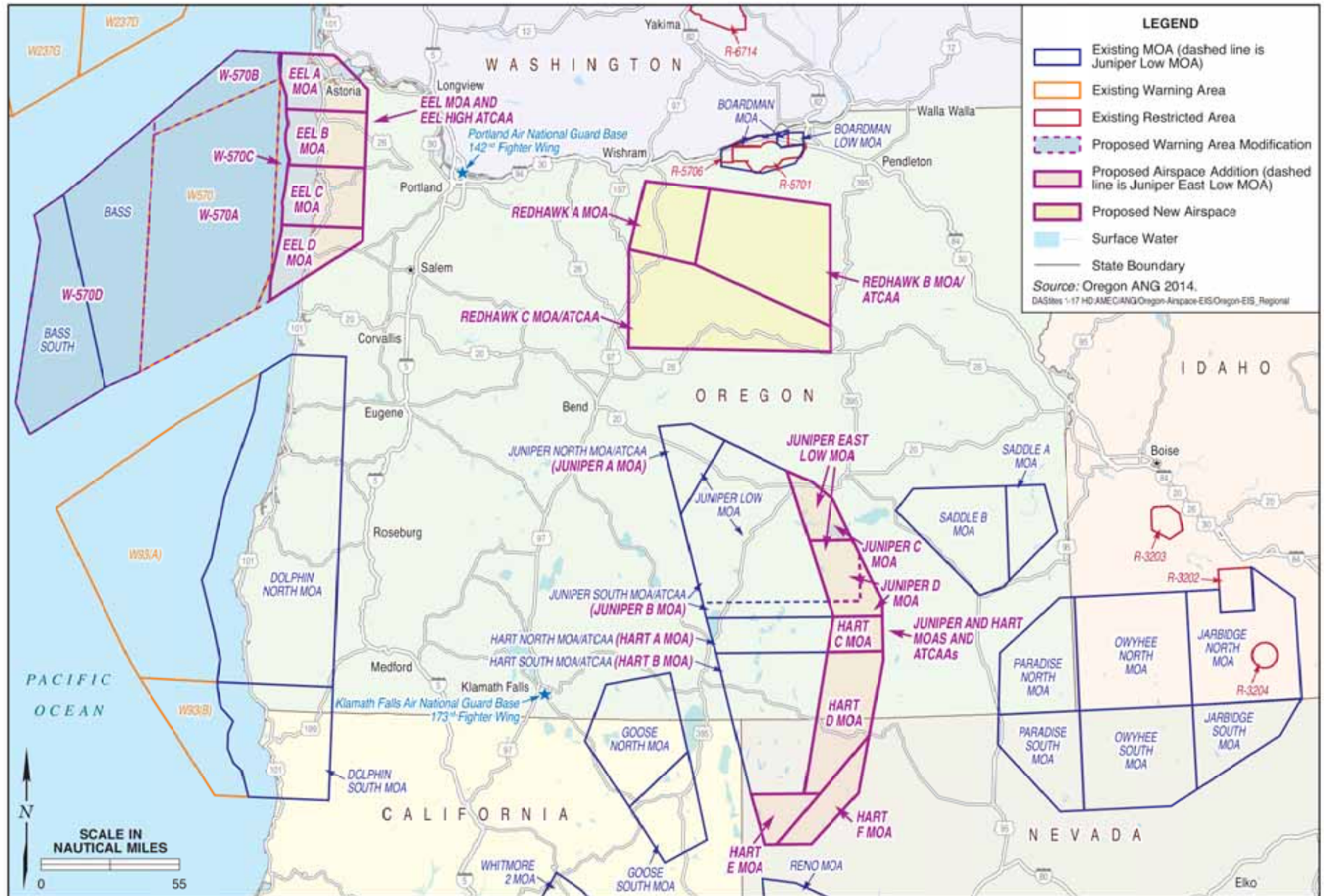
- Volume. Volume is a key concept to understanding the amount of airspace actually required. The length and width of airspace are visible on a two-dimensional map, but the floor and ceiling must also be included to see the complete picture as airspace is always defined using three dimensions. This unique characteristic of airspace enables numerous users to operate safely at the same geographical location at the same time, but at different altitudes.
- Proximity. Airspace is often associated with a geographic area, airport, airfield, or military installation. Proximity affects the utility of the airspace and its use.
- Time. Airspace is allotted for use for a specific time period. Airspace designated for air-to-air training during a specific time may be subsequently used for air-to-ground gunnery when the next period begins.
- Attributes. Airspace attributes describe the physical characteristics or capabilities of the underlying surface that make certain sections of airspace unique. These attributes may be the type of terrain, instrumentation, chaff and flare approval, and target sets.





No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

ES-3



EIS

**Regional Location Map  
Proposed Airspace Establishment and Modification**

**FIGURE  
ES-1**

Proposed airspace improvements would include modifications to the existing Eel ATCAA, which occurs over portions of Clatsop, Tillamook, Yamhill, Polk, and Lincoln counties in coastal Oregon as well as a small inclusion above Pacific County in Washington. The expansion of the existing Juniper/Hart MOA Complex in eastern Oregon would overlies portions of Harney County in Oregon and Humboldt and Washoe counties in northwestern Nevada. The proposed Redhawk MOA Complex would be located above portions of seven counties in central Oregon including: Sherman, Gilliam, Morrow, Grant, Wheeler, Jefferson, and Wasco counties (refer to Figure ES-1).

Details of the units' training missions and objectives and requirements driving specific components of the Proposed Action are discussed below.

#### *Modifications to W-570 and Bass/Bass South ATCAAs*

Currently, there is a need to modify the configuration and vertical limits of Warning Area (W)-570 and convert the Bass/Bass South ATCAAs into warning areas to more effectively meet the training requirements of the 142 FW. The advanced avionics and weapons systems in the current generation of the F-15 Eagle have made the vertical and lateral boundaries of W-570 constrained and are insufficient to maximize pilot proficiency and experience to meet current training requirements of the 142 FW and the advanced technological capabilities of the F-15 aircraft.

#### *Eel MOA and Modification of the Eel ATCAA*

Frequently present weather conditions on the coast and sea-states that prohibit over-water training represent a significant impact to training and foster the need to establish a MOA beneath the existing Eel ATCAA to expand the vertical confines of the existing airspace and facilitate required Basic Fighter Maneuvers (BFM) and Air Combat Maneuvers (ACM) training. Current backup airspace (i.e., the Juniper/Hart MOA Complex) is located far away (as far as 140 nautical miles [NM]) and additional transit hours used flying to and from this airspace waste fuel and flying hours available for training.

*Expansion of the Juniper/Hart MOA Complex*

The need for expansion of the Juniper/Hart MOA Complex to support 173 FW requirements is driven by the fact that the airspace is currently too small to efficiently accommodate realistic mission oriented training requirements and the advanced technology within the F-15 aircraft. The proposed extension of the Juniper/Hart MOA Complex would allow two simultaneous 4 v 4 Defensive Counter-Air (DCA)/Offensive Counter-Air (OCA) training missions, three 2 v 2 scenarios, or four to five 1 v 1 scenarios, decreasing the overall time the airspace is activated and used by the 173 FW and allowing for more responsible stewardship of the airspace by the Oregon ANG. Additionally, the expanded airspace would be able to support existing Large Force Exercises (LFE), such as the biannual Sentry Eagle Exercises, with upgraded avionics and weapons systems and allow sufficient maneuvering to use threat emitters that are deployed for training in the Juniper/Hart MOA Complex.

*Establishment of the Redhawk MOA Complex*

The proposed over-land Redhawk MOA Complex is needed by the 142 FW to accomplish its mission. The proposed Redhawk MOA Complex would primarily be scheduled and utilized by the 142 FW as a “weather contingency” airspace when existing over-water airspace is unsuitable based upon weather conditions. Over-water airspace is generally unusable 23 percent of the time on an annual basis, and up to 75 percent of the time in a month, when storms over the Pacific Ocean extend into the coastal airspace ranges, making them unusable for anything other than instrument training. Airspace further inland and east of the Cascade Mountain range is generally unaffected by these weather systems. However, the 173 FW is the primary user of the existing Juniper/Hart MOA Complex, which creates schedule conflicts and safety-of-flight hazards when this airspace is used by the 142 FW as a weather backup. Even when the Juniper/Hart MOA Complex is available, the required distance and time flown to and from the complex is not conducive to maximizing the efficiency and effectiveness of limited training time, resulting in up to a 36-percent loss of critical training activities per sortie. Further, although the proposed modification to the Eel ATCAA would provide valuable over-land training airspace that the 142 FW needs, it would not support all mission types for which the pilots need to

train. Therefore, the 142 FW also has a need for suitable over-land airspace that would allow its pilots to more efficiently conduct realistic training operations. The proposed Redhawk MOA Complex would be located much closer to Portland than the existing Juniper/Hart MOA Complex, allowing 142 FW pilots to more efficiently conduct the full suite of realistic training operations and to be prepared to fulfill their primary mission of homeland security.

## **Description of the Proposed Action and Alternatives**

### *Proposed Action*

Under the Proposed Action, the vertical limits and lateral configuration of W-570, Bass ATCAA, and Bass South ATCAA would be modified within their existing boundaries to meet training requirements of the 142 FW. As shown in Table ES-1, W-570 would be renamed as W-570A, a new segment to be named W-570C would be created adjacent to the eastern boundary of W-570A from 11,000 feet above Mean Sea Level [MSL], and Bass ATCAA and Bass South ATCAA would be converted and reconfigured to W-570B and W-570D and the floor of these segments would be lowered from Flight Level (FL) 180 (18,000 feet MSL) to 1,000 feet MSL. The ceilings of W-570A as well the existing Bass South ATCAA (to be renamed W-570C and portion of W-570D) would remain at FL 500 (50,000 feet MSL) while the ceiling of the existing Bass South ATCAA (remaining portion to be renamed W-570D) would be raised from FL 270 (27,000 feet MSL) to FL 500 (50,000 feet MSL). The proposed modification of the W-570 and Bass/Bass South ATCAA Complex would not result in an increase in total annual flight hour or sortie authorizations for the 142 FW. However, implementation of the Proposed Action would result in an increase in use of approximately 253 hours annually within the airspace. This increase would be due in part to the fact that the expanded vertical limits of the airspace would accommodate additional training operations that cannot currently be supported. The increase in training time spent within the airspace complex would be offset by a reduction in overall transit time as the establishment of the proposed Eel MOA Complex and Redhawk MOA Complex would reduce the number of flying hours currently spent by the 142 FW transiting to and from existing weather backup and over-land training airspace (i.e., the Juniper/Hart MOA Complex).

**Table ES-1. Existing and Proposed Airspace Usage, W-570 and Bass/Bass South ATCAA Modifications**

| Existing                                                     |                      | Proposed Action                                         |                      |
|--------------------------------------------------------------|----------------------|---------------------------------------------------------|----------------------|
| Airspace                                                     | Annual Usage         | Airspace                                                | Annual Usage         |
| <b>W-570</b><br>(surface to FL 500;<br>5,941 sq mi)          | 900 hrs<br>1,800 ops | <b>W-570 A</b><br>(surface to FL 500;<br>5,941 sq mi)   | 900 hrs<br>1,800 ops |
| <b>Bass ATCAA</b><br>(FL 180 to FL 500;<br>9,854 sq mi)      | 42 hrs<br>250 ops    | <b>W-570 B</b><br>(1,000 MSL to FL 500;<br>871 sq mi)   | 100 hrs<br>600 ops   |
| <b>Bass South ATCAA</b><br>(FL 180 to FL 270;<br>2540 sq mi) | 17 hrs<br>100 ops    | <b>W-570 D</b><br>(1,000 MSL to FL 500;<br>5,592 sq mi) | 142 hrs<br>700 ops   |
| <b>N/A</b><br>(new proposed airspace)                        | N/A                  | <b>W-570 C</b><br>(11,000 MSL to FL 500;<br>673 sq mi)  | 70 hrs<br>550 ops    |

Source: Oregon ANG 2013a, 2013b.

Under the Proposed Action, the western portion of the existing Eel ATCAA would be converted into W-570C and the vertical limits would be expanded to include airspace from 11,000 feet MSL to FL 500 (50,000 feet MSL). The proposed Eel MOAs would be established directly underneath the resulting configuration of Eel ATCAA from 11,000 feet MSL up to but not including FL 180 (18,000 feet MSL). In addition, the proposed Eel High ATCAAs would be established directly above the existing Eel ATCAA from FL 270 (27,000 feet MSL) to FL 500 (50,000 feet MSL). Finally, the Eel MOA/ATCAA Complex would be divided into four segments (A, B, C, and D). Table ES-2 summarizes the proposed changes. The proposed establishment and modifications to the Eel MOA/ATCAA Complex would not result in an increase in total annual flight hour or sortie authorizations for the 142 FW; however, training operations within the Eel MOA/ATCAA would represent an increase over those currently occurring within the existing Eel ATCAA largely because the expanded vertical limits of the airspace would accommodate additional training operations that cannot currently be supported in the Eel ATCAA as currently configured. This increase in training hours would be offset by an overall reduction in transit hours flying to and from weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex. The Eel MOA/ATCAA Complex would see an increase of activity of approximately 305 hours annually over existing conditions.

**Table ES-2. Existing and Proposed Airspace Usage, Eel ATCAA Modifications**

| Existing                                               |                      | Proposed Action                                             |                     |
|--------------------------------------------------------|----------------------|-------------------------------------------------------------|---------------------|
| Airspace                                               | Annual Usage         | Airspace                                                    | Annual Usage        |
| N/A<br>(new proposed airspace)                         | N/A                  | <b>Eel MOA A</b><br>(11,000 MSL to FL 180;<br>751 sq mi)    | 60 hrs<br>180 ops   |
|                                                        |                      | <b>Eel MOA B</b><br>(11,000 MSL to FL 180;<br>877 sq mi)    | 90 hrs<br>270 ops   |
|                                                        |                      | <b>Eel MOA C</b><br>(11,000 MSL to FL 180;<br>963 sq mi)    | 90 hrs<br>270 ops   |
|                                                        |                      | <b>Eel MOA D</b><br>(11,000 MSL to FL 180;<br>625 sq mi)    | 60 hrs<br>180 ops   |
| <b>Eel ATCAA</b><br>(FL 180 to FL 270;<br>3,900 sq mi) | 333 hrs<br>4,000 ops | <b>Eel ATCAA A</b><br>(FL 180 to FL 270;<br>751 sq mi)      | 60 hrs<br>720 ops   |
|                                                        |                      | <b>Eel ATCAA B</b><br>(FL 180 to FL 270;<br>877 sq mi)      | 90 hrs<br>1,080 ops |
|                                                        |                      | <b>Eel ATCAA C</b><br>(FL 180 to FL 270;<br>963 sq mi)      | 90 hrs<br>1,080 ops |
|                                                        |                      | <b>Eel ATCAA D</b><br>(FL 180 to FL 270;<br>625 sq mi)      | 60 hrs<br>720 ops   |
| N/A<br>(new proposed airspace)                         | N/A                  | <b>Eel High ATCAA A</b><br>(FL 270 to FL 500;<br>751 sq mi) | 7.6 hrs<br>90 ops   |
|                                                        |                      | <b>Eel High ATCAA B</b><br>(FL 270 to FL 500;<br>877 sq mi) | 11.4 hrs<br>135 ops |
|                                                        |                      | <b>Eel High ATCAA C</b><br>(FL 270 to FL 500;<br>963 sq mi) | 11.4 hrs<br>135 ops |
|                                                        |                      | <b>Eel High ATCAA D</b><br>(FL 270 to FL 500;<br>625 sq mi) | 7.6 hrs<br>90 ops   |

Source: Oregon ANG 2013a, 2013b.

Under the Proposed Action, the eastern boundary of the existing Juniper/Hart MOA Complex would be extended approximately 20 miles to the east and the southern boundary would be extended approximately 25 miles to the south. Once established, the existing and proposed airspace segments would be renamed alphabetically to include Juniper A through D MOAs and Hart A through F MOAs. As with the existing Juniper and Hart MOAs, the proposed new MOAs to the east would be located from an elevation of 11,000 feet MSL to but not including FL 180 (18,000 feet MSL). Expansion of the existing Juniper Low MOA would include the proposed Juniper East Low MOA, which would be located directly underneath the proposed Juniper C MOA and a majority of the proposed Juniper D MOA. The proposed Juniper East Low MOA would be established from 500 feet AGL to but not including 11,000 feet MSL. In addition, the Proposed Action would include raising the floor of the existing Juniper Low MOA from 300 feet AGL to 500 feet AGL. Table ES-3 illustrates proposed changes to the Juniper/Hart MOA Complex. Implementation of the Proposed Action would not result in any changes to overall usage of the Juniper/Hart MOA Complex by the 173 FW. Use of the Juniper/Hart MOA Complex by 142 FW aircraft would decrease given the proposed establishment and modification of other airspace complexes included under the Proposed Action that would provide the 142 FW with closer, more consistently usable airspace.

Under the Proposed Action, a new over-land MOA complex would be established approximately 100 miles east-southeast of Portland in central Oregon, roughly bound by Highway 97/197 on the west, the towns of Wasco and Lexington on the north, U.S. Highway 395 on the east, and U.S. Highway 26 on the south. The proposed Redhawk MOAs (A, B, and C) would be established from 11,000 feet MSL to but not including FL 180 (18,000 feet MSL). In addition, associated ATCAAs would be established directly above the proposed Redhawk B MOA and Redhawk C MOA from FL 180 (18,000 feet MSL) to FL 230 (23,000 feet MSL). Total usage of the Redhawk MOA Complex is anticipated to be approximately 500 flying hours per year. Table ES-4 illustrates the configuration and usage of the proposed Redhawk MOA Complex. The proposed Redhawk MOA Complex would primarily be scheduled and utilized by the 142 FW, reducing scheduling and flight safety burdens on the Juniper/Hart MOA Complex. The proposed MOA complex would also provide the 142 FW with

**Table ES-3. Existing and Proposed Airspace Usage, Juniper/Hart MOA Complex**

| Baseline                                                           |                      |                      |                        | Proposed Action                                                      |                     |                      |                        |
|--------------------------------------------------------------------|----------------------|----------------------|------------------------|----------------------------------------------------------------------|---------------------|----------------------|------------------------|
| Airspace                                                           | Annual Usage         |                      |                        | Airspace                                                             | Annual Usage        |                      |                        |
|                                                                    | 142 FW               | 173 FW               | Total                  |                                                                      | 142 FW              | 173 FW               | Total                  |
| <b>Juniper Low MOA</b><br>(300 AGL to 11,000 MSL;<br>4,045 sq mi)  | 100 hrs<br>600 ops   | 143 hrs<br>660 ops   | 243 hrs<br>1,260 ops   | <b>Juniper Low MOA</b><br>(500 AGL to 11,000 MSL;<br>4,045 sq mi)    | 90 hrs<br>540 ops   | 114 hrs<br>660 ops   | 204 hrs<br>1,200 ops   |
| <b>Juniper North MOA</b><br>(11,000 MSL to FL 180;<br>641 sq mi)   | 250 hrs<br>600 ops   | 36 hrs<br>519 ops    | 286 hrs<br>1,119 ops   | <b>Juniper A MOA</b><br>(11,000 MSL to FL 180;<br>641 sq mi)         | 167 hrs<br>400 ops  | 21 hrs<br>519 ops    | 188 hrs<br>919 ops     |
| <b>Juniper South MOA</b><br>(11,000 MSL to FL 180;<br>3,801 sq mi) | 625 hrs<br>1,500 ops | 653 hrs<br>3,255 ops | 1,278 hrs<br>4,755 ops | <b>Juniper B MOA</b><br>(11,000 MSL to FL 180;<br>3,801 sq mi)       | 125 hrs<br>500 ops  | 499 hrs<br>3,255 ops | 624 hrs<br>3,755 ops   |
| <b>Hart North MOA</b><br>(11,000 MSL to FL 180;<br>875 sq mi)      | 84 hrs<br>500 ops    | 121 hrs<br>2,311 ops | 205 hrs<br>2,811 ops   | <b>Hart A MOA</b><br>(11,000 MSL to FL 180;<br>875 sq mi)            | 67 hrs<br>400 ops   | 121 hrs<br>2,311 ops | 188 hrs<br>2,711 ops   |
| <b>Hart South MOA</b><br>(11,000 MSL to FL 180;<br>2,416 sq mi)    | 17 hrs<br>200 ops    | 348 hrs<br>1,840 ops | 365 hrs<br>2,040 ops   | <b>Hart B MOA</b><br>(11,000 MSL to FL 180;<br>2,417 sq mi)          | 12.5 hrs<br>150 ops | 269 hrs<br>1,840 ops | 281.5 hrs<br>1,990 ops |
| <b>N/A</b><br>(new airspace)                                       | --                   | --                   | --                     | <b>Juniper East Low MOA</b><br>(500 AGL to 11,000 MSL;<br>976 sq mi) | 10 hrs<br>60 ops    | 35 hrs<br>425 ops    | 45 hrs<br>485 ops      |
| <b>N/A</b><br>(new airspace)                                       | --                   | --                   | --                     | <b>Juniper C MOA</b><br>(11,000 MSL to FL 180;<br>486 sq mi)         | 19 hrs<br>114 ops   | 37 hrs<br>1,085 ops  | 56 hrs<br>1,199 ops    |
| <b>N/A</b><br>(new airspace)                                       | --                   | --                   | --                     | <b>Juniper D MOA</b><br>(11,000 MSL to FL 180;<br>773 sq mi)         | 14 hrs<br>86 ops    | 44 hrs<br>1,085 ops  | 58 hrs<br>1,171 ops    |
| <b>N/A</b><br>(new airspace)                                       | --                   | --                   | --                     | <b>Hart C MOA</b><br>(11,000 MSL to FL 180;<br>383 sq mi)            | 3.5 hrs<br>40 ops   | 55 hrs<br>1,085 ops  | 58.5 hrs<br>1,125 ops  |



**Table ES-3. Existing and Proposed Airspace Usage, Juniper/Hart MOA Complex (Continued)**

| Baseline                                                   |                      |                      |                        | Proposed Action                                             |                      |                      |                        |
|------------------------------------------------------------|----------------------|----------------------|------------------------|-------------------------------------------------------------|----------------------|----------------------|------------------------|
| Airspace                                                   | Annual Usage         |                      |                        | Airspace                                                    | Annual Usage         |                      |                        |
|                                                            | 142 FW               | 173 FW               | Total                  |                                                             | 142 FW               | 173 FW               | Total                  |
| <b>N/A</b><br>(new airspace)                               | --                   | --                   | --                     | <b>Hart D MOA</b><br>(11,000 MSL to FL 180;<br>1,411 sq mi) | 1 hr<br>10 ops       | 55 hrs<br>1,085 ops  | 56 hrs<br>1,095 ops    |
| <b>N/A</b><br>(new airspace)                               | --                   | --                   | --                     | <b>Hart E MOA</b><br>(11,000 MSL to FL 180;<br>423 sq mi)   | 0<br>0 ops           | 32 hrs<br>708 ops    | 32 hrs<br>708 ops      |
| <b>N/A</b><br>(new airspace)                               | --                   | --                   | --                     | <b>Hart F MOA</b><br>(11,000 MSL to FL 180;<br>612 sq mi)   | 0<br>0 ops           | 18 hrs<br>708 ops    | 18 hrs<br>708 ops      |
| <b>Juniper ATCAA</b><br>(FL 180 to FL 510;<br>4,442 sq mi) | 167 hrs<br>2,000 ops | 833 hrs<br>2,500 ops | 1,000 hrs<br>4,500 ops | <b>Juniper ATCAA</b><br>(FL 180 to FL 510;<br>5,701 sq mi)  | 167 hrs<br>2,000 ops | 833 hrs<br>2,500 ops | 1,000 hrs<br>4,500 ops |

Source: Oregon ANG 2013a, 2013b, 2014.

Notes: All training within the existing and proposed Juniper Low MOAs are interconnected, interdependent, and are consistent with the purpose and need for the Proposed Action. A pilot's training with the Juniper Low MOAs – as identified in this table – includes and accounts for speed/altitude adjustments, airspace changes, and anticipates the probability of moving between airspaces during any given training mission.

**Table ES-4. Proposed Airspace Usage, Redhawk MOAs and ATCAAs**

| <b>Airspace</b>                                                | <b>Annual Operations-142 FW<br/>(duration)</b> |
|----------------------------------------------------------------|------------------------------------------------|
| <b>Redhawk MOA A</b><br>(11,000 MSL to FL 180;<br>1,016 sq mi) | 33 hrs<br>100 ops                              |
| <b>Redhawk MOA B</b><br>(11,000 MSL to FL 180;<br>2,675 sq mi) | 167 hrs<br>500 ops                             |
| <b>Redhawk MOA C</b><br>(11,000 MSL to FL 180;<br>2,808 sq mi) | 167 hrs<br>500 ops                             |
| <b>Redhawk ATCAA B</b><br>(FL 180 to FL 230;<br>2,675 sq mi)   | 60.5 hrs<br>364 ops                            |
| <b>Redhawk ATCAA C</b><br>(FL 180 to FL 230;<br>2,808 sq mi)   | 60.5 hrs<br>364 ops                            |

Source: Oregon ANG 2013a, 2013b.

more consistently usable airspace which located much closer to the unit's home installation than the Juniper/Hart MOA Complex, reducing the overall flying hours spent in transit.

### *Alternatives*

In addition to the Proposed Action, three alternatives were considered. Identified alternatives, which would include pursuing a subset of the proposed airspace modifications, are described below.

**Alternative B.** Under this alternative, the proposed Eel MOAs and Eel High ATCAA would not be established. Under the Proposed Action, the existing Eel ATCAA and proposed Eel MOAs would provide sufficient over-land airspace to conduct visual range BFM training, but these airspace areas would be too small to conduct Beyond Visual Range (BVR) tactical intercept training. The proposed Redhawk MOA Complex would be utilized for these types of tactical intercept training missions. However, under this alternative over-land tactical intercept training (i.e., BFM) intended for the proposed Eel MOAs would also be moved to the proposed Redhawk MOA Complex. As a result, this alternative would

provide a slightly reduced benefit relative to the Proposed Action given that sorties that would have been intended for the proposed Eel MOAs would have to transit a slightly greater distance to the proposed Redhawk MOA Complex, resulting in additional transit time and reduced training time.

**Alternative C.** This alternative would include the same airspace changes as described under the Proposed Action; however, the Redhawk MOA Complex would not be established. Under the Proposed Action, the proximity of the proposed Redhawk MOA Complex to Portland would substantially increase flying hours available for training. Under this alternative, pilots scheduled for sorties affected by weather conditions would continue to be forced to travel to the Juniper/Hart MOA Complex, which increases transit time and reduces training efficiency relative to the Proposed Action. Consequently, implementation of Alternative C would result in reduced benefits to Oregon ANG mission readiness as 70 percent of proposed 142 FW utilization of the Redhawk MOA Complex (i.e., approximately 342 flying hours) would be redistributed to the Juniper/Hart MOA Complex. Additionally, pilots would have to transit roughly 82 percent farther (i.e., approximately 60 NM farther) in order to reach the Juniper/Hart MOA Complex. This would result in a substantial increase in transit time relative to the Proposed Action and a corresponding decrease in training time spent within usable airspace.

**Alternative D.** This alternative would include the same airspace changes as described under the Proposed Action; however, the Juniper/Hart MOA Complex would not be modified. While the 142 FW would utilize other training airspace under this scenario, as modified or established by the Proposed Action (e.g., Redhawk MOA Complex), the 173 FW would continue to operate within the existing airspace, which is currently too small to efficiently accommodate training operations needed to maintain proficiency of pilots operating the unit's currently assigned aircraft. Consequently, this alternative would result in continued impacts to training efficiency and safety conditions, resulting in negative impacts to Oregon ANG mission readiness and ultimately weakening homeland defense and USAF readiness.

In addition to these three project alternatives, a No-Action Alternative was also considered. If the No-Action Alternative is selected, the Oregon ANG would not

implement the Proposed Action and would continue operating within the existing airspace, including W-570, Bass and Bass South ATCAAs, Eel ATCAA, and the existing Juniper/Hart MOA Complex. The current airspace constraints would continue to degrade the Oregon ANG's ability to efficiently conduct realistic training to ensure the required mission readiness and syllabus execution of the 142 FW and 173 FW, respectively. The travel distance and time currently required to access existing training airspaces, coupled with the frequency of weather conditions that limit the availability of coastal airspace areas for training operations, would continue to result in a loss of training for assigned pilots (approximately 300 hours per year). Further, transit by 142 FW pilots to the Juniper/Hart MOA Complex would result in increased fuel usage and maintenance relative to the Proposed Action. Further, the existing airspaces would have to be activated for a longer period of time to relative to scenarios under the Proposed Action, rendering them unavailable to other users at greater frequency and for longer durations. This alternative is carried forward for analysis in the EIS in accordance with Council on Environmental Quality (CEQ) regulation 40 Code of Federal Regulations (CFR) 1502.14(d).

### **Lead and Cooperating Agencies**

The National Guard Bureau (NGB) is the lead agency for this EIS pursuant to 40 CFR §1501.5 and §1508.5. Since the Proposed Action includes activities associated with special use airspace (SUA), the USAF requested the Federal Aviation Administration's (FAA's) cooperation (15 August 2012; see Appendix J, *FAA Cooperating Agency Correspondence*) in accordance with the guidelines described in the Memorandum of Understanding (MOU) between the FAA and the DoD Concerning SUA Environmental Actions, dated 4 October 2005. As a cooperating agency, the FAA was requested to participate in various portions of the EIS development, including:

- Participating in the scoping process;
- Assuming responsibility, upon request by the Air Force, for developing information and preparing analyses on issues for which you have special expertise; and

- Making staff support available to enhance interdisciplinary review capability.

This EIS was prepared in compliance with NEPA (42 U.S. Code [USC] §4321 et seq.), CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR §1500-1508), EIAP as promulgated at 32 CFR §989, and FAA Order 1050.1E, Change 1 (2006).<sup>2</sup>

### **Consistency of EIS with FAA Order 1050.1E, Change 1**

As a result of the FAA's status as a cooperating agency, this EIS was also prepared in compliance with EIAP as promulgated at 32 CFR §989 as well as FAA Order 1050.1E, Change 1 (2006). Table ES-5 lists each of the impact categories identified in FAA Order 1050.1E, Change 1 (2006) and the corresponding chapter in the EIS where these impacts are discussed. This EIS provides a detailed analysis of the potential environmental effects associated with the changes to military training airspace in Oregon, including modifications to existing ATCAAs and MOAs, and establishment of new MOAs and ATCAAs on 14 of the 18 potential impact categories identified in FAA Order 1050.1E, Change 1 (2006). The Proposed Action would have no impact on the remaining four categories identified in FAA Order 1050.1E, Change 1 (2006), which were eliminated from further analysis (see Table ES-5 for a resource-specific rationale for excluding these resource areas from further analysis).

### **Environmental Consequences of the Proposed Action and Alternatives**

The Proposed Action would have no impacts or negligible adverse impacts on the following 15 categories: coastal resources; compatible land use; construction impacts; Department of Transportation Act: Section 4(f); farmlands; floodplains;

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<sup>2</sup> At all times relevant to this action, FAA's required procedures for NEPA evaluations were contained in FAA Order 1050.1E, CHG 1, "Environmental Impact: Policies and Procedures" (2006). (Effective July 16, 2015, Order 1050.1E was replaced by Order 1050.1F, also titled, "Environmental Impacts: Policies and Procedures." See also, 1050.1F Desk Reference (July 16, 2015).

**Table ES-5. EIAP Consistency with FAA Order 1050.1E, Change 1,  
Environmental Resources to be Considered in an EA or EIS**

| <b>FAA Order 1050.1E Resource</b>                                                                 | <b>Location of Analysis in the EIS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Air Quality                                                                                       | Sections 3.6 and 4.6, <i>Air Quality</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Coastal Resources                                                                                 | Sections 3.4 and 4.4, <i>Biological Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Compatible Land Use                                                                               | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Construction Impacts                                                                              | No construction activities would occur under the Proposed Action; therefore, this resource was eliminated from further consideration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Department of Transportation Act: Section 4(f)                                                    | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i> . Per FAA Order 1050.1E, Change 1, Section 6 the EIS does not provide a Section 4(f) analysis. Paragraph 6.1c describes that designation of airspace for military flight operations is exempt from section 4(f) of the Department of Transportation Act. The Department of Defense reauthorization in 1997 provided that “[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303(c) of Title 49, USC (Public Law [PL] 105-85). |
| Farmlands                                                                                         | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Fish, Wildlife, and Plants                                                                        | Sections 3.4 and 4.4, <i>Biological Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Floodplains                                                                                       | No construction activities or other ground-based activities would occur under the Proposed Action and its implementation would not cause any disturbance of floodplains; therefore, this resource was eliminated from further consideration. Refer to Section 3.10.                                                                                                                                                                                                                                                                                                                                                                            |
| Hazardous Materials, Pollution Prevention, and Solid Waste                                        | Sections 3.8 and 4.8, <i>Hazardous Materials and Wastes</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Historical, Architectural, Archeological, and Cultural Resources                                  | Sections 3.5 and 4.5, <i>Cultural Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Light Emissions and Visual Impacts                                                                | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Natural Resources and Energy Supply                                                               | The Proposed Action would not involve extractive activities or changes in the energy supply; therefore, this resource was eliminated from further consideration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Noise                                                                                             | Sections 3.2 and 4.2, <i>Noise</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Socioeconomic Impacts, Environmental Justice and Children’s Environmental Health and Safety Risks | Sections 3.9 and 4.9, <i>Socioeconomics, Environmental Justice, and Children’s Health and Safety</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Secondary (Induced) Impacts                                                                       | Secondary impacts are addressed by resource area within Section 4, <i>Environmental Consequences</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Table ES-5. EIAP Consistency with FAA Order 1050.1E, Change 1,  
Environmental Resources to be Considered in an EA or EIS  
(Continued)**

| Resource               | Location in the EIS                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water Quality          | No construction activities or other ground-based activities would occur under the Proposed Action and its implementation would not cause any disturbance of surface water or groundwater resources; therefore, this resource was eliminated from further consideration. Refer to Section 3.10, <i>Dismissed Resource Areas</i> . Potential impacts to water quality as a result of chaff and flare have been addressed in 3.8 and 4.8, <i>Hazardous Materials and Wastes</i> . |
| Wetlands               | Sections 3.4 and 4.4, <i>Biological Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Wild and Scenic Rivers | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                     |

Source: FAA 2006.

hazardous materials, pollution prevention, and solid waste; historical, architectural, archaeological, and cultural resources; light emissions and visual impacts; natural resources and energy supply; socioeconomic impacts, environmental justice and children’s environmental health and safety risks; secondary impacts; water quality; wetlands; and wild and scenic rivers. The Proposed Action would also have less than significant adverse impacts on air quality; fish, wildlife and plants; noise; and airspace management as summarized below and described in detail in Sections 3 and 4 of the EIS. These effects are similarly summarized below and described in detail in Sections 3 and 4 of the EIS.

**Airspace Management.** Implementation of the Proposed Action would result in the redistribution of flight training operations within existing and proposed Oregon ANG SUA (i.e., warning areas, MOAs, and ATCAAs) located over northwestern and south-central Oregon. Proposed airspace modifications and establishments were specifically developed to account for computer modeling of actual aircraft flight path histories in the region, in order to identify the most ideal locations and configurations for the proposed airspace with the least potential impact on surrounding military, commercial, and general aviation. Further, all proposed new Oregon ANG airspace segments would only be activated on an as-needed basis – as a whole or individually – allowing for more responsible stewardship of the airspace regionally and helping to minimize

conflicts with other users and reducing the overall amount of time an airspace area would be activated.

Implementation of the Proposed Action is not expected to compromise or require changes to existing Air Traffic Control (ATC) systems, facilities, or procedures. Therefore, the Proposed Action is not expected to significantly impact airspace management or increase the likelihood of mid-air collisions with civilian aircraft.

**Noise.** The military training operations conducted within the proposed airspace areas would not surpass FAA thresholds as they would not result in an increase of 1.5 dB or more at or above 65 DNL. Further, noise levels beneath the proposed affected airspaces would not approach 55 DNL, which is considered by the USEPA as loud in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (USEPA 1974). Additionally, there would be an overall decrease in Onset Rate-Adjusted Monthly Day-Night Average ( $L_{dnmr}$ ) noise levels beneath the existing MOAs based on a broader geographic distribution of aircraft training operations and raising of the airspace floor in some areas (e.g., Juniper Low MOA). Therefore, implementation of the Proposed Action would not result in a significant impact to noise beneath the proposed airspace.

As a result of the Proposed Action, short-term exposure to noise generated by military flight operation would increase as military aircraft activity would be introduced within the proposed airspace areas, including W-570, Eel MOAs, Juniper/Hart expansion area, and Redhawk MOA Complex. Additionally, areas beneath the proposed Juniper/Hart expansion area as well as the W-570 (more than 15 NM from the coastline) could experience overpressure associated with sonic booms. However, the average number of daily short-term events above 65 dB sound exposure level (SEL) would remain the same or decrease within the existing airspaces as military operations would be spread throughout the existing and proposed airspaces following implementation of the Proposed Action. Short-term exposure would vary between and within MOAs but would not generally present a substantial adverse impact. (See Appendix E, *Noise*, for additional information regarding noise metrics.)



**Biological Resources.** The Proposed Action would not result in any construction or ground-disturbing activities. However, direct impacts would include potential for bird-aircraft collisions within the air column during transit or training operations. Additionally, secondary effects would include minor noise impacts to sensitive wildlife species as well as indirect impacts to sensitive biological resources, including sensitive habitats. However, direct overflights, resulting in maximum noise exposure, would be rare due to the distribution of flight activity throughout the proposed airspace areas. Further, the average noise would not exceed the FAA Order 1050.1E, Change 1 (2006) threshold of 65 DNL, and would not approach 55 DNL, which is considered by the USEPA as loud in residential areas and farms and other outdoor areas.

**Air Quality.** The Proposed Action does not include any changes to the existing inventories of F-15 aircraft at the 142 FW and 173 FW and implementation would not result in any increases to total annual flight hour or sortie authorizations for either unit. Therefore, overall aircraft operational emissions would not be expected to change substantially. However, aircraft emissions from the 142 FW and 173 FW are expected to be redistributed within the vertical limits and lateral configurations of the proposed airspace areas.

Expanded or newly established airspace in Polk County, OR and Washoe County, NV would be located in *nonattainment* or *maintenance* areas. However, the proposed airspace above these counties would be established at 11,000 feet MSL under the Proposed Action (approximately 6,000 feet AGL). The FAA conducted a study of ground level concentrations caused by elevated aircraft emissions released AGL using U.S. Environmental Protection Agency (USEPA)-approved models and conservative assumptions. The study concluded that aircraft operations at or above the average mixing height of 3,000 feet AGL have a very small effect on ground level concentrations and could not directly result in a violation of the National Ambient Air Quality Standards (NAAQS) in a local area. Therefore, while total training hours would increase under the Proposed Action, the overall aircraft operational emissions would not be expected to affect ground level concentrations of pollutants. Further, these emissions would be dispersed over a larger area. All other proposed airspace areas would be established over counties that are in *attainment* for all criteria pollutants.

Consequently, a General Conformity Determination would not be required for the Proposed Action (see Appendix F, *Air Quality*).

**Cultural Resources.** Implementation of the Proposed Action would only involve changes to airspace, and would not include any project components that would touch or otherwise directly affect the ground surface. Archaeological resources such as surface or subsurface artifacts or other intact cultural deposits would not be disturbed since there would be no ground-disturbing activities (e.g., construction or demolition) associated with the Proposed Action. Consequently, the only potential effects of the Proposed Action on cultural resources underlying the affected or proposed airspaces would result from noise and/or noise generated vibrations, or the visual impact of military overflights within the affected and proposed airspace. While individual flyover events may result in noticeable noise levels at the ground surface, due to the altitude and frequency of these events cultural resources, including historic structures, national historic trails, archaeological resources, or tribal lands below the existing and proposed airspaces would not be subject to significant increases in average noise levels and impacts to cultural resources would be less than significant.

**Safety.** Implementation of the Proposed Action would not change the total number of sorties from existing conditions (i.e., the number of flight training hours authorized would be unchanged) and operations within the proposed airspace areas would generally present the same risk of in-flight bird collision as those occurring within existing airspace areas. The Oregon ANG does not use live ammunition during training exercises within the airspace; however, aircraft are equipped with MJU-7 flares during training missions. To proactively address potential wildfire risk, the Oregon ANG has developed and routinely implements safety precautions related to chaff and flare use. In particular, neither unit deploys flares below 5,000 feet AGL, in order to minimize the impacts to public safety resulting from training exercises involving flare use (AFI 11-2F-15V3 KF CH 8), which effectively eliminates the potential for wildfire related to flare use by the Oregon ANG. Further, the potential for a flare cartridge to contact a person or habitable structure is exceedingly unlikely. Therefore, overall impacts related to safety associated with the Proposed Action would be less than significant.

**Socioeconomics, Environmental Justice, and Children's Health and Safety.**

Under the Proposed Action, there would be no long-term changes in economic activity associated with the 142 FW or 173 FW, as no additional personnel would be added to either unit. Further, the Proposed Action would have negligible impacts on underlying cities and communities. The altitudes of the proposed operational floors would allow for continued use of local airspace by general aviation pilots beneath the MOAs, as these pilots are permitted to fly beneath MOAs without restrictions, and even through them (including the proposed Juniper Low MOA). Consequently, while general aviation pilots may avoid MOAs as a matter of principle, the establishment of the MOAs would not preclude local flight traffic, and would therefore have a negligible economic impact on underlying cities or airfields that benefit from fuel sales or tie-down fees. Further, based on the projected noise levels associated with the existing and proposed airspace, implementation of the Proposed Action would have less than significant impacts on livestock, housing, and tourism beneath the airspace.

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## ACRONYMS AND ABBREVIATIONS

|          |                                           |                 |                                                                       |
|----------|-------------------------------------------|-----------------|-----------------------------------------------------------------------|
| 142 FW   | 142d Fighter Wing                         | BGEPA           | Bald and Golden Eagle Protection Act                                  |
| 173 FW   | 173d Fighter Wing                         |                 |                                                                       |
| 270 ATCS | 270th Air Traffic Control Squadron        | BLM             | Bureau of Land Management                                             |
| ACC      | Air Combat Command                        | BLS             | U.S. Bureau of Labor Statistics                                       |
| ACDP     | Air Contaminant Discharge Permit          | BRAC            | Base Realignment and Closure                                          |
| ACEC     | Areas of Critical Environmental Concern   | BVR             | Beyond Visual Range                                                   |
|          |                                           | CAA             | Clean Air Act                                                         |
| ACHP     | Advisory Council on Historic Preservation | CAAA            | Clean Air Act Amendment                                               |
|          |                                           | CAP             | central accumulation point                                            |
| ACM      | Air Combat Maneuvers                      | CDC             | Center for Disease Control                                            |
| ACT      | Air Combat Tactics                        | CEQ             | Council on Environmental Quality                                      |
| AETC     | Air Education and Training Command        | CERCLA          | Comprehensive Environmental Response, Compensation, and Liability Act |
| AFB      | Air Force Base                            |                 |                                                                       |
| AFI      | Air Force Instruction                     | CFA             | Controlled Firing Area                                                |
| AGE      | aerospace ground equipment                | CFC             | chlorofluorocarbons                                                   |
| AGL      | above ground level                        | CFR             | Code of Federal Regulations                                           |
| AHAS     | Avian Hazard Advisory System              | CH <sub>4</sub> | methane                                                               |
| AHC      | Advanced Handling Considerations          | CMPA            | Cooperative Management and Protection Area                            |
| AIRFA    | American Indian Religious Freedom Act     | CMR             | Combat Mission Ready                                                  |
|          |                                           | CO              | carbon monoxide                                                       |
| AMEC     | AMEC Environment & Infrastructure, Inc.   | CO <sub>2</sub> | carbon dioxide                                                        |
|          |                                           | CY              | calendar year                                                         |
| AMRAAM   | Advanced Medium-Range Air-to-Air Missile  | dB              | decibel                                                               |
|          |                                           | dBA             | A-weighted decibel                                                    |
| ANG      | Air National Guard                        | DCA             | Defensive Counter-Air                                                 |
| ANGB     | Air National Guard Base                   | DEQ             | Department of Environmental Quality                                   |
| ANGRC    | Air National Guard Readiness Center       |                 |                                                                       |
| ANSI     | American National Standards Institute     | DNL             | day-night average sound level                                         |
|          |                                           | DoD             | Department of Defense                                                 |
| APE      | Area of Potential Effect                  | DODI            | Department of Defense Instruction                                     |
| ARTCC    | Air Route Traffic Control Center          | DOI             | U.S. Department of the Interior                                       |
| AST      | aboveground storage tank                  | EA              | Environmental Assessment                                              |
| AT/FP    | Anti-Terrorism/Force Protection           | EIAP            | Environmental Impact Analysis Process                                 |
| ATC      | air traffic control                       |                 |                                                                       |
| ATCAA    | Air Traffic Control Assigned Airspace     | EIS             | Environmental Impact Statement                                        |
|          |                                           | EO              | Executive Order                                                       |
| BASH     | Bird-Aircraft Strike Hazard               | ERP             | Environmental Restoration Program                                     |
| BEA      | Bureau of Economic Analysis               |                 |                                                                       |
| BEA      | U.S. Bureau of Economic Analysis          | ESA             | Endangered Species Act                                                |
| BFM      | Basic Fighter Maneuvers                   | FAA             | Federal Aviation Administration                                       |
|          |                                           | FAR             | Federal Aviation Regulation                                           |

## ACRONYMS AND ABBREVIATIONS (continued)

|                   |                                                  |                 |                                                          |
|-------------------|--------------------------------------------------|-----------------|----------------------------------------------------------|
| FICON             | Federal Interagency Committee on Noise           | NASA            | National Aeronautics and Space Administration            |
| FL                | Flight Level                                     | NBHMA           | North Bank Habitat Management Area                       |
| FONSI             | Finding of No Significant Impact                 | NDOW            | Nevada Department of Wildlife                            |
| FR                | Federal Register                                 | NEPA            | National Environmental Policy Act                        |
| FTU               | Flight Training Unit                             | NESHAP          | National Emission Standards for Hazardous Air Pollutants |
| FW                | Fighter Wing                                     |                 |                                                          |
| FY                | Fiscal Year                                      |                 |                                                          |
| GIS               | Geographic Information System                    | NGB             | National Guard Bureau                                    |
| HAP               | hazardous air pollutant                          | NHPA            | National Historic Preservation Act                       |
| HUD               | U.S. Department of Housing and Urban Development | NM              | nautical miles                                           |
|                   |                                                  | NMFS            | National Marine Fisheries Service                        |
| HWMP              | Hazardous Waste Management Plan                  | NMS             | National Marine Sanctuaries                              |
|                   |                                                  | NO <sub>2</sub> | nitrogen dioxide                                         |
| hz                | hertz                                            | NOA             | Notice of Availability                                   |
| IFR               | Instrument Flight Rules                          | NOAA            | National Oceanic and Atmospheric Association             |
| IR                | instrument route                                 |                 |                                                          |
| JHMCS             | Joint Helmet Mounted Cueing System               | NOI             | Notice of Intent                                         |
|                   |                                                  | NORAD           | North American Aerospace Defense Command                 |
| JP-               | jet propulsion fuel                              |                 |                                                          |
| km                | kilometer                                        | NOTAM           | Notice to Airmen                                         |
| km <sup>3</sup>   | cubic kilometers                                 | NO <sub>x</sub> | nitrogen oxide                                           |
| L <sub>dn</sub>   | day-night average sound level                    | NPS             | National Park Service                                    |
| L <sub>dnmr</sub> | A-weighted sound level                           | NRHP            | National Register of Historic Places                     |
| LFE               | Large Force Exercises                            | NRS             | Nevada Revised Statutes                                  |
| L <sub>max</sub>  | maximum sound level                              | NSP             | Nevada State Parks                                       |
| LOW A/A           | low altitude air-to-air                          | NWR             | National Wildlife Refuge                                 |
| LOWAT             | low-altitude training                            | NWSTF           | Naval Weapons Systems Training Facility                  |
| MBTA              | Migratory Bird Treaty Act                        |                 |                                                          |
| Met               | Meteorological                                   | O <sub>3</sub>  | ozone                                                    |
| mg/m <sup>3</sup> | milligrams per cubic meter                       | OAR             | Oregon Administrative Rules                              |
| MOA               | Military Operations Area                         | OCA             | Offensive Counter-Air                                    |
| MOU               | Memorandums of Understanding                     | ODFW            | Oregon Department of Fish and Wildlife                   |
| MPA               | Marine Protected Areas                           |                 |                                                          |
| MRNMAP            | Range Noise Model and Assessment Program         | OE/AAA          | Obstruction Evaluation/ Airport Airspace Analysis        |
| MSL               | Mean Sea Level                                   | OHSD            | Oregon Historic Sites Database                           |
| MTR               | military training route                          | OHV             | Off-Highway Vehicle                                      |
| NAAQS             | National Ambient Air Quality Standards           | OPRD            | Oregon Parks and Recreation Department                   |
|                   |                                                  |                 |                                                          |
| NAS               | National Airspace System                         | ORS             | Oregon Revised Statutes                                  |
| NAS               | Naval Air Station                                | OSHA            | Occupational Safety and Health Administration            |

## ACRONYMS AND ABBREVIATIONS (continued)

|                   |                                                                  |                   |                                         |
|-------------------|------------------------------------------------------------------|-------------------|-----------------------------------------|
| PAA               | Primary Authorized Aircraft                                      | SUA               | Special Use Airspace                    |
| Pb                | lead                                                             | TI                | Tactical Intercept                      |
| PCA               | Positive Control Area                                            | TTP               | Tactics, Techniques and Procedures      |
| PCPI              | per capita personal income                                       | tpy               | tons per year                           |
| PM                | particulate matter                                               | TRACON            | Terminal Radar Approach Control         |
| PM <sub>10</sub>  | particulate matter equal to or less than ten microns in diameter | U.S.              | United States                           |
| PM <sub>2.5</sub> | particulate matter equal to or less than 2.5 microns in diameter | ug/m <sup>3</sup> | micrograms per cubic meter              |
| POL               | petroleum, oil, and lubricants                                   | USACE             | U.S. Army Corps of Engineers            |
| PS                | Public Services and Safety                                       | USAF              | U.S. Air Force                          |
| PSD               | Prevention of Significant Deterioration                          | USC               | U.S. Code                               |
| psf               | pounds per square foot                                           | USCCSP            | Climate Change Science Program          |
| QD                | quantity-distance                                                | USDA              | U.S. Department of Agriculture          |
| RCRA              | Resource Conservation and Recovery Act                           | USEPA             | U.S. Environmental Protection Agency    |
| RMA               | Recreation Management Area                                       | USFS              | U.S. Forest Service                     |
| RNA               | Research Natural Areas                                           | USFWS             | U.S. Fish and Wildlife Service          |
| ROD               | Record of Decision                                               | UST               | underground storage tank                |
| ROI               | region of influence                                              | VFR               | Visual Flight Rules                     |
| ROW               | right of way                                                     | VOC               | volatile organic compound               |
| RPZ               | runway protection zone                                           | VPTA              | Volume, Proximity, Time, and Attributes |
| SAP               | satellite accumulation point                                     | VQO               | visual quality objectives               |
| SEL               | sound exposure level                                             | VR                | visual route                            |
| SHPO              | State Historic Preservation Office                               | W-                | Warning Area                            |
| SIP               | State Implementation Plan                                        | WAC               | Washington Administrative Code          |
| SO <sub>2</sub>   | sulfur dioxide                                                   | WRCC              | Western Regional Climate Center         |
| SOP               | Special Operating Procedures                                     | WSP               | Washington State Parks                  |
| SO <sub>x</sub>   | sodium oxide                                                     | WVR               | Within Visual Range                     |
| SPMA              | Snowy Plover Management Area                                     |                   |                                         |

## **SECTION 1**

### **INTRODUCTION**

#### **1.1 INTRODUCTION**

The Air National Guard (ANG) has prepared this Environmental Impact Statement (EIS) to document and evaluate proposed changes to military training airspace primarily in Oregon, including modifications to existing Air Traffic Control Assigned Airspaces (ATCAAs) and Military Operations Areas (MOAs), and establishment of new MOAs and ATCAAs (see Figure 1-1). Expanded and newly established airspace areas would be used by the 142d Fighter Wing (142 FW) and the 173d Fighter Wing (173 FW) of the Oregon ANG based in Portland and Klamath Falls, respectively. The Environmental Impact Analysis Process (EIAP) for the Proposed Action has been conducted in accordance with the Council on Environmental Quality (CEQ) regulations to comply with the National Environmental Policy Act (NEPA) of 1969 and in conformity with Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*; 32 Code of Federal Regulations (CFR) §989, *Environmental Impact Analysis Process*; and Federal Aviation Administration (FAA) Order 1050.1E, Change 1 (2006).<sup>1</sup>

#### **1.2 LOCATION**

The Proposed Action includes modifications to military training airspace located over coastal, central, and eastern Oregon, and the Pacific Ocean. In addition, minor portions of the Proposed Action would be located above a small area of northwestern Nevada and the southwestern-most corner of Washington. These changes to the primary airspace inventory available to the Oregon ANG would be implemented in an area where some MOAs and ATCAAs are established (see Figure 1-1).

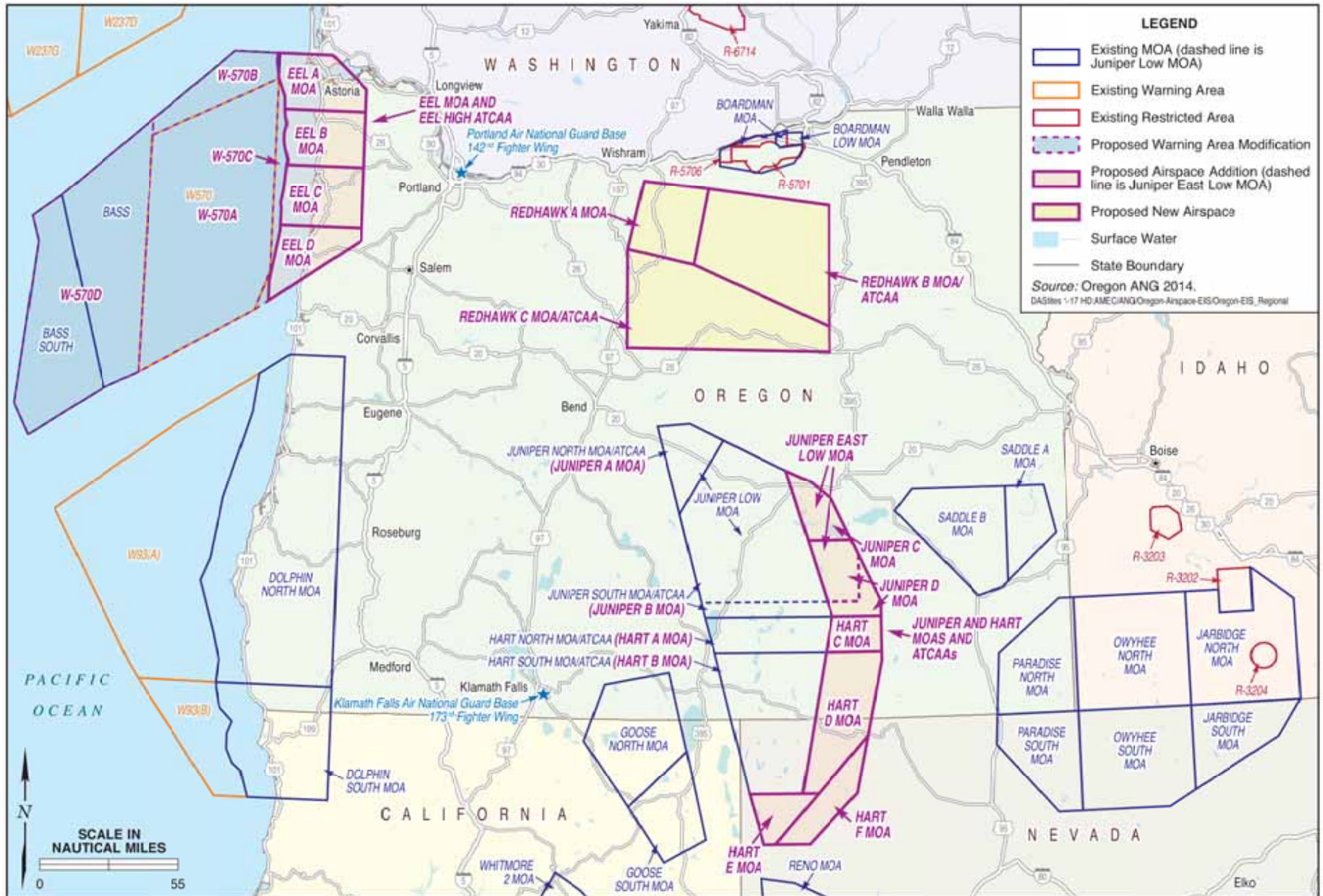
Proposed airspace improvements would include modifications to the existing Eel ATCAA, which occurs over portions of Clatsop, Tillamook, Yamhill, and Lincoln counties in coastal Oregon as well as a small inclusion above Pacific County in

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<sup>1</sup> At all times relevant to this action, FAA's required procedures for NEPA evaluations were contained in FAA Order 1050.1E, CHG 1, "Environmental Impact: Policies and Procedures" (2006). (Although 1050.1E has been replaced by 1050.1F and accompanying Desk Reference – effective July 16, 2015 – at all times germane to this action, the required procedures for NEPA evaluations have been consistent with FAA's applicable orders.)



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



EIS

FIGURE  
1-1

Washington. The expansion of the existing Juniper and Hart MOAs in eastern Oregon would cover portions of Harney County in Oregon and Humboldt and Washoe counties in northwestern Nevada.

The proposed new 6,500-square mile Redhawk MOA Complex would be located above portions of seven counties in central Oregon including: Sherman, Gilliam, Morrow, Grant, Wheeler, Jefferson, and Wasco counties (refer to Figure 1-1).

### **1.3 PRIMARY MILITARY USERS OF THE AIRSPACE**

The ANG is an integral part of the U.S. Air Force (USAF) under the Department of Defense's Total Force Policy, which includes the 142 FW and 173 FW of the Oregon ANG as well as the airspace areas they use. The ANG is comprised of 89 flying wings. This mission of each ANG unit includes both federal and state roles. Additionally, ANG units may be activated in a number of ways as prescribed by public law. The following sections describe both units' specific missions. For purposes of this document, a *sortie* represents a single takeoff, performance of a mission, and landing. An *operation* is defined as a subset of a sortie that accounts for an individual flying activity within an individual piece of training airspace. There can be multiple operations per sortie.

#### **1.3.1 142d Fighter Wing**

The 142 FW is based at Portland International Airport and operates the F-15 Eagle. The unit's mission is to provide 24-hour continuous air defense and air sovereignty capabilities in support of homeland defense. As part of the Air Expeditionary Force, the unit is also tasked with maintaining a world-wide deployable war fighting capability. The 142 FW protects the Pacific Northwest skies from Northern California to the Canadian border as part of Aerospace Control Alert (ACA) and the North American Aerospace Defense Command. The wing also stands ready to participate in state and federal contingency missions as required. The unit is currently allocated 3,500 annual flight hours resulting in approximately 2,335 annual sorties and an average sortie duration of 1.5 hours. The 142 FW has a Primary Aircraft Authorization (PAA) of 18 F-15 Eagles, and has 30 pilots assigned. The unit conducts training within the Eel ATCAA, Warning Area (W)-570, Bass and Bass South ATCAAs, Juniper Low MOA, Juniper North and



South MOAs, Hart North and South MOAs, Dolphin North MOA, Boardman MOA, Olympic MOA (located in northwestern Washington), and Okanogan/Roosevelt MOA (located in northeastern Washington).

As of Fiscal Year (FY) 2012, authorized personnel levels at the 142 FW totaled 1,077 personnel. Full-time personnel totaled approximately 178 active guard reserves and technicians. Total personnel associated with the 142 FW also include traditional guardsmen (621 personnel), full-time federal civil service military technicians (230 personnel), and state employees (48 personnel) (Oregon ANG 2012a).

### **1.3.2 173d Fighter Wing**

The 173 FW is based at Kingsley Field located at Klamath Falls Airport in southern Oregon. As the only F-15 Formal Training Unit (FTU) in the USAF, the primary mission of the 173 FW is to train pilots for air-to-air combat for the ANG and USAF. During training, pilots from the ANG Air Superiority Fighter and USAF Combat units are trained by the 173 FW to fly F-15 aircraft in two primary courses: 1) the *Basic Course*, a six-month program designed for pilots with no fighter experience; and 2) the *Transition Course*, lasting about three months, geared toward fighter pilots that are new to the F-15 aircraft. During both courses, student pilots learn to employ the F-15 through all phases of flight from take-off and landing to advanced air-to air tactics.

The 173 FW has a PAA of 21 F-15 Eagles, with 30 pilots assigned permanently to the unit to act as instructors for the average student throughput of 40 pilot trainees per year with 63 pilot trainees in 2012. The unit is currently allotted 6,200 flight hours, resulting in approximately 4,770 annual sorties and an average sortie duration of 1.3 hours. Training operations currently take place within the Goose MOA, Juniper Low MOA, Juniper North and South MOAs, Hart North and South MOAs, Dolphin MOA, and W-93.



173 FW F-15 Eagles in flight



As of FY 2012, authorized personnel levels at the 173 FW totaled 800 personnel with drill weekend training conducted once a month. Full-time personnel totaled approximately 226 active guard reserves and technicians. Total personnel associated with the 173 FW also include traditional guardsmen (248 personnel), full-time federal service technicians (Title 32) (255 personnel), and State Employees (71 personnel) (Oregon ANG 2012b). The Oregon ANG's 270th Air Traffic Control Squadron (270 ATCS) and the Oregon Army National Guard's 182d Calvary Infantry are tenant organizations of the 173 FW.

### **1.3.3 F-15 Eagle**

Both the 142 FW and 173 FW operate the F-15 Eagle aircraft, an all-weather, extremely maneuverable, tactical fighter designed to help the USAF gain and maintain air supremacy over the battlefield. The Eagle's air superiority is achieved through a mixture of unprecedented maneuverability and acceleration, range, weapons, and avionics. It can penetrate enemy defenses and outperform and outfight any current aircraft threat. The F-15 has electronic systems and weaponry to find, fix, track, target, and engage enemy aircraft while operating in friendly or enemy-controlled airspace. The weapons and flight control systems are designed so one person can safely and effectively perform air-to-air combat. The latest generation of technologically advanced F-15s employs weapons systems and executes tactics that require much greater vertical and lateral airspace areas than previously required. Greater vertical and lateral dimensions are required to accommodate these current and evolving weapon system changes to include greater radar and missile system standoff capabilities and the need to defend against emerging adversary capabilities.

The F-15's maneuverability and acceleration are achieved through high engine thrust-to-weight ratio and low wing loading (i.e., the ratio of aircraft weight to its wing area), which is a vital factor in maneuverability and, combined with the high thrust-to-weight ratio, enables the aircraft to turn tightly without losing airspeed.

The F-15's versatile pulse-Doppler radar system can look up at high-flying targets and down at low-flying targets without being confused by ground clutter. It can detect and track aircraft and small high-speed targets at distances beyond visual range (in excess of 80 nautical miles [NM]) down to close range, and at altitudes down to treetop level. The radar feeds target information into the central computer

for effective weapons delivery. For within visual range (WVR), the radar acquires enemy aircraft, with this information projected on the pilot's heads-up display or Joint Helmet Mounted Cueing System (JHMCS). The F-15's electronic warfare system provides both threat warning and countermeasures against selected threats (USAF 2008).

The F-15 Eagle is an all-weather tactical fighter aircraft designed to gain and maintain air superiority in aerial combat. This aircraft is powered by two Pratt and Whitney F100-PW-220 turbofan engines that at afterburner can generate 25,000 pounds of thrust each. The F-15 has a combat ceiling of 50,000 feet above mean sea level (MSL) and a ferry range (i.e., the maximum range an aircraft can fly) of more than 3,000 NM.

#### **1.4 MISSION READINESS**

Training requirements for active-duty and reserve components of the USAF are specified in regulations written by their host commands (e.g., Air Combat Command [ACC], and Air Education and Training Command [AETC]). These regulations specify the type, quality, and frequency of pilot training required to develop and maintain flight proficiency to meet readiness requirements expected for wartime tasking, air sovereignty alert, and contingency operations. These regulations are further discussed below.

##### **1.4.1 The Ready Aircrew Program**

Training requirements are set forth in the Ready Aircrew Program (RAP), which is the USAF's overarching continuation training program designed to focus training or develop capabilities vital to a unit's core missions. The RAP requirements for every qualified F-15 pilot include low-altitude training (LOWAT) (from 500 feet to 1,000 feet above ground level [AGL]), as well as Low Slow/Visual Identification intercept and Slow Shadow intercept training missions. These training events entail identifying and engaging low-altitude aerial targets, low-altitude navigation, tactical formation, and defensive maneuvering to avoid or negate threats. For a definition of all training exercises see Table 1-1. USAF's training instructions do not permit simulator training or other types of training to be substituted for LOWAT (in accordance with RAP).

**Table 1-1. Training Exercises Defined**

| Training Type                           | Definition                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advanced Handling Characteristics (AHC) | Consists of a single airplane training for proficiency in utilization and exploitation of the aircraft flight envelope consistent with operational and safety constraints including, but not limited to, high/maximum angle of attack maneuvering, energy management, minimum time turns, maximum/optimum acceleration and deceleration techniques, and confidence maneuvers. |
| Air Combat Maneuvering (ACM)            | Training typically involves three to four similar aircraft and emphasizes intra-flight coordination, survival tactics, and maneuvering of two aircraft against one or two adversaries.                                                                                                                                                                                        |
| Air Combat Tactics (ACT)                | Usually involves four to eight aircraft. This scenario involves designating friendly and enemy forces, which separate as far as possible in the maneuvering airspace to begin tactics training. The training consists of opposing forces engaging each other over a large range of altitudes.                                                                                 |
| Basic Fighter Maneuvering (BFM)         | Fundamental training of all air-to-air flight maneuvering. This training is normally conducted with two similar aircraft to practice individual offensive and defensive maneuvering against a single adversary.                                                                                                                                                               |
| Low Air-to-Air (LOW A/A)                | Normally involves two to four aircraft practicing the fundamentals of searching for and engaging an aerial target at low-altitude.                                                                                                                                                                                                                                            |
| Low Attitude Navigation                 | Involves training conducted below 1,000 feet AGL using onboard systems and the fundamental aspects of dead reckoning and point-to-point low-altitude navigation, with or without prior route planning.                                                                                                                                                                        |
| Low/Slow Visual Identification          | Consists of identifying and engaging aerial targets at low-altitude.                                                                                                                                                                                                                                                                                                          |
| Slow Shadow Training                    | Involves practicing maneuvers to intercept slow flying rotary or fixed wing aircraft and maintaining surveillance without being detected.                                                                                                                                                                                                                                     |
| Tactical Intercepts (TI)                | Involves the detection and interception of hostile aircraft. The target aircraft attempts to penetrate the area protected by the interceptor who, with the aid of radar, attempts to detect the target, maneuver to identify the target, and based on the scenario, reach a position from which the target can be destroyed.                                                  |

Source: Oregon ANG 2013a.

## 1.4.2 Combat Mission Ready

Air Force Instruction (AFI) 11-2F-15 V1 (2010) implements the RAP as it applies to F-15 pilots. The RAP program recognizes two levels of pilot readiness: Combat

Mission Ready (CMR) and Basic Mission Capable (BMC). The fundamental difference between CMR and BMC status is the level of proficiency in mission-critical skills. In other words, a CMR pilot is fully proficient in all mission-critical skills, whereas a BMC pilot is familiar with, but not necessarily proficient in all mission-critical skills. The RAP directs units to “design training programs to achieve the highest degree of combat readiness consistent with flight safety and resource availability. Training must balance the need for realism against the expected threat, pilot capabilities, and safety.” Mission Readiness, as directed by the RAP, requires pilots to train in environments that they could be exposed to in real world missions. The RAP’s directive is consistent with the USAF’s mantra: “Train as we fight.” AFI 11-2F-15 V1 instructs units to maintain as many pilots in CMR as practicable.

### **1.4.3 Configuring Airspace for Today’s Aircraft and Tactics**

Low Altitude Air-to-Air (Low A/A) is defined as performing realistic, mission oriented air-to-air operations while in a Low Altitude Training (LOWAT) certified low altitude block (i.e., at or below 1,000 feet AGL over land). This event also includes low altitude navigation, tactical formation, defensive maneuvering to avoid or negate threats (AFI 11-2F-15V3). The USAF Airspace Master Plan states that optimum airspace for air-to-air training must be large enough to permit realistic offensive and defensive tactics (USAF 1992). If the airspace is too small, pilots can be distracted from mission training objectives by the need to constantly monitor their proximity to airspace boundaries (via displays showing boundaries, pilot-to-pilot communication, and pilot-to-ground communication), special use land management areas, and other restrictions to flight operations. In addition, smaller airspace concentrates noise, air emissions, and other environmental effects of military operations because it requires pilots to fly in the same area repeatedly.

Recent improvements to the F-15’s radar, along with other avionics upgrades and the growing reliance on stand-off Tactics, Techniques and Procedures (TTP) requires a larger airspace than currently exists in the airspace managed by both the 142 FW and 173 FW.

The 142 FW primarily trains in W-570/Bass/Eel Complex with adjoining ATCAA. The 173 FW primarily trains in Goose, Juniper and Hart MOAs with adjoining

ATCAAs. These airspaces have historically served training requirements over the years but need modification to meet current and emerging long range F-15 intercept capabilities. Recent F-15 radar improvements and avionics upgrades coupled with emerging threat capabilities have resulted in more reliance on stand-off TTP which requires farther distances between opposing fighters to optimize training.

#### **1.4.4 Weather Impacts on Mission Readiness**

Weather conditions over the Pacific Ocean, referred to as sea-states, prohibit training when wind velocity is greater than 25 knots and sea conditions that have wind-wave heights over five feet. Due to operational safety guidelines contained in AFIs, these conditions prohibit over-water training operations in the current primary airspace used by the 142 FW located in W-570 and the Bass/Bass South ATCAAs. On average, sea-states exceeded limits approximately 23 percent of the scheduled time (2008-2011); reaching as high as 75 percent in a month.<sup>2</sup> There are days when storms over the Pacific Ocean extend into the coastal airspace ranges, making them unusable for anything other than instrument training. Airspace further inland and east of the Cascade Mountain range is generally unaffected by these weather systems.

When weather impacts limit use of W-570, which is located 85 NM from Portland, the 142 FW must request back-up airspace which is scheduled and used as primary airspace by other units. Since this airspace is located more than 140 NM from Portland (approximately 55 NM further than W-570), the unit suffers a 22 to 36 percent reduction of training for the same amount of sorties.

#### **1.4.5 Weather Impacts on Efficiency**

The majority of mission ready pilots in the 142 FW are what is known as, “traditional guardsmen.” Traditional guardsmen have full time employment outside the ANG. This limits the number of days they are available to participate in training. Consequently, when weather prohibits use of W-570 and Juniper/Hart MOAs are not available, the time constraints for these pilots increase the difficulty

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<sup>2</sup> The data presented are representative of operational and utilization numbers that drove the original Test/Training Needs Statement and remains relevant today.

of maintaining their CMR status. Even when Juniper/Hart MOA Complex is available, the required distance and time flown enroute to the areas is not conducive to maximizing limited training time, resulting in up to a 36-percent loss of critical training per sortie, resulting from the increased transit time to the back-up airspace and corresponding decrease in training time.

#### **1.4.6 Budgetary Considerations**

In the current economic climate, ANG units must find ways to maintain mission readiness and avoid losing critical capabilities by increasing training efficiency in difficult budgetary times. By creating alternative airspace closer to the home station, units could balance their needs against fiscal challenges and increase training efficiency by as much as 36 percent per flying hour.

### **1.5 PURPOSE AND NEED FOR THE PROPOSED ACTION**

The overarching *purpose* of the Proposed Action is to provide properly configured and located military airspace to provide efficient, *realistic mission-oriented training* with adequate size and within close proximity to support the advanced 21st century air-to-air tactical fighter technologies and the current and evolving training mission requirements of the Oregon ANG in an era of increased operational complexity.

The overarching *need* for the Proposed Action is driven by several factors including travel distance and time required to access existing training airspace areas; and the frequency of weather conditions that limit the availability of coastal airspace areas for operational training. This results in loss of training time as fuel and flying hours are used to access back-up airspace. Details related to the units' training missions and objectives and requirements driving specific components of the Proposed Action are discussed below.

The specific *purpose* and *need* for each of the proposed airspace components included in the Proposed Action are described below in Section 1.5.2 (W-570), Section 1.5.3 (Eel MOA Complex), Section 1.5.4 (Juniper/Hart MOA Complex), and Section 1.5.5 (Redhawk MOA Complex).

### 1.5.1 Considerations for Military Training Airspace

The minimum vertical and lateral airspace requirements are driven by aircraft capabilities and tactical employment. The F-15 can transit altitudes rapidly and fly in excess of 20 NM per minute. As discussed previously, LOWAT operations are critically important to F-15 training missions. High-altitude airspace is equally important due to differences in closure rates and expanded range capabilities associated with technological advances of F-15 radar and weapons systems. All fourth generation fighter aircraft can operate up to 50,000 feet MSL and higher when provided with appropriate airspace to maneuver.

Low A/A is defined as performing realistic, mission oriented air-to-air operations while in a LOWAT certified low altitude block (i.e., at or below 1,000 feet AGL over land). This event also includes low altitude navigation, tactical formation, defensive maneuvering to avoid or negate threats (AFI 11-2F-15V3). The USAF Airspace Master Plan states that optimum airspace for LOWAT air-to-air training must be large enough to permit realistic offensive and defensive tactics (USAF 1992). If the area is too small, pilots can be distracted from mission training objectives by the need to constantly monitor their proximity to airspace boundaries (via displays showing boundaries, pilot-to-pilot communication, and pilot-to-ground communication), sensitive land use areas, and other restrictions to flight operations. In addition, a smaller airspace area concentrates noise, air emissions, and other environmental effects of military overflights because it requires pilots to fly over the same area repeatedly.

The USAF sponsored a study in 2001 entitled *Relating Ranges and Airspace to Air Combat Command Missions and Training* to assess current range and airspace needs of units assigned to ACA (RAND Corporation 2001). The geographic location and size of airspace areas were the two primary factors in the assessment of existing airspace. The

study evaluated the maximum free cruising distances for fighter training sorties, which is the distance a fighter can fly and still have enough fuel remaining to complete the required training. Information presented in Table 1-2, including the

**RAND Corporation Airspace Study  
Definitions**

**Maximum Free Cruising Distance.** The maximum distance a fighter can fly and still have enough fuel remaining to complete the required training.

**Maximum Desired Distance.** Exactly half of the Maximum Free Cruising Distance.

maximum free cruising distance and the maximum desired distance to the training airspace were developed based on the 2001 study. The maximum desired distance to the training airspace is found by dividing the maximum free cruising distance by two. This allows for the fighters to fly to the airspace, complete the programmed training, and then return to the field from which they departed.

**Table 1-2. Maximum Desired Distance to Training Airspace**

| Mission Type                       | Maximum Free Cruising Distance | Maximum Desired Distance to Airspace |
|------------------------------------|--------------------------------|--------------------------------------|
| Basic Fighter Maneuvers            | 79 NM                          | 40 NM                                |
| Air Combat Maneuvers               | 146 NM                         | 73 NM                                |
| Offensive or Defensive Counter Air | 209 NM                         | 105 NM                               |

Note: The 142 FW and 173 FW perform Basic Fighter Maneuvers, Air Combat Maneuvers, and Offensive or Defensive Counter Air.

Sources: RAND Corporation 2001; Oregon ANG 2011.

In addition to this 2001 study, the RAND Corporation conducted research and published *Preserving Range and Airspace Access for the Air Force Mission* in 2011. This study is intended to inform strategic planners, instructors, and airspace users, of the relationship between warfighting requirements for pilots and the airspace needed to supply them.

The *Future Training Space Requirements Study*, was performed by the ANG in 2005 at the request of the USAF, to discuss the current requirements and explore the process by which future training concepts and emerging systems (e.g., fifth generation) can be evaluated. As platforms, weapons, and systems are growing ever more capable, which when combined with the attendant advancements in doctrine and tactics, create requirements for more training airspace.

Developing military training airspace should consider the primary tenets of AFI 13-201, *Airspace Management*, which is to achieve better efficiency through Volume, Proximity, Time, and Attributes (VPTA). Having training airspace that achieves these criteria is critical to accomplish realistic mission oriented training and better stewardship of resources.

While all these criteria may not be achievable for a specific training airspace, they can be used as a guide in developing training airspace. Airspace that satisfies the



above training requirements must also address the aeronautical, environmental, public interest, and operational criteria as summarized below.

#### Exclusionary Criteria

- The proposed airspace must comply with the criteria contained in *FAA Handbook 7610.4, Special Military Operations* (FAA 2011) for management, control, design, and safe separation procedures;
- The proposed airspace must be as free as possible of airways, jet routes, terminal control areas, airport radar service areas, and airport traffic areas; and
- The proposed airspace must be capable of supporting both day and night operations.

#### Evaluative Criteria

- The proposed airspace should be located and oriented such that overflights of populated, noise-sensitive, and/or environmentally sensitive areas are minimized;
- The proposed airspace should be close enough to the unit's home airfield to allow pilots and aircrews to complete the maximum amount of training practicable;
- The proposed airspace should combine air-to-air training opportunities to minimize costs of overall training operations;
- MOAs/ATCAAs should provide low-, medium-, and high-altitude capability; and
- The proposed airspace should be located and management controls established such that a sufficient amount of time can be spent in the area to accomplish the objectives of the assigned mission (RAND Corporation 2001).

### **1.5.2 Modifications to W-570 and the Bass/Bass South ATCAAs**

Currently, there is a need to modify the configuration and vertical limits of W-570 and convert the Bass/Bass South ATCAAs into warning areas to more effectively meet the training requirements of the 142 FW (Oregon ANG 2011). The 142 FW conducts training operations in W-570 and Bass/Bass South ATCAAs, which are located over water (refer to Figure 1-1). Over-water airspace is uniquely suited for air-to-air combat training because of the relative lack of restrictions. For example, the ability to fly supersonic at altitudes as low as 10,000 feet MSL in this

type of airspace provides realistic mission oriented training for combat readiness.<sup>3</sup> W-570 is roughly 90 by 50 NM in size, which was adequate for training with F-4 Phantoms and older versions of the F-15. The advanced avionics and weapons systems in the current generation of the F-15 have made the vertical and lateral boundaries of W-570 constrained and are insufficient to maximize pilot proficiency and experience to meet current training requirements of the 142 FW and the advanced technological capabilities of the F-15 aircraft. The latest generation of technologically advanced F-15s now employs weapons (e.g., Advanced Medium-Range Air-to-Air Missile [AMRAAM]) and executes tactics that would be more effectively accommodated by airspace with greater vertical and lateral airspace than W-570 currently offers.

### **1.5.3 Establishment of Eel MOA and Modification of the Eel ATCAA**

As previously identified, there is a need to modify the configuration and vertical limits of W-570 and the Bass/Bass South ATCAAs to maximize pilot proficiency and experience to meet current training requirements of the 142 FW and accommodate the advanced technological capabilities of the F-15 aircraft. However, due to frequently present weather conditions on the coast and sea-states that prohibit over-water training (see below), there is a need to establish a MOA underneath the existing Eel ATCAA to expand the vertical confines of the existing airspace and facilitate required Basic Fighter Maneuvers (BFM) and Air Combat Maneuvers (ACM) training.

Due to operational safety guidelines contained in AFI 11-2F-15V3 KF CH 8, sea state conditions can prohibit over-water training operations in W-570 and the Bass/Bass South ATCAAs (refer to Section 1.4.4, *Weather Impacts on Mission Readiness*). On average, sea-states were out of limits approximately 23 percent of the scheduled time (2008-2011); reaching as high as 75 percent in a given month. In addition to inclement weather, factors such as adversary support and naval operations also present minor scheduling restrictions and limit airspace

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<sup>3</sup> The Oregon ANG understands concerns regarding supersonic flight. Under the Proposed Action, the frequency and locations of overland supersonic flights would not change. In the Juniper/Hart ATCAAs, these flights would only occur above 30,000 MSL, an altitude at which potential noise impacts would be negligible. Supersonic activity would only occur offshore within W-570 above 10,000 feet MSL and 15 NM offshore with the aircraft nose pointed away from the coastline and within the Juniper/Hart MOA Complex above 30,000 feet MSL. No supersonic activity would occur within the Eel MOAs or ATCAAs or within the Redhawk MOAs or ATCAAs at any altitudes.

availability, requiring the 142 FW to identify compatible airspace elsewhere, primarily the Juniper/Hart MOA Complex (Oregon ANG 2011). This annual average of unavailability represents a substantial constraint to training.

Options for other suitable airspace areas are limited by their distance from Portland, size constraints, or by scheduling needs of other military units in the region. In most cases, the only suitable over-land airspace is the Eel ATCAA, located adjacent to W-570 along Oregon's coast. Even though the over-land portions of Eel ATCAA are available when sea states preclude over-water training, it is rarely utilized (except for air-to-air refueling)<sup>4</sup> due to the limited (i.e., vertically constrained) altitude structure of 18,000 feet MSL to 27,000 feet MSL. This limited altitude block provides almost no benefit for F-15 Advanced Handling Considerations (AHC), BFM, and ACM, and cannot accommodate larger Offensive Counter-Air (OCA) or Defensive Counter-Air (DCA) training missions (Oregon ANG 2011).

Because a large portion of realistic combat training requires a block of altitudes much lower and higher than what is currently available within Eel ATCAA (located approximately 36 NM from Portland International Airport), the 142 FW currently utilizes the Juniper/Hart MOA Complex for BFM, ACM, Tactical Intercepts (TI), ACA, OCA, and DCA training missions when weather conditions require over-land training (Oregon ANG 2011). The border of Juniper South and Hart North MOAs is located approximately 210 NM from Portland. The closest airspace suitable for BFM – the Boardman MOA – is located 120 NM away and the airspace most appropriate to support both BFM and ACM airspace when not using the Juniper/Hart or Boardman MOAs is the Olympic MOA, located 140 NM from Portland. The distance and time required to reach these airspace areas for over-land training cause mission degradation. Between 22 and 36 percent of fuel that could be used during training operations is expended during transit to and from the Juniper/Hart MOA Complex instead of the Eel ATCAA, resulting in reduced training time once operating within a given airspace due to fuel considerations. Further, approximately 320 additional transit hours are used flying to and from the Juniper/Hart MOA Complex per year, which is nearly 10 percent of the

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<sup>4</sup> Air-to-air refueling occurs in the over-land portions of the existing Eel ATCAA and in the vicinity of the proposed Redhawk MOA Complex; however, changes to air-to-air refueling operations are not proposed as a part of the Proposed Action.

142 FW's annual flying hour allocation or the equivalent requirement for three pilots to maintain CMR. These hours – if reallocated – would be used to better provide 142 FW pilots with sufficient flying hours to achieve higher mission readiness. Finally, increased transit time results in additional fuel and maintenance costs for the F-15.<sup>5</sup> This issue is further exacerbated by the implementation of the Domestic Reduced Vertical Separation Minimum (DRVSM) airspace. The long distances flown to other over-land airspaces that would normally be flown at higher altitudes to conserve fuel are now more difficult to schedule due to the FAA-mandated procedures for non-DRVSM approved aircraft such as the F-15. Potential suitable airspace for the 142 FW includes the Juniper/Hart MOA Complex and the Boardman and Olympic MOAs, which all exceed the maximum desired distances to training airspace (RAND Corporation 2001). Airspace areas that meet the prescribed maximum desired distance criteria from the 142 FW in Portland that could potentially be modified include W-570 and the Bass/Bass South ATCAAs as well as the Eel ATCAA. Establishment of a new MOA underneath the existing Eel ATCAA would provide over-land training airspace that would comply with the maximum desired distance to airspace for BFM and ACM training missions (Oregon ANG 2011).

#### **1.5.4 Expansion of the Juniper/Hart MOA Complex**

The need for expansion of the Juniper/Hart MOA Complex to support 173 FW requirements is driven by the fact that the airspace is currently too small to efficiently accommodate training requirements and the advanced technology within the F-15 aircraft.

Base Realignment and Closure (BRAC) Commission findings in 2005 directed the 173 FW at Kingsley Field to increase its inventory of aircraft. When training is limited to two vs. two ("2 v 2") tactical intercepts (TI) scenarios, the current Juniper/Hart MOA airspace can support only two separate fights simultaneously. Since the 173 FW typically flies 12 jets at a time to meet syllabus and student pilot throughput requirements, it is routine to need three 2 v 2 scenarios or four to five 1 v 1 scenarios during a single flying period. This is not possible within the current

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<sup>5</sup> The F-15s at the 142 FW are maintained by civilian technicians that work standard 8-hour days. The additional transit time to the Juniper/Hart MOA Complex (approximately 20 to 30 minutes) results in reduced availability of the aircraft for maintenance, resulting in down time for maintenance technicians and increased maintenance requirements over time.

airspace configuration without staggering takeoff times and increasing the total amount of time the airspace is activated. As the F-15 and enemy aircraft threats continue to advance, more challenging scenarios are required. When the training is expanded to a 4 v 4 TI scenario (which is required by the 173 FW's FTU syllabus) the current airspace can only support one training mission at a time, which results in the airspace being activated and used for a longer time period on these days. The proposed extension of the Juniper/Hart MOA Complex would allow two simultaneous 4 v 4 DCA/OCA, three 2 v 2 scenarios and associated airspace, or four to five 1 v 1 scenarios and associated airspace, decreasing the overall time the airspace is activated and used by and the 173 FW and allowing for more responsible stewardship of the airspace by the Oregon ANG. The proposed airspace would be able to host both the 173 FW operating in the south and the 142 FW operating in the north when sea-states are out of limits and the Wings are in the OCA/DCA phase of training with minimal impact on each other.

In addition, the current Juniper/Hart MOA Complex is approximately 140 NM long by approximately 50 NM wide. The width of this airspace is inadequate to support biennial Large Force Exercises (LFE) with upgraded avionics and weapons systems. Advanced F-15 radar systems can detect and track aircraft and small high-speed targets at distances well beyond visual range. Including distances needed for marshaling opposing forces (4 v 4), supersonic intercepts require 162 NM by 64 NM airspace, which exceeds the dimensions of the available Juniper/Hart MOA Complex (ANG 2005). Further, it does not provide enough lateral room east to west for aircraft to adequately accomplish current tactics in accordance with training requirements (Oregon ANG 2011).

The ability to attack, react to, and avoid Surface-to-Air Missiles (SAMs) is dependent on tactical maneuvers that require larger training airspace areas than the Juniper/Hart MOA Complex currently provides. The demonstration of correct defensive reactions to SAMs is a requirement of the F-15 student syllabus and critical to the survivability of our pilots during wartime. Currently, this training is accomplished only in the simulator, which does not provide realistic simulation of advanced and potentially disorienting maneuvers. Expansion of the airspace allows for sufficient maneuvering to use threat emitters that are deployed for training in the Juniper/Hart MOA Complex (Oregon ANG 2011).

### **1.5.5 Establishment of the Redhawk MOA Complex**

The proposed over-land Redhawk MOA Complex is needed by the 142 FW to accomplish its mission. The proposed Redhawk MOA Complex would primarily be scheduled and utilized by the 142 FW as “weather contingency” airspace when existing over-water airspace is unsuitable based upon weather conditions. Over-water airspace is generally unusable 23 percent of the time annually, and up to 75 percent of the time monthly, when storms over the Pacific Ocean extend into the coastal airspace ranges, making them unusable for anything other than instrument training. Airspace further inland and east of the Cascade Mountain range is generally unaffected by these weather systems. However, the 173 FW is the primary user of the Juniper/Hart MOA Complex. As described in Section 1.4.5, *Weather Impacts on Efficiency*, the Juniper/Hart MOA Complex is often not available to the 142 FW as a weather backup airspace due to the 173 FW training operations, which creates schedule conflicts and safety-of-flight hazards. Even when the Juniper/Hart MOA Complex is available, the required distance and time flown en route to the areas is not conducive to maximizing the efficiency and effectiveness of limited training time, resulting in up to a 36 percent loss of critical training activities per sortie, resulting from the increased transit time to the backup airspace and corresponding decrease in training time. The proposed Redhawk MOA Complex would enable the 142 FW to reduce transit time to the weather contingency airspace, allowing up to 25 percent more training. With the Redhawk MOA Complex, the 142 FW would be able to fly shorter duration missions and accomplish more training, significantly increasing efficiency and readiness.

Additionally, although the proposed modification to the Eel ATCAA would provide valuable over-land training airspace that the 142 FW needs, it would not support all mission types in which the pilots need to train. The modified Eel airspace would provide space only for AHC, BFM, ACM, and Air Sovereignty Training (AST) missions. Therefore, the 142 FW also has a need for suitable over-land airspace that will allow its pilots to more efficiently conduct the full suite of realistic training operations to be prepared to fulfill their mission. For the 142 FW, the proposed Redhawk MOA Complex would be located much closer than Juniper/Hart MOA Complex for over-land intercept training. Currently, the longer flight to Juniper/Hart MOA Complex results in a loss of training hours, degrading unit readiness. The Redhawk MOA Complex would provide suitable

over-land airspace that would allow 142 FW pilots to more efficiently conduct the full suite of realistic training operations and to be prepared to fulfill their primary mission of homeland security. The proposed Redhawk MOA Complex would be located approximately 90 NM east of Portland (refer to Figure 1-1). This location would be compatible with maximum desired distances to training airspace for all mission types evaluated in Table 1-2 and as previously discussed in Section 1.5.3, *Establishment of Eel MOA and Modification of the Eel ATCAA* (Oregon ANG 2011).

## **1.6 SUMMARY OF ENVIRONMENTAL STUDY REQUIREMENTS**

### **1.6.1 National Environmental Policy Act**

NEPA requires that federal agencies consider potential environmental consequences of proposed actions. The law's intent is to protect, restore, or enhance the environment through well-informed federal decisions. The CEQ was established under NEPA for the purpose of implementing and overseeing federal policies as they relate to this process. In 1978, the CEQ issued *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR §1500-1508 [CEQ 1978]). These regulations specify that an Environmental Assessment be prepared to:

- Briefly provide sufficient analysis and evidence for determining whether to prepare an EIS or a Finding of No Significant Impact (FONSI);
- Aid in an agency's compliance with NEPA when no EIS is necessary; and
- Facilitate preparation of an EIS when one is necessary.

In the case of the Proposed Action, it was determined early in the environmental planning process that preparation of an EIS would be required. To comply with other relevant environmental requirements in addition to NEPA, and to assess potential environmental impacts, the EIAP and decision-making process for the Proposed Action involves a thorough examination of all environmental issues pertinent to the proposed airspace modifications.

### **1.6.2 The Environmental Impact Analysis Process**

The "Environmental Impact Analysis Process" (EIAP) is the Air Force process for conducting environmental impact analyses, as promulgated at 32 CFR §989. To

comply with NEPA and complete the EIAP, CEQ Regulations and the EIAP are used together.

### **1.6.3 EIS Process Steps**

Compliance with NEPA guidance and the CEQ Regulations requirements, and the EIAP for preparation of an EIS involves several critical steps, summarized as follows:

- 1) *Announce that an EIS will be prepared.* The Notice of Intent (NOI) to prepare this EIS was published in the *Federal Register* on 17 May 2013 (see Appendix A, *Federal Register*).
- 2) *Conduct Public Scoping.* The ANG, in coordination with the Oregon Military Department, conducted five scoping meetings in the towns of Tillamook, Astoria, Condon, Burns, and Prineville, Oregon from 17 through 21 June 2013. Details including scoping meeting dates and locations were announced through several media outlets including newspaper and radio advertisements, and project-specific informational pages on both the 142 FW and 173 FW public websites. Information related to the Proposed Action was disseminated to the public in an open-house format and included supporting multi-media materials. The ANG requested formal written scoping comments from the public, state and local government agencies, as well as affected federal agencies for 30 days after the close of scoping meetings, to ascertain if there were additional issues relevant to the range of actions, alternatives, and impacts to be examined in detail in the EIS. In addition, the ANG initiated consultation with the Oregon, Washington, and Nevada State Historic Preservation Offices (SHPOs) and federally recognized Native American Tribes in advance of the public comment period in order to incorporate any identified concerns or issues in the EIS (see Appendix H, *Tribal Outreach*).
- 3) *Prepare a Draft EIS.* The Draft EIS describes the purpose and need of the Proposed Action and alternatives; presents existing conditions in the region potentially affected; and provides analyses of the environmental consequences of the Proposed Action and Alternatives. The Draft EIS was made available and distributed on 24 July 2015 to agencies, regional libraries, and members of the public who request copies to ensure the widest distribution possible.
- 4) *Review by the Public and Agencies.* The 45-day public comment period provided the public and agencies the opportunity to review the Draft EIS and to provide comments on the analyses. The placement of a Notice of Availability (NOA) in the *Federal Register* on 24 July 2015 announced the



availability of the Draft EIS and announce public hearings in the towns of Tillamook, Astoria, Condon, Burns, and Prineville, Oregon from 11 through 17 August 2015. Relevant comments received during the public comment period were incorporated into the Final EIS.

- 5) *Prepare a Final EIS.* The Draft EIS was revised and the Final EIS was prepared to reflect public and agency comments, ANG responses, and additional information received from reviewers. A NOA will be published in the *Federal Register* to announce availability of the Final EIS.
- 6) *Issue a Record of Decision (ROD).* The NOA for the Final EIS will begin a 30-day waiting period before the ROD can be signed. The ROD identifies which action has been selected by the USAF and what management actions or other measures would be carried out to avoid, minimize, or mitigate, where practicable, adverse impacts to the environment.
- 7) *FAA EIS and ROD.* As a cooperating agency that retains administrative authority of the National Airspace System (NAS), the FAA can either prepare a separate EIS or adopt this EIS and prepare a separate ROD to approve, approve in part, or disapprove the proposed establishment and modification of airspace included in the Proposed Action.

#### **1.6.4 Intergovernmental Review of Federal Programs**

EO 12372, *Intergovernmental Review of Federal Programs*, structures the federal government's system of consultation with state and local governments on its decisions involving grants, other forms of financial assistance, and direct development. Under EO 12372, states, in consultation with local governments, design their own review processes and select those federally supported development activities that they wish to review. As detailed in 40 CFR §1501.4(b), CEQ regulations require intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the consultation required by EO 12372, the USAF notifies relevant federal, state, and local agencies and allows them sufficient time to make known their environmental concerns specific to a proposed action. Comments and concerns submitted by these agencies are subsequently incorporated into the analysis of potential environmental impacts conducted as part of the EIS.

#### **1.6.5 Lead and Cooperating Agencies**

The National Guard Bureau (NGB) is the lead agency for this EIS pursuant to 40 CFR §1501.5 and §1508.5. Since the Proposed Action includes activities associated

with special use airspace (SUA), the NGB requested the FAA's cooperation (15 August 2012) in accordance with the guidelines described in the Memorandum of Understanding (MOU) between the FAA and the DoD Concerning SUA Environmental Actions, dated 4 October 2005. As a cooperating agency, NGB requested that the FAA participate in various portions of EIS development, including:

- Participating in the scoping process;
- Assuming responsibility, upon request by the Air Force, for developing information and preparing analyses on issues for which FAA personnel have special expertise; and
- Making FAA staff support available to enhance interdisciplinary review capabilities.

This EIS was prepared in compliance with NEPA (42 U.S. Code [USC] §4321 et seq.), CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR §1500-1508), EIAP as promulgated at 32 CFR §989, and FAA Order 1050.1E, Change 1 (2006).

#### **1.6.6 Federal Aviation Administration Guidelines**

The FAA is responsible for managing navigable airspace for public safety and ensuring efficient use for commercial air traffic, general aviation, and national defense, including SUA utilized by the DoD. The FAA has established several policies including:

- Order 1050.1E, Change 1, Environmental Impacts: Policies and Procedures (2006); and
- Order 7400.2J, Procedures for Handling Airspace Matters (2012).

FAA Order 1050.1E, Change 1 provides the FAA with policies and procedures to ensure agency compliance with NEPA and implementing regulations issued by the CEQ (40 CFR §1500-1508). Appendix A in FAA Order 1050.1E, Change 1 identifies 18 impact categories that should be considered during the NEPA process. As a result of the FAA's status as a cooperating agency, this EIS was also prepared in compliance with EIAP as promulgated at 32 CFR §989 as well as FAA Order 1050.1E, Change 1 (2006). The sections where each of these resource areas

are discussed in the EIS, or the rationale for excluding a detailed discussion of a specific resource, are provided in Table 1-3. FAA Order 7400.2J, specifically Chapter 32, which provides guidance to air traffic personnel to assist in applying the requirements in FAA Order 1050.1E, Change 1, to air traffic actions.

### **1.6.7 Endangered Species Act**

The Endangered Species Act (ESA) of 1973 (16 USC §1531–1544, as amended) established measures for the protection of plant and animal species that are federally listed as threatened and endangered, and for the conservation of habitats that are critical to the continued existence of those species. Federal agencies must evaluate the effects of their proposed actions through a set of defined procedures, which can include the preparation of a Biological Assessment and can require formal consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the ESA.

### **1.6.8 Clean Air Act**

The Clean Air Act (CAA) (42 USC §7401–7671, as amended) provided the authority for the U.S. Environmental Protection Agency (USEPA) to establish nationwide air quality standards to protect public health and welfare. Federal standards, known as the National Ambient Air Quality Standards (NAAQS), were developed for six criteria pollutants: ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), particulate matter less than 2.5 and 10.0 microns in diameter (PM<sub>2.5</sub> and PM<sub>10</sub>) and lead (Pb). The Act also requires that each state prepare a State Implementation Plan (SIP) for maintaining and improving air quality and eliminating violations of the NAAQS. Under the CAA Amendments of 1990, federal agencies are required to determine whether their undertakings are in conformance with the applicable SIP and demonstrate that their actions will not cause or contribute to a new violation of the NAAQS; increase the frequency or severity of any existing violation; or delay timely attainment of any standard, emission reduction, or milestone contained in the SIP.

**Table 1-3. EIAP Consistency with FAA Order 1050.1E, Change 1, Environmental Resources to be Considered in an EA or EIS**

| Resource                                                                                          | Location in the EIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Air Quality                                                                                       | Sections 3.6 and 4.6, <i>Air Quality</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Coastal Resources                                                                                 | Sections 3.4 and 4.4, <i>Biological Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Compatible Land Use                                                                               | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Construction Impacts                                                                              | No construction activities would occur under the Proposed Action; therefore, this resource was eliminated from further consideration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Department of Transportation Act: Section 4(f)                                                    | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i> . Per FAA Order 1050.1E, Change 1, Section 6 the EIS does not provide a Section 4(f) analysis. Paragraph 6.1c describes that designation of airspace for military flight operations is exempt from section 4(f) of the Department of Transportation Act. The Department of Defense reauthorization in 1997 provided that “[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303(c) of Title 49, USC (Public Law [PL] 105-85). |
| Farmlands                                                                                         | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Fish, Wildlife, and Plants                                                                        | Sections 3.4 and 4.4, <i>Biological Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Floodplains                                                                                       | No construction activities or other ground-based activities would occur under the Proposed Action and its implementation would not cause any disturbance of floodplains; therefore, this resource was eliminated from further consideration. Refer to Section 3.10, <i>Dismissed Resource Areas</i> .                                                                                                                                                                                                                                                                                                                                          |
| Hazardous Materials, Pollution Prevention, and Solid Waste                                        | Sections 3.8 and 4.8, <i>Hazardous Materials and Wastes</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Historical, Architectural, Archeological, and Cultural Resources                                  | Sections 3.5 and 4.5, <i>Cultural Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Light Emissions and Visual Impacts                                                                | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Natural Resources and Energy Supply                                                               | The Proposed Action would not involve extractive activities or changes in the energy supply; therefore, this resource was eliminated from further consideration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Noise                                                                                             | Sections 3.2 and 4.2, <i>Noise</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Socioeconomic Impacts, Environmental Justice and Children’s Environmental Health and Safety Risks | Sections 3.9 and 4.9, <i>Socioeconomics, Environmental Justice, and Children’s Health and Safety</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Table 1-3. EIAP Consistency with FAA Order 1050.1E, Change 1, Environmental Resources to be Considered in an EA or EIS (Continued)**

| Resource                    | Location in the EIS                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Secondary (Induced) Impacts | Secondary impacts are addressed by resource area within Section 4.0, <i>Environmental Consequences</i> .                                                                                                                                                                                                                                                                                                                                     |
| Water Quality               | No construction activities or other ground-based activities would occur under the Proposed Action and its implementation would not cause any disturbance of surface water or groundwater resources; therefore, this resource was eliminated from further consideration. Refer to Section 3.10. Potential impacts to water quality as a result of chaff and flare have been addressed in 3.8 and 4.8, <i>Hazardous Materials and Wastes</i> . |
| Wetlands                    | Sections 3.4 and 4.4, <i>Biological Resources</i>                                                                                                                                                                                                                                                                                                                                                                                            |
| Wild and Scenic Rivers      | Sections 3.3 and 4.3, <i>Land Use and Visual Resources</i>                                                                                                                                                                                                                                                                                                                                                                                   |

Source: FAA 2006.

### 1.6.9 Cultural Resources Regulatory Requirements

The National Historic Preservation Act (NHPA) of 1966 (16 USC §470) established the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation (ACHP) outlining procedures for the management of cultural resources on federal property. Cultural resources can include archaeological remains, architectural structures, and traditional cultural properties such as ancestral settlements, historic trails, and places where significant historic events occurred. NHPA requires federal agencies to consider potential impacts to cultural resources that are listed, nominated to, or eligible for listing on the NRHP; designated a National Historic Landmark; or valued by Native Americans for maintaining their traditional culture. Section 106 of NHPA requires federal agencies to consult with the appropriate SHPO if their undertaking might affect such resources. *Protection of Historic and Cultural Properties* (36 CFR §800 [1986]) provided an explicit set of procedures for federal agencies to meet their obligations under the NHPA, which includes inventorying of resources and consultation with SHPO.

*Memorandum on Government-to-Government Relations with Native American Tribal Governments* (29 April 1994). Directs agencies to consult with Native American tribal officials regarding agency actions with tribal implications. Requires federal agencies to assess the impact of plans, projects, programs, and activities on tribal

trust resources and assure that tribal government rights and concerns are considered during the development of such plans, projects, programs, and activities.

EO 13007, *Indian Sacred Sites*, directs federal land (any land or interests in land owned by the U.S., including leasehold interests held by the U.S., except Native American trust lands) management agencies to accommodate access to, and ceremonial use of, Native American sacred sites provided that the tribe or appropriately authoritative representative of a Native American religion has informed the agency of the existence of such a site. Sacred sites are defined in EO 13007 as any specific, discrete, narrowly delineated location on federal land that is identified by a Native American tribe as sacred by virtue of its established religious significance to, or ceremonial use by, a Native American religion. The term Native American tribe refers to a Native American or Alaska Native tribe, band, nation, Pueblo, village, or community that the Secretary of the Interior acknowledges to exist as a Native American tribe pursuant to Public Law No. 103-454, 108 Stat. 4791, and “Indian” refers to a member of such a Native American tribe or Native American individual determined to be an appropriately authoritative representative of a Native American religion.

The American Indian Religious Freedom Act (AIRFA) (42 USC §1996) established federal policy to protect and preserve the rights of Native Americans to believe, express, and exercise their traditional religions, including providing access to sacred sites. EO 13175, *Consultation and Coordination with Indian Tribal Governments*, charges federal departments and agencies with regular and meaningful consultation with Native American tribal officials in the development of policies that have tribal implications.

#### **1.6.10 Other Regulatory Requirements**

Additional regulatory legislation that potentially applies to the implementation of this proposal includes guidelines promulgated by EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, to ensure that any potential disproportionately high and adverse impacts to citizens in either of these categories are identified and addressed. Where appropriate, additional outreach to affected populations must be conducted. Additionally,

potential health and safety impacts that could disproportionately affect children are considered under the guidelines established by EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, acts as additional protection for migratory birds. EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, specifies that every federal organization and agency must make the reduction of greenhouse gas emissions a priority and establishes specific goal-setting, inventorying, and reporting requirements for federal agencies.

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## SECTION 2

### DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

#### 2.1 INTRODUCTION

This section describes details related to the Proposed Action and alternatives, including the No-Action Alternative. Guidance for complying with the National Environmental Policy Act (NEPA) requires an assessment of potentially effective and reasonably feasible alternatives to implementation of the Proposed Action. Alternatives that were dismissed early in the planning process as infeasible – including alternative airspace locations and configurations – are not included for analysis and only the Proposed Action, reasonable Alternatives, and the No-Action Alternative have been addressed in this Environmental Impact Statement (EIS). Details related to the Proposed Action, Alternatives, and the No-Action Alternative, as well as a description of alternatives that were considered but eliminated from further analysis are provided below.

Specific modifications and improvements to military training airspace included in the Proposed Action were preliminarily developed early in the concept phase by the Oregon Air National Guard (ANG) in coordination, consultation, and support from the Federal Aviation Administration's (FAA's) Seattle Air Route Traffic Control Center (ARTCC) and Portland Terminal Radar Approach Control (TRACON) as well as the U.S. Air Force's (USAF's) Western Air Defense Sector. When developing airspace, evaluative and exclusionary criteria is applied by the controlling ARTCC (refer to Section 1.4.3, *Configuring Airspace for Today's Aircraft and Tactics*); and as such, the actual placement of airspace boundaries are primarily determined by them. Proposed airspace improvements are specifically developed to account for computer modeling of aircraft flight path histories in the region in order to identify the most ideal locations and configurations for the proposed airspace with the least impact on surrounding military, commercial, and general aviation. These boundary locations also take into account the primary tenets of Air Force Instruction (AFI) 13-201, *Airspace Management*, to achieve better efficiency through Volume, Proximity, Time, and Attributes (VPTA).

Further, dimensions and configurations for the proposed expansion of the Juniper/Hart Military Operations Area (MOA) Complex to the east and south were developed based on previous coordination with FAA (Seattle, Salt Lake, and

Oakland ARTCCs) during the biannual Sentry Eagle Exercises, as well as input and concerns gathered during initial outreach efforts with county and municipal representatives (see Figure 2-4 and the corresponding discussion regarding the evolution of the Proposed Action). Previous coordination and ongoing communication with FAA regarding these biannual training events has resulted in minimal impacts to commercial traffic flow during these temporary expansions of the Juniper/Hart MOA Complex supporting the Sentry Eagle Exercises.

## **2.2 PROPOSED ACTION**

The Proposed Action includes modifications to existing ATCAAs and MOAs operated by the Oregon ANG, as well as establishment of new MOAs. Proposed airspace improvements would be used predominantly by the 142d Fighter Wing (142 FW) and the 173d Fighter Wing (173 FW) of the Oregon ANG based in Portland and Klamath Falls, respectively. The Proposed Action is intended to provide properly configured and located military airspace to provide realistic mission-oriented training with adequate size in order to support the advanced 21st century air-to-air tactical fighter technologies as well as the current and evolving training mission requirements of the Oregon ANG. The Proposed Action does not include any changes to the existing inventories of F-15 aircraft at the 142 FW and 173 FW and implementation would not result in any increases to total annual flight hour or sortie authorizations for either unit.<sup>6</sup> Increases in training hours for each unit would be offset by reductions in overall transit time to weather backup and over-land training airspace. Further, the Proposed Action would not include the development or construction of any facilities, result in any ground-disturbing activities, or include any changes to manpower levels at either unit. The deployment of mobile threat emitters will also facilitate realistic mission oriented training without any terrestrial disturbance or construction activity. Details of the specific components of the Proposed Action are provided below.

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<sup>6</sup> Authorized annual flight hours are the maximum flight hours that can be flown during the year. Actual flight hours (as well as number of sorties) vary annually. This EIS conservatively evaluates environmental impacts resulting from the maximum flight hour and sortie authorizations. There would be no change to these authorizations as a result of the Proposed Action.

## 2.2.1 W-570 and Bass/Bass South ATCAA Modifications

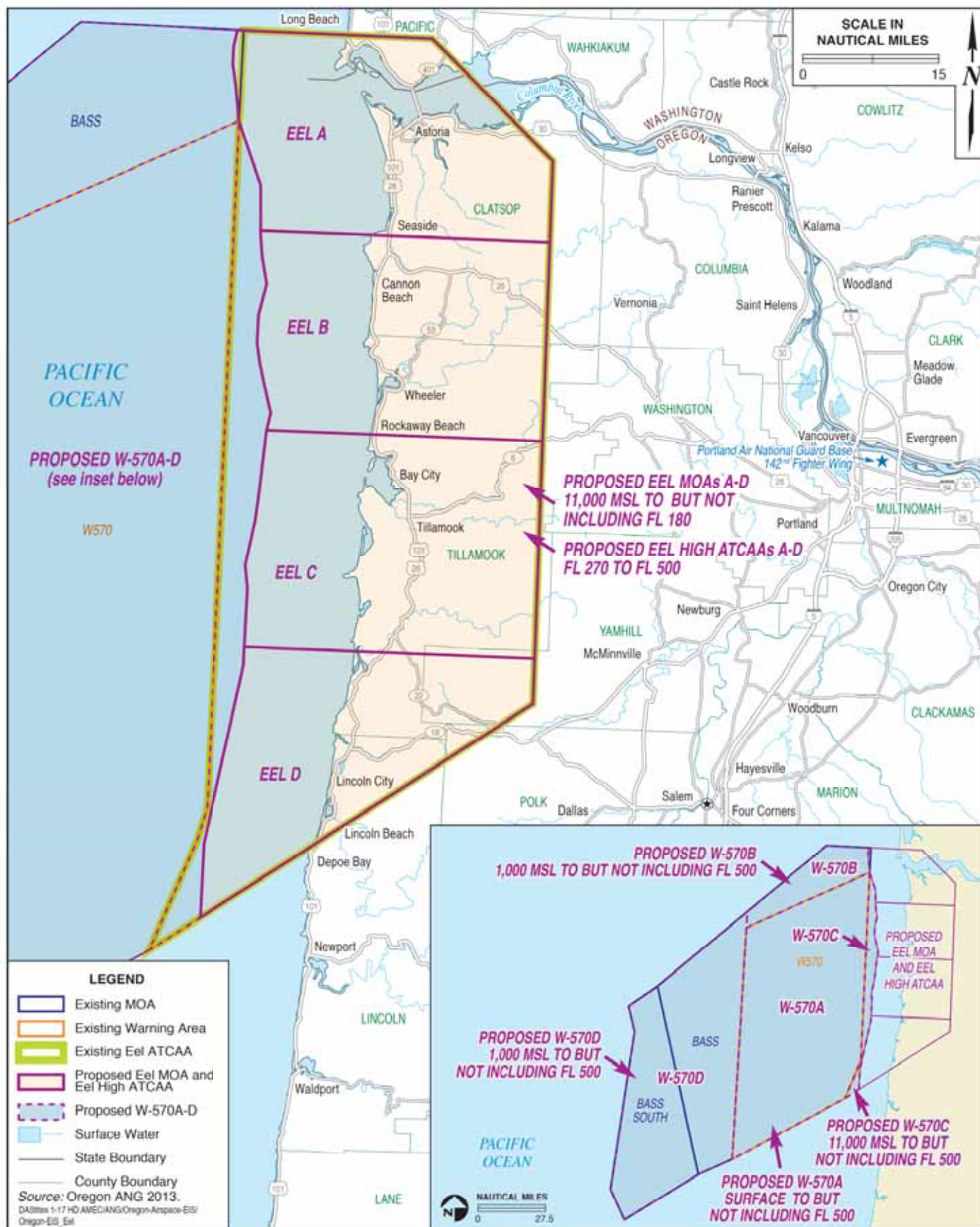
Under the Proposed Action, the vertical limits and lateral configuration of Warning Area (W)-570, Bass ATCAA, and Bass South ATCAA would be modified within their existing boundaries to meet training requirements of the 142 FW. W-570 would be renamed as W-570A. A new segment to be named W-570C would be created adjacent to the eastern boundary of W-570A from 11,000 feet above Mean Sea Level (MSL). In addition, Bass ATCAA and Bass South ATCAA would be converted and reconfigured to W-570B and W-570D and the floor of these segments would be lowered from Flight Level (FL) 180 (18,000 feet MSL) to 1,000 feet MSL. The ceilings of W-570A as well the existing Bass South ATCAA (to be renamed W-570C and portion of W-570D) would remain at FL 500 (50,000 feet MSL) while the ceiling of the existing Bass South ATCAA (remaining portion to be renamed W-570D) would be raised from FL 270 (27,000 feet MSL) to FL 500 (50,000 feet MSL). Figure 2-1 depicts the proposed modification and reconfiguration of the airspaces. Table 2-1 provides a detailed summary of existing and proposed airspace operations.

**Table 2-1. Existing and Proposed Airspace Usage, W-570 and Bass/Bass South ATCAA Modifications**

| Existing                                                      |                      | Proposed Action                                        |                      |
|---------------------------------------------------------------|----------------------|--------------------------------------------------------|----------------------|
| Airspace                                                      | Annual Usage         | Airspace                                               | Annual Usage         |
| <b>W-570</b><br>(surface to FL 500;<br>5,941 sq mi)           | 900 hrs<br>1,800 ops | <b>W-570A</b><br>(surface to FL 500;<br>5,941 sq mi)   | 900 hrs<br>1,800 ops |
| <b>Bass ATCAA</b><br>(FL 180 to FL 500;<br>9,854 sq mi)       | 42 hrs<br>250 ops    | <b>W-570B</b><br>(1,000 MSL to FL 500;<br>871 sq mi)   | 100 hrs<br>600 ops   |
| <b>Bass South ATCAA</b><br>(FL 180 to FL 270;<br>2,540 sq mi) | 17 hrs<br>100 ops    | <b>W-570D</b><br>(1,000 MSL to FL 500;<br>5,592 sq mi) | 142 hrs<br>700 ops   |
| <b>N/A</b><br>(new proposed<br>airspace)                      | N/A                  | <b>W-570 C</b><br>(11,000 MSL to FL 500;<br>673 sq mi) | 70 hrs<br>550 ops    |

Notes: FL - Flight Level; MSL - mean sea level; ops - operation.

Sources: Oregon ANG 2013a, 2013b.



EIS

**Proposed Eel ATCAA  
and W-570 Modifications**

**FIGURE  
2-1**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

A single sortie – representing a single takeoff, performance of a mission or training event, and landing – typically accounts for multiple operations within a given airspace area. An operation represents a flying event in each individual subdivision of airspace. Therefore, one sortie (i.e., take-off and landing) can constitute several operations within multiple airspace segments. The proposed modification of the W-570 and Bass/Bass South ATCAA Complex would not result in an increase in total annual flight hour or sortie authorizations for the 142 FW. However, implementation of the Proposed Action would result in an increase of approximately 253 hours annually within the airspace. This increase would be in part due to the fact that the expanded vertical limits of the airspace would accommodate additional training operations that cannot currently be supported. The increase in training time spent within the airspace complex would be offset by a reduction in overall transit time as the establishment of the proposed Eel MOA Complex and Redhawk MOA Complex would reduce the number of flying hours currently spent transiting to existing 142 FW weather backup and over-land training airspace (i.e., the Juniper/Hart MOA Complex). In addition, the creation of additional segments within the existing boundaries of the W-570 and Bass/Bass South ATCAA Complex would also result in an increase in operations counts. The same number of sorties flown within the overall boundaries of airspace complex would now transit between a larger number of airspace segments, which results in a higher total count for operations within the airspace. Further, due to the increase in training accomplished there would be a corresponding increase in mission readiness (refer to Section 1.4, *Mission Readiness*) under the Proposed Action.

Realigning the boundaries within the existing W-570 and Bass/Bass South ATCAA Complex along with the proposed vertical expansion would make the airspace more efficient while meeting the training needs and capabilities of advanced fourth generation tactical fighters. The proposed W-570A, B, C, and D segments would be activated on an as-needed basis as a whole or individually (no regularly scheduled daily hours of use would be posted on aviation charts), allowing for more responsible stewardship of the airspace by the Oregon ANG. For example, if training mission requirements call for Basic Fighter Maneuvers (BFM) and does not require large volumes of airspace, there could be training days when W-570B and D would not have to be activated while W-570A and C are in use. Further, when high wind velocity (greater than 25 knots) and rough sea

conditions (wind wave heights exceeding five feet) in one of the proposed W-570 segments, a different segment could be activated individually if weather conditions are permissible there.

### **2.2.2 Establishment of Eel MOA and Modifications of Eel ATCAA**

The existing Eel ATCAA is located above the northern coast of Oregon from FL 180 (18,000 feet MSL) to FL 270 (27,000 feet MSL). Under the Proposed Action, the western portion of the existing Eel ATCAA would be converted into W-570C and the vertical limits would be expanded to include airspace from 11,000 feet MSL to FL 500 (50,000 feet MSL) as depicted in Figure 2-1. The proposed Eel MOAs would be established directly underneath the resulting configuration of Eel ATCAA from 11,000 feet MSL up to but not including FL 180 (18,000 feet MSL). In addition, the proposed Eel High ATCAAs would be established directly above the existing Eel ATCAA from FL 270 (27,000 feet MSL) to FL 500 (50,000 feet MSL). Finally, the Eel MOA/ATCAA Complex would be divided into four segments (A, B, C, and D) as shown in Figure 2-1.

Adding the Eel MOAs under the Eel ATCAA would provide additional maneuvering altitudes needed to execute the required F-15 employment tactics and training. For larger exercises where the entire Bass/Eel/W-570 Complex is utilized, the added airspace in the Eel MOAs would allow for a greater flexibility and variety of training scenarios and maneuvering capabilities, providing a more realistic training environment. Dividing the Eel airspace into four sections would allow the 142 FW to schedule flights to fly over land while minimizing impacts on the underlying population (refer to Figure 2-1). The internal borders of Eel MOA/ATCAA Complex were drawn with the coastal cities in mind. As pilots maintain a five nautical mile (NM) buffer from the airspace boundaries during training exercises, placing the borders of the internal segments over the most highly populated areas on the coast would tend to drive the pilots flying training missions to the center of that particular segment and away from population centers. Given the maximum topographic elevations in the area (approximately 3,000 feet MSL), the proposed Eel MOAs would be located at least 8,000 feet or more above ground level (AGL).

The proposed establishment and modifications to the Eel MOA/ATCAA Complex would not result in an increase of total 142 FW sorties per year but would increase the number of training operations conducted within the Eel MOA/ATCAA Complex. Increased training hours would be offset by corresponding reductions in transit time to weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex. Sorties currently flown to other over-land airspace as a result of sea-states or other training requirements would be redistributed to the Eel MOA/ATCAA Complex, which would see an increase of activity of approximately 305 hours annually over existing conditions. Table 2-2 provides a detailed summary of existing and proposed airspace operations.

The creation of additional airspace segments within the existing boundaries of the airspace complex would also result in an increase in operation counts. However, the Proposed Action would not result in any changes to annual flight hours allocated to the 142 FW and would not result in any increases to the overall number of sorties flown by the 142 FW.

### **2.2.3 Juniper/Hart MOA Complex Expansion**

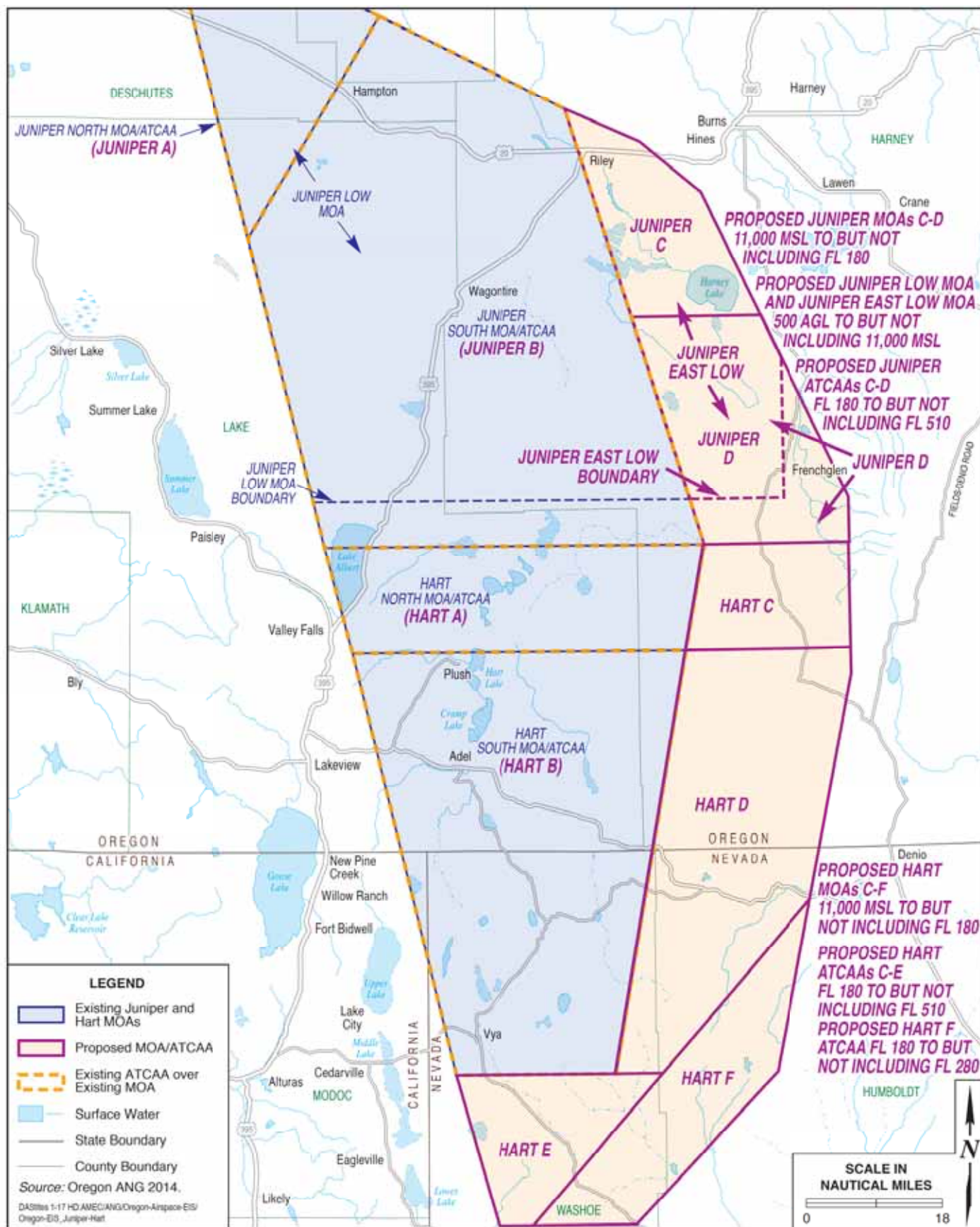
Under the Proposed Action, the eastern boundary of the existing Juniper/Hart MOA Complex would be extended approximately 20 miles to the east and the southern boundary would be extended approximately 25 miles to the south (see Figure 2-2). Once established, the existing and proposed airspace segments would be renamed alphabetically to include Juniper A through D MOAs and Hart A through F MOAs. As with the existing Juniper and Hart MOAs, the proposed new MOAs to the east would be located from an elevation of 11,000 feet MSL to but not including FL 180 (18,000 feet MSL). Given that the majority of residents in this region of Oregon reside at elevations of 5,000 feet MSL or below, the proposed MOAs would be established at an elevation equivalent to approximately 6,000 feet AGL.

**Table 2-2. Existing and Proposed Airspace Usage, Eel ATCAA Modifications**

| Existing                                               |                      | Proposed Action                                             |                     |
|--------------------------------------------------------|----------------------|-------------------------------------------------------------|---------------------|
| Airspace                                               | Annual Usage         | Airspace                                                    | Annual Usage        |
| <b>N/A</b><br>(new proposed airspace)                  | N/A                  | <b>Eel MOA A</b><br>(11,000 MSL to FL 180;<br>751 sq mi)    | 60 hrs<br>180 ops   |
|                                                        |                      | <b>Eel MOA B</b><br>(11,000 MSL to FL 180;<br>877 sq mi)    | 90 hrs<br>270 ops   |
|                                                        |                      | <b>Eel MOA C</b><br>(11,000 MSL to FL 180;<br>963 sq mi)    | 90 hrs<br>270 ops   |
|                                                        |                      | <b>Eel MOA D</b><br>(11,000 MSL to FL 180;<br>625 sq mi)    | 60 hrs<br>180 ops   |
| <b>Eel ATCAA</b><br>(FL 180 to FL 270;<br>3,900 sq mi) | 333 hrs<br>4,000 ops | <b>Eel ATCAA A</b><br>(FL 180 to FL 270;<br>751 sq mi)      | 60 hrs<br>720 ops   |
|                                                        |                      | <b>Eel ATCAA B</b><br>(FL 180 to FL 270;<br>877 sq mi)      | 90 hrs<br>1,080 ops |
|                                                        |                      | <b>Eel ATCAA C</b><br>(FL 180 to FL 270;<br>963 sq mi)      | 90 hrs<br>1,080 ops |
|                                                        |                      | <b>Eel ATCAA D</b><br>(FL 180 to FL 270;<br>625 sq mi)      | 60 hrs<br>720 ops   |
| <b>N/A</b><br>(new proposed airspace)                  | N/A                  | <b>Eel High ATCAA A</b><br>(FL 270 to FL 500;<br>751 sq mi) | 7.6 hrs<br>90 ops   |
|                                                        |                      | <b>Eel High ATCAA B</b><br>(FL 270 to FL 500;<br>877 sq mi) | 11.4 hrs<br>135 ops |
|                                                        |                      | <b>Eel High ATCAA C</b><br>(FL 270 to FL 500;<br>963 sq mi) | 11.4 hrs<br>135 ops |
|                                                        |                      | <b>Eel High ATCAA D</b><br>(FL 270 to FL 500;<br>625 sq mi) | 7.6 hrs<br>90 ops   |

Notes: FL - Flight Level, MSL - mean sea level, N/A - not applicable, op - operation.  
Sources: Oregon ANG 2013a, 2013b.





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Proposed Juniper and Hart MOAs

FIGURE  
2-2



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

Expansion of the existing Juniper Low MOA would include the proposed Juniper East Low MOA, which would be located directly underneath the proposed Juniper C MOA and a majority of the proposed Juniper D MOA. The proposed Juniper East Low MOA would be established from 500 feet AGL to but not including 11,000 feet MSL. In addition, the Proposed Action would include raising the floor of the existing Juniper Low MOA from 300 feet AGL to 500 feet AGL, further decreasing potential environmental impacts and providing good stewardship of airspace by only using what is required to meet realistic mission oriented training. Finally, ATCAAs would be established directly above the proposed new MOAs from an elevation of FL 180 (18,000 feet MSL) to FL 510 (51,000 feet MSL) to match the ceilings of the existing Juniper and Hart ATCAAs. However, in order to accommodate direct commercial flight traffic in the area, the ATCAA proposed above the Hart F MOA would be established from FL 180 (18,000 feet MSL) to FL 280 (28,000 feet MSL) for the purpose of deconflicting the overlying airspace (see Section 2.3.2, *Alternatives Considered but Eliminated*). The proposed new airspace segments would be activated on an as-needed basis as a whole or individually, allowing for more responsible stewardship of the airspace.

Table 2-3 presents a summary of aircraft operations under existing and proposed scenarios within the Juniper/Hart MOA Complex.

As detailed in Table 2-3, implementation of the Proposed Action would not result in any changes to overall hours spent in the Juniper/Hart MOA Complex by the primary user, the 173 FW. However, the number of 173 FW operations conducted within the existing portions of the Juniper/Hart MOA Complex would decrease given that the distribution of total airspace usage would be spread out into the proposed Juniper/Hart MOA expansion. Further, use of the Juniper/Hart MOA Complex by 142 FW aircraft would decrease given the proposed establishment and modification of other airspace complexes included under the Proposed Action that would provide the 142 FW with closer, more consistently usable airspace. Establishment of an airspace area located nearer to the unit's home airfield would result in a decrease in transit time, allowing for an increase in training time which would meet the purpose and need described in Section 1.5, *Purpose and Need for the Proposed Action*.

**Table 2-3. Existing and Proposed Airspace Usage, Juniper/Hart MOA Complex**

| Baseline                                                           |                      |                      |                        | Proposed Action                                                         |                     |                      |                        |
|--------------------------------------------------------------------|----------------------|----------------------|------------------------|-------------------------------------------------------------------------|---------------------|----------------------|------------------------|
| Airspace                                                           | Annual Usage         |                      |                        | Airspace                                                                | Annual Usage        |                      |                        |
|                                                                    | 142 FW               | 173 FW               | Total                  |                                                                         | 142 FW              | 173 FW               | Total                  |
| <b>Juniper Low MOA</b><br>(300 AGL to 11,000 MSL;<br>4,045 sq mi)  | 100 hrs<br>600 ops   | 143 hrs<br>660 ops   | 243 hrs<br>1,260 ops   | <b>Juniper Low MOA</b><br>(500 AGL to<br>11,000 MSL;<br>4,045 sq mi)    | 90 hrs<br>540 ops   | 114 hrs<br>660 ops   | 204 hrs<br>1,200 ops   |
| <b>Juniper North MOA</b><br>(11,000 MSL to FL 180;<br>641 sq mi)   | 250 hrs<br>600 ops   | 36 hrs<br>519 ops    | 286 hrs<br>1,119 ops   | <b>Juniper A MOA</b><br>(11,000 MSL to<br>FL 180;<br>641 sq mi)         | 167 hrs<br>400 ops  | 21 hrs<br>519 ops    | 188 hrs<br>919 ops     |
| <b>Juniper South MOA</b><br>(11,000 MSL to FL 180;<br>3,801 sq mi) | 625 hrs<br>1,500 ops | 653 hrs<br>3,255 ops | 1,278 hrs<br>4,755 ops | <b>Juniper B MOA</b><br>(11,000 MSL to<br>FL 180;<br>3,801 sq mi)       | 125 hrs<br>500 ops  | 499 hrs<br>3,255 ops | 624 hrs<br>3,755 ops   |
| <b>Hart North MOA</b><br>(11,000 MSL to FL 180;<br>875 sq mi)      | 84 hrs<br>500 ops    | 121 hrs<br>2,311 ops | 205 hrs<br>2,811 ops   | <b>Hart A MOA</b><br>(11,000 MSL to<br>FL 180;<br>875 sq mi)            | 67 hrs<br>400 ops   | 121 hrs<br>2,311 ops | 188 hrs<br>2,711 ops   |
| <b>Hart South MOA</b><br>(11,000 MSL to FL 180;<br>2,416 sq mi)    | 17 hrs<br>200 ops    | 348 hrs<br>1,840 ops | 365 hrs<br>2,040 ops   | <b>Hart B MOA</b><br>(11,000 MSL to<br>FL 180;<br>2,417 sq mi)          | 12.5 hrs<br>150 ops | 269 hrs<br>1,840 ops | 281.5 hrs<br>1,990 ops |
| <b>N/A</b><br>(new airspace)                                       | --                   | --                   | --                     | <b>Juniper East Low MOA</b><br>(500 AGL to<br>11,000 MSL;<br>976 sq mi) | 10 hrs<br>60 ops    | 35 hrs<br>425 ops    | 45 hrs<br>485 ops      |
| <b>N/A</b><br>(new airspace)                                       | --                   | --                   | --                     | <b>Juniper C MOA</b><br>(11,000 MSL to<br>FL 180;<br>486 sq mi)         | 19 hrs<br>114 ops   | 37 hrs<br>1,085 ops  | 56 hrs<br>1,199 ops    |

**Table 2-3. Existing and Proposed Airspace Usage, Juniper/Hart MOA Complex (Continued)**

| Baseline                                                      |                      |                      |                        | Proposed Action                                                 |                      |                      |                        |
|---------------------------------------------------------------|----------------------|----------------------|------------------------|-----------------------------------------------------------------|----------------------|----------------------|------------------------|
| Airspace                                                      | Annual Usage         |                      |                        | Airspace                                                        | Annual Usage         |                      |                        |
|                                                               | 142 FW               | 173 FW               | Total                  |                                                                 | 142 FW               | 173 FW               | Total                  |
| <b>N/A</b><br>(new airspace)                                  | --                   | --                   | --                     | <b>Juniper D MOA</b><br>(11,000 MSL to<br>FL 180;<br>773 sq mi) | 14 hrs<br>86 ops     | 45 hrs<br>1,085 ops  | 59 hrs<br>1,171 ops    |
| <b>N/A</b><br>(new airspace)                                  | --                   | --                   | --                     | <b>Hart C MOA</b><br>(11,000 MSL to<br>FL 180;<br>383 sq mi)    | 3.5 hrs<br>40 ops    | 55 hrs<br>1,085 ops  | 58.5 hrs<br>1,125 ops  |
| <b>N/A</b><br>(new airspace)                                  | --                   | --                   | --                     | <b>Hart D MOA</b><br>(11,000 MSL to<br>FL 180;<br>1,411 sq mi)  | 1 hr<br>10 ops       | 55 hrs<br>1,085 ops  | 56 hrs<br>1,095 ops    |
| <b>N/A</b><br>(new airspace)                                  | --                   | --                   | --                     | <b>Hart E MOA</b><br>(11,000 MSL to<br>FL 180;<br>423 sq mi)    | 0 hrs<br>0 ops       | 32 hrs<br>708 ops    | 32 hrs<br>708 ops      |
| <b>N/A</b><br>(new airspace)                                  | --                   | --                   | --                     | <b>Hart F MOA</b><br>(11,000 MSL to<br>FL 180;<br>612 sq mi)    | 0 hrs<br>0 ops       | 18 hrs<br>708 ops    | 18 hrs<br>708 ops      |
| <b>Juniper ATCAA</b><br>(FL 180 to<br>FL 510;<br>4,442 sq mi) | 167 hrs<br>2,000 ops | 833 hrs<br>2,500 ops | 1,000 hrs<br>4,500 ops | <b>Juniper ATCAA</b><br>(FL 180 to<br>FL 510;<br>5,701 sq mi)   | 167 hrs<br>2,000 ops | 833 hrs<br>2,500 ops | 1,000 hrs<br>4,500 ops |
| <b>Hart ATCAA</b><br>(FL 180 to<br>FL 510;<br>3,291 sq mi)    | 67 hrs<br>800 ops    | 300 hrs<br>1,200 ops | 367 hrs<br>2,000 ops   | <b>Hart ATCAAs A-E</b><br>(FL 180 to<br>FL 510;<br>5,509 sq mi) | 60 hrs<br>720 ops    | 270 hrs<br>1,080 ops | 330 hrs<br>1,800 ops   |

**Table 2-3. Existing and Proposed Airspace Usage, Juniper/Hart MOA Complex (Continued)**

| Baseline                     |              |        |       | Proposed Action                                            |                 |                   |                   |
|------------------------------|--------------|--------|-------|------------------------------------------------------------|-----------------|-------------------|-------------------|
| Airspace                     | Annual Usage |        |       | Airspace                                                   | Annual Usage    |                   |                   |
|                              | 142 FW       | 173 FW | Total |                                                            | 142 FW          | 173 FW            | Total             |
| <b>N/A</b><br>(new airspace) | --           | --     | --    | <b>Hart ATCAA F</b><br>(FL 180 to<br>FL 280;<br>612 sq mi) | 7 hrs<br>80 ops | 30 hrs<br>120 ops | 37 hrs<br>200 ops |

Notes: AGL- above ground level; FL- Flight Level; MSL- mean sea level; ops – operations; hrs- hours;

Operations vary from five minutes to 25 minutes per operation.

Sources: Oregon ANG 2013a, 2013b, 2014.

Notes: All training within the existing and proposed Juniper Low MOAs are interconnected, interdependent, and are consistent with the purpose and need for the Proposed Action. A pilot's training with the Juniper Low MOAs – as identified in this table – includes and accounts for speed/altitude adjustments, airspace changes, and anticipates the probability of moving between airspaces during any given training mission.

By segmenting the proposed MOAs, the 173 FW would be able to activate the required airspace to meet the mission objectives during any specific training exercise. Further, the Juniper/Hart MOA Complex has been expanded in the past to similar lateral dimensions on a temporary basis support the ANG's biannual Sentry Eagle Exercise – the ANG's largest air-to-air combat exercise which typically includes multiple units from across the country.

#### **2.2.4 Redhawk MOA Complex Establishment**

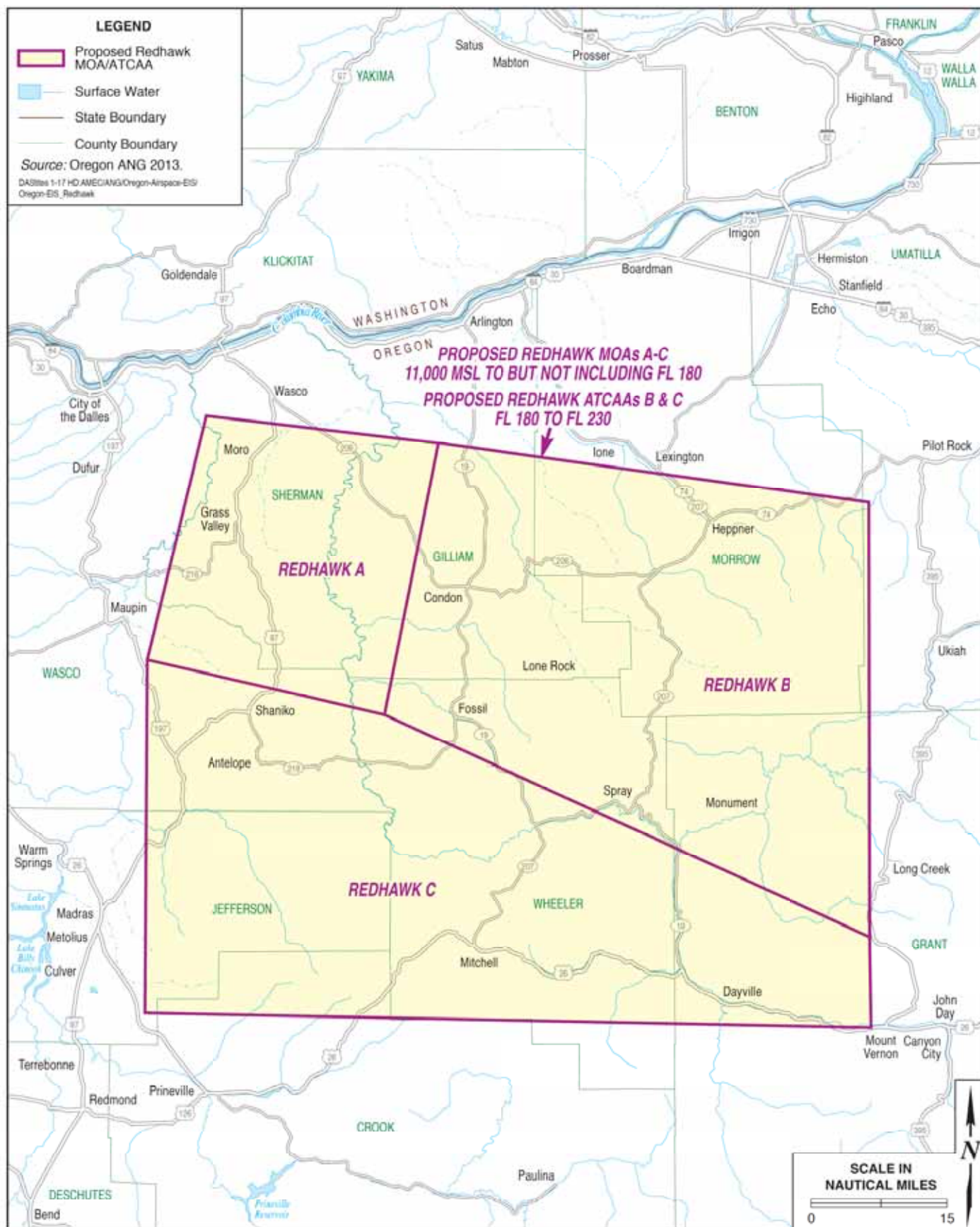
Under the Proposed Action, a new over-land MOA Complex would be established approximately 100 miles east-southeast of Portland in central/northern Oregon, roughly bound by Highway 97/197 on the west, the towns of Wasco and Lexington on the north, U.S. Highway 395 on the east, and U.S. Highway 26 on the south (see Figure 2-3). This location was determined through coordination with the FAA Seattle ARTCC, which controls the airspace in this area.

The proposed Redhawk MOAs (A, B, and C) would be established from 11,000 feet MSL to but not including FL 180 (18,000 feet MSL). Given that the majority of residents in this region of Oregon generally reside at elevations of 5,000 feet MSL or below, the proposed MOAs would be established at an elevation equivalent to approximately 6,000 feet AGL. In addition, associated ATCAAs would be established directly above the proposed Redhawk B MOA and Redhawk C MOA from FL 180 (18,000 feet MSL) to FL 230 (23,000 feet MSL).

The proposed Redhawk MOA Complex would have the sufficient lateral and vertical space to efficiently provide enough maneuvering airspace to support the majority of Ready Aircrew Program (RAP) training requirements for the 142 FW. The proposed Redhawk ATCAAs would always be scheduled with the proposed Redhawk MOA.

Establishment of the proposed Redhawk MOA Complex would help to alleviate concerns related to prohibitive weather conditions as well as scheduling and safety-of-flight conflicts with the Juniper/Hart MOA Complex. Additionally, the proposed Redhawk MOA Complex would be located much closer than





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## Proposed Redhawk MOAs and ATCAAs

FIGURE  
2-3



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

Juniper/Hart MOA Complex, allowing 142 FW pilots to reduce transit time and more efficiently conduct the full suite of realistic training operations. Dividing the complex into three segments would allow for the greatest scheduling flexibility and efficient use and responsible stewardship of the airspace. The proposed airspace segments would be activated on an as-needed basis as a whole or individually, allowing for more responsible stewardship of the airspace. No formal weather/sea state limitations would exist for scheduling/utilizing the proposed Redhawk MOA; however, over-water airspace would still be preferred for tactical intercept training, because it allows F-15 pilots to train supersonic and with greater vertical volume of airspace relative to the proposed Redhawk MOA Complex. Table 2-4 presents a summary of airspace operations within the proposed Redhawk MOA Complex and associated ATCAAs.

**Table 2-4. Proposed Airspace Usage, Redhawk MOAs and ATCAAs**

| <b>Airspace</b>                                                | <b>Annual Operations-142 FW<br/>(duration)</b> |
|----------------------------------------------------------------|------------------------------------------------|
| <b>Redhawk MOA A</b><br>(11,000 MSL to FL 180;<br>1,016 sq mi) | 33 hrs<br>100 ops                              |
| <b>Redhawk MOA B</b><br>(11,000 MSL to FL 180;<br>2,675 sq mi) | 167 hrs<br>500 ops                             |
| <b>Redhawk MOA C</b><br>(11,000 MSL to FL 180;<br>2,808 sq mi) | 167 hrs<br>500 ops                             |
| <b>Redhawk ATCAA B</b><br>(FL 180 to FL 230;<br>2,675 sq mi)   | 60.5 hrs<br>364 ops                            |
| <b>Redhawk ATCAA C</b><br>(FL 180 to FL 230;<br>2,808 sq mi)   | 60.5 hrs<br>364 ops                            |

Notes: AGL - above ground level; FL - Flight Level; MSL - mean sea level; hrs - hours; op - operation. Refer to Section 1.4.4 and Section 1.4.5, which provide a basis for how annual operations were derived for the proposed Redhawk MOA Complex.  
Sources: Oregon ANG 2013a, 2013b.

When the 142 FW is conducting a two vs. two (2 v 2) or 2 v 4 air combat maneuvering (ACM) or tactical intercepts (TI) training scenario, typically only Redhawk MOAs A and B would need to be activated. When conducting larger 4 v 4 TI or air combat tactics (ACT) scenarios, all three MOA segments could be activated simultaneously to maximize the efficiency of training opportunities. In



addition, the location of the proposed airspace would tie into an existing aerial refueling track, which runs east to west and abuts the southern edge of the Redhawk MOA Complex, which further increases the value for this proposed over-land airspace.

## **2.3 PROPOSED ACTION ALTERNATIVES**

### **2.3.1 Development of Alternatives**

As described in the introduction (refer to Section 2.1, *Introduction*), the Proposed Action was developed in coordination with the FAA's ARTCC and Portland TRACON, and the USAF's Western Air Defense Sector. In this process, the controlling ARTCC applied evaluative and exclusionary criteria to preliminarily design the placement of airspace boundaries. The utilization of existing airspace is always considered prior to modifying, expanding, or establishing new airspace; as such other airspaces within Oregon were reviewed against VPTA criteria (refer to Section 1.4.3, *Configuring Airspace for Today's Aircraft and Tactics*).

The specific locations and shapes of proposed airspace modifications were specifically developed to account for aircraft flight path histories in the region in order to identify the most ideal locations and configurations for the proposed airspace with the least potential to impact surrounding military, commercial, and general aviation. Consequently, while several alternate locations for airspace were considered, they were not carried forward.

### **2.3.2 Alternatives Considered but Eliminated**

Prior to developing the Eel MOA concept, the existing Dolphin MOA and W-93, located approximately 25 NM south of the existing Eel ATCAA at its closest point (refer to Figure 1-1), was considered for modification; however, while these areas provides suitable backup airspace, the USAF identified three issues with the Dolphin MOA and W-93 that would prohibit effective utilization of these airspaces: 1) modification of either of these airspaces would conflict with air-to-air refueling tracks; 2) modification of these airspaces would conflict with flight restrictions implemented as mitigations for noise impacts identified in previous NEPA analyses; and 3) modification of these airspaces would not address the

weather issues (i.e., sea-states) associated with the existing Eel ATCAA (refer to Section 1.4.4., *Weather Impacts on Mission Readiness*).

The Proposed Action is the result of close coordination with FAA requirements and guidance. There are no alternate airspace locations that were identified during coordination with the FAA that could support mission training requirements of the Oregon ANG while maintaining suitable training airspace configurations. Further, reducing the dimensions from what is proposed would result in constrained airspace, providing little to no benefit, and therefore would not meet the purpose and need. Similarly, the location for the proposed establishment of the Redhawk MOA Complex was developed in coordination with the FAA Seattle ARTCC after reviewing computer models, and placing the airspace in the least used portion of airspace and close enough for the 142 FW to utilize effectively. The Proposed Action is the result of intense analysis and coordination with FAA and meets the VPTA, and therefore the purpose and need.

The USAF has determined the appropriate level of simulator use verses real world aircraft time. The 142 FW and 173 FW currently conduct missions in simulators; however, per USAF guidance, simulators can only be used for certain mission types, and cannot replace or substitute training in an aircraft. Consequently, the increased use of simulators as an alternative was not carried forward for further analysis.

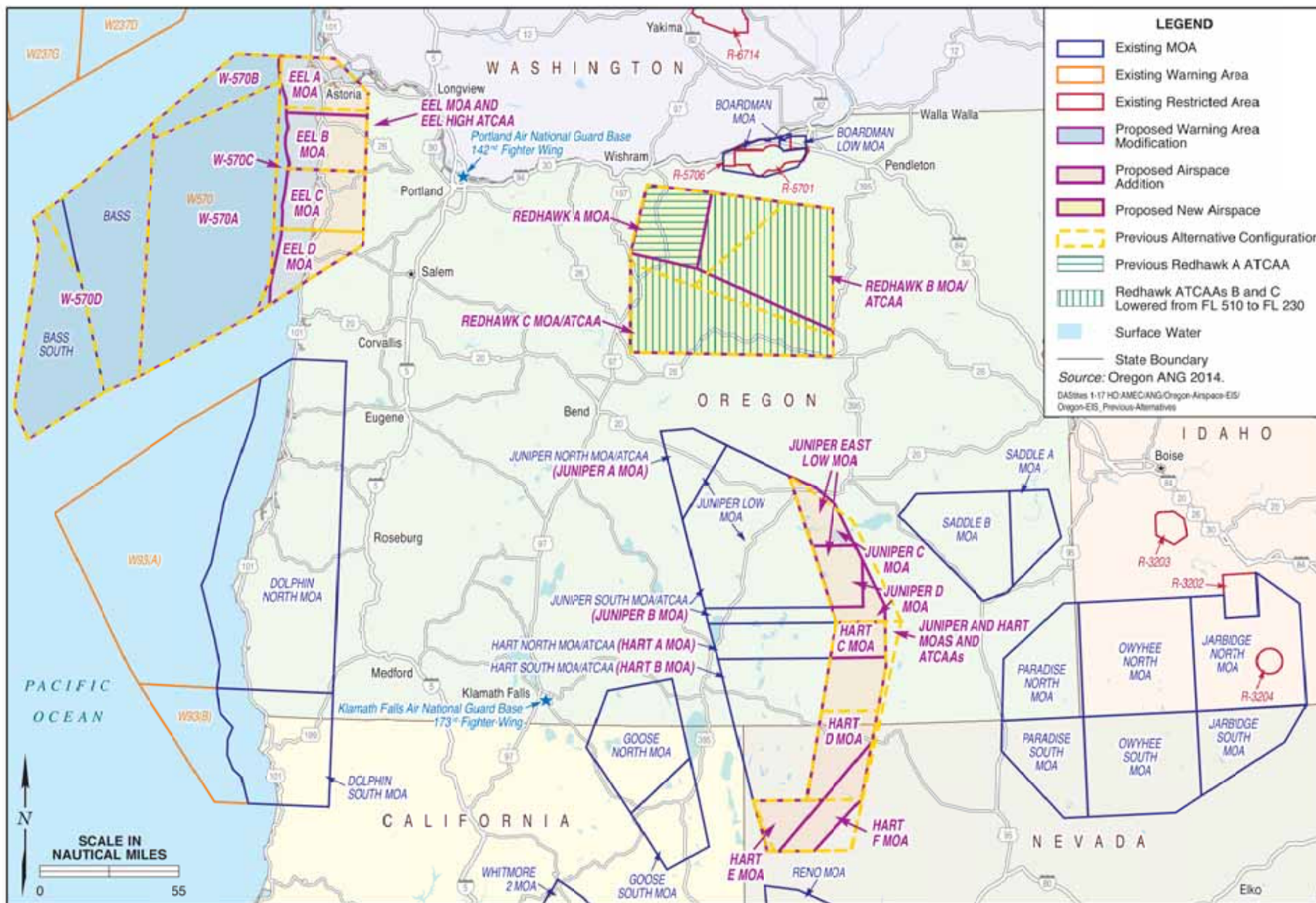
#### Evolution of the Proposed Action

As originally developed and summarized in the Oregon ANG's Test/Training Space Needs Statement (January 2011), proposed changes to regional airspace included greater horizontal and vertical limits (e.g., up to FL 700 [70,000 feet MSL] instead of FL 500 [50,000 feet MSL] in most cases), as well as less segmentation within proposed airspaces. Figure 2-4 provides a depiction of airspace modifications as initially developed and configured in contrast to the modifications currently included under the Proposed Action. In almost all cases, the initially developed configurations and modifications were revised by Oregon ANG after continual coordination with regional airspace users and reflect an ongoing attempt to reduce potential conflicts with commercial and general aviation traffic, limit potential environmental concerns, and promote more responsible stewardship of airspace by the Oregon ANG.



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2-19



EIS

Previously Considered Alternatives

FIGURE  
2-4

*W-570 and Bass/Bass South ATCAA Modifications*

With regard to W-570 and Bass/Bass South ATCAAs, key differences of the initially developed proposal included expansion of the existing W-570 from surface to FL 700 (70,000 feet MSL) to include the northern portion of Bass ATCAA (see Figure 2-4). In addition, the remaining portion of Bass ATCAA would have been converted to W-570B from 1,000 feet MSL to FL 700 (70,000 feet MSL) (instead of FL 500 [50,000 feet MSL]). Finally, the Bass South ATCAA would have been converted to W-570C from 1,000 feet MSL to FL 270 (27,000 feet MSL) (instead of FL 500 [50,000 feet MSL]).

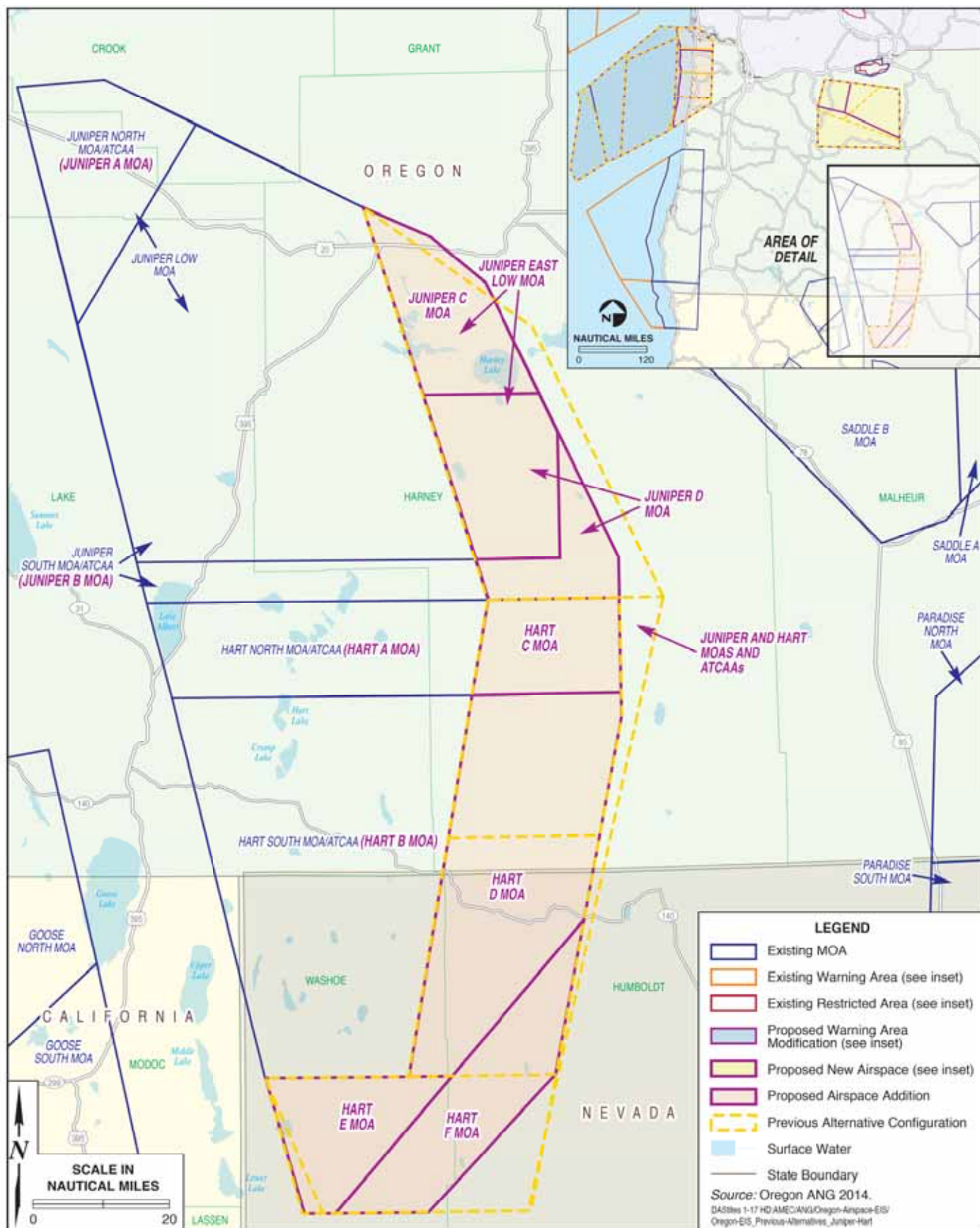
*Establishment of Eel MOA and Modifications of Eel ATCAA*

As initially developed, the proposed establishment of the Eel MOAs would have started at 10,000 feet MSL instead of the currently proposed floor of 11,000 feet MSL. In addition, the originally proposed Eel High ACTAAs would have extended to FL 700 (70,000 feet MSL) instead of FL 500 (50,000 feet MSL). Finally, the originally proposed Eel MOAs would have been configured directly underneath the existing Eel ATCAA; however, this would have been in conflict with FAA requirements that MOAs not extend any greater than 12 NM from the coastline. Consequently, the W-570C configuration presented in the EIS was developed in order to avoid this potential conflict with National Airspace System considerations.

*Juniper/Hart MOA Complex Expansion*

With regard to the Juniper/Hart MOA Complex, the originally proposed expansion of the complex extended further east – without segmentation – and started at 10,000 feet MSL instead of the currently proposed floor of 11,000 feet MSL (refer to Figure 2-4). Additionally, the originally proposed new Juniper/Hart ATCAAs extended up to FL 700 (70,000 feet MSL) instead of FL 510 (51,000 feet MSL). As potential conflicts with regional airspace users were identified, the originally proposed expansion of the Juniper/Hart MOA Complex was refined. In addition, the proposed expansion of the Juniper/Hart MOAs was segmented to allow for activation only when needed and promote more responsible stewardship of the airspace by the Oregon ANG. Most significantly, the proposed expansion of





EIS

### Previously Considered Alternatives Juniper/Hart MOA Complex

FIGURE  
2-5



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

the Juniper East Low MOA was originally configured underneath the entirety of the Juniper MOA expansion. After initial outreach conducted by Oregon ANG with county representatives in the area, the eastward limits of the Juniper East Low MOA were modified to reduce potential conflicts with sensitive regional resources, including protected areas (i.e., the Steens Mountain Cooperative Management and Protection Area).

During the EIAP, Seattle ARTCC and Salt Lake ARTCC requested additional revisions to the proposed Juniper/Hart MOA Complex boundaries. Seattle ARTCC suggested that the boundary between the proposed Hart C and Hart D MOAs should be moved north and aligned with the boundary between the existing Hart North and Hart South MOAs, such that ATC could take back a small portion of the airspace to allow nonparticipating aircraft to transition across the airspace at low altitudes. Under the original configuration, ATC would have had to take back Hart North (Hart A) and Hart C MOAs at and below an altitude of 500 feet above the nonparticipating aircraft, which would take away more airspace than necessary and would reduce the utility of the airspace for the Oregon ANG.

The external and internal airspace segment boundaries within the Juniper/Hart MOA Complex were further revised following an April 2014 meeting with Salt Lake ARTCC. During additional FAA review of the proposed expansion area, analysis of four separate one-week periods in 2012 revealed that an average of 26 to 30 Instrument Flight Rules (IFR) air carrier aircraft transit the proposed Hart D and Hart E MOAs daily, with the busiest periods occurring during the summer. Salt Lake ARTCC identified this as a primary filed route used by commercial air traffic traveling from Boise, Idaho into San Francisco, California. Consequently, in order to deconflict this airspace, Salt Lake ARTCC directed revision of the boundaries, including: 1) removal of the southeastern corner of the proposed airspace area, and 2) resegmentation of the Hart MOAs in this area to include a proposed Hart F MOA, with an overlying ATCAA that would extend to FL 280 (28,000 feet MSL), rather than the originally proposed FL 510 (51,000 feet MSL). These revisions, which reduced the total footprint and volume of the proposed airspace, have now been incorporated as elements of the Proposed Action.

### *Redhawk MOA Complex Establishment*

As originally proposed, the Redhawk MOA Complex would have been established from 10,000 feet MSL to FL 700 (70,000 feet MSL). In addition, the originally proposed configurations included slightly different internal boundaries between Redhawk A and B MOAs (refer to Figure 2-4). Following coordination with the FAA Western Service Area the total volume of the airspace was reduced with a proposed floor of 11,000 feet MSL and a proposed ceiling of FL 510, as evaluated in the Draft EIS that was released on 24 July 2015. Revisions to the originally proposed configuration reflect an attempt to reduce potential conflicts with commercial and general aviation traffic, limit potential environmental concerns, and promote more responsible stewardship of airspace by the Oregon ANG. Additional coordination with the FAA's Seattle ARTCC, following release of the Draft EIS and circularization of the airspace proposal, resulted in further reduction in the total volume of Redhawk ATCAAs to accommodate commercial aircraft approaches into Portland International Airport. The originally proposed Redhawk A ATCAA was removed from the proposal and the Redhawk B ATCAA and Redhawk C ATCAA were revised to include a proposed floor of 11,000 feet MSL to a proposed ceiling of FL 230 [23,000 feet MSL]), as described in Memorandum for the Record signed on 9 December 2015 by the Seattle ARTCC and the Oregon ANG.

### **2.3.3 Alternatives Considered for Analysis**

Identified alternatives which would include pursuing a subset of the proposed airspace modifications are discussed below.

Alternative B: No Modifications to Eel ATCAA

– This alternative would include the same airspace changes as described under the Proposed Action; however, the Eel MOA and Eel High ATCAA would not be reconfigured. When coastal weather and sea-states preclude the use of the proposed W-570 Complex, the increase in 142 FW operations in the Eel MOA/ATCAA Complex under the Proposed Action would instead be redistributed to the proposed Redhawk MOAs under this scenario. This alternative would provide a slightly reduced benefit to increased training time

within usable airspace given that sorties that would have been intended for the proposed Eel MOAs would have to transit a slightly greater distance to the proposed Redhawk MOA Complex. In addition, this alternative would be contradictory to the intent for the establishment of the Redhawk MOA Complex to be used only when weather conditions preclude training missions in the W-570 Complex as well as the Eel MOA/ATCAA Complex, resulting in higher utilization of the proposed new Redhawk MOA Complex than intended.

Raising the proposed floor to any altitude above 11,000 feet MSL up to FL 180 (18,000 feet MSL) where the ATCAA already exists would render the proposed Eel MOA less usable for BFM and ACM which, during inclement weather in W-570, is why Eel MOA is needed. Therefore, raising the altitude of the proposed Eel MOA was not considered as an alternative.

**Alternative B  
No Modifications to the Eel ATCAA**

- *Increased Distance to Airspace:*  
Distance to Redhawk MOA Complex is approximately 36 NM farther than distance to Eel MOA/ATCAA Complex.
- *Increased Transit Time:*  
One directional transit time to Redhawk MOA Complex is approximately 14 minutes longer than transit to Eel MOA/ATCAA.
- *Reduced Training Time:*  
Implementation of Alternative B would result in the loss of two to three training operations per sortie relative to the Proposed Action.



Alternative C: No Redhawk MOA Complex - This alternative includes the same airspace changes as described under the Proposed Action; however, the Redhawk MOA Complex would not be established. Under Alternative C, approximately 30 percent of proposed 142 FW utilization of the Redhawk MOA Complex would be redistributed to the Eel MOA/ATCAA Complex while approximately 70 percent would be relocated to the Juniper/Hart MOA Complex. This is largely due to the fact that the Redhawk MOA Complex was designed to accommodate over-land training when coastal weather conditions preclude the use of the Eel MOA/ATCAA Complex.

Consequently, implementation of Alternative C would result in reduced benefits to Oregon ANG mission readiness as 70 percent of training operations intended for the Redhawk MOA Complex would instead have to transit approximately 60 NM farther in order to reach the Juniper/Hart MOA Complex. This would result in a decrease in training time spent within usable airspace due to increased time spent in transit.

Alternative D: No Expansion of Juniper/Hart MOA Complex - This alternative includes the same airspace changes as described under the Proposed Action; however, the Juniper/Hart MOA Complex would not be expanded. While the 142 FW would utilize other training airspace under this scenario as modified or established by the Proposed Action (e.g., Redhawk MOA Complex), the 173 FW would continue to operate within the existing airspace, which is currently too

**Alternative C  
No Redhawk MOA Complex**

- *Increased Distance to Airspace:*  
Distance to Juniper/Hart MOA Complex 60 NM farther than distance to Redhawk MOA Complex.
- *Increased Transit Time:*  
One directional transit time to Juniper/Hart MOA Complex is approximately 14 minutes longer than transit to Redhawk MOA Complex. This would result in a 20-percent reduction of the total operations transferred to the Juniper/Hart MOA Complex.
- *Reduced Training Time:*  
Implementation of Alternative C would result in the loss of two to three training operations per sortie relative to the Proposed Action.

**Alternative D  
No Expansion of Juniper/Hart MOA Complex**

- 142 FW would utilize Eel MOA/ATCAA and Redhawk MOA Complex.
- 173 FW would continue to operate within existing Juniper/Hart MOA Complex, which is currently too small to efficiently accommodate training requirements.
- Implementation of Alternative D would result in a decrease in the quality of training relative to the Proposed Action.

small to efficiently accommodate training operations. Consequently, this alternative would result in continued impacts to training and safety resulting in negative impacts to Oregon ANG mission readiness and ultimately weakening homeland defense and USAF readiness.

## **2.4 NO-ACTION ALTERNATIVE**

If the No-Action Alternative is selected, the Oregon ANG would not implement the Proposed Action and would continue operating within the existing airspace, including W-570, Bass and Bass South ATCAAs, Eel ATCAA, and the existing Juniper/Hart MOA Complex. The current airspace constraints would continue to degrade the Oregon ANG's ability to efficiently conduct realistic training to ensure the required mission readiness and syllabus execution of the 142 FW and 173 FW, respectively. The associated travel distance and time required to access existing training airspaces coupled with the frequency of weather conditions that limit the availability of coastal airspace areas for training operations would continue to result in a loss of training for assigned pilots (approximately 300 hours per year). Further, transit by 142 FW pilots to the Juniper/Hart MOA Complex would result in increased fuel usage and maintenance relative to the Proposed Action. Further, the existing airspaces would have to be activated for a longer period of time to relative to the Proposed Action, rendering them unavailable to other users at greater frequency and for longer durations. This alternative is carried forward for analysis in the EIS in accordance with Council on Environmental Quality regulation 40 CFR 1502.14(d).

### **SECTION 3**

#### **AFFECTED ENVIRONMENT**

This section describes relevant existing environmental conditions for resources potentially affected by implementation of the Proposed Action and alternatives. In accordance with guidelines established by the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, Air Force Instruction (AFI) 32-7061 (promulgated at 32 Code of Federal Regulations [CFR] §989), and Federal Aviation Administration (FAA) Order 1050.1E, Change 1 (2006), the description of the affected environment focuses on only those aspects potentially subject to impacts.

For the purposes of this Environmental Impact Statement (EIS), the region of influence (ROI) includes the areas below the proposed modifications to the Eel Air Traffic Control Assigned Airspace (ATCAA) and Warning Area (W)-570 as well as the proposed expansion of the Juniper/Hart Military Operations Area (MOA) Complex and the areas below the proposed Redhawk MOA Complex. Counties that could be affected by the modification of the Eel ATCAA and W-570 include portions of Clatsop, Tillamook, Yamhill, Polk, and Lincoln counties along coastal Oregon as well as a small inclusion over Pacific County in Washington State. Counties affected by the expansion of the Juniper/Hart MOA Complex in eastern Oregon would include portions of Harney County in Oregon as well as Humboldt and Washoe counties in northwestern Nevada. Further, counties affected by the proposed Redhawk MOA Complex would include Sherman, Gilliam Morrow, Grant, Wheeler, Jefferson, and Wasco counties in central Oregon. The following resource areas are included in the description of the affected environment:

- Airspace Management;
- Noise;
- Land Use and Visual Resources;
- Biological Resources;
- Cultural Resources;
- Air Quality;
- Safety;
- Hazardous Materials and Wastes; and

- Socioeconomics, Environmental Justice, and Children's Health and Safety.

A brief discussion of resource areas that are anticipated to experience no environmental impact under implementation of the Proposed Action or its alternatives is included in Section 3.10, *Dismissed Resources Areas*. These environmental resources include:

- Utilities and Infrastructure;
- Ground Transportation;
- Geological Resources; and
- Water Resources.

### **3.1 AIRSPACE MANAGEMENT**

#### **3.1.1 Introduction**

##### **3.1.1.1 Definition of Resource**

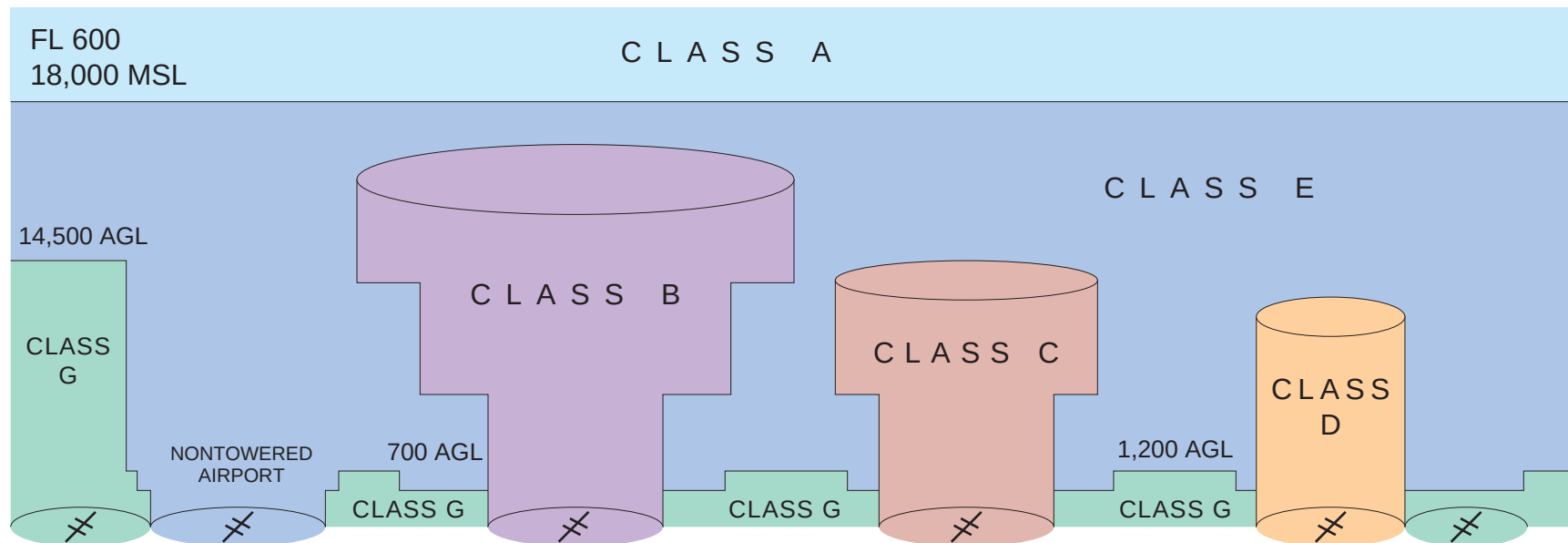
Airspace management is defined by the U.S. Air Force (USAF) as the coordination, integration, and regulation of the use of airspace of defined dimensions. The objective of these established management practices is to meet military training requirements through the safe and efficient use of available navigable airspace in a peacetime environment while minimizing the impact on other aviation users and the public (AFI 13-201). There are two categories of airspace or airspace areas: regulatory and nonregulatory. Within these two categories, further classifications include *controlled*, *uncontrolled*, *special use*, and *other airspace*. The categories and types of airspace are determined by: (1) the complexity or density of aircraft movements; (2) the nature of the operations conducted within the airspace; (3) the level of safety required; and (4) national and public interest in the airspace.

##### **3.1.1.2 Controlled Airspace**

Controlled airspace is a generic term that encompasses the different classifications of airspace (Class A, B, C, D, and E airspace shown in Figure 3.1-1) and defines dimensions within which air traffic control (ATC) service is provided to Instrument Flight Rules (IFR) flights and to Visual Flight Rules (VFR) (see Section 11.0, *Glossary*) flights (U.S. Department of Transportation 1994). All military and civilian aircraft are subject to Federal Aviation Regulations (FARs).

##### Class A Airspace

Class A airspace includes all flight levels or operating altitudes over 18,000 feet above mean sea level (MSL). Formerly referred to as a Positive Control Area (PCA), Class A airspace is dominated by commercial aircraft utilizing routes between 18,000 and 60,000 feet MSL.



AGL – above ground level  
 FL – flight level  
 MSL – mean sea level

NOTE: Altitudes not to scale.  
 Source: FAA 1993.

EIS

FAA Airspace Classification

FIGURE  
3.1-1

### Class B Airspace

Class B airspace typically comprises contiguous cylinders of airspace, stacked upon one another, extending from the surface up to 14,500 feet MSL (refer to Figure 3.1-1). To operate in Class B airspace, pilots must contact appropriate controlling authorities and receive clearance to enter the airspace. Additionally, aircraft operating within Class B airspace must be equipped with specialized electronics that allow air traffic controllers to accurately track aircraft speed, altitude, and position. Class B airspace is typically associated with major metropolitan airports such as Seattle-Tacoma International Airport.

### Class C Airspace

Airspace designated as Class C can generally be described as controlled airspace that extends from the surface or a given altitude to a specified higher altitude. Class C airspace is designed and implemented to provide additional ATC into and out of primary airports where aircraft operations are periodically at high-density levels. All aircraft operating within Class C airspace are required to maintain two-way radio communication with local ATC entities. Both Portland International and Klamath Falls Airport have associated Class C airspace.

### Class D Airspace

Class D airspace encompasses a five-statute-mile radius of an operating ATC-controlled airport, extending from the ground to 2,500 feet above ground level (AGL) or higher. All aircraft operating within Class D airspace must be in two-way radio communication with the ATC facility.

### Class E Airspace

Generally, if the airspace is not Class A, Class B, Class C, or Class D, and it is controlled airspace, it is Class E airspace (refer to Figure 3.1-1). Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. Also in this class are federal airways, airspace beginning at either 700 or 1,200 feet AGL used to transition to and from the terminal or en route environment, en route domestic, and offshore airspace areas

designated below 18,000 feet MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 feet MSL over the U.S., including that airspace overlying the waters within 12 nautical miles (NM) of the coast of the 48 contiguous states and Alaska, up to but not including 18,000 feet MSL, and the airspace above Flight Level (FL) 600 (60,000 feet MSL).

### 3.1.1.3 Uncontrolled Airspace

Uncontrolled airspace (Class G) is not subject to restrictions that apply to controlled airspace. Limits of uncontrolled airspace typically extend from the ground surface to 700 feet AGL in urban areas and from the ground surface to 1,200 feet AGL in rural areas. Uncontrolled airspace can extend above these altitudes to as high as 14,500 feet MSL if no other types of controlled airspace have been assigned. ATC does not have authority to exercise control over aircraft operations within uncontrolled airspace. Primary users of uncontrolled airspace are general aviation aircraft operating in accordance with VFR. Table 3.1-1, below, identifies existing public airports below affected Oregon ANG airspace.

**Table 3.1-1. Existing Public Airports Beneath Affected and Proposed Oregon ANG Airspace**

| Airspace                        | Public Airport               |
|---------------------------------|------------------------------|
| Juniper South (i.e., Juniper B) | Alkau Lake State Airport     |
| Eel A                           | Port of Ilwaco Airport       |
|                                 | Astoria Regional Airport     |
|                                 | Seaside Airport              |
| Eel B                           | Nehalem Bay State Airport    |
| Eel C                           | Tillamook Airport            |
|                                 | Pacific City Airport         |
| Eel D                           | Siletz Bay State Airport     |
| Redhawk A                       | Condon State Pauling Airport |
| Redhawk B                       | Monument Airport             |

Note: Existing private and unverified airports below proposed and affected airspaces were not individually identified, though their existence and locations were acknowledged and considered.

Sources: FAA 2013a, 2013b.



#### 3.1.1.4 Special Use Airspace

Special use airspace consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. With the exception of Controlled Firing Areas (CFAs), special use airspace is depicted on aeronautical charts, and information provided there includes hours of operation, altitudes, and the agency controlling the airspace. All special use airspace descriptions are contained in FAA Order 7400.8.

Prohibited and Restricted Areas are regulatory special use airspace and are established in accordance with Title 14 CFR Part 73 through the rulemaking process. Warning areas, CFAs, and MOAs are nonregulatory special use airspace.

Warning areas are airspace areas of defined dimensions over international waters that contain activity that may be hazardous to nonparticipating aircraft. Because international agreements do not provide for prohibition of flight in international airspace, no restrictions to flight are imposed. As such, warning areas are established in international airspace to alert pilots of nonparticipating aircraft to potential danger.

CFAs are established to contain activities that, if not conducted in a controlled environment, would be hazardous to nonparticipating aircraft. Approval of a CFA is considered for those activities that are either of short duration or of such a nature that they could be immediately suspended upon notice that such activity might endanger nonparticipating aircraft. Examples of such activities include: firing of missiles, rockets, anti-aircraft artillery, and field artillery; static testing of large rocket motors; blasting; and ordnance or chemical disposal. However, CFAs are not proposed as a part of the Proposed Action and further, existing CFAs would not be affected by the Proposed Action.

MOAs are airspace of defined vertical and lateral limits outside of controlled airspace that are used to separate certain military flight activities from IFR traffic, and to identify for VFR traffic the areas where concentrated military aircraft operations may occur. When a MOA is active, IFR traffic may be cleared to enter and pass through the area if adequate IFR separation criteria can be met and procedures are described in a Letter of Agreement between the unit and the ATC

controlling agency (FAA Order 7400.2K). Nonparticipating VFR aircraft are not prohibited from entering an active MOA; however, extreme caution is advised when such aircraft transit the area during military operations.

By definition, MOAs comprise airspace of vertical and lateral dimensions established to separate military training activities (e.g., air combat maneuvers and air intercepts) from other air traffic. All MOAs within the U.S. are depicted on sectional aeronautical charts identifying the exact area, the name of the MOA, altitudes of use, published hours of use (if applicable), and the corresponding controlling agency.

ATCAAs comprise airspace above 18,000 feet MSL and are designed to accommodate non-hazardous, high-altitude military flight training activities; this airspace remains under control of the FAA and, when not in use by military aircraft, may be used to support civil aviation activities. ATCAAs allow military aircraft to conduct high-altitude air-to-air combat training, practice evasion maneuvers, perform aerial refueling, and initiate or egress from attacks on targets within a range. ATC routes IFR traffic around this airspace when activated; ATCAAs do not appear on any sectional or FAA IFR Enroute Aeronautical Charts.

#### 3.1.1.5 Military Training Routes

Military Training Routes (MTRs) are flight paths that provide a corridor, typically eight miles wide, for low-altitude navigation and training. Low-altitude navigation training is important because aircrews may be required to fly at low altitudes for tens or hundreds of miles to avoid detection in combat conditions. In order to train realistically, the military and the FAA have developed a nationwide network of MTRs. This system allows the military to train for low-altitude navigation at air speeds in excess of 250 knots. There are two types of MTRs, instrument routes (IRs) and visual routes (VRs). The difference between IR and VR routes is that IR routes are flown under ATC, while VR routes are not.

### **3.1.2 Existing Conditions**

#### **3.1.2.1 Oregon ANG Unit Background**

##### 142d Fighter Wing

The 142 FW primarily conducts training within the Eel ATCAA, W-570, Bass and Bass South ATCAAs, Juniper Low MOA, Juniper North and South MOAs, and Hart North and South MOAs. In addition, a small percentage of 142 FW training operations take place within Dolphin North MOA, Boardman MOA, Olympic MOA, and Okanogan/Roosevelt MOA (see Figure 3.1-2).

##### 173d Fighter Wing

The 173 FW primarily conducts training operations within the Goose MOA, Juniper Low MOA, Juniper North and South MOAs, Hart North and South MOAs, Dolphin MOA, and W-93 (see Figure 3.1-2).

#### **3.1.2.2 Affected Airspace Use and Flight Procedures**

The majority of flight training operations associated with the Oregon ANG take place in special use airspace (i.e., warning areas, MOAs, and ATCAAs) located over northwestern and eastern Oregon, northern California, and Nevada (see Figure 3.1-2).

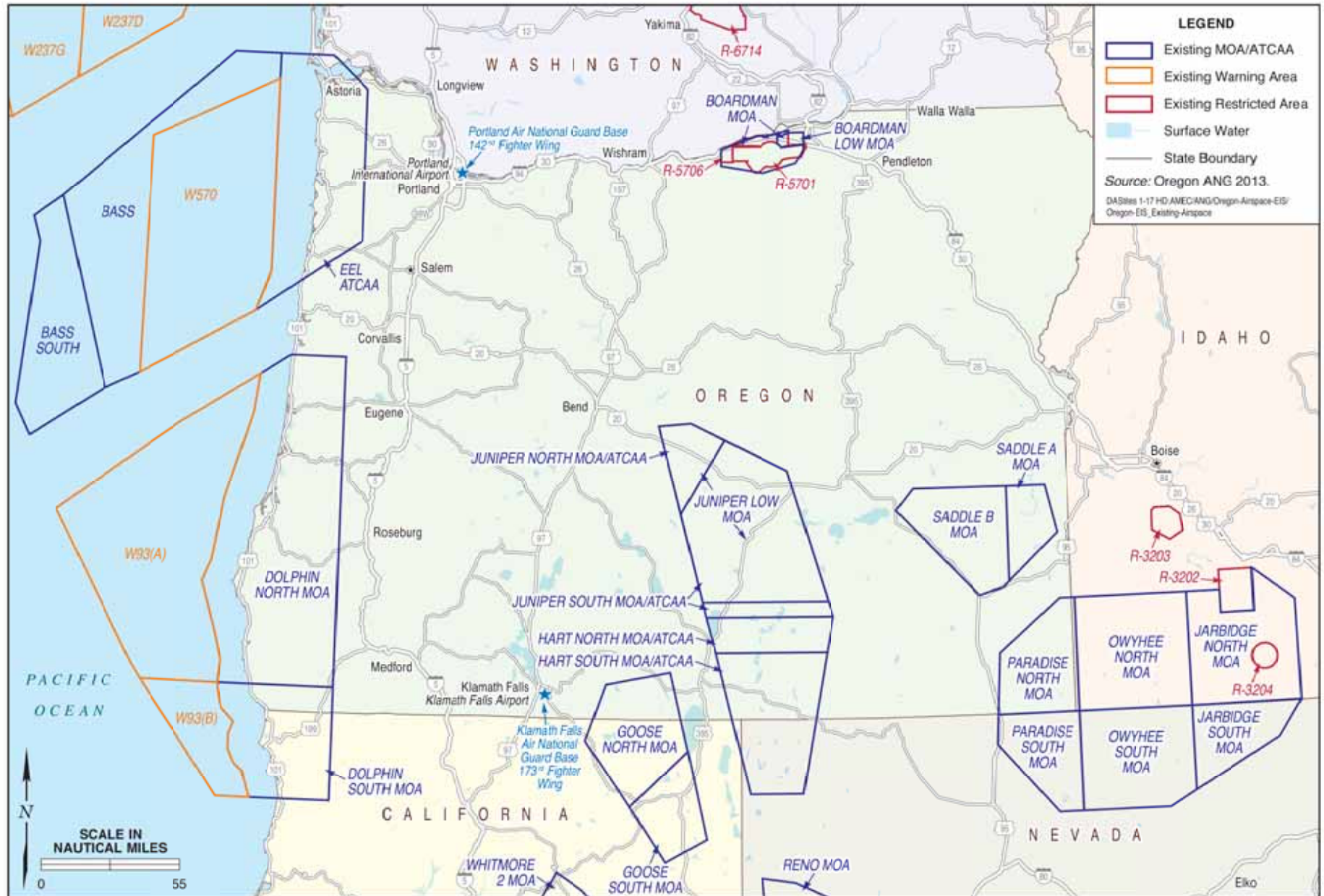
Flight schedules and activities for the Oregon ANG are filed weekly with FAA's Seattle Air Route Traffic Control Center (ARTCC), the controlling agency of regional airspace. In addition, prior to initiating a training mission, Oregon ANG pilots file a flight plan with Seattle ARTCC and receive takeoff clearance from ATC at their respective airfields.

Pilots fly in accordance with IFR and remain under ATC until reaching a designated location; at that point, clear of conflicting aircraft, Oregon ANG aircraft are cleared to enter the MOAs or other special use airspace. Upon returning to base, Oregon ANG pilots maintain the same coordination with Seattle ARTCC and ATC at their respective airfield, entering ATC at a fixed point and remaining under that control until landing.



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

3-10



EIS

Existing Regional Airspace

FIGURE  
3.1-2

### W-570 and Bass/Bass South ATCAAs

The 142 FW utilizes W-570 and the Bass/Bass South ATCAAs, which are located just off the coast of northwestern Oregon as its primary over-water training airspace (refer to Figure 3.1-2). Pilots from the 142 FW currently spend a total of approximately 959 flying hours<sup>1</sup> per year, or approximately 27 percent of their overall annual allocated flying hours within the W-570 and the Bass/Bass South ATCAAs (see Table 3.1-2).

**Table 3.1-2. Existing Airspace Usage, W-570 and Bass/Bass South ATCAA**

| <b>Airspace</b>                                        | <b>142 FW Annual Usage</b> |
|--------------------------------------------------------|----------------------------|
| <b>W-570</b><br>(surface to 50,000 feet MSL)           | 900 hrs<br>1,800 ops       |
| <b>Bass ATCAA</b><br>(18,000 to 50,000 feet MSL)       | 42 hrs<br>250 ops          |
| <b>Bass South ATCAA</b><br>(18,000 to 27,000 feet MSL) | 17 hrs<br>100 ops          |

Notes: MSL - mean sea level; op - operation.

Sources: Oregon ANG 2013a, 2013b.

W-570 is configured from the surface of the water up to 50,000 feet MSL. However, a large majority (85 percent) of 142 FW's usage of W-570 occurs at elevations greater than 7,000 feet MSL (Oregon ANG 2013a). Both Bass and Bass South ATCAAs begin at 18,000 feet MSL, with Bass ATCAA extending up to 50,000 feet MSL and Bass South ATCAA extending up to 27,000 feet MSL.

Weather conditions over the Pacific Ocean, referred to as sea-states, prohibit training over-water when wind velocity is greater than 25 knots and wind-wave heights exceed five feet. Due to operational safety guidelines contained in AFI 11-2F-15V3 KF CH 8, these sea-state conditions prohibit over-water training operations in W-570 and the Bass/Bass South ATCAAs. On average, sea-states

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<sup>1</sup> The term flying hours, or flight hours, refers to the total cumulative flying time spent by Oregon ANG aircraft during a given period. Because Oregon ANG flying operations typically utilize multiple aircraft simultaneously, a training scenario including four aircraft and lasting one hour would result in a recorded total of four flying hours.

were out of limits approximately 23 percent of the scheduled time from 2008-2011; reaching as high as 75 percent in a given month (Oregon ANG 2011).<sup>2</sup>

### Eel ATCAA

When sea-states prohibit the use of W-570 and the Bass/Bass South ATCAAs, pilots from the 142 FW are able to conduct a portion of their training within the Eel ATCAA, located over the northwest coast of Oregon (refer to Figure 3.1-2). Although the over-land portions of Eel ATCAA are available when sea states preclude over-water training, they are rarely utilized other than to facilitate, transit, recovery holding, and air-to-air refueling due to the limited (i.e., vertically constrained) altitude structure of 18,000 feet MSL to 27,000 feet MSL (see Figure 3.1-3). This limited altitude block provides almost no benefit for F-15 Advanced Handling Considerations (AHC), Basic Fighter Maneuvers (BFM), and Air Combat Maneuvers (ACM), and cannot accommodate larger Offensive Counter-Air (OCA) or Defensive Counter-Air (DCA) training missions (Oregon ANG 2011).

Given these operational limitations, the 142 FW currently utilizes Eel ATCAA, primarily for transit and recovery holding, for approximately 333 flying hours per year (refer to Table 2-2), or approximately 9.5 percent of their overall annual allocated flying hours (Oregon ANG 2013a).

### Juniper/Hart MOAs

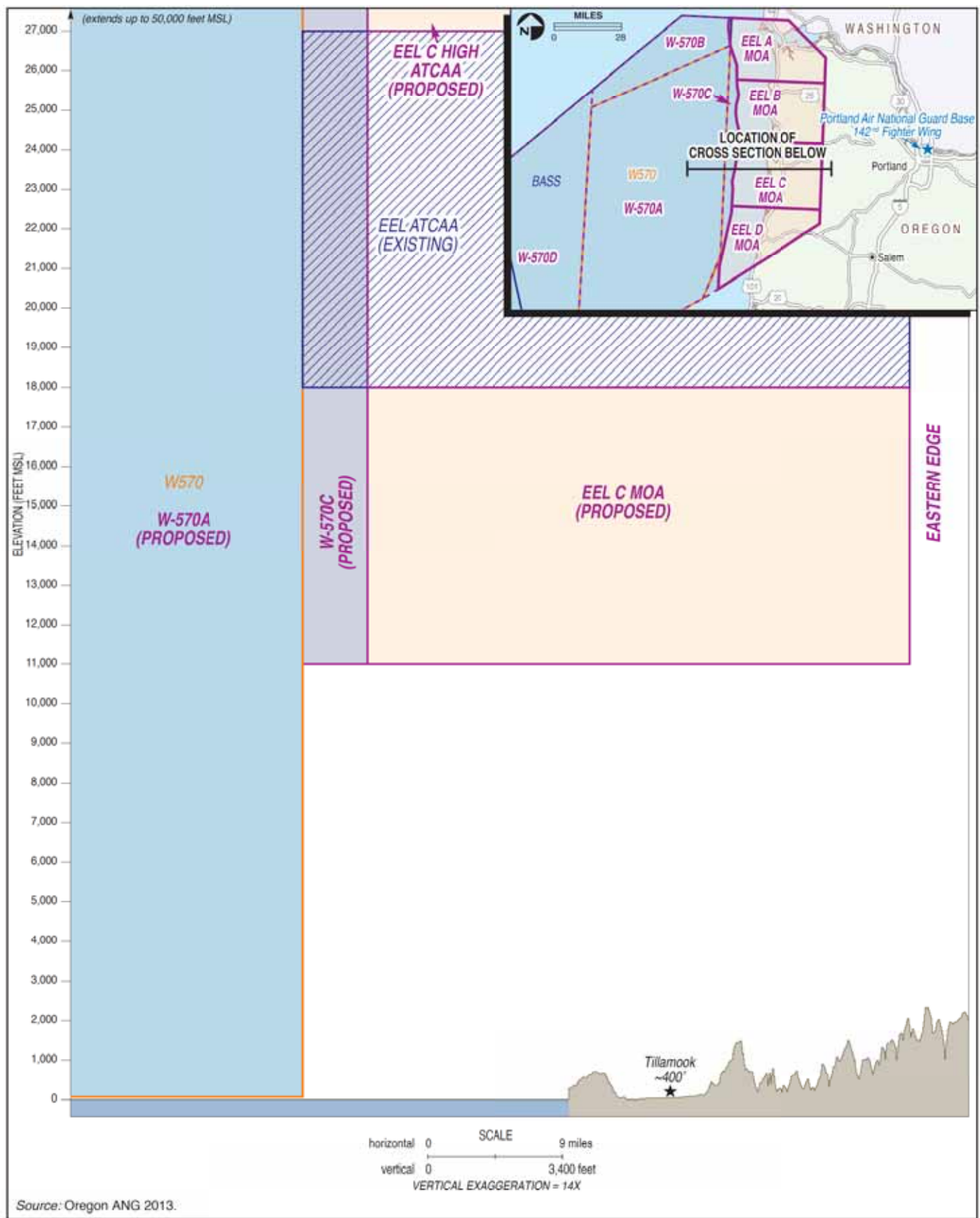
The Juniper/Hart MOA Complex, located in eastern Oregon, is utilized primarily by the 173 FW to conduct a variety of Air Combat Tactics (ACT) training operations.

In addition, pilots from the 142 FW also utilize this over-land airspace complex when sea-states prohibit the use of W-570 and the Bass/Bass South ATCAAs and when specific mission types require overland training. The Juniper/Hart MOA

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<sup>2</sup> The data presented are representative of operational and utilization numbers that drove the original Test/Training Space Needs Statement and remains relevant today.





EIS

Existing and Proposed Eel MOA/ATCAA Complex  
and W-570 Cross-Section

FIGURE  
3.1-3



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

Complex includes: Juniper North and South MOAs (11,000 feet MSL to 18,000 feet MSL); Juniper ATCAA (18,000 feet MSL to FL 510 [51,000 feet MSL]); Hart North and South MOAs (11,000 feet MSL to FL 180 [18,000 feet MSL]); Hart ATCAA (18,000 feet MSL to FL 510 [51,000 feet MSL]); and Juniper Low MOA (300 feet AGL to 10,999 feet MSL). Table 3.1-3 provides a breakdown of Oregon ANG usage of this airspace. In addition, Figure 3.1-4 provides a representative cross sectional view of the Juniper Low and Juniper South MOAs.

**Table 3.1-3. Existing Airspace Usage, Juniper/Hart MOA Complex**

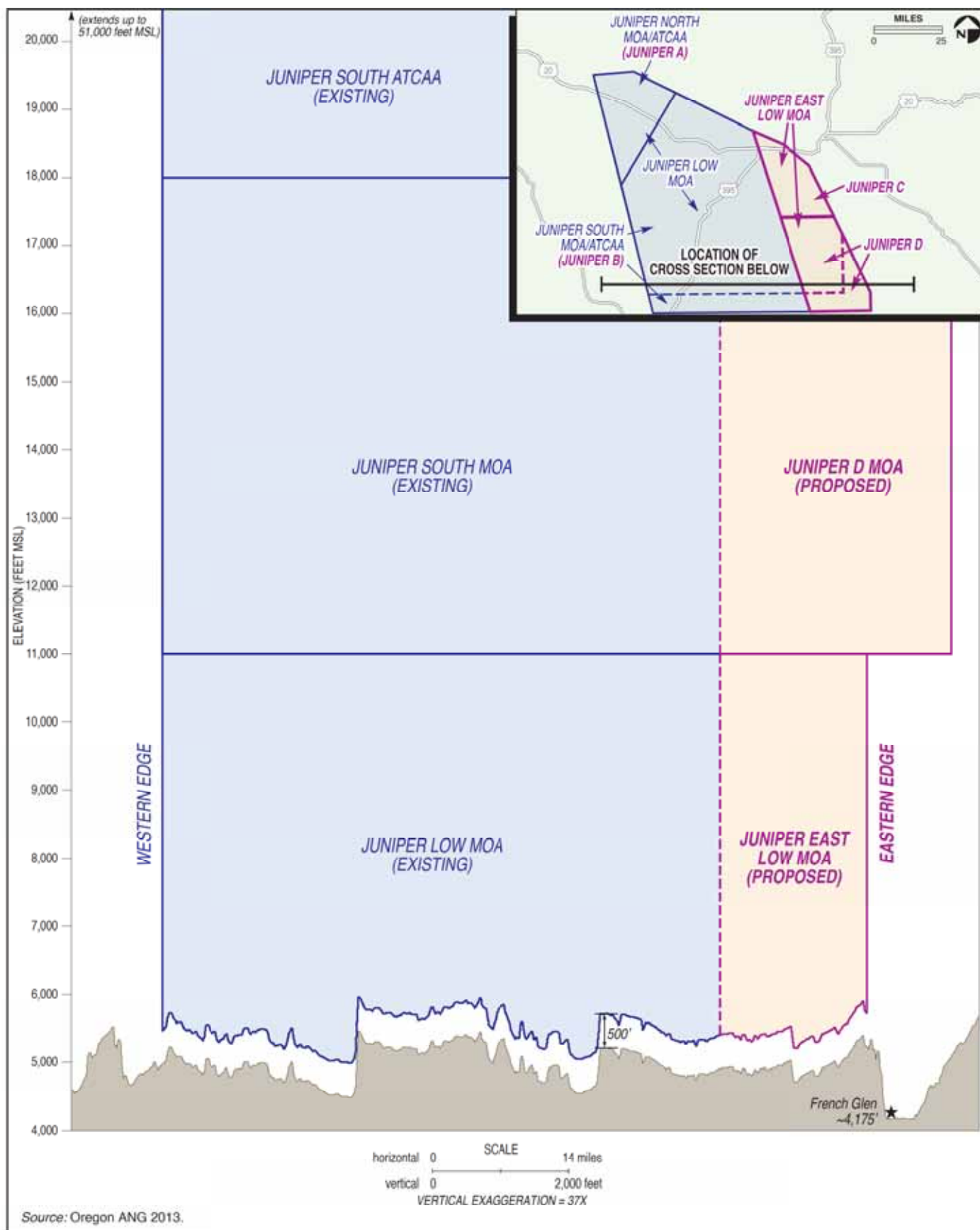
| Airspace                                           | Annual Usage         |                      |                        |
|----------------------------------------------------|----------------------|----------------------|------------------------|
|                                                    | 142 FW               | 173 FW               | Total                  |
| <b>Juniper Low MOA</b><br>(300 AGL to 11,000 MSL)  | 100 hrs<br>600 ops   | 143 hrs<br>660 ops   | 243 hrs<br>1,260 ops   |
| <b>Juniper North MOA</b><br>(11,000 MSL to FL 180) | 250 hrs<br>600 ops   | 36 hrs<br>519 ops    | 286 hrs<br>1,119 ops   |
| <b>Juniper South MOA</b><br>(11,000 MSL to FL 180) | 625 hrs<br>1,500 ops | 653 hrs<br>3,255 ops | 1,278 hrs<br>4,755 ops |
| <b>Hart North MOA</b><br>(11,000 MSL to FL 180)    | 84 hrs<br>500 ops    | 121 hrs<br>2,311 ops | 205 hrs<br>2,811 ops   |
| <b>Hart South MOA</b><br>(11,000 MSL to FL 180)    | 17 hrs<br>200 ops    | 348 hrs<br>1,840 ops | 365 hrs<br>2,040 ops   |
| <b>Juniper ATCAA</b><br>(FL 180 to FL 510)         | 167 hrs<br>2,000 ops | 833 hrs<br>2,500 ops | 1,000 hrs<br>4,500 ops |
| <b>Hart ATCAA</b><br>(FL 180 to FL 510)            | 67 hrs<br>800 ops    | 300 hrs<br>1,200 ops | 367 hrs<br>2,000 ops   |

Notes: AGL - above ground level; FL - Flight Level; MSL - mean sea level; ops - operations; hrs - hours.  
Sources: Oregon ANG 2013a; 2013b.

As summarized in Table 3.1-3, the 173 FW currently utilizes the Juniper/Hart MOA Complex for approximately 2,434 flying hours per year, or approximately 39 percent of their overall annual allocated flying hours, while the 142 FW spends approximately 1,310 flying hours per year (37.4 percent of overall flying hours) in the airspace (Oregon ANG 2013a, 2013b).

The Juniper/Hart MOA Complex is approximately 140 NM long by approximately 50 NM wide, which is too small to efficiently accommodate realistic mission-oriented training requirements of the Oregon ANG. When training is limited to two vs. two (“2 v 2”) ACM or Tactical Intercept (TI) scenarios, the





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### Existing and Proposed Juniper MOA/ATCAA Complex Cross-Section

FIGURE  
3.1-4



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

current Juniper/Hart MOA Complex can support only two separate training missions simultaneously. Since the 173 FW typically flies 12 jets at a time to meet syllabus and student pilot throughput requirements, it is routine to need three 2 v 2 scenarios and the associated airspace or four to five 1 v 1 scenarios and the associated airspace during a single flying period. This is not possible within the current airspace configuration without staggering takeoff times and increasing the total amount of time the airspace is activated.<sup>3</sup> When the training is expanded to 4 v 4 TI or ACT as required by the 173 FW's Flight Training Unit (FTU) syllabus, the current airspace can only support one training mission at a time, which results in the airspace being activated and used for a longer time period on these days.

### Other Aircraft Operations

As previously described in Section 2.0, *Description of Proposed Action and Alternatives* the 142 FW and the 173 FW fly approximately 2,602 hours and 2,434 hours, respectively, within previously established or existing airspace areas. The remainder of the authorized flight hours for each of the units (i.e., approximately 26 percent for the 142 FW and approximately 60 percent for the 173 FW) are flown during transition training, practice approaches at the airfield, cross-county flights, maintenance-flights or similar flight activities.

### Military Training Routes

MTRs, or military flight paths that provide a corridor for regional low-altitude navigation and training, are located throughout the State of Oregon. MTRs, including both IRs and VRs that are located underneath or near the affected portions of existing Oregon ANG airspace, are utilized by a variety of military users and aircraft types including A-10, F-15, F-16, F-18, C-17, C-130, and EA-6B aircraft (U.S. Navy 2013a, 2013b; USAF 2013; Idaho ANG 2013). Controlling agencies responsible for scheduling these routes include Gowen Field Air National Guard Base, Mountain Home Air Force Base, Naval Air Station (NAS) Whidbey Island, and NAS Lemoore. In general, military usage of MTRs underneath affected

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<sup>3</sup> General aviation pilots and other airspace users can still transit through a MOA when it is activated; however, it requires closure coordination to mitigate potential safety risks (see Section 4.9, *Socioeconomics and Environmental Justice*).

Oregon ANG airspace is relatively low. Table 3.1-4 provides a summary of 2012 usage of these MTRs.

**Table 3.1-4. Existing Military Usage of MTRs underneath Affected Oregon ANG Airspace**

| Route   | Scheduling Agency  | Annual Average Count | Overlapping Airspace Complex (including existing and proposed airspace)* |
|---------|--------------------|----------------------|--------------------------------------------------------------------------|
| IR-342  | NAS Whidbey Island | 9                    | Juniper/Hart and Redhawk                                                 |
| IR-343  | NAS Whidbey Island | 4                    | Juniper/Hart and Redhawk                                                 |
| VR-1352 | NAS Whidbey Island | 5                    | Juniper/Hart and Redhawk                                                 |
| VR-1353 | NAS Whidbey Island | 58                   | Juniper/Hart and Redhawk                                                 |
| VR-1251 | NAS Lemoore        | 32                   | Juniper/Hart                                                             |
| VR-1254 | NAS Lemoore        | 11                   | Juniper/Hart                                                             |
| VR-316  | Gowen Field ANGB   | 34                   | Juniper/Hart                                                             |
| VR-319  | Gowen Field ANGB   | 2                    | Juniper/Hart                                                             |
| VR-1301 | Gowen Field ANGB   | 144                  | Juniper/Hart                                                             |
| IR-300  | Mountain Home AFB  | 50                   | Juniper/Hart                                                             |
| IR-313  | Mountain Home AFB  | 0                    | Juniper/Hart                                                             |

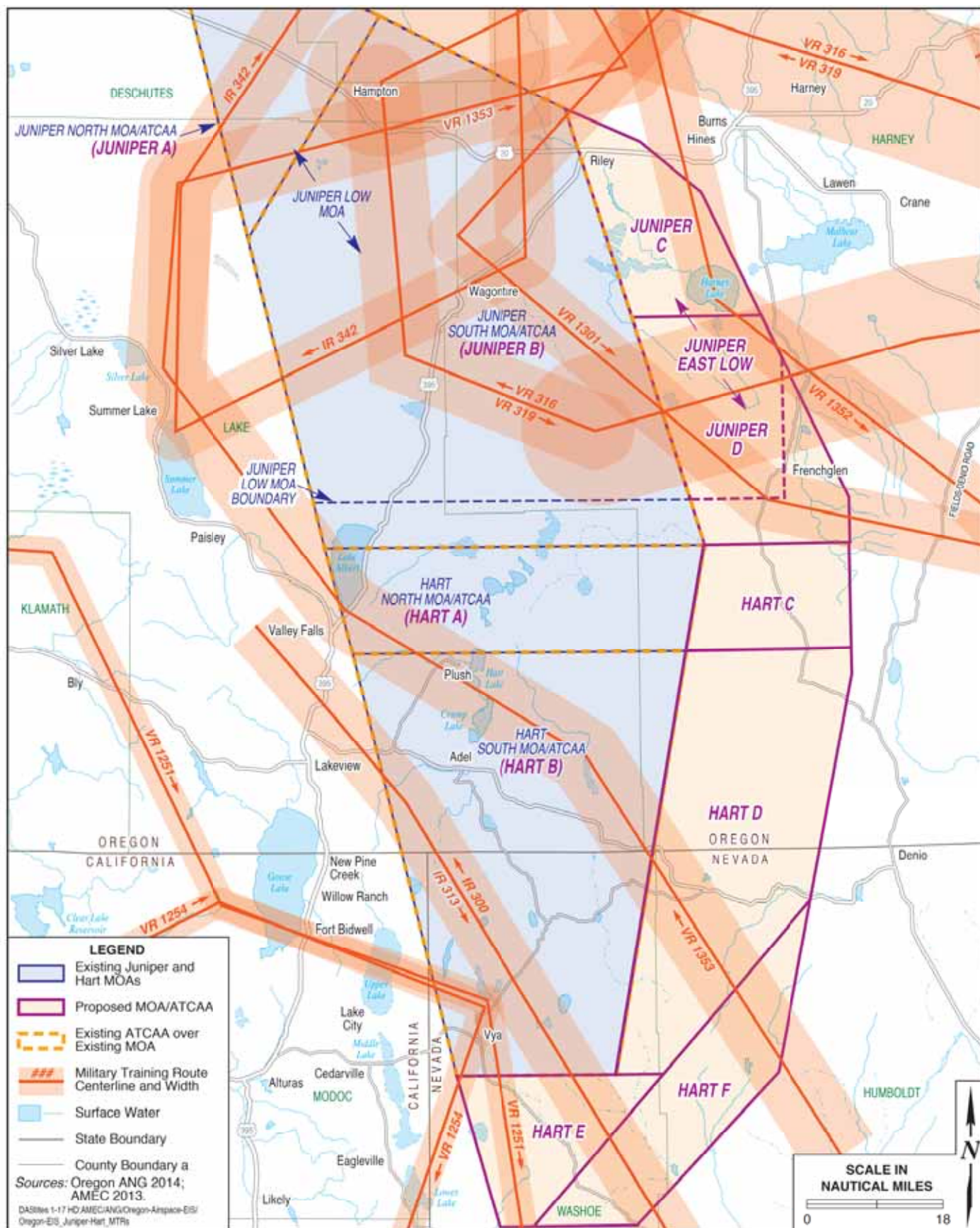
Notes: AGL - above ground level; AFB - Air Force Base; ANGB - Air National Guard Base; IR - Instrument Route; NAS - Naval Air Station; VR - Visual Route.

Oregon ANG use of MTRs is minimal and constitutes a negligible percentage of the average counts.

\*MTRs established below *proposed* airspace are included in this presentation because they comprise an element of the *existing* airspace inventory.

Sources: U.S. Navy 2013a and 2013b; USAF 2013; Idaho ANG 2013.

In addition, Figure 3.1-5 depicts MTRs located underneath portions of the existing and proposed Juniper/Hart MOA Complex while Figure 3.1-6 depicts existing MTRs located underneath the proposed Redhawk MOA Complex. (MTRs established below *proposed* airspace are included in this presentation because they comprise an element of the *existing* airspace inventory.) No existing MTRs are located underneath the Eel ATCAA or W-570 and Bass/Bass South ATCAAs. While the floor elevations of these MOAs are located as low as 100 feet AGL, military aircraft rarely fly below 500 feet AGL over-ground due to safety considerations and regulations.



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Existing MTRs in the Vicinity of the Juniper/Hart MOA Complex

FIGURE  
3.1-5



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.





FIGURE  
3.1-6

## **3.2 NOISE**

### **3.2.1 Introduction**

#### **3.2.1.1 Definition of Resource**

Noise is defined as unwanted sound or, more specifically, as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying (Federal Interagency Committee on Noise [FICON] 1992). Human response to noise can vary according to the type and characteristics of the noise source, the distance between the noise source and the receptor, the sensitivity of the receptor, and the time of day.

This section describes the existing noise environment in and beneath the affected and proposed airspace areas and provides a summary of the noise metrics that are pertinent to the analysis of noise-related effects in Section 4.2, *Noise*. Further, Appendix E, *Noise*, explains the basic properties of sound propagation, attenuation, and human responses to noise, and provides a more detailed description of the various noise metrics commonly used to assess noise-related impacts within special use airspace.

#### **3.2.1.2 Noise Metrics for Airspace Noise Analysis**

Due to the wide range in sound levels, sound is expressed in decibels (dB), a unit of measure based on a logarithmic scale. A 10 dB increase in noise level corresponds to a 100-percent increase (i.e., doubling) in perceived loudness. As a general rule, a 3 dB change is necessary for noise increases to be noticeable to humans (Bies and Hansen 1988). Sound measurement is further refined by using an A-weighted decibel (dBA) scale that emphasizes the range of sound frequencies that are most audible to the human ear (i.e., between 1,000 and 8,000 cycles per second). Sound frequency is measured in terms of hertz (hz), and the normal human ear can detect sounds ranging from about 20 to 15,000 hz. However, because all sounds in this wide range of frequencies are not heard equally well by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 hz range, the very high and very low frequencies are adjusted to approximate the human ear's lower sensitivity to those frequencies. This is called "A-weighting" and is commonly used in the measurement of community environmental noise. Unless

otherwise noted, all decibel measurements presented in the following noise analysis are dBA.

Table 3.2-1 identifies noise levels associated with some common indoor and outdoor activities and settings. Table 3.2-1 also indicates the subjective human judgments of noise levels, specifically the perception of noise levels doubling or being halved. For reference purposes, a baseline noise level of 70 dB is described as moderately loud. As can be seen in the table illustrating the logarithmic dB scale, humans perceive an increase of 10 dB as a doubling of loudness, while an increase of 30 dB corresponds with an eight-fold increase in perceived loudness.

### Measurements of Average Sound Level

#### *Day-Night Average A-Weighted Sound Level*

A-weighted day-night average sound level (DNL) is the preferred noise metric for aircraft operations in a community noise environment surrounding an airfield, in which noise is generally continuous or patterned. DNL averages A-weighted sound levels over a 24-hour period, with an additional 10 dB penalty added to noise events occurring between 10:00 p.m. and 7:00 a.m. This penalty is intended to account for generally lower background noise levels at night and the additional annoyance of nighttime noise events. The federal government adopted DNL in the early 1980s because it is considered the best single system of noise measurement that can be uniformly applied in measuring noise in communities around civilian airports and military facilities, and for which there is a relationship between projected noise and surveyed reaction of people to the noise. DNL is the preferred noise metric of the U.S. Department of Housing and Urban Development (HUD), the U.S. Department of Transportation (DOT), FAA, U.S. Environmental Protection Agency (USEPA), Veterans' Administration, and Department of Defense (DoD).

**Table 3.2-1. Sound Levels of Typical Noise Sources and Noise Environments**

| Average Decibel Level (dB) | Typical Physical Response under Continuous Exposure  | Example Source                                                                                              |
|----------------------------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 0                          |                                                      | Softest sound that can be heard                                                                             |
| 10                         |                                                      | Normal breathing                                                                                            |
| 20                         |                                                      | Ticking watch                                                                                               |
| 30                         |                                                      | Soft whisper                                                                                                |
| 40                         |                                                      | Refrigerator hum                                                                                            |
| 60                         |                                                      | Normal conversation or air conditioner                                                                      |
| 70                         | Annoying                                             | Washing machine or dishwasher                                                                               |
| 80-85                      | Very annoying                                        | City traffic (inside the car)                                                                               |
| 90                         | Damage to hearing possible after 2 hours of exposure | Gas-powered lawnmowers and leaf blowers                                                                     |
| 95                         | Damage to hearing possible after 1 hour of exposure  | Motorcycle                                                                                                  |
| 100                        | Hearing loss possible after 15 minutes               | Approaching subway train or car horn at approximately 16 feet                                               |
| 105                        | Hearing loss possible after 5 minutes                | The maximum set level for personal listening devices as well as very loud radio, stereos, and music at home |
| 110                        | Hearing loss possible in less than 2 minutes         | Shouting in the ear                                                                                         |
| 120                        | Hearing loss possible in less than 1 minute          | Standing by sirens                                                                                          |
| 140-150                    | Pain and even ear injury                             | Firecrackers or firearm shots                                                                               |

Source: Centers for Disease Control and Prevention 2016.

#### *Onset Rate-Adjusted Monthly Day-Night Average*

Military aircraft utilizing special use airspace, such as MOAs, MTRs, and Restricted Areas/Ranges, generate a noise environment that is somewhat different from that associated with airfield operations. As opposed to daily patterned or continuous noise environments associated with airfields, flight activity within special use airspace is highly sporadic and often seasonal. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-air-speed flyover can have a rather sudden onset, exhibiting a rapid rate of increase and rapid rate of decrease in sound level (e.g., up to 150 dB per second).



Onset rate-adjusted monthly day-night average, A-weighted sound level ( $L_{dnmr}$ ) is a noise metric that has been developed specifically for aircraft operations in special use airspace, including MOAs and MTRs (see Appendix E, *Noise*). The  $L_{dnmr}$  is similar to the DNL in that it is an average metric with a 10 dB penalty for events occurring between 10:00 p.m. and 7:00 a.m. However, because the tempo of operations is so variable,  $L_{dnmr}$  is calculated using the average number of operations per day in the busiest month of the year.  $L_{dnmr}$  represents an average for an entire month utilizing the highest monthly sortie activity (i.e., the busiest month), and includes an additional penalty up to 11 dB to compensate for the “startle” effect of a low-altitude overflight. For aircraft exhibiting a rate of increase in sound level (i.e., onset rate) of from 15 to 150 dB per second, an adjustment or penalty ranging from 0 to 11 dB is added. Onset rates above 150 dB per second require a 11 dB penalty, while onset rates below 15 dB per second require no adjustment. Because of this penalty,  $L_{dnmr}$  always equals or exceeds DNL. Consequently,  $L_{dnmr}$  can be conservatively compared to DNL noise thresholds (see Section 4.2, *Noise* for additional details regarding noise impact analysis methodology and FAA impact significance criteria). Further, because it is a conservative measure of average noise exposure over time with built-in penalties for rapid onset of noise,  $L_{dnmr}$  closely correlates with the probability of “highly annoying” a noise receptor, and is appropriate to use in areas where receptors would be highly sensitive to potential noise impacts.

#### Measurements of Short-term Noise Events

$L_{dnmr}$ , which is an average metric, is the accepted metric for land use compatibility guidelines beneath special use airspace; however, other important concerns regarding aircraft operations within special use airspace include the number, intensity, and duration of individual noise events that contribute to the  $L_{dnmr}$ . Consequently,  $L_{dnmr}$  is generally supplemented with metrics describing instances of unpredictable, discrete short-term noise events that produce long-term average  $L_{dnmr}$ .

#### *Maximum Sound Level*

The highest A-weighted sound level measured during a single event in which the sound level changes value over time (e.g., an aircraft overflight) is called the

maximum A-weighted sound level or maximum sound level ( $L_{\max}$ ). See Table 3.2-2 below for a description of  $L_{\max}$  by altitude for F-15 aircraft.

**Table 3.2-2. Maximum Sound Level for F-15s Based on Distance from Aircraft Source**

| Altitude (Feet AGL) | Decibel Level (dB) |
|---------------------|--------------------|
| 500                 | 116                |
| 1,000               | 111                |
| 2,000               | 105                |
| 4,000               | 98                 |
| 8,000               | 90                 |
| 10,000              | 87                 |

Notes: Power settings for these fly-overs were 400 knots indicated speed at 90 percent power (see Appendix E, *Noise*); these noise level extrapolations have been corroborated by noise demonstration fly-overs.

Source: Wyle 2008.

### *Sound Exposure Level*

Although the maximum sound level described above provides some measure of the intrusiveness of the event, it does not completely describe the noise heard throughout the duration of the flyover event. The period of time during which the sound is heard is also significant. The Sound Exposure Level (SEL) combines both of these characteristics into a single metric.

SEL is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. It represents the sound level of the constant sound that would, in one second, generate the same acoustic energy, as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the SEL of an overflight for slower moving aircraft is usually greater than the  $L_{\max}$  of the overflight.

SEL is a composite metric (i.e., made up of distinct parts), which represents both the intensity of a sound and its duration. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than simply relying on the A-weighted sound level.

Similar to  $L_{dnmr}$ , SEL is a conservative noise metric and is therefore an appropriate metric to use in situations where receptors are highly sensitive to noise. During the public scoping process, several members of the public indicated that noise was a concern beneath the affected airspace, and that the area would be sensitive to increases in noise following implementation of the Proposed Action. Neither the FAA nor the USAF requires evaluation of SEL, but the ANG has elected to evaluate SEL for this analysis in an attempt to more fully address public concerns.

#### 3.2.1.3 Noise Modeling Methodology

The noise analysis for existing conditions within the existing W-570 airspace and Juniper/Hart MOA Complex, as well as existing conditions along the established MTRs – entirely separate from the Proposed Action – employed the noise model MRNMAP version 3.0. The MRNMAP program was used to calculate uniform distributed  $L_{dnmr}$  levels and the average daily number of events that exceed 65 dB SEL within existing MOAs and along active MTRs. The analytical parameters considered in this analysis included aircraft type, airspeed, power settings, proposed aircraft operations, vertical training profile, and a conservative estimate of the amount of time spent within each airspace block (see Appendix E, *Noise*).

For the purpose of this analysis, an operation is defined as a randomized flight pattern occurring within the boundaries of a designated MOA, or along an MTR. The aircraft noise evaluation in this analysis is based on the busiest month of aircraft operations and the type of mission flown by each of the military aircraft. Information on the number of aircraft operations occurring at various altitudes within the MOAs and along the MTRs was collected from the 142 FW and 173 FW as well as the primary scheduling personnel for the MTRs. The complete analysis parameters for baseline noise conditions using MRNMAP version 3.0 are presented in Appendix E, *Noise*.

#### 3.2.1.4 Regional Setting

The majority of proposed airspace actions are located within the State of Oregon. However, the proposed expansion of the Juniper/Hart Military MOA Complex would include airspace over portions of Humboldt and Washoe counties in northwestern Nevada. Additionally, modifications to the Eel ATCAA would

include airspace over a small portion of Pacific County in Washington and modification to W-570 and the Bass/Bass South ATCAAs would occur over the Pacific Ocean. The land areas that would be affected by the Proposed Action are generally characterized by rural, low density communities with pockets of concentrated populations along the coast, including the communities of Astoria, Lincoln City, Pacific City, and Tillamook.

### **3.2.2 Existing Conditions**

#### **3.2.2.1 Noise in the Airfield Environment**

Noise levels from flight operations typically occur beneath main approach and departure corridors, or local air traffic patterns around an airfield, and in areas immediately adjacent to parking ramps and aircraft staging areas. As aircraft take off and gain altitude, their noise contribution drops.

The number of sorties departing from the home airfields used by the 142 FW and the 173 FW – Portland International Airport and Kingsley Field, respectively – would not change as a result of the proposed establishment and modification of airspace areas. Therefore, existing noise exposure levels surrounding the airfields would not be affected by the Proposed Action.

#### **3.2.2.2 Monthly Day-Night Average Airspace Noise Levels**

Military flight operations were modeled beneath the existing and proposed MOAs in order to evaluate existing noise conditions and provide a baseline against which project noise levels could be assessed. In addition, other noise sources within the ROI have been described qualitatively by land use.

#### **Eel MOA/ATCAA and W-570**

Under the Proposed Action, Eel MOAs A through D would be established beneath the existing Eel ATCAA over the coastal counties of Clatsop, Tillamook, Yamhill, Polk, and Lincoln in Oregon, and Pacific County in Washington. Proposed modifications to W-570, Bass/Bass South ATCAAs would only affect the floor and ceiling of the airspace; the existing location of the airspace above the Pacific Ocean would remain the same.

### *Existing W-570 and Bass/Bass South ATCAAs*

The noise environment below the existing W-570 airspace and Bass/Bass South ATCAAs, located over the Pacific Ocean, is dominated by sound resulting from wind and open ocean waves. However, occasional vessel engine noise as well as noise generated by military aircraft also contributes to the existing noise environment. Existing military aircraft operations occur within the existing W-570 airspace from ocean surface level to 50,000 feet MSL with 85 percent of operations occurring above 7,000 feet AGL. There are no low-altitude MTRs in this location (see Table 3.2-3).

**Table 3.2-3. Sound Levels Associated with Existing Military Aircraft Operations in the Existing W-570**

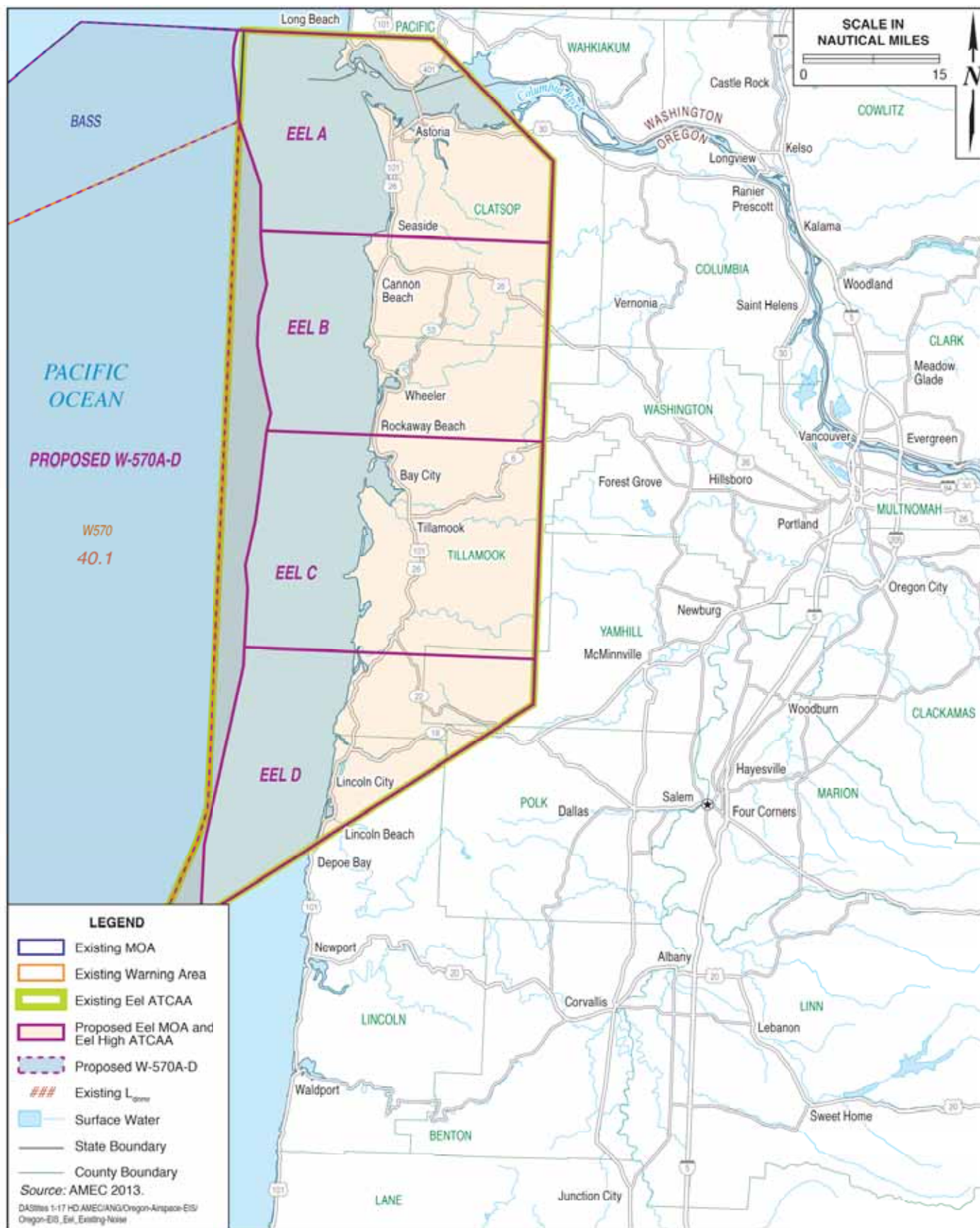
| Special Use Airspace | Uniform Distributed<br>Sound Level<br><i>L</i> <sub>dnmr</sub> | Maximum<br>Centerline<br><i>L</i> <sub>dnmr</sub> | Number of Daily<br>Events Above 65 dB<br>SEL |
|----------------------|----------------------------------------------------------------|---------------------------------------------------|----------------------------------------------|
| Warning Areas        |                                                                |                                                   |                                              |
| W-570                | 40.1                                                           | -                                                 | 0.1                                          |

Note: *L*<sub>dnmr</sub> within an MTR is measured along the centerline as an MTR is a linear corridor. *L*<sub>dnmr</sub> levels decrease with increased distance from the centerline. No MTRs occur within or below the existing Eel ATCAA or W-570 airspace.

Source: AMEC 2013; Please see Appendix E, *Noise* for full noise modeling criteria and results.

Noise levels within the existing W-570 airspace are punctuated by occasional events above 65 dB SEL (i.e., low level military overflights). These events occur approximately once every ten days in most locations within the airspace.

Flight operations within the existing Bass/Bass South ATCAA occur above 18,000 feet MSL. These operations were not modeled as they are infrequent and occur at such high altitudes that they do not measurably contribute to the existing noise environment below.



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**Existing Noise Levels Associated with  
Oregon ANG Operations in the Existing W570**

**FIGURE  
3.2-1**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

### *Existing Eel ATCAA and Proposed Eel MOA/ATCAA*

The noise environment along the coast below the existing Eel ATCAA and the proposed Eel MOA/ATCAA is comprised of a combination of urban city environments, suburban neighborhoods, rural parks, open spaces, natural areas, and open water.<sup>4</sup> Within the coastal cities, including Astoria, Lincoln City, Pacific City, and Tillamook, the noise environment at ground-level is dominated by street traffic, event activity (e.g., sports events, special events, etc.), commercial and mixed-use activities, construction noise activity, and public activity (e.g., barking dogs, music, car alarms, etc.).

According to FICON, the authority on Federal policy and guidance regarding noise, typical suburban communities have an outdoor noise level of 53 to 57 DNL, while more densely populated urban areas have sound levels in the range of 63 to 67 DNL, with sound levels changing rapidly as activities change around the receptor (FICON 1992). Most of the remaining population residing in rural or other non-urban areas is estimated to experience outdoor DNL values ranging between 30 and 50 dB (FICON 1992; USEPA 1974).

Flight operations within the existing Eel ATCAA occur above 18,000 feet MSL. These operations were not modeled as they are infrequent and occur at high altitudes that they do not measurably contribute to the existing noise environment below.

### Juniper/Hart MOA Complex

Proposed expansion of the existing Juniper/Hart MOA Complex would extend the existing training airspace eastward over Harney County, Oregon and to the south over portions of Washoe and Humboldt counties in Nevada.

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<sup>4</sup> The noise environment below the existing Eel ATCAA and the proposed Eel MOA/ATCAA are identical since the proposed Eel MOA/ATCAA would be established within the same footprint as the existing Eel ATCAA.

### *Existing Juniper/Hart MOA Complex*

The noise environment beneath the existing Juniper/Hart MOA Complex is generally dominated by non-urban natural sounds, characteristic of a rural environment. The majority of the land below the existing Juniper/Hart MOA Complex is owned and managed by the U.S. Bureau of Land Management (BLM) or the U.S. Fish and Wildlife Service (USFWS), though portions are owned and managed by private individuals or companies (see Section 3.3, *Land Use and Visual Resources*). BLM and USFWS lands are designated as protected (e.g., wildlife areas, wildlife refuges, etc.) or are managed for multiple uses, including recreation. Private lands in the area are primarily used for ranching activities. Noise levels associated with ranching are low and similar to wind.

The noise environment beneath the existing and Juniper/Hart MOA Complex is also affected by sporadic military aircraft operations. Operations within the existing Juniper North and Juniper South airspace areas as well as the existing Hart North and Hart South airspace areas occur above 11,000 feet MSL. However, low-altitude operations within the existing Juniper Low MOA and along existing MTRs in the area (i.e., Visual Routes [VR] and Instrument Routes [IR]) are authorized at altitudes as low as 500 feet AGL and 100 feet AGL, respectively (refer to Section 3.1, *Airspace Management*).

Unlike local aircraft operations at an airfield, operations within the existing Juniper Low MOA and along existing MTRs are infrequent and sporadic. Approximately 243 flight hours per year are currently flown within the existing Juniper Low MOA, between 500 and 11,000 feet AGL, and flight activity along existing MTRs range from zero operations per year along IR-313 to 144 operations per year along VR-1301. Although low-altitude aircraft operations can produce loud noise levels during individual flyover events, unlike an airfield environment, aircraft-related noise from airspace operations is not the dominant noise source beneath the existing Juniper/Hart MOA Complex. Additionally, unlike local aircraft operations at an airfield, flyover events are unpredictable and can happen anywhere within a MOA. On a daily 24-hour average throughout the Juniper/Hart MOA Complex, the contribution of noise generated from military is less than ambient levels described for rural areas (i.e., < 50 DNL; see Table 3.2-4).



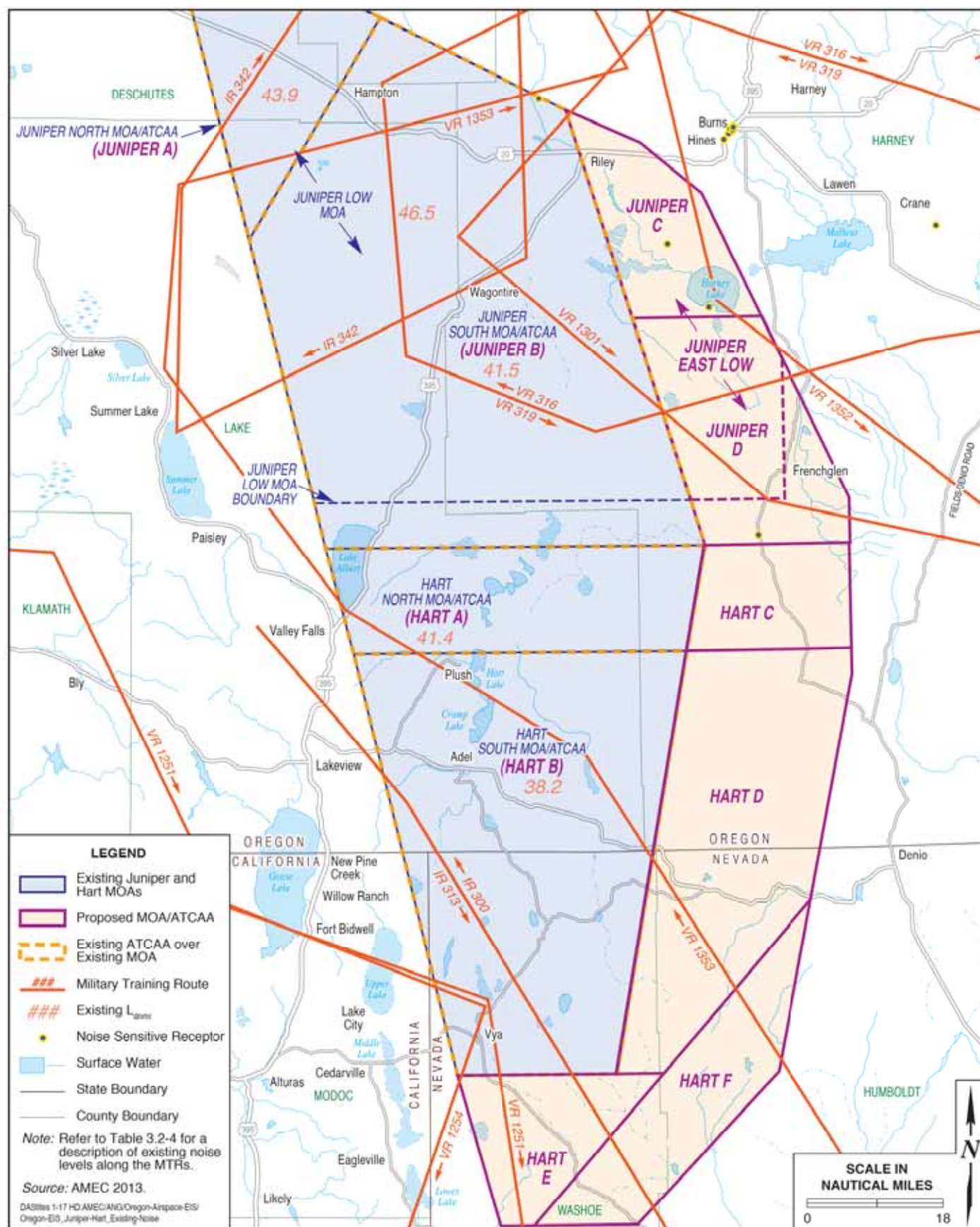


**Table 3.2-4. Sound Levels Associated with Existing Military Aircraft Operations in the Existing Juniper/Hart MOA Complex**

| Special Use Airspace | Uniform Distributed<br>Sound Level<br>$L_{dnmr}$ | Maximum<br>Centerline<br>$L_{dnmr}$ | Number of Daily<br>Events Above 65 dB<br>SEL |
|----------------------|--------------------------------------------------|-------------------------------------|----------------------------------------------|
| MOAs                 |                                                  |                                     |                                              |
| Juniper North        | 43.9                                             | -                                   | 0.3                                          |
| Juniper South        | 41.5                                             | -                                   | 0.8                                          |
| Juniper Low          | 46.5                                             | -                                   | 0.0                                          |
| Hart North           | 41.4                                             | -                                   | 0.3                                          |
| Hart South           | 38.2                                             | -                                   | 0.2                                          |
| MTRs                 |                                                  |                                     |                                              |
| IR-300               |                                                  |                                     |                                              |
| - Track Segment B-C  | -                                                | 43.5                                | 0.1                                          |
| - Track Segment C-D  | -                                                | 44.1                                | 0.1                                          |
| IR-313               |                                                  |                                     |                                              |
| - Track Segment R-S  | -                                                | 43.5                                | 0.1                                          |
| - Track Segment S-T  | -                                                | 41.5                                | 0.1                                          |
| IR-342               |                                                  |                                     |                                              |
| - Track Segment C-D  | -                                                | 30.6                                | 0.0                                          |
| - Track Segment D-E  | -                                                | 30.6                                | 0.0                                          |
| - Track Segment F-G  | -                                                | 30.6                                | 0.0                                          |
| VR-316               |                                                  |                                     |                                              |
| - Track Segment C-D  | -                                                | 19.6                                | 0.0                                          |
| - Track Segment D-E  | -                                                | 20.8                                | 0.0                                          |
| - Track Segment E-F  | -                                                | 22.5                                | 0.0                                          |
| - Track Segment F-G  | -                                                | 19.6                                | 0.0                                          |
| VR-319               |                                                  |                                     |                                              |
| - Track Segment F-G  | -                                                | 7.0                                 | 0.0                                          |
| - Track Segment G-H  | -                                                | 9.5                                 | 0.0                                          |
| - Track Segment H-I  | -                                                | 8.0                                 | 0.0                                          |
| - Track Segment I-J  | -                                                | 7.0                                 | 0.0                                          |
| VR-1251              |                                                  |                                     |                                              |
| - Track Segment J-K  | -                                                | 39.8                                | 0.0                                          |
| - Track Segment K-L  | -                                                | 39.8                                | 0.0                                          |

**Table 3.2-4. Sound Levels Associated with Existing Military Aircraft Operations in the Existing Juniper/Hart MOA Complex (Continued)**

| Special Use Airspace  | Uniform Distributed Sound Level<br>$L_{dnmr}$ | Maximum Centerline<br>$L_{dnmr}$ | Number of Daily Events Above 65 dB SEL |
|-----------------------|-----------------------------------------------|----------------------------------|----------------------------------------|
| VR-1254               |                                               |                                  |                                        |
| - Track Segment B-C   | -                                             | 31.6                             | 0.0                                    |
| - Track Segment C-D   | -                                             | 31.6                             | 0.0                                    |
| VR-1301               |                                               |                                  |                                        |
| - Track Segment D-E   | -                                             | 30.6                             | 0.0                                    |
| - Track Segment E-F   | -                                             | 30.6                             | 0.0                                    |
| VR-1353               |                                               |                                  |                                        |
| - Track Segment A-B   | -                                             | 35.3                             | 0.1                                    |
| - Track Segment B-C   | -                                             | 35.3                             | 0.1                                    |
| - Track Segment C-Q   | -                                             | 38.7                             | 0.1                                    |
| - Track Segment Q1-Q2 | -                                             | 38.7                             | 0.1                                    |

Note:  $L_{dnmr}$  within an MTR is measured along the centerline as an MTR is a linear corridor.  $L_{dnmr}$  levels decrease with increased distance from the centerline.

Source: AMEC 2013; Please see Appendix E, *Noise*, for full noise modeling criteria and results.

#### *Proposed Juniper/Hart MOA Complex Expansion Area*

Within the proposed Juniper/Hart expansion area, the noise environment is generally dominated by non-urban natural sounds, characteristic of a rural environment. Similar to the area beneath the existing Juniper/Hart MOA Complex, the majority of land below the proposed Juniper/Hart expansion area is owned and managed by the BLM or the USFWS (see Section 3.3, *Land Use and Visual Resources*). These BLM and USFWS lands are designated as protected (e.g., wildlife areas, wildlife refuges, etc.) or are managed for multiple uses, including recreation. Private lands in the area are primarily used for ranching activities. Noise associated with ranching is low and generally would be expected to similar to wind.

No MOAs currently overlie the footprint of the proposed Juniper/Hart expansion area. However, the noise environment beneath the proposed Juniper/Hart expansion area is periodically affected by military aircraft operations along existing MTRs, which allow military training at altitudes as low as 100 feet AGL (refer to Section 3.1, *Airspace Management*).

As previously described, flight operations along MTRs in this area are infrequent. Consequently, while low-altitude aircraft operations can produce high noise levels during individual flyover events, aircraft-related noise from airspace operations is not the dominant noise source beneath the proposed Juniper/Hart expansion area. Consequently, on a daily 24-hour average along the MTRs, the contribution of military aircraft-related noise is lower than ambient levels for rural areas (see Table 3.2-5).

**Table 3.2-5. Sound Levels Associated with Existing Military Aircraft Operations in the Proposed Juniper/Hart MOA Complex Expansion Area**

| Special Use Airspace | Uniform Distributed<br>Sound Level<br><i>L</i> <sub>dnmr</sub> | Maximum<br>Centerline<br><i>L</i> <sub>dnmr</sub> | Number of Daily<br>Events Above 65 dB<br>SEL |
|----------------------|----------------------------------------------------------------|---------------------------------------------------|----------------------------------------------|
| MTRs                 |                                                                |                                                   |                                              |
| VR-1251              |                                                                |                                                   |                                              |
| - Track Segment K-L  | -                                                              | 39.8                                              | 0.0                                          |
| VR-1254              |                                                                |                                                   |                                              |
| - Track Segment C-D  | -                                                              | 31.6                                              | 0.0                                          |
| IR-300               |                                                                |                                                   |                                              |
| - Track Segment C-D  | -                                                              | 44.1                                              | 0.1                                          |
| IR-313               |                                                                |                                                   |                                              |
| - Track Segment R-S  | -                                                              | 43.5                                              | 0.1                                          |
| VR-1352              |                                                                |                                                   |                                              |
| - Track Segment A-B  | -                                                              | 28.1                                              | 0.0                                          |
| - Track Segment B-C  | -                                                              | 28.1                                              | 0.0                                          |
| VR-1301              |                                                                |                                                   |                                              |
| - Track Segment E-F  | -                                                              | 30.6                                              | 0.0                                          |
| - Track Segment F-G  | -                                                              | 30.6                                              | 0.0                                          |
| VR-1353              |                                                                |                                                   |                                              |
| - Track Segment A-B  | -                                                              | 35.3                                              | 0.1                                          |
| VR-316               |                                                                |                                                   |                                              |
| - Track Segment C-D  | -                                                              | 19.6                                              | 0.0                                          |
| VR-319               |                                                                |                                                   |                                              |
| - Track Segment I-J  | -                                                              | 7.0                                               | 0.0                                          |

Note: *L*<sub>dnmr</sub> within an MTR is measured along the centerline as an MTR is a linear corridor. *L*<sub>dnmr</sub> levels decrease with increased distance from the centerline.

Source: AMEC 2013; Please see Appendix E, *Noise*, for full noise modeling criteria and results.

### Redhawk MOA Complex

The noise environment beneath the proposed Redhawk MOA Complex is similar to the noise environment described for the existing Juniper/Hart MOA Complex and proposed Juniper/Hart MOA Complex expansion area. This region of central Oregon is largely undeveloped and dominated by non-urban natural sounds, characteristic of a rural environment. Much of the land beneath the proposed Redhawk MOA Complex is held by private individuals or companies and used for ranching activities (see Section 3.3, *Land Use and Visual Resources*). As previously described, noise associated with ranching is low and to similar to wind.

While the noise environment beneath the proposed Redhawk MOA Complex is not currently affected by any existing overlying MOAs, this area is traversed by four MTRs with authorized operational altitudes as low as 500 feet AGL (refer to Section 3.1, *Airspace Management*). Flight operations within the existing MTRs are sporadic and infrequent, ranging from four operations per year along IR-343 to 58 operations per year along VR-1353. Consequently, while low-altitude aircraft operations can produce high noise levels during individual flyover events, unlike an airfield environment, aircraft-related noise from low-altitude airspace operations is not the dominant noise source beneath the proposed Redhawk MOA Complex. On average, the contribution of military aircraft-related noise along MTRs beneath the proposed Redhawk MOA Complex is lower than ambient levels for rural areas (see Table 3.2-6).

#### 3.2.2.3 Supersonic Aircraft Noise

Aircraft in supersonic flight (i.e., exceeding the speed of sound [Mach 1.0]) generate an air pressure wave. The air pressure wave is sometimes reflected upward resulting from changing air temperatures at different altitudes such that it never reaches the ground (Plotkin et al. 1989). When the pressure wave does reach the ground, it is heard as a sonic boom. A sonic boom is characterized by a rapid increase in pressure followed by a decrease before a second rapid return to normal atmospheric levels. This change occurs quickly, usually within a few tenths of a second. It is usually perceived as a “bang-bang” sound. The amplitude of a sonic boom is measured by its peak overpressure, in pounds per square foot. The amplitude depends on the aircraft’s size, weight, geometry, Mach number, maneuver (e.g., turn, dive, etc.), and flight altitude.

**Table 3.2-6. Sound Levels Associated with Existing Military Aircraft Operations in the Proposed Redhawk MOA Complex**

| Special Use Airspace | Uniform Distributed<br>Sound Level<br>L <sub>dnmr</sub> | Maximum<br>Centerline<br>L <sub>dnmr</sub> | Number of Daily<br>Events Above 65 dB<br>SEL |
|----------------------|---------------------------------------------------------|--------------------------------------------|----------------------------------------------|
| MTRs                 |                                                         |                                            |                                              |
| IR-342               |                                                         |                                            |                                              |
| - Track Segment G-H  | -                                                       | 30.6                                       | 0.0                                          |
| - Track Segment H-I  | -                                                       | 30.6                                       | 0.0                                          |
| - Track Segment I-J  | -                                                       | 30.6                                       | 0.0                                          |
| IR-343               |                                                         |                                            |                                              |
| - Track Segment F-G  | -                                                       | 27.1                                       | 0.0                                          |
| - Track Segment G-H  | -                                                       | 27.1                                       | 0.0                                          |
| - Track Segment H-I  | -                                                       | 16.6                                       | 0.0                                          |
| - Track Segment I-J  | -                                                       | 16.6                                       | 0.0                                          |
| VR-1353              |                                                         |                                            |                                              |
| - Track Segment Q2-D | -                                                       | 38.7                                       | 0.1                                          |
| - Track Segment D-E  | -                                                       | 38.7                                       | 0.1                                          |
| VR-1352              |                                                         |                                            |                                              |
| - Track Segment A-B  | -                                                       | 28.1                                       | 0.0                                          |

Source: AMEC 2013; Please see Appendix E, *Noise*, for full noise modeling criteria and results.

There are several factors that influence sonic booms, including weight, size, and shape of the aircraft or vehicle, as well as its altitude, attitude (i.e., orientation or position) and flight path, and weather or atmospheric conditions. A larger and heavier aircraft must displace more air and create more lift to sustain flight, compared with small, light aircraft. Therefore, they will create stronger and louder sonic booms than those associated with smaller, lighter aircraft. The larger and heavier the aircraft, the stronger the pressure waves will be. Altitude determines the distance pressure waves travel before reaching the ground, and this has the most significant effect on the intensity of sonic booms. As the shock cone gets wider with altitude, and it moves outward and downward, its strength is reduced. Generally, the higher the aircraft, the greater the distance the pressure wave must travel, reducing the intensity of the sonic boom.

Not all supersonic flights cause sonic booms that are heard on the ground. As altitude increases, air temperature and sound speed decrease. The change in the speed of sound with altitude typically results in pressure waves, which create

sonic booms, to be turned upward as they move toward the ground. Depending on the altitude of the aircraft and the Mach number, many pressure waves can be bent upward such that they never reach the ground. This phenomenon, referred to as “cutoff”, also acts to limit the width (or area covered) of the sonic booms that do reach the ground.

While the single biggest condition affecting overpressure is altitude, maneuvers can also affect boom pounds per square foot, increasing, or decreasing overpressures from those for steady level flight. Overpressures of 1 to 2 pounds per square foot (psf) are produced by supersonic aircraft flying at normal operating altitudes (National Aeronautics and Space Administration [NASA] 2015), which are below those that would begin to cause physical injury to humans or wildlife. However, they can be annoying and cause a startle reaction in humans and wildlife. For example, some scattered public reaction could be expected between 1.5 and 2 psf (NASA 2015). On occasion, sonic booms can cause physical damage (e.g., window breakage, etc.) if the overpressure is of sufficient magnitude. Minor damage to structures may occur with 2 to 5 psf (NASA 2015). The condition of the structure is a major factor when damage occurs, the probability of which still tends to be low. For example, at 1 psf, the probability of a window breaking ranges from one in a billion (Sutherland 1990) to one in a million (Hershey and Higgins 1976). These damage rates are associated with a combination of boom load and glass condition. At 10 psf, the probability of breakage is between one in a hundred and one in a thousand. Laboratory tests of glass (White 1972) have shown that properly installed window glass will not break at overpressures below 10 psf, even when subjected to repeated booms.

Sonic booms from air combat training activities tend to be concentrated within elliptical boundaries fitting within airspace. Aircraft set up at positions at opposite ends of the airspace before proceeding toward each other for engagement. Supersonic events can occur as the aircraft accelerate toward each other, during dives in the engagement itself, and during disengagement.

The USAF has established accepted supersonic flight procedures that are applicable over both land and water to reduce the probability of sonic booms. Supersonic flights occurring over water must take place 15 NM offshore and at an altitude above 10,000 feet MSL with the nose of the aircraft pointed away from the

coastline.<sup>5</sup> Supersonic flights over land must take place at altitudes above 30,000 feet MSL and within designated airspace. These procedures have been developed to limit the potential for sonic booms to affect the ground surface. At 30,000 feet an aircraft generates a relatively narrow boom carpet with an approximately 30-mile width. Further, F-15 aircraft flying at Mach 1.2 to Mach 1.3 at 30,000 feet generate an average overpressure of approximately 1.34 psf (NASA 1992), which is below the pressures that generally illicit human reaction (NASA 2015).

**Table 3.2-7. Typical Sonic Boom Overpressure Ranges and Equivalents**

| Overpressure (psf) | Common Equivalent                    |
|--------------------|--------------------------------------|
| 0.5 – 2            | Pile driver at construction site     |
| 2 – 4              | Cap gun or firecracker near ear      |
| 4 – 10             | Handgun as heard at shooter's ear    |
| 10 – 14            | Fireworks display from viewing stand |

Source: FAA 1999.

Annoyance created by sonic booms is a function of boom intensity, number of booms per time period, attitude of the population, and the activity in which people were engaged at the time of the boom. There is no precise relationship between the parameters. For example, while a Department of Transportation study (1990) found that 10 percent of subjects exposed to 10-15 booms per day were annoyed at an overpressure of 1 psf, other studies indicate that there is a wide range in estimating percent annoyed ranging from 10 to 70 percent at 1 psf and 55 to approximately 100 percent at 3 psf (American Institute of Aeronautics and Astronautics 1990).

Currently, 40 percent of 142 FW and 60 percent of 173 FW sorties require aircraft exceeding Mach 1.0 (supersonic) for brief periods of time (i.e., less than one minute) and take place within Juniper, Hart, and Bass ATCAAs and Warning Areas 93 and 570 (AFI 11-2F-15V3 KF CH 8). Per USAF supersonic flight procedures, 142 FW and 173 FW sorties with a supersonic component are conducted above 30,000 feet MSL within the ATCAAs over land and above 10,000

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<sup>5</sup> In smooth flight, the pressure wave starts at the nose of the aircraft and ends at the tail. There is a rise in pressure at the nose, decreasing steadily to a negative pressure at the tail, followed by a sudden return to normal pressure after the object passes. The boom is generated continuously as long as the aircraft is supersonic, filling out a narrow path on the ground following the aircraft's flight path, known as a boom carpet.



feet MSL and 15 miles off-shore within the Warning Areas over water with the nose of the aircraft pointed away from coastline.

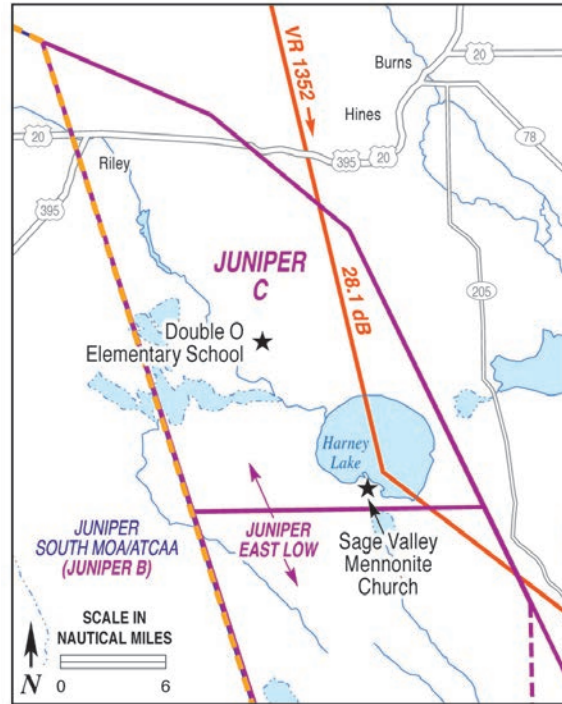
#### 3.2.2.4 Noise Sensitive Receptors Rationale

The floor of the proposed Eel MOA/ATCAA, proposed Redhawk MOA Complex, and the majority of the proposed Juniper/Hart MOA Complex expansion area would be located above 11,000 feet MSL, rendering it highly unlikely that sensitive receptors beneath these areas would notice any change in daily noise exposure, as sensitive receptors would be located approximately 4,500 feet below the floor of the proposed airspace, and by more than 10,000 feet in the case of the proposed Eel MOA Complex. The floor of the existing Juniper Low MOA is located at 300 feet AGL and the floor of the proposed Juniper East Low MOA would be located at 500 feet AGL. On average throughout the existing Juniper Low MOA Complex, due to the randomness and distribution of flight operations throughout the airspace, the contribution of military aircraft-related noise would be lower than ambient levels for rural areas (refer to Table 3.2-4 and 3.2-5). However, a low-altitude flyover event in the immediate vicinity of a sensitive receptor could result in loud and sudden noise that would be experienced by the receptors located within the footprint beneath the existing and proposed Juniper Low MOA elements. Two sensitive receptors were identified below the proposed Juniper East Low MOA (see Table 3.2-8). While no low level training airspace currently overlies these locations, a low-altitude MTR (i.e., VR-1352) – an existing route entirely separate from any element of the Proposed Action – is routed within the immediate vicinity of these sensitive receptors: Double O Elementary School and Sage Valley Mennonite Church (see Figure 3.2-3).

**Table 3.2-8 Sensitive Receptors Beneath the Proposed Juniper East Low MOA**

| Institution                  | Address                              |
|------------------------------|--------------------------------------|
| Schools                      |                                      |
| Double O Elementary School   | 60077 Double O Road, Hines, OR 97738 |
| Places of Worship            |                                      |
| Sage Valley Mennonite Church | 68159 S Harney Road, Burns, OR 97720 |

Source: Google Earth 2013.



Source: AMEC 2013.

**Figure 3.2-3. Sensitive Receptors**

#### 3.2.2.5 Noise Abatement Procedures

Avoidance of noise-sensitive areas is emphasized to all flying units utilizing special use airspace (SUA) and is noted in Special Operating Procedures (SOPs) established for each SUA within the U.S. Additionally, avoidance of noise-sensitive areas is emphasized to all instructors and students associated with 173 FW and 142 FW. SOPs identify areas where overflights at low altitudes should be avoided to the maximum extent practicable (e.g., National Marine Sanctuaries [NMS], National Wildlife Refuges [NWRs], farms and ranches, nesting sites, towns, and recreation areas, etc.). Implementation of avoidance procedures for noise sensitive areas provides additional training opportunities for military pilots associated with the avoidance of known threats in real-world flight missions. Scheduling agencies for SUAs are responsible for informing pilots of previously or newly identified noise-sensitive areas.

### 3.3 LAND USE AND VISUAL RESOURCES

#### 3.3.1 Introduction

##### 3.3.1.1 Definition of Resources

Land cover/land use can be separated into two primary categories: *natural* and *human modified*. *Natural* land cover includes woodlands, rangeland, grasslands, and other open or undeveloped areas. *Human-modified* land use includes residential, commercial, industrial, communications and utilities, agricultural, institutional, recreational, and generally other areas developed from a natural land cover condition.

Visual resources are defined as, “the visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features)” (Department of Interior [DOI] 1984). These features form the overall impressions that an observer receives of an area or its landscape character. Landforms, water surfaces, vegetation, and manufactured features are considered characteristic of an area if they are inherent to the structure and function of a landscape.

##### 3.3.1.2 Regional Setting

The majority of proposed airspace actions are located within the planning jurisdiction of the State of Oregon and local entities (e.g., cities, counties, etc.). The proposed expansion of the Juniper/Hart MOA Complex would include airspace over a small portion of Nevada, including the northernmost regions of Humboldt and Washoe counties. Additionally, modifications to the existing Eel ATCAA would include airspace over a small portion of Washington State, including Pacific County (refer to Figure 1-1).

#### Terrestrial Land Use and Visual Resources

Land uses and visual resources below the airspace areas are varied and include urbanized regions (e.g., Astoria, Condon, Frenchglen, etc.), rural farmland and timberlands, and remote and virtually unaltered open spaces that provide recreational opportunities and wildlife protection. The Great Basin Desert occupies southeastern Oregon, with farmland and National Forest lands comprising the predominant land uses. The western half of the state is

predominately forestland, with land uses consisting primarily of private timberlands, National Forest, and pockets of urban areas.

Similar to land use below the affected and proposed airspaces, viewsheds and landscapes below the affected and proposed airspaces are varied. The proposed Eel MOA/ATCAA overlies the Cascade Range, a major mountain range which extends from Northern California through Oregon and into Washington. The steep coastal mountains of California's redwood forests continue the full length of the Pacific shoreline in Oregon, underlying the proposed Eel MOA/ATCAA, with coastal viewsheds that include small islands and secluded beaches. The Juniper/Hart MOA Complex overlies the Great Basin Desert, which occupies the southeastern third of Oregon extending into Nevada and is characterized by a diversity of landforms, including valleys, basins, lakes and mountain ranges. The proposed Redhawk MOA Complex overlies the high desert of eastern Oregon, which features vast, sparsely vegetated plains, separated by isolated treeless mountains, hot springs, dry lakes, wetlands, volcanic remains, and deep narrow canyons (Crossley 2013).

#### Airspace and Aircraft Activity

Existing transient military, commercial, and civilian aircraft operations within the ROI result in the temporary presence of aircraft within existing airspaces or along existing MTRs and commercial flight routes. In some cases, this aircraft activity produces contrails and during military training operations within existing airspaces, chaff and flare may be deployed per FAA and DoD regulations (see Section 3.7, *Safety*).

#### *Contrails*

Aircraft contrails are line-shaped clouds or “condensation trails,” composed of ice particles that are visible behind jet aircraft engines, typically at cruise altitudes in the upper atmosphere. Depending on the temperature and the amount of moisture in the air at the aircraft altitude, contrails can evaporate quickly (in low humidity) or persist and grow (in high humidity). Jet engine exhaust provides only a small portion of the water that forms ice in persistent contrails. Persistent contrails are mainly composed of water that is naturally present along the aircraft flight path.

### *Chaff and Flare*

Chaff consists of small, extremely fine fibers of aluminum-coated glass that disperse widely when ejected from aircraft. During a particulate test conducted by the USAF's Air Combat Command (ACC), chaff debris settled quickly, indicating that chaff does not remain in the air column for long periods of time and therefore would not impair visibility (USAF 1997). Flares emit a small quantity of visible smoke when initially ignited (USAF 1997). However, the effect of this smoke on visibility is negligible due in part both to the small quantity released and the altitudes at which flares are deployed. Chaff and flare are currently used within the existing W-570 as well as the Juniper/Hart MOA Complex.

#### 3.3.1.3 Existing Regulatory Setting

Land use is regulated by management plans, policies, regulations, and ordinances (i.e., zoning) at the local level within county and city governments, state level for State Parks and State Forests, and at the federal level for National Forests, NWRs, Wild and Scenic Rivers, Areas of Critical Environmental Concern (ACEC), Marine Protected Areas (MPAs), Research Natural Areas (RNAs) and National Historic Places. Decisions regarding management and allowable activities and land use for tribal lands are made and enforced by tribal governments. These plans and policies determine the type and extent of land use allowable in specific areas and protect specially designated or environmentally sensitive areas.

Visually sensitive land uses beneath the affected and proposed airspaces are valued for their scenic vistas, and in some cases, for their pristine wilderness characteristics (e.g., Malheur NWR). Existing terrestrial visual resources within the ROI are managed in accordance with local, state, and federal managing agencies' directives and goals.

For more information on planning entities and regulations applicable to land use and visual resources below the project airspace areas see Appendix G, *Land Use and Land Management*.

### **3.3.2 Existing Conditions**

#### **3.3.2.1 Eel ATCAA and W-570**

##### Terrestrial Land Use and Visual Resources

The Eel ATCAA is located over portions of Clatsop, Tillamook, Yamhill, Polk, and Lincoln counties in coastal Oregon as well as a small inclusion over Pacific County in Washington. Land uses in this region consist primarily of private timberlands, federally and state-owned lands, and pockets of urban areas. Private land use and management underlying the Eel ATCAA are predominantly governed at the local level by county and city governments. Northwestern Oregon and southwestern Washington are predominately characterized by forested viewsheds, which extend from the rocky coastline into coastal foothills and the mountainous Coast Range. Sensitive land uses and scenic resources managed by federal and state agencies include substantial areas underlying the airspace, consisting of 72 State Parks and two State Forests, one National Forest, five NWRs, three ACECs, one National Historic Park, and one Conservation Area (see Figure 3.3-1 and 3.3-2).

The W-570 airspace is located entirely offshore over the Pacific Ocean. Activity and uses of ocean areas are regulated within areas designated as Marine Protected Areas (MPAs). MPAs are administered by state and federal authority, and are protected for conservation purposes. Visual resources within MPAs are not easily accessible by the majority of the public and do not include an abundance of elements that contribute to the visual characteristic of the waters' surface.

For additional detailed descriptions of existing local land use management and designated visual resources see Appendix G, *Land Use and Land Management*.

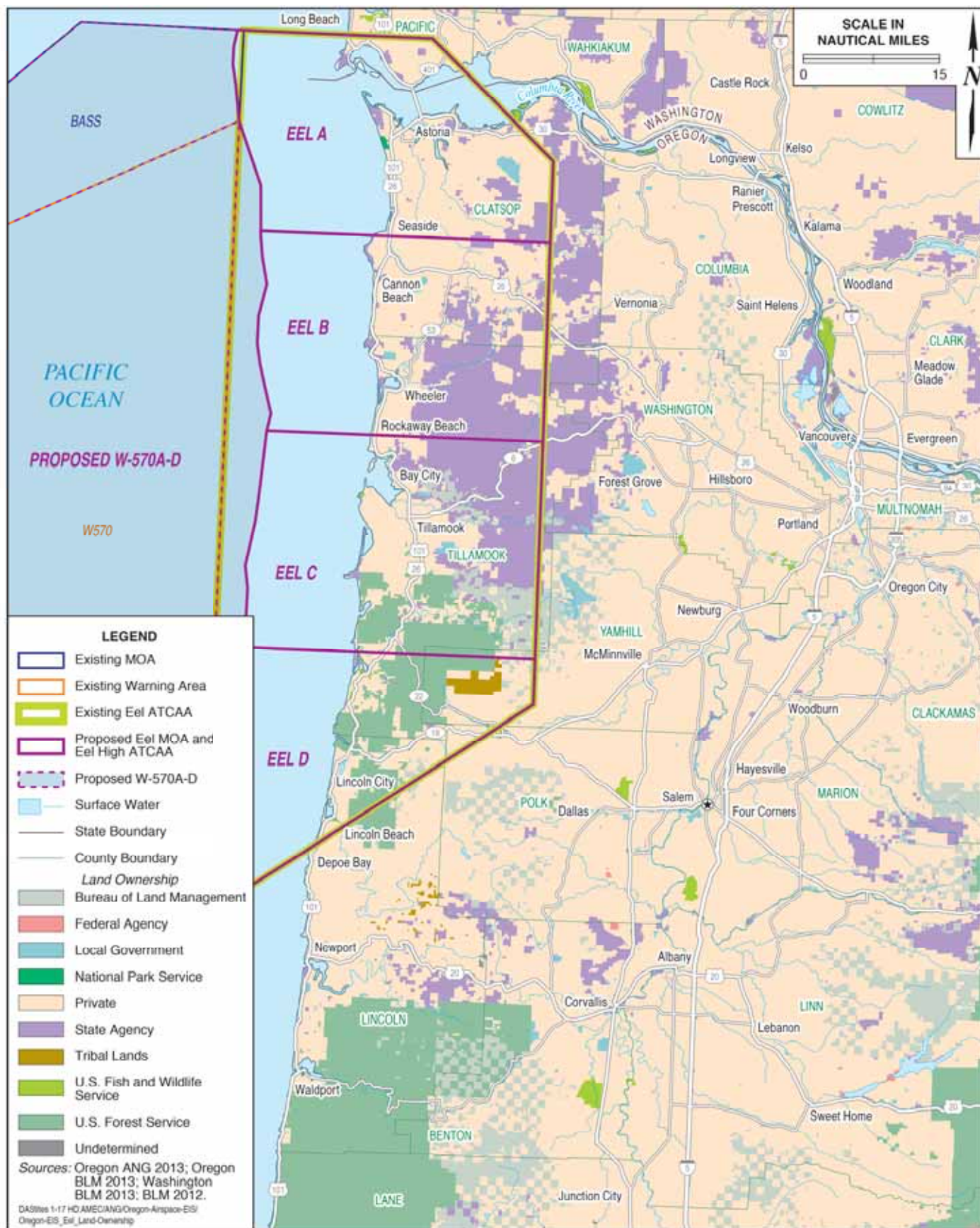
##### Wind Development

There are no current or reasonably foreseeable planned wind development projects identified below the existing Eel ATCAA or W-570.

##### National Historic Trails

The existing Eel ATCAA is located over a small portion of the Lewis and Clark National Historic Trail along the Columbia River.





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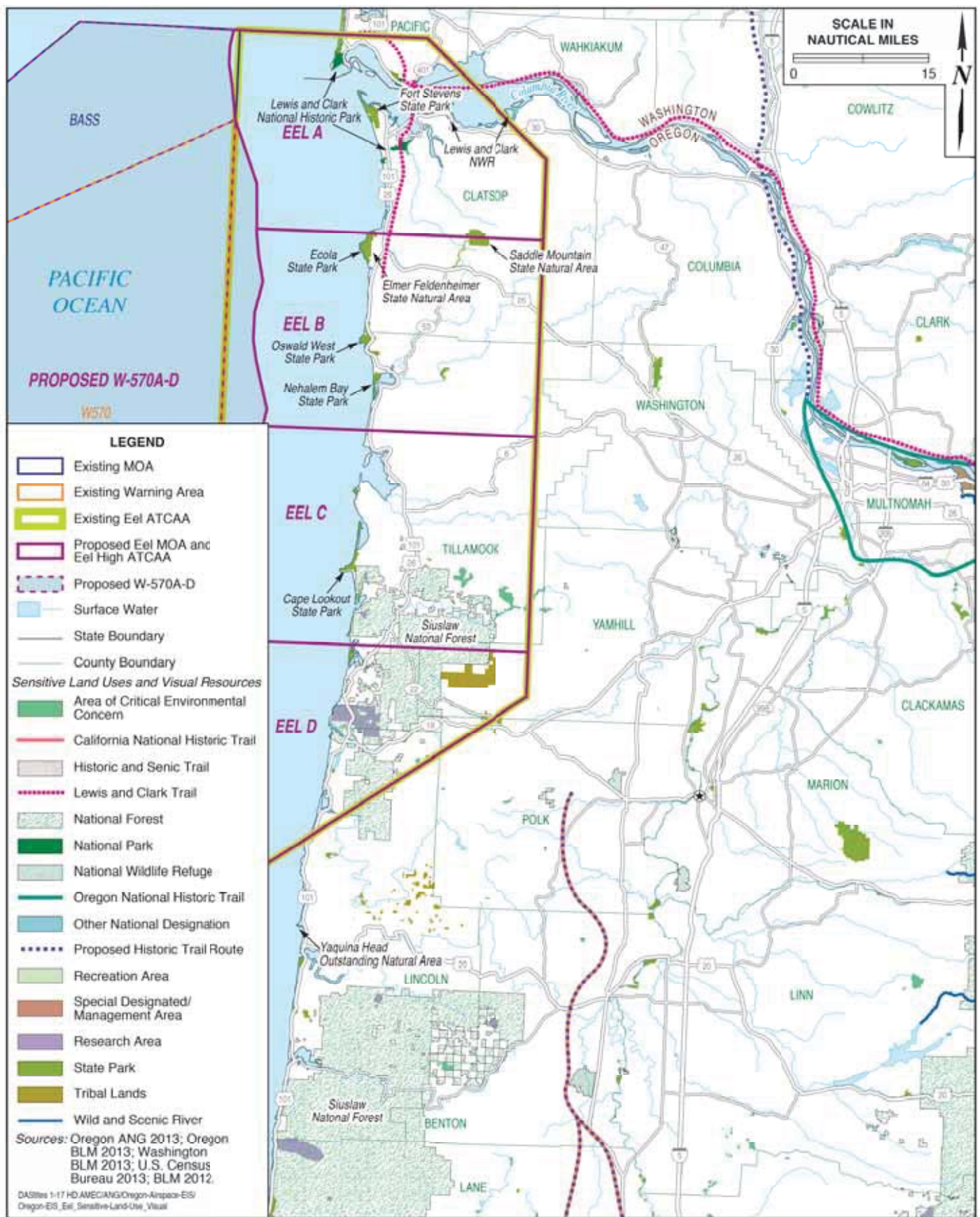
**Land Ownership Beneath and in the Vicinity of Eel and W-570 Airspace**

**FIGURE 3.3-1**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.





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**Sensitive Land Uses and Visual Resources within the Vicinity of Eel and W-570 Airspace**

**FIGURE 3.3-2**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



**Table 3.3-1. Sensitive Land Use and Visual Resource Areas Beneath the Proposed Eel MOA/ATCAA**

| State Parks                                    |                                   |                        |
|------------------------------------------------|-----------------------------------|------------------------|
| Fort Stevens SP                                | Del Rey Beach SP                  | Arcadia Beach SP       |
| Ecola SP                                       | Tolovana Beach SP                 | Gleneden Beach SP      |
| Boiler Bay SP                                  | Cape Kiwanda SP                   | Fogarty Creek SP       |
| Bradley SP                                     | Saddle Mountain SP                | Nehalem Bay SP         |
| Vernonia SP                                    | Lewis and Clark Historical SP     | Rocky Creek SP         |
| Twin Rocks SP                                  | Elmer Feldenheimer SP             | Otter Crest SP         |
| Hug Point SP                                   | Devil’s Punchbowl SP              | Oswald West SP         |
| Bald Peak SP                                   | Cape Lookout SP                   | Beverly Beach SP       |
| Erratic Rock SP                                | Robert Straub SP                  | Agate Beach SP         |
| Champoeg SP                                    | Manhattan Beach SP                | Yaquina Bay SP         |
| Roads End SP                                   | Maud Williamson SP                | South Beach SP         |
| Ona Beach SP                                   | Neskowin Beach SP                 | Lost Creek SP          |
| Beachside SP                                   | Governor Patterson Memorial SP    | Driftwood Beach SP     |
| Smelt Sands SP                                 | Yachats Ocean Road SP             | Cape Meares SP         |
| Ellmaker SP                                    | William B. Nelson Devil’s Lake SP | Tillicum Beach SP      |
| Seal Rock SP                                   | Oceanside Beach SP                | Grayland Beach SP      |
| Yachats SP                                     | Neahkahnie-Manzanita SP           | Haystack Hill SP       |
| Pacific Pines SP                               | H.B. Van Duzer Forest SP          | Cougar Valley SP       |
| Roads End SP                                   | Leadbetter Point SP               | Gleneden Beach SP      |
| Fishing Rock SP                                | Depoe Bay Whale Watch Center SP   | Sunset Beach SP        |
| D River SP                                     | Oceanside Beach SP                | Gearhart Ocean SP      |
| Symons SP                                      | Rockaway Beach SP                 | Sunset Highway SP      |
| Sand Lake SP                                   | Clay Myers SP                     | Munson Creek SP        |
| Devil’s Lake SP                                | Cape Disappointment SP            | Fort Columbia SP       |
| State Forests                                  |                                   |                        |
| Clatsop State Forest                           |                                   | Tillamook State Forest |
| National Forests                               |                                   |                        |
| Siuslaw National Forest                        |                                   |                        |
| National Wildlife Refuges (NWR)                |                                   |                        |
| Siletz Bay NWR                                 | Lewis and Clark NWR               | Cape Meares NWR        |
| Nestucca Bay NWR                               | Oregon Islands NWR                | Three Arch Rocks NWR   |
| Areas of Critical Environmental Concern (ACEC) |                                   |                        |
| Elk Creek ACEC                                 | Nestucca River ACEC               | Lost Prairie ACEC      |
| National Historic Parks                        |                                   |                        |
| Lewis and Clark National Historical Park       |                                   |                        |
| National Historic Trails                       |                                   |                        |
| Lewis and Clark National Historic Trail        |                                   |                        |
| Conservation Areas                             |                                   |                        |
| Seashore Conservation Area                     |                                   |                        |

Sources: Washinton State Parks and Recreation Commission 2013; Oregon Parks and Recreation 2010; BLM 2012.

### Wild and Scenic Rivers

No Wild and Scenic Rivers occur beneath the existing Eel ATCAA or W-570.

### Tribal Lands

Land area affiliated with the Confederate Tribes of Grand Ronde Community is located in the southwestern region of Polk County. Land area affiliated with the Confederated Tribes of the Siletz Indians is located in the northeastern part of the Lincoln County (see Figure 3.5-1). The Shoalwater Bay Tribe of Pacific County has land located on the north shore of Willapa Bay, north of the Eel ATCAA.

### Airspace Use and Visual Resources

As currently configured and utilized, the existing Eel ATCAA serves as a training airspace for military aircraft operations and is used primarily - but not exclusively - by the 142 FW. Aircraft overflights occur at altitudes between 18,000 feet MSL and 27,000 feet MSL and are fairly common within the airspace, although they are not patterned and do not occur on a regularly scheduled timetable. There are currently no MTRs located within the footprint of the existing Eel ATCAA; however, multiple commercial air traffic routes (e.g., associated with Portland International Airport) pass through the training airspace. Refer to Section 3.1, *Airspace Management* for further discussion on existing airspace use.

Visibility within the aerial environment, including views from the ground surface into the aerial environment, is generally dependent on weather, specifically cloud cover. The average annual number of cloudy days recorded within the existing Eel ATCAA is 239 and the average annual number of clear days recorded is 38 (as recorded by the City of Astoria) (Western Regional Climate Center [WRCC] 2013).<sup>6</sup> Cloud cover masks, at least in part, existing military aircraft operations within the existing Eel ATCAA.

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<sup>6</sup>A clear day denotes zero to 30 percent cloud coverage during the daylight hours; partly cloudy is 40 to 70 percent cloud coverage during the daylight hours, and cloudy is cloud coverage over 80 percent to 100 percent of the sky.

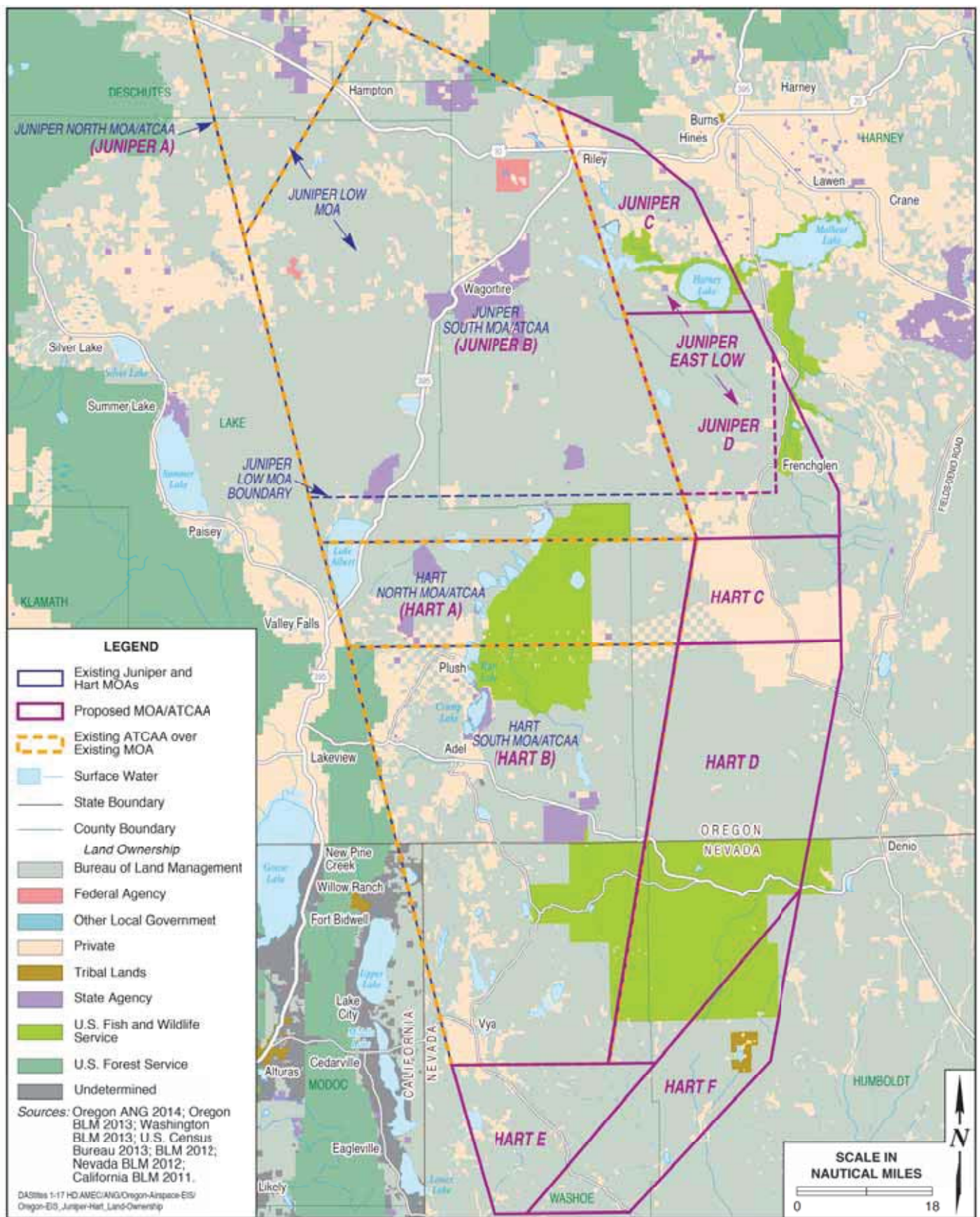
### 3.3.2.2 Juniper/Hart MOA Complex

#### Terrestrial Land Use and Visual Resources

The existing Juniper/Hart MOA Complex overlies approximately 7,928 square miles extending in a north-south direction from approximately 25 miles south of the Grant/Harney County line, in Oregon to approximately 15 miles north of the Humboldt/Pershing County line in Nevada. Eastern Oregon and northern Nevada are primarily arid due to the rain shadow effect of the Cascades on the western boundary of the region. Outdoor recreational activities, timber, and ranching are the primary economic activities. Lands underlying the Juniper/Hart MOA Complex are predominantly managed by the BLM. Other federally or state-managed lands underlying existing and proposed airspace areas include 15 State Parks, two National Forests, three NWRs, nine National Wilderness Areas, five ACECs, five segments of one Wild and Scenic River, and one Cooperative Management and Protection Area (see Figures 3.3-3 and 3.3-4). The Juniper/Hart MOA Complex also overlies a number of Wilderness Study Areas (WSAs) and Lands with Wilderness Characteristics (LWCs) managed by the BLM (see Appendix G, *Land Use and Land Management*). No National Parks occur within these areas. Private land holdings are governed at the local level by county and city governments.

Proposed modifications to the Juniper/Hart MOA Complex would extend the training space to the east and to the south. The expansion of the existing Hart South MOA to the south would extend and establish new airspace over Humboldt and Washoe counties, both in northwestern Nevada (refer to Figure 2-3).

Consistent with visual resources described above for the proposed Eel MOA/ATCAA, visual resources below the Juniper/Hart MOA Complex consist of both designated and non-designated scenic landscapes. Visual resources in this region include rolling hills, high desert low growing forests, wind-formed shrubs, and open grasslands, while urban landscapes are mostly comprised of small rural towns and remote individual homes.



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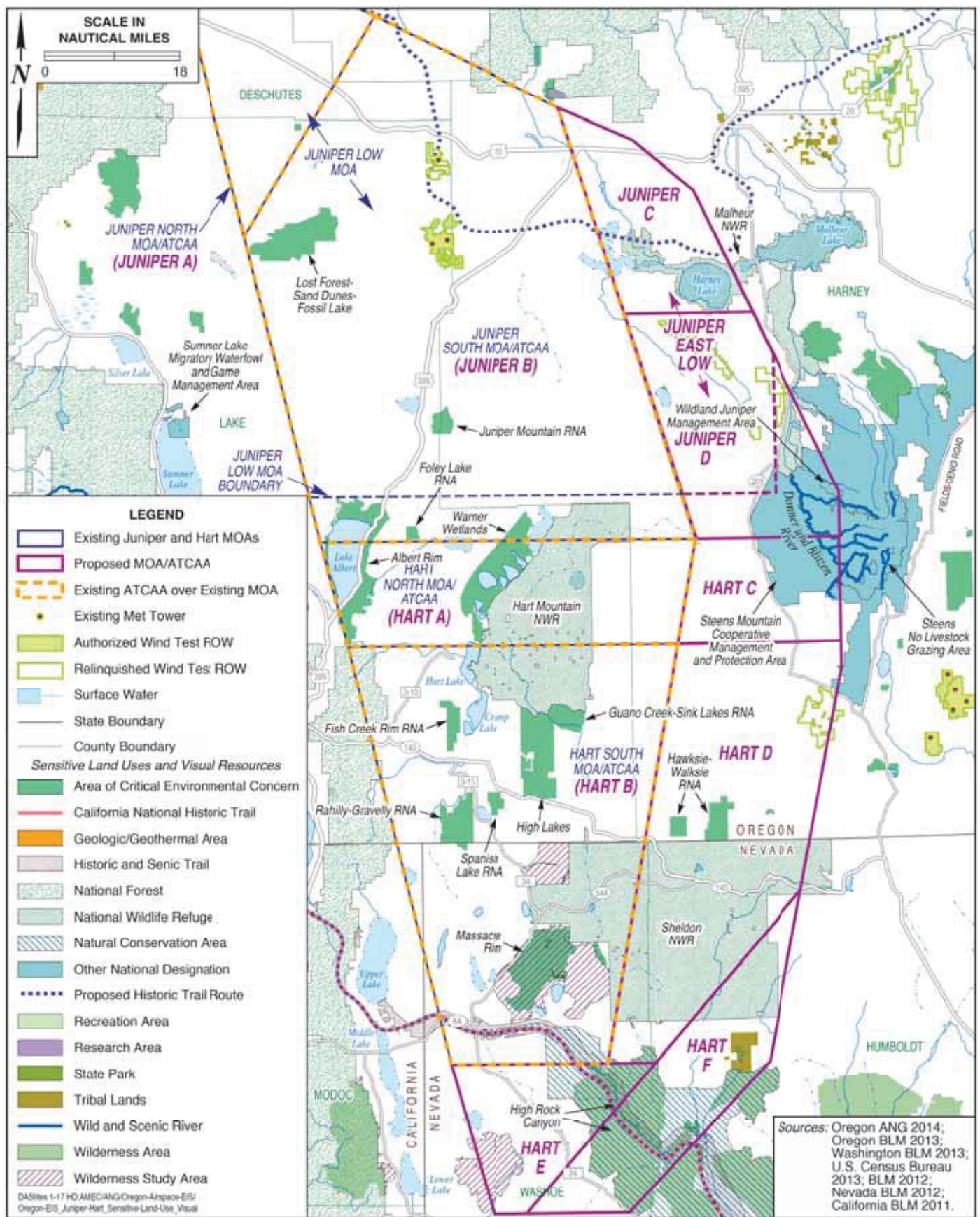
### Land Ownership Beneath and in the Vicinity of Juniper/Hart MOA Complex

FIGURE  
3.3-3



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### Sensitive Land Uses and Visual Resources within the Vicinity of Juniper/Hart MOA Complex

FIGURE  
3.3-4



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

**Table 3.3-2. Sensitive Land Use and Visual Resource Areas Beneath the Proposed Juniper/Hart MOA Complex**

| State Parks                                                         |                              |                                         |
|---------------------------------------------------------------------|------------------------------|-----------------------------------------|
| Frenchglen SP                                                       | Pete French Round Barn SP    | Fort Rock SP                            |
| Chandler SP                                                         | Three Sisters SP             | Goose Lake SP                           |
| Cline Falls SP                                                      | Peter Skene Ogden SP         | Smith Rock SP                           |
| La Pine SP                                                          | Redmond-Bend Juniper SP      | Tumalo SP                               |
| Booth SP                                                            | Robert Sawyer Shop SP        | Pilot Butte SP                          |
| National Forest                                                     |                              |                                         |
| Malheur NF                                                          | Fremont-Winema NF            |                                         |
| National Wildlife Refuges (NWR)                                     |                              |                                         |
| Malheur NWR                                                         | Hart Mountain Antelope NWR   | Sheldon NWR                             |
| National Wilderness Area                                            |                              |                                         |
| Mt. Washington NWA                                                  | Gearhart Mountain NWA        | Three Sisters NWA                       |
| High Rock NWA                                                       | E. Fork High Rock Canyon NWA | Little High Rock Lake NWA               |
| High Rock Lake NWA                                                  | North Black Rock Range NWA   | Black Canyon NWA                        |
| Lake Abert ACEC                                                     | Warner Wetlands ACEC         | High Rock Canyon ACEC                   |
| Abert Rim ACEC                                                      | Soldier Meadows ACEC         |                                         |
| National Historic and Scenic Trail Segments                         |                              |                                         |
| California/Nevada Applegate-Lassen Emigrant National Historic Trail |                              |                                         |
| Wild and Scenic River Segments                                      |                              |                                         |
| Donner und Blitzen-South Fork                                       |                              | Donner und Blitzen-Little Blitzen River |
| Donner und Blitzen-Indian and Big Indian Creek                      |                              | Donner und Blitzen-Fish Creek           |
| Donner und Blitzen-Main Stem                                        |                              |                                         |
| Cooperative Management and Protection Area                          |                              |                                         |
| Steens Mountain                                                     |                              |                                         |

Sources: Oregon Parks and Recreation 2010; BLM 2012; BLM Nevada State Office 2012.

For descriptions of existing local land use management and designated visual resources see Appendix G, *Land Use and Land Management*.

### Wind Development

Wind development testing is currently ongoing below the Juniper/Hart MOA Complex (refer to Figure 3.3-4). There are two stages of wind development identified below the airspace. The first is an authorized right-of-way (ROW),

which constitutes approval for wind tower development, and the second is land developed with wind towers. The authorized Wagontire wind test ROW is located predominately in Lake County, though a small portion of it extends into Harney County. The entire ROW is located below the existing Juniper Low MOA. Three existing meteorological (Met) towers are located in Lake County below the existing Juniper Low MOA. Met towers are used to gather wind data necessary for site evaluation and development of wind energy project. All three are identified by the BLM, though none are identified within the FAA's database of wind development. The first two, Wagontire Met1 and Wagontire Met2, are located within the authorized Wagontire ROW. The third tower, Little Glass Butte, is located north of the Wagontire ROW in a relinquished test ROW (refer to Figure 3.3-4). A relinquished ROW is a test area that has been authorized for wind development but development has not been pursued. None of the existing ROWs or Met towers adversely impact training activities within the existing Juniper Low MOA (Oregon ANG 2013). No other authorized or existing wind developments exist below the existing Juniper/Hart MOA Complex.

#### Wild and Scenic Rivers

Wild and Scenic Rivers are preserved for possessing outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. Rivers or segments of rivers so designated are preserved in their free-flowing condition and are not dammed or otherwise impeded. National wild and scenic designation essentially vetoes the licensing of new hydropower projects on or directly affecting the river. It also provides very strong protection against bank and channel alterations that adversely affect river values, protects riverfront public lands from oil, gas and mineral development, and creates a federal reserved water right to protect flow-dependent values (U.S. Forest Service [USFS] 2009). The modified airspace would extend over one Wild and Scenic River, which is managed by the BLM. The river that would be below active airspace is the Donner und Blitzen Wild and Scenic River. This river system has a total of nine river segments, though only five would be located below the airspace. The Donner und Blitzen Wild and Scenic River, along with two other rivers designated as Wild and Scenic (Wildhorse River and Kiger River) fall within Steens Mountain Cooperative Management and Protection Area (CMPA) (BLM 2005). For additional

descriptions of these water features see Appendix G, *Land Use and Land Management*.

### National Historic Trails

The proposed Juniper/Hart MOA Complex including the proposed Hart B, Hart E, and Hart F MOAs overlie small segments of the California National Historic Trail. Additionally, the proposed Juniper C MOA, including the proposed Juniper East Low MOA and the existing Juniper A and Juniper B MOAs overlie segments of a proposed route of the Oregon National Historic Trail.

### Tribal Lands

The Summit Lake Paiute Tribe is located south of the Sheldon NWR in the western part of Humboldt County. The reservation was established in 1913 and is 12,573 acres with 10,098 acres of trust lands. Tribal headquarters are located in Sparks, Nevada.

### Airspace Use and Visual Resources

The existing aerial visual environment is currently influenced by military, commercial, and civilian aircraft and glider operations. Eight MTRs – entirely separate from the Proposed Action – currently pass through the footprint of the existing and proposed Juniper/Hart MOA Complex: IR-300, IR-313, IR-342, VR-319, VR-316, VR-1353, VR-1301, VR-1254, VR-1251, and VR-1352 (refer to Section 3.1, *Airspace Management*). Overflights associated with these MTRs do not have a patterned or routine schedule; however, pilots and aircrews using these routes schedule their flights and remain within the established MTR corridor, which generally averages approximately 4 NM in width. The existing Juniper/Hart MOA Complex is currently used for military training operations; however, because flight patterns within the existing Juniper/Hart MOA Complex are not fixed, current overflights related to training exercises within the existing Juniper and Hart airspaces are unpredictable. Commercial and civilian aircraft as well as gliders also fly within the existing Juniper/Hart MOA Complex when it has not been activated for military training exercises. Commercial flights generally use traffic routes according to scheduled timetables; however, recreational aircraft flight operations are unpredictable, exposing observers on the ground surface to



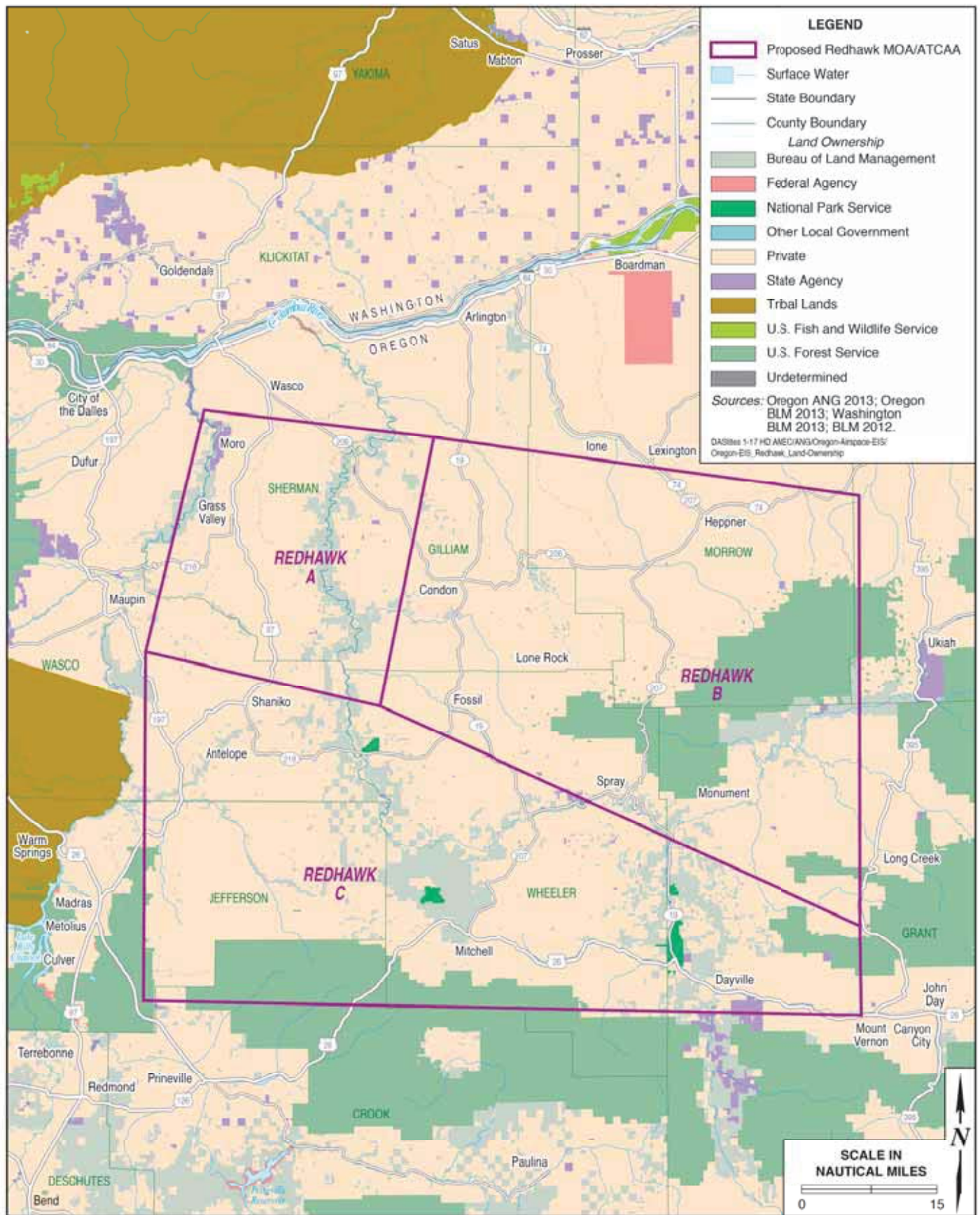
random, albeit infrequent overflights. A minimum of two recreational glider clubs, one based out of Portland, Oregon and the other based out of Reno, Nevada, are also known to utilize airspace in the Steens Mountain area for recreational gliding. These operations are slightly more predictable as glider clubs generally operate in these areas for discrete (e.g., two week) periods during the year.

As previously described, visibility within the aerial environment, including views from the ground surface into the aerial environment, is generally dependent on weather, specifically cloud cover. The average annual number of cloudy days recorded in the vicinity of the proposed Juniper/Hart MOA Complex is 151, and the average number of clear days is 120 (as measured from the City of Burns) (WRCC 2013).

### 3.3.2.3 Redhawk MOA Complex

#### Terrestrial Land Use and Visual Resources

The proposed establishment of the Redhawk MOA Complex would create an approximately 6,518-square mile training space in central Oregon over portions of Sherman, Gilliam, Morrow, Grant, Wheeler, Jefferson, and Wasco counties. Outdoor recreational activities, timber, and ranching are the primary economic activities. Lands underlying the proposed Redhawk MOA Complex are predominantly privately owned. Private land holdings are governed at the local level by county and city governments. State controlled lands include 11 State Parks and one State Recreation Area. Federally managed lands underlying the proposed airspace include portions of three National Forests, two National Wilderness Areas, one National Monument, one National Grassland, and two Wild and Scenic Rivers segments (see Figure 3.3-5 and 3.3-6). A number of WSAs and LWCs occur beneath the proposed Redhawk MOA Complex. Additionally, the proposed Sutton Mountain Wilderness Area is located beneath the proposed Redhawk C MOA (see Figure 3.3-6). However, the proposed legislation that would have established the Sutton Mountain and Painted Hills Preservation Act was never enacted.



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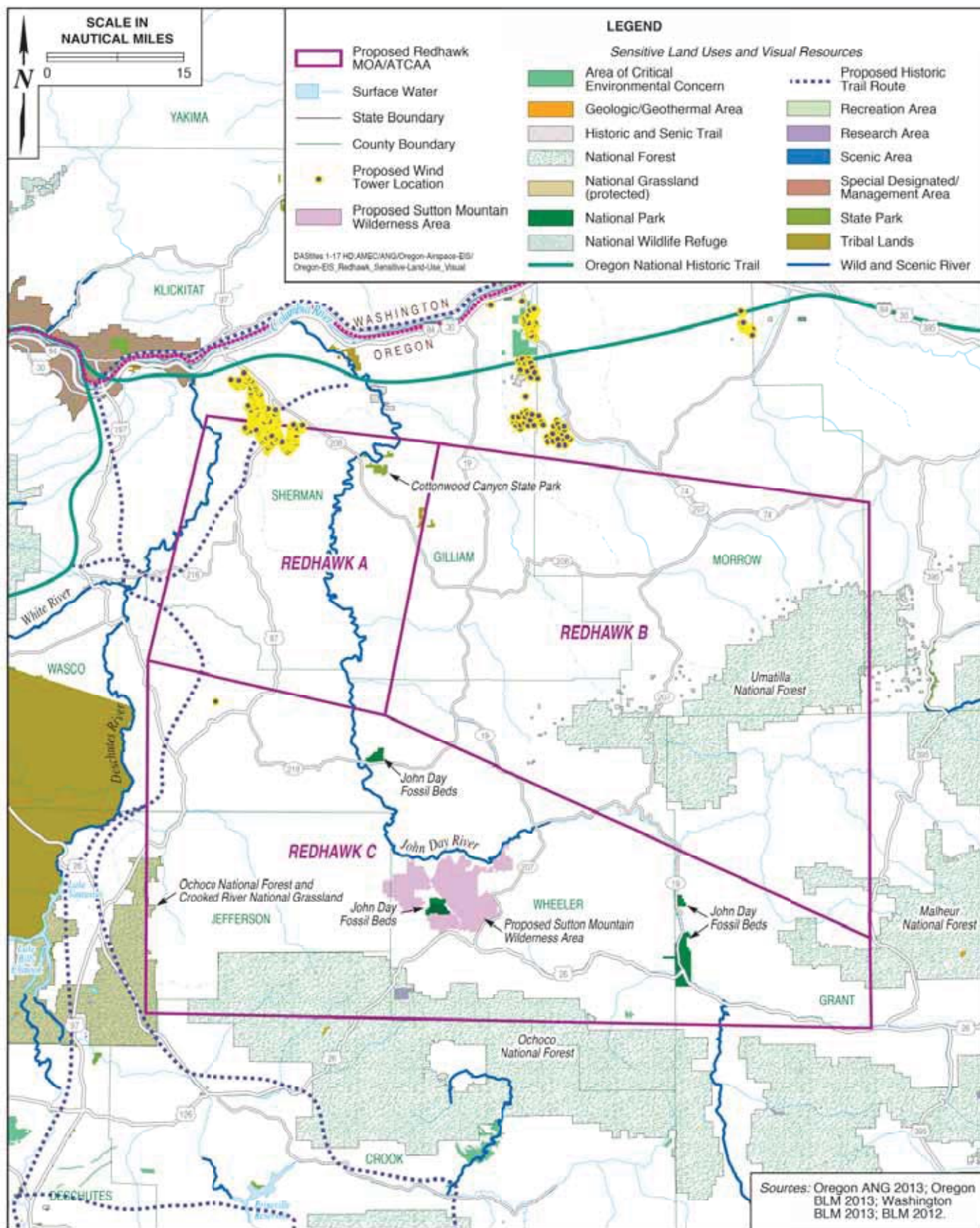
**Land Ownership Beneath and in the Vicinity of the Proposed Redhawk MOA Complex**

**FIGURE 3.3-5**



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**Sensitive Land Uses and Visual Resources within the Vicinity of the Proposed Redhawk MOA Complex**

**FIGURE 3.3-6**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

**Table 3.3-3. Designated Visual Resource Areas Beneath the Proposed Redhawk MOA Complex**

| State Parks                                             |                  |                      |
|---------------------------------------------------------|------------------|----------------------|
| Cottonwood Canyon SP                                    | J.S. Burres SP   | Koberg Beach SP      |
| Deschutes -Hilderbrand SP                               | Mayer SP         | Memaloose SP         |
| John Day Chaparral Access SP                            | Arlington SP     | White River Falls SP |
| Cove Palisades SP                                       | Somers SP        |                      |
| State Recreation Area                                   |                  |                      |
| Deschutes River SRA                                     |                  |                      |
| National Forest                                         |                  |                      |
| Umatilla NF                                             | Malheur NF       | Ochoco NF            |
| National Wilderness Area                                |                  |                      |
| Mill NWA                                                | Bridge Creek NWA |                      |
| National Monument                                       |                  |                      |
| John Day Fossil Bed NM (Clarno and Painted Hills units) |                  |                      |
| National Grassland                                      |                  |                      |
| Crooked River NG                                        |                  |                      |
| Wild and Scenic River Segments                          |                  |                      |
| Deschutes River                                         | John Day Creek   |                      |

Sources: Oregon Parks and Recreation 2010; BLM 2012.

Central Oregon is primarily arid due to the rain shadow effect of the Cascades on the western boundary of the region. Visual resources in this part of the state are similar to those described for the proposed Juniper/Hart MOA Complex – low growing trees, wind formed shrubs, and open grasslands. In addition to these characteristic features, the Strawberry Mountain Range stretches beneath the proposed Redhawk MOA Complex adding a mountainous backdrop to the landscape. Urban landscapes in this area are also mostly small rural towns and remote individual homes.

For descriptions of existing local land use management and designated visual resources see Appendix G, *Land Use and Land Management*.

### Wind Development

Multiple wind towers have been proposed and approved as a part of the Golden Hills Wind Project within Sherman County along the northern boundary of the proposed Redhawk MOA Complex (Oregon Department of Energy 2016). A single

tower has been proposed and approved within Wasco County beneath the proposed Redhawk MOA Complex. The towers in Sherman County are proposed at a height of 500 feet and the wind tower in Wasco County is proposed at a height of 265 feet. However, to date, neither of these facilities have been constructed (Oregon Department of Energy 2016).

### Wild and Scenic Rivers

The BLM and the USFS are the agencies responsible for managing the two National Wild and Scenic Rivers beneath the proposed Redhawk MOA Complex. Two Wild and Scenic Rivers occur beneath the proposed Redhawk MOA Complex: the Deschutes River and the John Day River. The Deschutes River is designated as a National Scenic River for 30 miles and as a National Recreation River for 143 miles.

### National Historic Trails

The proposed Redhawk A and Redhawk C MOAs are located over small segments of a proposed route of the Oregon National Historic Trail.

### Tribal Lands

The Confederated Tribes of the Warm Springs are located west of the proposed airspace; no portion of tribal land is located below the proposed airspace (see Figure 3.5-1).

### Airspace Use and Visual Resources

There are currently no air-to-air military training operations that occur within the airspace that is proposed for the establishment of the Redhawk MOA Complex. However, four MTRs – entirely separate from the proposed airspace establishment – traverse the airspace beneath the proposed Redhawk MOA Complex: IR-342, IR-343, VR-1353, and VR-1352. Aircraft operations along these MTRs and within the proposed airspace area currently consist of recreational aircraft, aircraft operations along the MTRs, and commercial overflights. Commercial flights occur according to patterned flight schedules; however, recreational flights and operations along MTRs, though they are scheduled on a

flight-by-flight basis with the appropriate scheduling entity, are infrequent and unpredictable. Refer to Section 3.1, *Airspace Management* for a discussion on existing airspace use.

As previously described, visibility within the aerial environment is generally dependent on weather. The average annual number of cloudy days recorded in the vicinity of the Proposed Redhawk MOA Complex is 173, and the average annual number of clear days is 101 (as measured from the City of Pendleton) (WRCC 2013). Consequently, cloud cover masks, at least in part, existing military, commercial, and civilian aircraft operations within the proposed Redhawk MOA Complex.

### **3.4 BIOLOGICAL RESOURCES**

#### **3.4.1 Introduction**

Biological resources include native or naturalized plants and wildlife and the habitats in which they occur. Sensitive biological resources are defined as those plant and wildlife species listed as threatened or endangered, or proposed as such, by the USFWS, Oregon Department of Fish and Wildlife (ODFW), Washington Department of Fish and Wildlife, or Nevada Department of Wildlife. The federal Endangered Species Act (ESA) of 1973 protects listed species against take, which includes killing, harming, harassing, or any action that may damage their habitat. Federal Species of Concern are not protected by the federal ESA; however, these species warrant consideration because they could become listed and protected at any time. Additionally, the Bald and Golden Eagle Protection Act (BGEPA) of 1940 (Public Law [PL] 87-884; 16 U.S. Code [USC] §668a-d) prohibits the taking or harming (i.e. harassment, sale, or transportation) of bald eagles or golden eagles, including their eggs, nests, or young, without appropriate permit.

Under Oregon state law (Oregon Revised Statutes [ORS] 496.171-496.192) the Fish and Wildlife Commission through ODFW maintains a list of native wildlife species in Oregon that have been determined to be either “threatened” or “endangered” according to criteria set forth by Oregon Administrative Rules (OAR) 635-100-0105. A similar list is maintained by the Nevada Department of Wildlife under Nevada Revised Statutes (NRS) 527 and Washington Department of Fish and Wildlife under Washington Administrative Code (WAC) 232-12-297.

Migratory birds, as listed in 50 CFR §10.13, are ecologically and economically important to recreational activities in the U.S., including bird watching, studying, feeding, and hunting. The Migratory Bird Treaty Act (MBTA) of 1918 (PL 65-186; 16 USC §703 et seq.) provides for regulations to control taking of migratory birds, their nests, eggs, parts, or products without the appropriate permit and provides enforcement authority and penalties for violations. Additionally, in 2001, Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was issued to focus attention of federal agencies on the environmental effects to migratory bird species and, where feasible, implement policies and programs, which support the conservation and protection of migratory birds. For further

discussion regarding Bird-aircraft Strike Hazard (BASH) and avoidance measures incorporated into flight procedures, see Section 3.7, *Safety*.

### 3.4.2 Existing Conditions

#### 3.4.2.1 Regional Biological Setting

Oregon is ecologically diverse with habitats ranging from coastal forests in the Cascades Range to desert environments within eastern Oregon. The climatic gradient across the state results in a varied landscape that includes areas of forested mountains, glaciated peaks, shrub- and grass-covered plains, agricultural valleys, beaches, desert playas, and wetlands (Omernik 2011). Within Oregon, there are nine USEPA identified ecoregions, which are characterized by areas of general similarity in their ecosystems and in the type, quality, and quantity of natural resources they support. Each of these ecoregions is described in detail below and depicted in Figure 3.4-1.

**Coast Range.** The low mountains of the Coast Range are covered by highly productive, rain-drenched evergreen forests. Historically, sitka spruce (*Picea sitchensis*) forests dominated the fog-shrouded coast, while a mosaic of western red cedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), and seral (i.e., in an intermediate stage of ecological succession) douglas-fir blanketed (*Pseudotsuga menziesii*) inland areas. However, today, douglas-fir plantations are more prevalent on the intensively logged and managed landscape of the Coast Range (Omernik 2011).

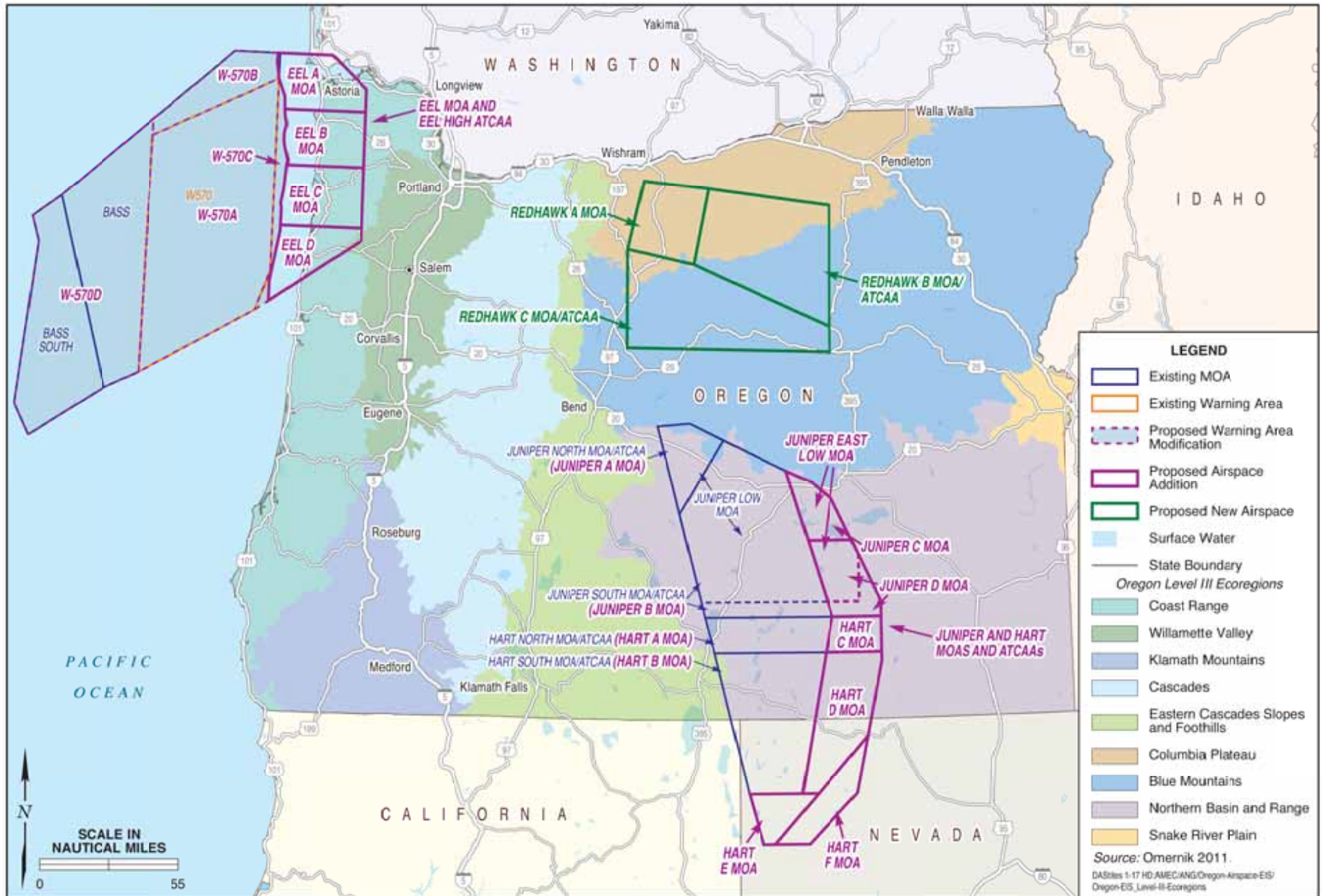
**Willamette Valley.** The topography within the Willamette Valley as well as the corresponding vegetation mosaic differs from the coniferous forests of the surrounding Coast Range, Cascades, and Klamath Mountains. This ecoregion contains terraces and floodplains of the Willamette River system, scattered hills, buttes, and adjacent foothills. Mean annual rainfall is 37 to 60 inches and summers are generally dry (Omernik 2011). Historically, this ecoregion was characterized by prairies, oak (*Quercus* spp.) savanna, coniferous forests, extensive wetlands, and deciduous riparian forests. However, today, the Willamette Valley contains the bulk of Oregon's population, industry, and commerce. Productive soils and a temperate climate make it one of the most important agricultural areas in Oregon. Consequently, much of the natural vegetation cover has been converted to cropland.





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Mapped USEPA Level III Ecoregions in Oregon

FIGURE  
3.4-1

**Cascades.** The Cascades Range is largely comprised of a volcanic geology that has been affected and shaped by alpine glaciation. Maximum elevations of up to 11,239 feet MSL occur on active and dormant volcanic peaks in the eastern part of the Cascades. The western Cascades are geologically older, lower in elevation, and dissected by numerous, steep-sided stream valleys. Generally, this ecoregion has a moist, temperate climate that supports an extensive and highly productive coniferous forest that is intensively managed for logging.

**Eastern Cascades Slopes and Foothills.** This ecoregion is located within the rain shadow of the Cascade Range. It experiences greater temperature extremes and receives less precipitation than ecoregions to the west. Open forests of ponderosa pine (*Pinus ponderosa*) and some lodgepole pine (*Pinus contora*) distinguish this region from the higher elevation ecoregions to the west, where hemlock and douglas-fir forests are common, as well as the drier ecoregions to the east, characterized by shrubs and grasslands. The vegetation in this ecoregion is adapted to the prevailing dry, continental climate and frequent fire regime. Historically, creeping ground fires consumed accumulated fuel and devastating crown fires were less common in dry forests.

**Columbia Plateau.** The Columbia Plateau ecoregion, bisected by the Columbia River, is an arid, sagebrush steppe and grassland that is flanked by forested and mountainous ecoregions. Where precipitation amounts are sufficient, its deep soils have been extensively cultivated for wheat.

**Blue Mountains.** The Blue Mountains ecoregion is a complex of mountain ranges that are lower and more open than the neighboring Cascades and Northern Rockies. However, like the Cascades, the Blue Mountains are mostly volcanic in origin and much of this ecoregion is grazed by cattle.

**Snake River Plain.** The plains and low hills of the Snake River Plain are considerably lower and less rugged than surrounding ecoregions. Irrigation water is plentiful in many areas within this ecoregion. Consequently, many of the alluvial valleys bordering the Snake River are in agriculture and principally produce sugar beets, potatoes, alfalfa, small grains, and vegetables. The remainder of the Snake River Plain in Oregon is covered by sagebrush-grassland and is used for cattle grazing.

**Klamath Mountains.** The Klamath Mountains ecoregion encompasses the highly dissected ridges, foothills, and valleys of the Klamath and Siskiyou mountains. This ecoregion was unglaciated during the Pleistocene epoch, when it served as a refuge for northern plant species. Its mix of granitic, sedimentary, metamorphic, and extrusive rocks contrasts with the predominantly volcanic geology of the Cascades. The mild, subhumid climate of the Klamath Mountains is characterized by a lengthy summer drought. It supports a mosaic of both conifers and hardwoods characteristic of the Pacific Northwest and North California (Omernik 2011).

**Northern Basin and Range.** This ecoregion contains dissected lava plains, rolling hills, alluvial fans, valleys, and scattered mountains. Overall, it is higher in elevation and is characterized by a cooler climate relative to the Snake River Plain. Additionally, the Northern Basin and Range ecoregion has more available moisture and a cooler climate than the Central Basin and Range to the south. Natural vegetation includes sagebrush steppe and cool season grasses (e.g., Idaho fescue [*Festuca idahoensis*] and bluebunch wheatgrass [*Pseudoroegneria spicata*]). Additionally, Juniper (*Juniperus* spp.) dominated woodland occurs on rugged, stony uplands within this ecoregion.

#### 3.4.2.2 Federally Protected Species

Due to the large geographic footprint of the affected and proposed airspace areas a number of federally protected species have the potential to occur within the Proposed Action area. A brief summary of each of these species has been provided, and a more detailed description of federally and state-listed species by airspace area is included below. However, all special status freshwater aquatic and plant species have been excluded from further description and analysis as the Proposed Action would not include any ground disturbing activity that would have the potential to affect these species.

#### Mammals

**Gray Wolf:** The gray wolf is a federally and state-listed as endangered species. The Oregon Wildlife Commission has developed a Wolf Conservation and Management Plan to meet the requirements of both the Oregon ESA and the Oregon Wildlife Policy. However, this plan includes methods of wolf distraction

and deterrent from humans and livestock that cannot be implemented due to the over-riding requirements of the federal ESA. The federal ESA establishes the current minimum level of wolf protection.

| Species   | Description                                                                                                                      | Distribution/Habitat                                                                                                                              | Diet                                                                                   |
|-----------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Gray wolf | <ul style="list-style-type: none"> <li>• Gray, black, or white fur</li> <li>• Resembles German shepherds or malamutes</li> </ul> | <ul style="list-style-type: none"> <li>• Canada</li> <li>• Alaska, Idaho, Oregon, Michigan, Minnesota, Montana, Wisconsin, and Wyoming</li> </ul> | <ul style="list-style-type: none"> <li>• Ungulates</li> <li>• Small mammals</li> </ul> |

**Sea otter:** The sea otter is a federally and state-listed threatened species. The Oregon sea otter population was hunted to extinction in the State of Oregon over a century ago, with the last known individual being killed just off the Newport Beach in 1907. In 1911 the first protection measure for sea otters was put in place with the establishment of the International Fur Seal Treaty, banning the hunting of sea otters and fur seals. The Marine Mammal Protection Act of 1972 reinforced their protection in U.S. waters. Although the trapping or poaching of sea otters is now illegal in the U.S., various factors including habitat destruction, competition for food with human fishermen, pollution and natural predation continue to challenge the species' return.

| Species   | Description                                                                                                                                                                                                                             | Distribution/Habitat                                                                                                                                                                                                                              | Diet                                                                                                |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Sea otter | <ul style="list-style-type: none"> <li>• Thick deep brown fur with silver-gray/yellow/black speckles</li> <li>• Head, throat, and chest are lighter in color than body</li> <li>• Short, thick, muscular tail and small ears</li> </ul> | <ul style="list-style-type: none"> <li>• Historical: coastal Japan, Siberia, Aleutian islands, British Columbia, Washington, Oregon, California, Baja California</li> <li>• Current: California, Alaska, coastal Canada, Russia, Japan</li> </ul> | <ul style="list-style-type: none"> <li>• Urchins, Abalone, Mussels, Clams, Crabs, Snails</li> </ul> |

**Red tree vole:** The North Oregon Coast population of the red tree vole is identified as a federal Candidate for listing under the federal ESA, though it is not identified as a special status species by the State of Oregon. The red tree vole is endemic to western Oregon and occurs at moderate elevations on the west slope of the Cascade Range southward as far as the Douglas-Jackson County line and in the Coast Range to the Oregon-California border. Conservation measures, including surveys prior to timber harvesting, are being taken by federal agencies to protect the red tree vole.

| Species       | Description                                                                                                                                        | Distribution/Habitat                                                                                                                             | Diet                                                                |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Red tree vole | <ul style="list-style-type: none"> <li>• Small furry rodent</li> <li>• Long fur-covered tail</li> <li>• Reddish-brown to orange-red fur</li> </ul> | <ul style="list-style-type: none"> <li>• Cascade Mountains in Oregon and northwestern California</li> <li>• Late-successional forests</li> </ul> | <ul style="list-style-type: none"> <li>• Conifer needles</li> </ul> |

***Columbian white-tailed deer:*** The Columbian white-tailed deer is federally listed as an endangered species, though it is not identified as a special status species by the State of Oregon. The Columbian white-tailed deer has been managed according to a USFWS-established recovery plan since 1983. Key requirements of the plan include population monitoring, predator control, and acquisition of new habitat. Metrics of progress toward species recovery include population maintenance and growth, habitat protection and acquisition, and overall population long-term sustainability.

At the time of listing, two populations were identified as protected: the Douglas County population and the Columbia River population. Since 1983, the population within Douglas County has increased in number and was officially delisted in 2003. The Columbia River population (part of which occurs within Clatsop County), maintains an endangered status and listing (USFWS 2013b, 2013e).

| Species                     | Description                                                                                                                                                                      | Distribution/Habitat                                                                                                                                                                                                           | Diet                                                                                                                                                                                   |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Columbian white-tailed deer | <ul style="list-style-type: none"> <li>• Reddish-brown spring and summer coat</li> <li>• Grey-brown fall and winter coat</li> <li>• Tail has distinguishing underside</li> </ul> | <ul style="list-style-type: none"> <li>• Columbia River, WA/OR</li> <li>• Douglas County, OR</li> <li>• Tidal spruce, forested swamps with shrubs and scattered trees; riparian habitats; oak-savannah upland areas</li> </ul> | <ul style="list-style-type: none"> <li>• Herbivorous</li> <li>• Legumes</li> <li>• Shoots and leaves</li> <li>• Acorns and fruit</li> <li>• Mushrooms</li> <li>• Poison ivy</li> </ul> |

***Washington ground squirrel:*** The Washington ground squirrel is a candidate for listing under the federal ESA, and identified as endangered by the State of Oregon (Oregon Department of Fish and Wildlife 2011). In the 2011 annual USFWS status review it was re-confirmed that listing of the species is warranted. However, to date, publication of a proposed rule to list the Washington ground squirrel has been precluded by other higher priority listing actions (USFWS 2011b).

Historical and current threats to Washington ground squirrels include destruction, modification, or curtailment of its habitat or range from agricultural, energy, and

other development; non-native plant infestations and associated increases in wildfire frequency; grazing; historical poisoning and shooting for pest management purposes and recreational shooting; disease, predation, drought, and wildfire (USFWS 2011a).

| Species                    | Description                                                                                                                                             | Distribution/Habitat                                                                                         | Diet                                                                                                                          |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Washington ground squirrel | <ul style="list-style-type: none"> <li>• Small rodent</li> <li>• Smoky grey-brown fur, grey-white underparts and feet, grey-brown short tail</li> </ul> | <ul style="list-style-type: none"> <li>• Washington and Oregon</li> <li>• Sagebrush and grassland</li> </ul> | <ul style="list-style-type: none"> <li>• Herbaceous vegetation</li> <li>• Flowers, Bulbs, seeds</li> <li>• Insects</li> </ul> |

**Kit fox:** The kit fox is not a federally listed species; however, it is identified as threatened by the State of Oregon. Kit foxes inhabit mixed-grass shrublands, shrublands, grasslands, and margins of pinyon-juniper woodlands over much of the Southwest (McGrew 1979; Fitzgerald et al. 1994). Range reductions have been attributed to habitat loss, degradation, and fragmentation resulting from agricultural, industrial, and urban development (USFWS 2006). Kit foxes occur in Deschutes and Malheur counties and has been found near Klamath Falls, Klamath County and in the southern half of Harney and Malheur counties.

| Species | Description                                                                                                                                            | Distribution/Habitat                                                                                                                              | Diet                                                                                                          |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Kit fox | <ul style="list-style-type: none"> <li>• Slim body, thin long legs, large ears</li> <li>• Black tipped tail, brownish-gray fur, white chest</li> </ul> | <ul style="list-style-type: none"> <li>• Oregon: Deschutes, Malheur, Klamath, and Harney counties</li> <li>• Grasslands and shrublands</li> </ul> | <ul style="list-style-type: none"> <li>• Small rodents</li> <li>• Rabbits</li> <li>• Mice and rats</li> </ul> |

## Birds

**Marbled murrelet:** In 1992, Washington, Oregon, and California marbled murrelet populations were federally and state-listed as threatened. Although most murrelet nesting habitat on private lands has been eliminated by logging, suitable habitat remains on federal- and state-owned lands. Areas of critical habitat have been federally designated to protect habitat and promote the recovery of the species. These areas include approximately three million acres of federal lands and almost one million acres of state, county, city and private lands.

| Species          | Description                                                                                                                                                                                                                                                                          | Distribution/Habitat                                                                                                    | Diet                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Marbled murrelet | <ul style="list-style-type: none"> <li>• Small, chubby seabird; very short neck</li> <li>• Breeding season: dark brown to blackish upperparts, white or mottled belly and throat</li> <li>• Winter: grey upperparts, dark marks on sides of breast, white ring around eye</li> </ul> | <ul style="list-style-type: none"> <li>• Coastal Washington, Oregon, California</li> <li>• Old growth forest</li> </ul> | <ul style="list-style-type: none"> <li>• Small fish</li> <li>• Invertebrates</li> </ul> |

**Short-tailed albatross:** The short-tailed albatross was listed as endangered by the state and federal government throughout its range in July 2000. Currently, the short-tailed albatross population is estimated at approximately 1,200 individuals. Of these, the total number of breeding age birds is thought to be approximately 600 individuals. At-sea sightings since the 1940s indicate that the short-tailed albatross, while very few in number today, is distributed widely throughout its historical foraging range of the temperate and subarctic North Pacific Ocean and is often found close to the U.S. coast.

| Species                | Description                                                                                                                                                            | Distribution/Habitat                                                                                                                                   | Diet                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Short-tailed albatross | <ul style="list-style-type: none"> <li>• 7-foot wingspan, large, bubblegum-pink bill</li> <li>• White body, white or light gold head, black and white wings</li> </ul> | <ul style="list-style-type: none"> <li>• Nesting habitat is isolated to Islands in Japan</li> <li>• Feeding habitat spans the North Pacific</li> </ul> | <ul style="list-style-type: none"> <li>• Squid</li> <li>• Fish</li> <li>• Shrimp</li> </ul> |

**Northern spotted owl:** The USFWS listed the northern spotted owl as threatened under the Endangered Species Act in 1990. In 1994, the Northwest Forest Plan provided protections for the spotted owl and other species inhabiting late-successional forests in Washington, Oregon, and California. Critical habitat for the spotted owl was initially designated in 1992 and was revised in 2008. A new final rule designating critical habitat was published in December 2012. A recovery plan for the spotted owl was first issued in 2008 and revised in 2011. A number of conservation partnerships are in place with public and private partners who contribute to spotted owl recovery. The two main threats to the spotted owl's continued survival are habitat loss and competition from the barred owl, a species native to eastern North America.

| Species              | Description                                                                                                                                                                                                                                  | Distribution/Habitat                                                                                                                       | Diet                                                                                                  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Northern spotted owl | <ul style="list-style-type: none"> <li>• Medium sized bird</li> <li>• Dark-to-chestnut brown; round or oval white spots on head, neck, back, and under parts; flight feathers are dark brown and barred with light brown or white</li> </ul> | <ul style="list-style-type: none"> <li>• British Columbia, Canada, Oregon, California, Washington</li> <li>• Old growth forests</li> </ul> | <ul style="list-style-type: none"> <li>• Small rodents</li> <li>• Birds, insects, reptiles</li> </ul> |

**Brown pelican:** In 1970, under a law that preceded the Endangered Species Act of 1973, the USFWS listed the brown pelican as endangered. A recovery plan was published in 1983. In November 2009, the brown pelican was removed from the Endangered Species List; however, this species is still protected under the MBTA. Brown pelican decline is attributed to organophosphate pesticide (e.g., DDT) exposure and associated reproductive failure, local food shortages, and human disturbance. In the early 1970s, the use of DDT was banned, and restrictions controlling the use of other pesticides were imposed in the U.S. As a result, pelican reproduction improved. Sanctuaries, reserves, and natural areas have been established to protect nesting habitat and fledging areas from human disturbances and to preserve nearby marine resources.

| Species       | Description                                                                                                                                                                                                                                                                             | Distribution/Habitat                                                                                                      | Diet                                                                           |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Brown pelican | <ul style="list-style-type: none"> <li>• Approximately 6.5-foot wingspan, huge bill, reddish orange throat pouch</li> <li>• Large heavy all-brown body, white neck and belly, pale yellow head, short dark legs</li> <li>• White stripe runs down the pouch side of the neck</li> </ul> | <ul style="list-style-type: none"> <li>• Rocky, sandy, vegetated offshore islands, beaches</li> <li>• Open sea</li> </ul> | <ul style="list-style-type: none"> <li>• Anchovy, sardine, mackerel</li> </ul> |

**Yellow-billed cuckoo:** The yellow-billed cuckoo in the western U.S. was designated as a threatened species under the federal ESA in November 2014. The greatest threat to the species has been reported to be loss of riparian habitat. It has been estimated that 90 percent of the cuckoo's stream-side habitat has been lost. Habitat loss in the west is attributed to agriculture, dams, and river flow management, overgrazing and competition from exotic plants such as tamarisk. According to the USFWS (2015), there have been very few recorded observations of this species in Oregon.



| Species              | Description                                                                                                                                                                                  | Distribution/Habitat                                                                                                                                                        | Diet                                                                                                            |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Yellow-billed cuckoo | <ul style="list-style-type: none"> <li>• Slender with a long tail</li> <li>• Bold white spots on underside of tail</li> <li>• Brown back, white underside, black mask across face</li> </ul> | <ul style="list-style-type: none"> <li>• Deciduous woodlands</li> <li>• Low, scrubby vegetation</li> <li>• Abandoned farmland</li> <li>• Dense riparian thickets</li> </ul> | <ul style="list-style-type: none"> <li>• Caterpillars</li> <li>• Grasshoppers</li> <li>• Dragonflies</li> </ul> |

**Bald and golden eagles:** Bald eagles were delisted under the federal ESA in 2007 and under the Oregon ESA in 2012. USFWS is currently working with the ODFW to monitor bald eagle populations and ensure that relisting is not necessary. However, additional legal protections for bald eagles as well as golden eagles include the BGEPA, MBTA, and the Lacey Act. Each of these protections restricts activities that could have a detrimental effect on bald and golden eagle populations. Monitoring activities are based on the Bald Eagle Monitoring Plan, released in June 2010.

| Species       | Description                                                                                                                                        | Distribution/Habitat                                                                                                                          | Diet                                                                                      |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Bald eagles   | <ul style="list-style-type: none"> <li>• White head, brown body, yellow feet and legs, hooked yellow bill</li> <li>• 6-7 foot wing span</li> </ul> | North American Continent                                                                                                                      | <ul style="list-style-type: none"> <li>• Fish, carrion, smaller birds, rodents</li> </ul> |
| Golden eagles | <ul style="list-style-type: none"> <li>• Large dark brown raptor; golden feathers on head and neck</li> </ul>                                      | <ul style="list-style-type: none"> <li>• Northern Hemisphere</li> <li>• Semi-open country, chaparral, shrubland, cliffs and bluffs</li> </ul> | <ul style="list-style-type: none"> <li>• Small to medium sized mammals</li> </ul>         |

**Greater sage-grouse:** In October 2015, the USFWS determined that the greater sage-grouse was not warranted for listing under the federal ESA (80 Federal Register [FR] 59857); however, this species is still considered sensitive by the ODFW (ODFW 2008). The greater sage-grouse is highly dependent on available sage-brush habitat. Disturbance and conversion of this habitat has threatened the species and reduced the reproduction success and survival rate of existing populations. Though not listed as a threatened or endangered species, the greater sage-grouse has conservation and protective programs in place through various state and federal agencies including the USFWS, BLM, and the ODFW. Federal protection includes habitat restoration as well as designated management zones and priority areas for conservation. Within Oregon, the ODFW has developed the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to*

*Maintain and Enhance Populations and Habitat.* This plan includes identification of “Core Areas” of habitat warranting protection, limiting hunting and harvest restrictions, limiting construction activities within greater sage-grouse habitat during breeding season from one hour after sunset to two hours after sunrise, and restricting off-highway-vehicle use to areas more than two miles from nesting areas during breeding season as well as other measures intended to mitigate potential disturbance (ODFW 2011).

| Species             | Description                                                                                                                                                                                  | Distribution/Habitat                                                                                                                                                                                                       | Diet                                                                                                    |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Greater sage-grouse | <ul style="list-style-type: none"> <li>• All: White chest feathers</li> <li>• Males: long black tail feathers with white tips</li> <li>• Females: mottled black, brown, and white</li> </ul> | <ul style="list-style-type: none"> <li>• Oregon, Idaho, Nevada, Montana, Wyoming, Utah, Colorado, Washington, California, North Dakota, South Dakota, Alberta, and Saskatchewan</li> <li>• Sagebrush grasslands</li> </ul> | <ul style="list-style-type: none"> <li>• Wildflowers</li> <li>• Insects</li> <li>• Sagebrush</li> </ul> |

***Western snowy (coastal) plover:*** The western snowy plover was listed as federally threatened in 1993. Critical habitat was designated in 2005 for 32 areas along the coasts of California, Oregon, and Washington. A recovery plan was finalized in September 2007. In December 2010, the USFWS, along with other federal agencies and the State of Oregon signed off on a statewide Habitat Conservation Plan. In June 2012 the USFWS published the final ruling to increase snowy plover designated critical habitat.

| Species              | Description                                                                                                                                                                                                                                                                        | Distribution/Habitat                                                                                                                            | Diet                                                                                                                                                    |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Western snowy plover | <ul style="list-style-type: none"> <li>• Small shore bird with a thin dark bill</li> <li>• Pale brown to gray upper parts, white or buff colored belly, darker patches on its shoulders and head, white forehead, black patches above white forehead and behind the eye</li> </ul> | <ul style="list-style-type: none"> <li>• Tidal waters adjacent to the Pacific Ocean</li> <li>• Peninsulas, offshore islands, beaches</li> </ul> | <ul style="list-style-type: none"> <li>• Invertebrates</li> <li>• Crustaceans</li> <li>• Mollusks</li> <li>• Marine worms</li> <li>• Insects</li> </ul> |

## Reptiles

***Loggerhead sea turtle:*** Loggerheads are the most abundant species of sea turtle found in U.S. coastal waters. Loggerhead sea turtles are protected by various international treaties and agreements as well as federal laws. The loggerhead sea turtle was first listed under the federal ESA as threatened throughout its range in

July 1978. Loggerheads are circumglobal, occurring throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Individual country initiatives as well as cooperation between countries have led to various international treaties and agreements as well as federal laws for loggerhead sea turtle protection.

| Species               | Description                                                                                                                                                                                 | Distribution/Habitat                                                                                                                             | Diet                                                                        |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Loggerhead sea turtle | <ul style="list-style-type: none"> <li>• Top shell is slightly heart-shaped and reddish-brown in color, pale yellowish bottom shell</li> <li>• Hatchlings are brown to dark gray</li> </ul> | <ul style="list-style-type: none"> <li>• Global, throughout temperate and tropical regions of the Atlantic, Pacific and Indian Oceans</li> </ul> | <ul style="list-style-type: none"> <li>• Whelks</li> <li>• Conch</li> </ul> |

**Green sea turtle:** The green turtle was listed under the federal ESA in July 1978. Additionally, the Oregon population of green sea turtles is identified as threatened under the state ESA. Similar to the loggerhead sea turtle, the green sea turtle is globally distributed and international cooperation has led to various treaties and agreements for green sea turtle protection.

| Species          | Description                                                                                                                                       | Distribution/Habitat                                                                                                                     | Diet                                                                            |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Green sea turtle | <ul style="list-style-type: none"> <li>• Smooth black, gray green, brown, and yellow top shell</li> <li>• Yellowish white bottom shell</li> </ul> | <ul style="list-style-type: none"> <li>• Global, tropical and subtropical waters along coasts between 30° North and 30° South</li> </ul> | <ul style="list-style-type: none"> <li>• Seagrasses</li> <li>• Algae</li> </ul> |

**Leatherback sea turtle:** The leatherback turtle was listed as endangered under the federal ESA in 1970. Leatherback sea turtle nesting grounds are located around the world. Consequently, various international treaties and agreements as well as national laws have been instrumental in the conservation of leatherback sea turtles.

| Species                | Description                                                                                     | Distribution/Habitat                                                                                                                             | Diet                                                                                              |
|------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Leatherback sea turtle | <ul style="list-style-type: none"> <li>• Black top shell, pinkish-white bottom shell</li> </ul> | <ul style="list-style-type: none"> <li>• Global, throughout temperate and tropical regions of the Atlantic, Pacific and Indian Oceans</li> </ul> | <ul style="list-style-type: none"> <li>• Soft-bodied animals, like jellyfish and salps</li> </ul> |

**Olive ridley sea turtle:** The olive ridley turtle was listed under the federal ESA in July 1978. Additionally, the Oregon population of olive ridley sea turtles is identified as threatened under the state ESA. Similar to the other sensitive sea turtles that have been described, this species is globally distributed and requires

international protection. Cooperation between countries, as well as individual country initiative has led to various international treaties and agreements as well as federal laws for olive ridley sea turtle conservation.

| Species                 | Description                                                                                                                                   | Distribution/Habitat                                                                                                           | Diet                                                                                                            |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Olive ridley sea turtle | <ul style="list-style-type: none"> <li>• Grayish-green, heart-shaped top shell</li> <li>• Hatchlings are black with a greenish hue</li> </ul> | <ul style="list-style-type: none"> <li>• Global, tropical regions of the South Atlantic, Pacific and Indian Oceans.</li> </ul> | <ul style="list-style-type: none"> <li>• Shrimp, fish, lobster, crabs, algae, tunicates and mollusks</li> </ul> |

#### 3.4.2.3 Eel MOA/ATCAA and W-570

The footprint of the proposed Eel MOA/ATCAA and W-570 include the area below the existing Eel ATCAA as well as the existing W-570 and Bass/Bass South ATCAAs over coastal northwest Oregon within the counties of Clatsop, Tillamook, Yamhill, Polk, and Lincoln in Oregon, and Pacific County in Washington (refer to Figure 2-1).

Current overland military flight activities within the existing Eel ATCAA have a floor of 18,000 feet MSL (i.e., military aircraft are not permitted to conduct training operations below this altitude). However, commercial and general aviation pilots are not limited by this airspace floor and routinely fly at altitudes lower than 18,000 feet MSL along the Oregon coastline. Additionally, the existing W-570 extends from the surface to 50,000 feet MSL and the Bass ATCAA and Bass South ATCAA extend from 18,000 feet MSL to 50,000 feet MSL and 27,000 feet MSL respectively (refer to Section 3.1, *Airspace Management*).

#### Vegetation and Wildlife

Ecoregions underlying the existing W-570 and Bass/Bass South ATCAAs are limited to the marine environment. Aquatic vegetation found in the marine environment includes giant kelp (*Macrocystis pyrifera*), bull kelp (*Nereocystis leutkeana*), brown rockweed (*Ascophyllum nodosum*), red algae (*Rhodophyta* spp.), and surfgrass (*Phyllospadix scouleri*) (Northwest Habitat Institute 2011). Wildlife in the marine environment includes sturgeon (*Acipenser* spp.), salmon (*Onocorhynchus* spp.), trout (*Onocorhynchus* spp.), and steelhead (*Onocorhynchus* spp.), as well as a number of marine mammal species (ODFW 2012a).

The existing Eel ATCAA overlies coastal uplands and lowlands, volcanic, and mid-coastal sedimentary environments within the USEPA Level III Coast Range Ecoregion. Vegetation communities found within the terrestrial environments beneath the existing Eel ATCAA include, conifer thickets (*Abies* spp.), shrubs such as evergreen huckleberry (*Vaccinium ovatum*), and salmonberry (*Rubus spectabilis*), marsh species such as arrowgrass (*Triglochin* spp.) and saltgrass (*Distichlis spicata*), and hardwood species such as red alder (*Alnus rubra*) (Oregon State University 2012a). Wildlife include elk (*Cervus canadensis*), mountain lion (*Puma concolor*), brush rabbit (*Sylvilagus bachmani*), and Townsends big-eared bats (*Corynorhinus townsendii*) (Oregon State University 2012b).

### Threatened and Endangered Species

Federally and state-listed threatened and endangered species that have the potential to occur beneath the proposed W-570 or within the counties beneath the proposed Eel MOA/ATCAA and are identified in Table 3.4-1.

Federally designated critical habitat for the marbled murrelet, western snowy plover, and northern spotted owl occur beneath the existing Eel ATCAA. Though no critical habitat has been designated specific to the Columbian white-tailed deer below the existing Eel ATCAA, deer from the endangered Columbia River population of Columbian white-tailed deer have the potential to occur beneath the existing airspace area. However, due to the floor of the existing training airspaces at 18,000 feet MSL, military aircraft do not currently interfere with the habitat quality for special status terrestrial species or special status bird species in these areas (e.g., Lafferty 2001). Additionally, while federally designated critical habitat for a number of salmonid species occurs in within the existing airspace footprint, the value of freshwater aquatic habitat beneath the existing Eel ATCAA is not influenced by existing military aircraft operations. Similarly, the value of marine aquatic habitat beneath the existing Eel ATCAA is also not influenced by existing military aircraft operations.

**Table 3.4-1. Threatened and Endangered Species Potentially Occurring Beneath the Proposed Eel MOA/ATCAA and W-570**

| Common Name                    | Scientific Name                        | Federal Status | State Status |
|--------------------------------|----------------------------------------|----------------|--------------|
| <b>Mammals</b>                 |                                        |                |              |
| Gray wolf                      | <i>Canis lupus</i>                     | E              | LE           |
| Columbian white-tailed deer    | <i>Odocoileus virginianus leucurus</i> | E              | -            |
| Sea otter                      | <i>Enhydra lutris</i>                  | T              | LT           |
| Red tree vole                  | <i>Arborimus longicaudus</i>           | C              | -            |
| <b>Birds</b>                   |                                        |                |              |
| Marbled murrelet               | <i>Brachyramphus marmoratus</i>        | T              | LT           |
| Western snowy (coastal) plover | <i>Charadrius alexandrinus nivosus</i> | T              | LT           |
| Short-tailed albatross         | <i>Phoebastria albatrus</i>            | E              | LE           |
| Northern spotted owl           | <i>Strix occidentalis caurina</i>      | T              | LT           |
| Brown pelican                  | <i>Pelecanus occidentalis</i>          | -              | LE           |
| <b>Reptiles (Marine)</b>       |                                        |                |              |
| Loggerhead sea turtle          | <i>Caretta caretta</i>                 | T              | LT           |
| Green sea turtle               | <i>Chelonia mydas</i>                  | E              | LE           |
| Leatherback sea turtle         | <i>Dermochelys coriacea</i>            | E              | LE           |
| Olive ridley sea turtle        | <i>Lepidochelys olivacea</i>           | T              | LT           |

Notes: All special status freshwater aquatic and plant species have been excluded from the table as the Proposed Action would not include any ground disturbing activity.

E/LE - Endangered/Listed Endangered

T/LT - Threatened/Listed Threatened

C - Candidate Species

Sources: USFWS 2013c, 2013d; ODFW 2012b.

#### 3.4.2.4 Juniper/Hart MOA Complex

The existing Juniper/Hart MOA Complex, including the Juniper Low MOA, is located in eastern Oregon, with the existing Hart South MOA extending into northern Nevada and including a small area of Modoc County in the northeastern most corner of California. Proposed modifications to the Juniper/Hart MOA Complex would extend the training space to the east and to the south. The expansion of the existing Hart South MOA to the south would extend the airspace would establish new airspace over Humboldt and Washoe counties, both in northwestern Nevada (refer to Figure 2-3).

Current flight activities within the existing Juniper/Hart MOA Complex, excluding the Juniper Low MOA, have a floor of 11,000 feet MSL. The existing Juniper Low MOA, which overlies portions of Harney, Lake, Deschutes, and Crook counties, has a floor of 300 feet AGL; however, military aircraft operations do not occur below 500 feet AGL due to flight safety precautions.

### Vegetation and Wildlife

The existing Juniper/Hart MOA Complex as well as the proposed Juniper/Hart MOA Complex expansion area overlie the Northern Basin and Range USEPA Level III Ecoregion (refer to Figure 3.4-1). The habitat within this ecoregion below the proposed Juniper/Hart MOA Complex is characteristic of the high desert (Omernik 2011). Vegetation found in this environment includes, western juniper (*Juniperus occidentalis*), and white fir (*Abies concolor*) (Oregon State University 2012a). Wildlife in the high desert environment includes, black-tailed deer (*Odocoileus hemionus*), least chipmunk (*Neotamias minimus*), blue grouse (*Dendragapus obscurus*), American kestrel (*Falco sparverius*), and greater sage-grouse (Oregon State University 2012b).

### Threatened and Endangered Species

Federally and state listed threatened and endangered species that have the potential to occur within Harney, Humboldt, and Washoe counties are identified in Table 3.4-2. Federally designated critical habitat beneath the proposed Juniper/Hart MOA Complex includes habitat for borax lake chub (*Gila boraxobius*), warner sucker (*Catostomus warnerensis*), and desert dace (*Eremichthys across*).

**Table 3.4-2. Threatened and Endangered Species Potentially Occurring Beneath the Proposed Juniper/Hart MOA Complex**

| Common Name           | Scientific Name                        | Federal Status | State Status |
|-----------------------|----------------------------------------|----------------|--------------|
| <b>Mammals</b>        |                                        |                |              |
| Gray wolf             | <i>Canis lupus</i>                     | E              | LE           |
| Wolverine             | <i>Gulo gulo</i>                       | -              | LT           |
| Kit fox               | <i>Vulpes macrotis</i>                 | -              | LT           |
| <b>Birds</b>          |                                        |                |              |
| Greater sage-grouse   | <i>Centrocercus urophasianus</i>       | -              | SS           |
| Yellow-billed cuckoo  | <i>Coccyzus americanus</i>             | T              | -            |
| Western snowy plover* | <i>Charadrius alexandrinus nivosus</i> | -              | LT           |

Notes: All special status aquatic and plant species have been excluded from the table as the Proposed Action would not include any ground disturbing activity. \*The Western snowy plover is federally listed as endangered for coastal populations only.

E/LE - Endangered/Listed Endangered

T/TE - Threatened/Listed Threatened

PS - Partial Status

C - Candidate Species

SS - Oregon State Sensitive Species

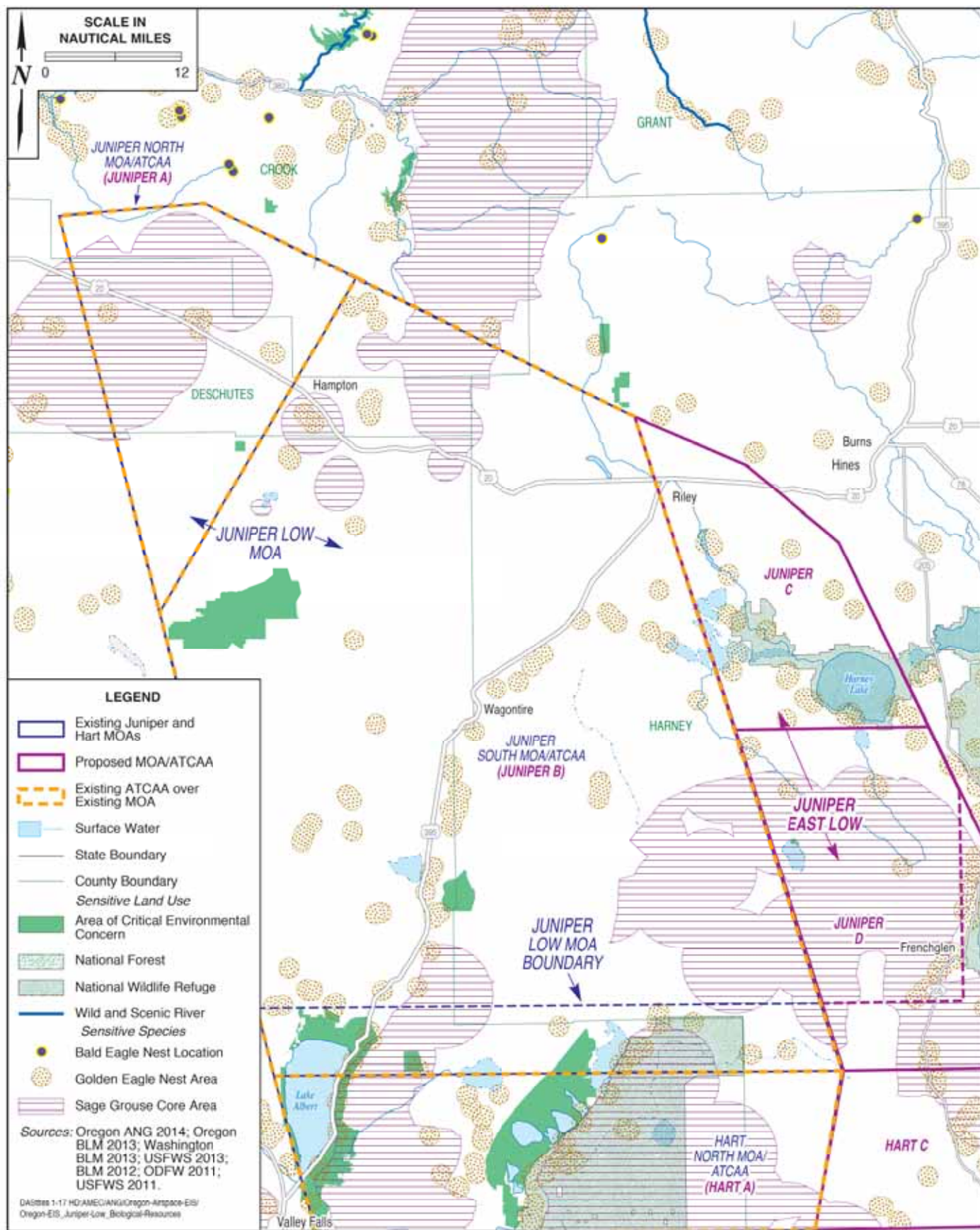
To provide a positive, proactive approach to species conservation, a “sensitive” species classification was created under Oregon’s Sensitive Species Rule (OAR 635-100-040). The Sensitive Species List focuses fish and wildlife management and research activities on species that need conservation attention. Although the intent of the Sensitive Species List is to prevent species from declining to the point of qualifying as threatened or endangered, this list is not used as a “candidate” list for species to be considered for listing under the Oregon Threatened and Endangered Species rules.

Sources: USFWS 2013c, 2013d; Oregon 2012b.

Greater sage grouse are known to occur in Crook, Grant, and Harney counties in areas underlying the existing and proposed Juniper/Hart MOA Complex. Further, the existing and proposed Juniper/Hart MOA Complex overlies “Core Areas” and “Low Density Habitat Areas” as identified in the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat* (see Figure 3.4-2).

Currently, there are no documented nesting locations for bald eagles located beneath the existing Juniper Low MOA (see Figure 3.4-2). Therefore, no ongoing coordination occurs between the 142 FW or the 173 FW and the USFWS regarding bald eagle nesting locations or avoidance measures within the footprint of the existing Juniper Low MOA. There are 195 recorded golden eagle nesting sites below the existing Juniper Low MOA. While at this time the USFWS has not formalized protection standoff distances and permit requirements for golden





**Biological Resources Beneath and in the Vicinity of the Juniper Low MOA and Proposed Juniper Low East MOA**

**FIGURE 3.4-2**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

eagles, during the scoping period for this EIS, the USFWS recommended avoiding flights below 1,000 feet AGL over nesting pairs of golden eagles (see Section 6.0, *Special Procedures*).

#### 3.4.2.5 Redhawk MOA Complex

The area located beneath the proposed Redhawk MOA Complex comprises an approximately 6,500 square-mile area of central Oregon, above the areas of Sherman, Gilliam, Morrow, Grant, Wheeler, Jefferson, and Wasco counties.

##### Vegetation and Wildlife

The proposed Redhawk MOA Complex spans the Columbia Plateau and Blue Mountains USEPA Level III Ecoregions (refer to Figure 3.4-1). Vegetation found in the northern-central Oregon environment includes grasses such as fescue (*Festuca* spp.), and wheatgrass (*Agropyron* spp.), shrubs such as Oregon grape (*Mahonia* spp.), and wax currant (*Ribes cereum*), forbs such as yarrow (*Achillea* spp.), and gumweed (*Grindelia* spp.), and trees such as lodgepole pine, and Engelmann spruce (*Picea engelmannii*) (Oregon State University 2012a). Wildlife in the central Oregon include American badger (*Taxidea taxus*), black bear (*Ursus americanus*), bighorn sheep (*Ovis Canadensis*), Canada lynx (*Lynx canadensis*), desert woodrat (*Neotoma lepida*), American wigeon (*Anas Americana*), and great blue heron (*Ardea Herodias*) (Oregon State University 2012b).

##### Threatened and Endangered Species

Federally and state-listed threatened and endangered species that have the potential to occur within Sherman, Gilliam, Morrow, Grant, Wheeler, Jefferson and Wasco counties are identified in Table 3.4-3. Federally designated critical habitat located beneath the proposed Redhawk MOA Complex exists for steelhead. Additionally, bald and golden eagle nesting areas occur within the footprint of the proposed airspace.

**Table 3.4-3. Threatened and Endangered Species Potentially Occurring Below the Proposed Redhawk MOA Complex**

| Common Name                | Scientific Name                   | Federal Status | State Status |
|----------------------------|-----------------------------------|----------------|--------------|
| <b>Mammals</b>             |                                   |                |              |
| Gray wolf                  | <i>Canis lupus</i>                | E              | LE           |
| Wolverine                  | <i>Gulo gulo</i>                  | -              | LT           |
| Washington ground squirrel | <i>Uroditellus washingtoni</i>    | C              | LE           |
| <b>Birds</b>               |                                   |                |              |
| Greater sage-grouse        | <i>Centrocercus urophasianus</i>  | -              | SS           |
| Northern spotted owl       | <i>Strix occidentalis caurina</i> | T              | LT           |

Notes: All special status aquatic and plant species have been excluded from the table as the Proposed Action would not include any ground disturbing activity.

E/LE - Endangered/Listed Endangered

T/LT - Threatened/Listed Threatened

SS - Oregon State Sensitive Species

To provide a positive, proactive approach to species conservation, a "sensitive" species classification was created under Oregon's Sensitive Species Rule (OAR 635-100-040). The Sensitive Species List focuses fish and wildlife management and research activities on species that need conservation attention. Although the intent of the Sensitive Species List is to prevent species from declining to the point of qualifying as threatened or endangered, this list is not used as a "candidate" list for species to be considered for listing under the Oregon Threatened and Endangered Species rules.

Sources: USFWS 2013c; ODFW 2012b.

### **3.5 CULTURAL RESOURCES**

#### **3.5.1 Introduction**

##### **3.5.1.1 Definition of Resource**

Cultural resources are defined as 1) physical evidence of or the place of past human activity including site, object, landscape, or structure; and/or 2) a site, structure, landscape, object, or natural feature of significance to a group of people traditionally associated with it. Depending on their conditions and historic use, these resources may provide insight to living conditions in previous civilizations and may retain cultural and religious significance to modern groups.

Archaeological resources comprise areas where prehistoric or historic activity measurably altered the environment or deposits of physical remains (e.g., lithic materials, ceramics, historic refuse, etc.) discovered therein. Architectural resources include standing buildings, districts, bridges, dams, and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for inclusion in the National Register of Historic Places (NRHP), an inventory of culturally significant resources identified in the U.S.; however, more recent structures, such as Cold War-era resources, may also warrant protection if they have the potential to gain significance in the future. Traditional cultural resources can include archaeological resources, structures, neighborhoods, prominent topographic features, habitats, plants, wildlife, minerals that Native Americans or other groups consider essential for the persistence of traditional culture and properties.

A traditional cultural property is a property that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural identity of the community. Properties eligible for inclusion must possess integrity of location, design, setting, materials, workmanship, feeling, and are associated with events that have made a significant contribution to the broad patterns of our history; or are associated with the lives of significant persons in the past; or embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable

entity whose components may lack individual distinction; or have yielded or may be likely to yield, information important in history or prehistory.

The principal federal law addressing cultural resources is the National Historic Preservation Act (NHPA) of 1966, as amended (16 USC §470 et seq.), and its implementing regulations (36 CFR §800). Compliance with these regulations, commonly referred to as the Section 106 process, involves identifying and evaluating historic or potentially historic properties; assessing the effects of federal actions on historic properties; and consulting to avoid, reduce, or minimize adverse effects. As part of the Section 106 process, proponent agencies are required to consult with the State Historic Preservation Office (SHPO).

The term “historic properties” refers to cultural resources that meet specific criteria for eligibility for listing in the NRHP; however, to warrant protection historic properties need not be formally listed in the NRHP. According to the *National Register Bulletin #15, How to Apply the National Register Criteria for Evaluation*, historical significance is assigned to a property based on its association with individuals or events significant in local, state, or national history (Criteria A and B); its ability to embody the distinctive characteristics of a type, period, or method of construction (Criterion C); or its potential to yield information important to prehistory or history (Criterion D). Properties less than 50 years of age must possess exceptional historical importance to be included on the NRHP (Criterion G). Section 106 of the NHPA does not require the preservation of historic properties, but ensures that the decisions of federal agencies concerning the treatment of these places result from meaningful considerations of cultural and historic values and of the options available to protect the properties. The Proposed Action comprises an undertaking, as defined by 36 CFR §800.3, and is therefore subject to requirements outlined in Section 106 of the NHPA.

Department of Defense Instruction (DODI) 4710.02, *Department of Defense Interactions with Federally Recognized Tribes* (14 September 2006) established parameters outlining the DoD’s interactions with federally recognized tribes. The policy outlines DoD trust obligations, communication procedures with tribes on a government-to-government basis, consultation protocols, and actions to recognize and respect the significance that tribes ascribe to certain natural resources and properties of traditional cultural or religious importance. The policy also requires

consultation with federally recognized tribes when proposed activities could impact tribal resources or interests.

#### **3.5.1.2 Regional Setting**

Human habitation of the Pacific Northwest, including present-day Oregon, is believed to have begun 15,000 years ago. Evidence of early human presence has been observed indirectly based on the discovery of weapons used to hunt megafauna as well as artifacts used in daily life. Remnants such as projectile points, stone tools, stone bowls, and beads are still found throughout the Pacific Northwest (State of Oregon 2013).

Contact and settlement by Europeans likely occurred earlier along the coastal regions of Oregon as these areas could be more easily accessed by sailing explorers and merchants. European settlement and contact would have spread towards the interior of the state over longer time periods as settlers accessed these regions over land. Arrival of Europeans on the Northwest Coast is believed to have begun in the 1500s as Spanish explorers surveyed the Pacific Coast and Spanish merchants wrecked their ships on their way to trade locations in New Spain (i.e., Mexico) (State of Oregon 2013). Contact during this time is believed to have been infrequent and relatively unobtrusive on the culture of tribes inhabiting the area. More focused exploration of the Oregon coast and trading with native tribes began in the late 1700s involving explorers and merchants from Spain and Britain. By the end of the 18th century, an estimated 300 vessels from a dozen different countries had sailed to the Northwest Coast. European contact with the interior parts of Oregon likely began in the 1800s with the exploration party of Meriwether Lewis and William Clark. Lewis and Clark were tasked with mapping the land and identifying a route for commerce across North America, as well as opening diplomatic relations between the tribes and the U.S. These endeavors paved the way for establishment of the fur trade and permanent Euro-American settlements in the region (State of Oregon 2013).

#### **3.5.2 Existing Conditions**

Outreach to Native American Tribes during the Environmental Impact Analysis Process (EIAP) for identification of sacred sites and other areas of importance is

summarized in subsection 3.5.2.3, *Native American Consultation*. Existing buried cultural resources, artifacts, and other subsurface resources would not be impacted by implementation of the Proposed Action as the proposed airspace modification would not include any ground-disturbing activities (i.e., the Proposed Action is limited to changes to airspace areas and aircraft activities therein). Therefore, existing subsurface archaeological resources are not described in detail in the discussion below.

As ground-disturbing activities would not occur as a result of the Proposed Action, the only physical cultural resources with the potential to be indirectly impacted would be historic structures, which could be damaged during aircraft overflights at altitudes low enough to generate significant noise vibrations. A study conducted by Wyle, an acoustic research consulting firm, and research conducted by the National Research Council/National Academy of Sciences, found that “only sound lasting more than one second above a sound level of 130 dB is potentially damaging to structural components” due to noise-generated vibrations (Wyle 2008; National Research Council/National Academy of Sciences 1977).<sup>7</sup> Consequently, all state and federally recognized historic resources within counties below the affected or proposed airspaces were identified; however, only historic structures within the footprint of the Juniper Low MOA and the proposed Juniper East Low MOA are individually analyzed (see Figure 3.5-1). All other military flight activity in affected or proposed airspaces included in the Proposed Action would be located at or above an altitude of 11,000 feet MSL and would not generate a maximum sound level equal to or greater than 130 dB (refer to Table 3.2-2 and Section 3.2, *Noise* for a description of relevant noise metrics).

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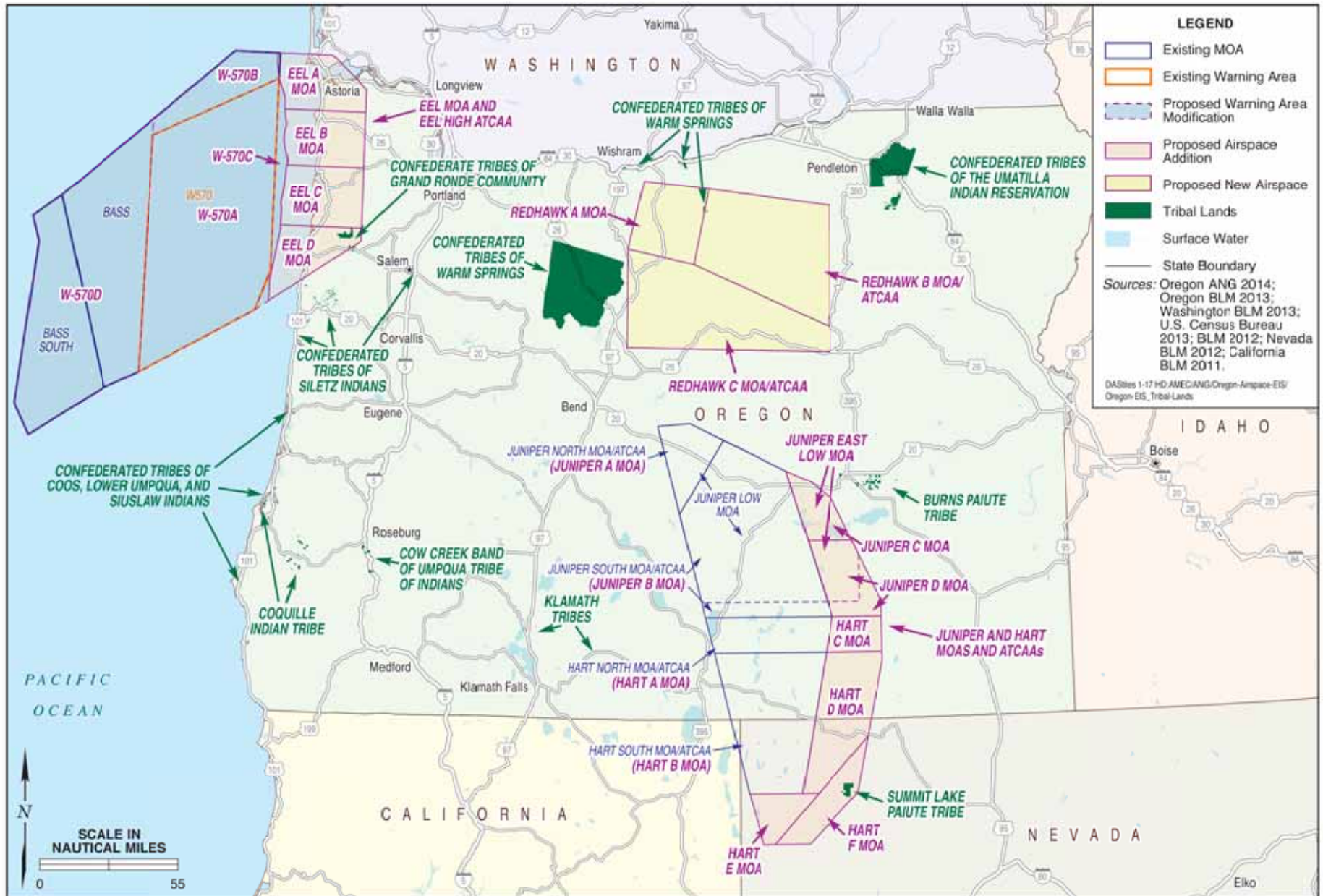
<sup>7</sup> The sound level resulting from the take-off of a military jet at a distance of 50 feet from the receptor ranges from approximately 120 to 130 dBs (refer to Table 3.2-1 in Section 3.2, *Noise*).





No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

3-86



EIS

Federally Recognized Native American Tribes in the Project Area

FIGURE  
3.5-1



### 3.5.2.1 Record Searches and Background Research

An initial record search in support of the EIAP for the Proposed Action was conducted by AMEC Environment & Infrastructure, Inc. (AMEC) in July 2013, utilizing the state historic site databases for Oregon, Washington, Nevada, and California.

The state record search identified previously recorded buildings and structures within each of the counties underlying the affected or proposed airspaces (see Table 3.5-1). Additionally, the NRHP was searched for sites that have been nationally recognized as having historical significance within each of the affected counties.

Record search results from the Oregon Historic Sites Database (OHSD) indicate that there are 6,266 historic sites recorded within Oregon counties below the affected and proposed airspaces included in the Proposed Action. In Pacific County, Washington, 555 historic sites were identified in the Washington State historic site database. Additionally, a total of 42 historic sites were identified within Humboldt and Washoe counties, Nevada in the Nevada State Historic Site List and a total of 35 historic sites were identified within Modoc County, California in the California List of Historical Resources. The number of historic sites recorded in counties below affected and proposed airspaces totals 6,898 sites; of these, 426 were also identified in the NRHP (see to Table 3.5-1) (Oregon State Parks 2013; Nevada Department of Conservation and Natural Resources 2010; Washington State Department of Archaeology and Historic Preservation 2013; National Parks Service [NPS] 2013). However, only a fraction of the state and federally recognized historic sites would have a potential to be impacted by low-altitude flow activities within the Juniper Low MOAs (see Section 3.5.2.2, *Documented Cultural and Historic Resources*). All other historic sites below the proposed Eel MOA/ATCAA, Redhawk MOA Complex, or the remainder of the proposed Juniper/Hart MOA Complex would not be affected as the floor of the proposed airspaces would be established at 11,000 feet MSL limiting noise exposure and associated potential impacts to the historic sites below.

**Table 3.5-1. State and Federally Recognized Historic Sites**

| County                          | State Records | NRHP Records |
|---------------------------------|---------------|--------------|
| Clatsop                         | 1,763         | 63           |
| Tillamook                       | 226           | 29           |
| Yamhill                         | 2,295         | 80           |
| Polk                            | 265           | 26           |
| Lincoln                         | 236           | 31           |
| Pacific (WA)                    | 555           | 19           |
| <b>Eel MOA/ATCAA</b>            | <b>5,340</b>  | <b>248</b>   |
| Harney                          | 231           | 7            |
| Humboldt (NV)                   | 4             | 14           |
| Washoe (NV)                     | 38            | 75           |
| Modoc (CA)                      | 35            | 18           |
| <b>Juniper/Hart MOA Complex</b> | <b>308</b>    | <b>114</b>   |
| Sherman                         | 72            | 6            |
| Gilliam                         | 112           | 4            |
| Morrow                          | 60            | 4            |
| Grant                           | 379           | 9            |
| Wheeler                         | 91            | 1            |
| Jefferson                       | 72            | 8            |
| Wasco                           | 464           | 32           |
| <b>Redhawk MOA Complex</b>      | <b>1,250</b>  | <b>64</b>    |
| <b>Total</b>                    | <b>6,898</b>  | <b>426</b>   |

Note: Due to the proposed floors of the affected and proposed airspaces only historic sites located below the Juniper Low MOA would have the potential to be impacted by low-altitude training operations.

Sources: Oregon State Parks 2013; Nevada Department of Conservation and Natural Resources 2010; Washington State Department of Archaeology and Historic Preservation 2013; California State Parks Office of Historic Preservation 2013; NPS 2013.

### 3.5.2.2 Documented Cultural and Historic Resources

As ground-disturbing activities are not included as a part of the Proposed Action, potential impacts to historic structures are limited to indirect impacts resulting from by noise vibrations generated during military aircraft overflights. Noise vibrations associated with sound levels ranging between 120 and 130 dB for a duration of more than one second would have the potential to cause damage (Wyle 2008; National Research Council/National Academy of Sciences 1977). Noise levels in this range would be experienced at approximately 50 feet from a

jet engine using power settings for take-off (e.g., full thrust, after-burners, etc.) (refer to Table 3.2-1 in Section 3.2, *Noise*). Receptors below the proposed Eel MOA/ATCAA, Juniper/Hart MOA Complex (including the existing Juniper Low MOA and proposed Juniper East Low MOA), and Redhawk MOA Complex would not be exposed to power settings as high as those used during take-off at actual or equivalent distances of 50 feet. However, historic structures, which have been identified as eligible for protection by either the OHSD or the NRHP and are located beneath the existing Juniper Low MOA and proposed Juniper East Low MOA could potentially be affected because they are located beneath the lowest floors of the proposed airspace (see Table 3.5-2). As previously described, historic resources beneath the remaining affected or proposed airspaces are not included as military flight activity within these airspaces would occur at or above 11,000 feet MSL.<sup>8</sup> Consequently, noise levels beneath these airspaces would not approach the range necessary to indirectly impact historic structures.

**Table 3.5-2. Historic Buildings below Juniper Low MOA**

| Property Name    | Location            | Year Built | NRHP/OHSD |
|------------------|---------------------|------------|-----------|
| Double 'O' Ranch | Double O Country Rd | 1875       | NRHP/OHSD |

Sources: Oregon State Parks 2013; Nevada Department of Conservation and Natural Resources 2010; Washington State Department of Archaeology and Historic Preservation 2013; California State Parks Office of Historic Preservation 2013; NPS 2013.

### 3.5.2.3 Native American Consultation

Federally recognized Native American tribes located beneath or in the vicinity of the Proposed Project in Oregon, Washington, and Nevada were contacted early in the EIAP in an effort to determine if sacred sites or places of importance to these tribes were located within the area of potential effect (APE) for the Proposed Action. Outreach to the nine federally recognized Native American tribes in Oregon has been ongoing since May 2012. Additionally, the federally recognized Summit Lake Paiute Tribe in Nevada was included in these outreach efforts and one other federally recognized tribe in northern Nevada was contacted at the

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<sup>8</sup> While aircraft overflights would occur at or above 11,000 feet MSL, over central Oregon these overflights would occur at approximately 7,500 feet AGL. However, as described in Table 3.5-1, overflights at this altitude would have no potential to result in noise levels that may impacts historic structures (i.e., 130 dB).

request of the Nevada SHPO in February 2013 (see Appendix H, *Tribal Outreach*). Tribes included in outreach efforts include:

- Burns Paiute Tribe
- Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians
- Coquille Indian Tribe
- Cow Creek Band of Umpqua Tribe of Indians
- Confederate Tribes of Grand Ronde Community
- Klamath Tribes
- Confederated Tribes of Siletz Indians
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of Warm Springs
- Summit Lake Paiute Tribe
- Reno-Sparks Indian Colony

Outreach has consisted of three rounds of written correspondence mailed to tribal contacts in July 2012, May 2013, and June 2013 (see Appendix H, *Tribal Outreach*). As part of the initial outreach, invitations to meet face-to-face during a private meeting or during public scoping meetings were extended. Letters and written invitations to meetings were followed up with telephone calls and emails in an effort to increase accessibility and encourage communication in the event a tribe would have any concerns regarding the Proposed Action or land below the affected or proposed airspace areas.

As of March 2014, there have been no concerns raised by any tribes regarding the Proposed Action, affected or proposed airspaces, or sacred sites or other cultural resources-related concerns. Outreach to tribes, and consideration to all identified concerns will continue throughout the duration of the EIAP. Correspondence sent to the tribes and any information the tribes shared with the project team is located in Appendix H, *Tribal Outreach*.

#### 3.5.2.4 Field Studies

As previously described, no part of the existing affected or proposed airspaces would disturb or otherwise impact the ground. Therefore, field studies to determine existence and location of archeological and cultural resources below the existing and proposed airspaces have not been conducted.

## **3.6 AIR QUALITY**

### **3.6.1 Introduction**

#### **3.6.1.1 Definition of Resource**

Air quality in a given location is evaluated based on the concentration of various pollutants in the atmosphere. National Ambient Air Quality Standards (NAAQS) are established by the USEPA for criteria pollutants, including: ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter equal to or less than ten microns in diameter (PM<sub>10</sub>) and 2.5 microns in diameter (PM<sub>2.5</sub>), and lead (Pb). NAAQS represent maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health and welfare.

Global climate change is a transformation in the average weather of the Earth, which can be measured by changes in temperature, wind patterns, and precipitation. Scientific consensus has identified human-related emission of greenhouse gases (GHG) above natural levels as a significant contributor to global climate change (U.S. Climate Change Science Program [USCCSP] 2009). GHG effectively trap heat in the atmosphere and influences the Earth's temperature. They include water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), ground-level O<sub>3</sub>, and fluorinated gases such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs).

#### **3.6.1.2 Criteria and Hazardous Air Pollutants**

Air quality is affected by stationary sources (e.g., industrial development) and mobile sources (e.g., motor vehicles). Air quality at a given location is a function of several factors, including the quantity and type of pollutants emitted locally and regionally, and the dispersion rates of pollutants in the region. Primary factors affecting pollutant dispersion are wind speed and direction, atmospheric stability, temperature, the presence or absence of inversions, and topography.

**Ozone (O<sub>3</sub>).** The majority of ground-level (i.e., terrestrial) O<sub>3</sub> is formed as a result of complex photochemical reactions in the atmosphere involving volatile organic compounds (VOC), nitrogen oxides (NO<sub>x</sub>), and oxygen. O<sub>3</sub> is a highly reactive gas

that damages lung tissue, reduces lung function, and sensitizes the lung to other irritants. Although *stratospheric* O<sub>3</sub> shields the earth from damaging ultraviolet radiation, terrestrial O<sub>3</sub> is a highly damaging air pollutant and is the primary source of smog.

As of June 2004, the USEPA issued the final rule for 8-hour O<sub>3</sub>, revising the 1-hour O<sub>3</sub> NAAQS standard. The 8-hour standard is more protective of public health and more stringent than the 1-hour standard, and nonattainment areas for 8-hour O<sub>3</sub> are now designated.

**Carbon Monoxide (CO).** CO is a colorless, odorless, poisonous gas produced by incomplete burning of carbon in fuel. The health threat from CO is most serious for those who suffer from cardiovascular disease, particularly those with angina and peripheral vascular disease.

**Nitrogen Dioxide (NO<sub>2</sub>).** NO<sub>2</sub> is a highly reactive gas that can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Repeated exposure to high concentrations of NO<sub>2</sub> may cause acute respiratory disease in children. Because NO<sub>2</sub> is an important precursor in the formation of O<sub>3</sub> (or smog), control of NO<sub>2</sub> emissions is an important component of overall pollution reduction strategies. The two primary sources of NO<sub>2</sub> in the U.S. are fuel combustion and transportation.

**Sulfur Dioxide (SO<sub>2</sub>).** SO<sub>2</sub> is emitted primarily from stationary source coal and oil combustion, steel mills, refineries, pulp and paper mills, and from non-ferrous smelters. High concentrations of SO<sub>2</sub> may aggravate existing respiratory and cardiovascular disease; asthmatics and those with emphysema or bronchitis are the most sensitive to SO<sub>2</sub> exposure. SO<sub>2</sub> also contributes to acid rain, which can lead to the acidification of lakes and streams and damage vegetation.

**Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>).** Particulate matter (PM) is a mixture of tiny particles that vary greatly in shape, size, and chemical composition, and can be comprised of metals, soot, soil, and dust. PM<sub>10</sub> includes larger, coarse particles, whereas PM<sub>2.5</sub> includes smaller, fine particles. Sources of coarse particles include crushing or grinding operations, and dust from paved or unpaved roads. Sources of fine particles include all types of combustion activities (e.g., motor vehicles,

power plants, wood burning) and certain industrial processes. Exposure to PM<sub>10</sub> and PM<sub>2.5</sub> levels exceeding current standards can result in increased lung- and heart-related respiratory illness. The USEPA has concluded that finer particles are more likely to contribute to health problems than those greater than 10 microns in diameter.

**Airborne Lead (Pb).** Airborne lead can be inhaled directly or ingested indirectly by consuming lead-contaminated food, water, or non-food materials such as dust or soil. Fetuses, infants, and children are most sensitive to Pb exposure. Pb has been identified as a factor in high blood pressure and heart disease. Exposure to Pb has declined dramatically in the last 10 years as a result of the reduction of Pb in gasoline and paint, and the elimination of Pb from soldered cans.

**Hazardous Air Pollutants (HAPs).** Hazardous air pollutants are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effect. Unlike criteria pollutants, HAPs are primarily chemical-specific pollutants (versus classes of pollutants) and many of the HAPs are actually constituent chemicals that are a subset of a criteria pollutant emission rate. This is found primarily with the VOCs (numerous constituent chemicals considered HAPs) and PM<sub>10</sub> (primarily heavy metals). Pb is both a criteria pollutant and HAP.

### 3.6.1.3 Clean Air Act Amendments

The Clean Air Act Amendments (CAAA) of 1990 place most of the responsibility to achieve compliance with NAAQS on individual states. To this end, USEPA requires each state to prepare a State Implementation Plan (SIP). A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state into compliance with all NAAQS. Areas not in compliance with a standard can be declared *nonattainment* areas by USEPA or the appropriate state or local agency. In order to reach *attainment*, NAAQS may not be exceeded more than once per year. A *nonattainment* area can reach *attainment* when NAAQS have been met for a period of 10 consecutive years. During this time period, the area is in *transitional attainment*, also termed *maintenance*.

Under the CAAA, the Title V Operating Permit Program and the Aerospace National Emission Standards for Hazardous Air Pollutants (NESHAP) Program, impose requirements for air quality permitting on emission sources of air pollutants. As Section 501 of the CAA limits the definition of a “major source” to stationary sources or groups of stationary sources, only stationary source emissions are included when determining eligibility for the Title V Operating Permit Program and the Aerospace NESHAP Program. Therefore, existing aircraft operations do not influence the Oregon ANG’s eligibility for participation in either the Title V Operating Permit Program or the Aerospace NESHAP Program.<sup>9</sup>

### 3.6.1.4 Regional Setting

The majority of the proposed airspace actions are located within the State of Oregon. Air quality in Oregon is managed by the Oregon Department of Environmental Quality (DEQ) and the state is divided into three regions to allow for better management of air quality: Western, Northwestern, and Eastern. Nonattainment and maintenance area statuses are identified based on which pollutants exceed the pollutant threshold for the reporting area (see Table 3.6-1).

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<sup>9</sup> An installation would qualify as a major source under the Title V Program if potential emissions from stationary sources exceed 100 tons per year (tpy) of any of the criteria pollutants; or 10 or 25 tpy of any single or combination of HAPs, respectively. An installation would qualify for the Aerospace NESHAP Program if potential emissions of any HAP equals or exceeds 10 tpy or any combination of HAPs equals or exceeds 25 tpy.



**Table 3.6-1. Non-Attainment and Maintenance Areas by Air Quality Region**

| County       | Pollutant |                |                  |                   |
|--------------|-----------|----------------|------------------|-------------------|
|              | CO        | O <sub>3</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Western      |           |                |                  |                   |
| Jackson      | -         | -              | M                | -                 |
| Josephine    | M         | -              | M                | -                 |
| Lane         | -         | -              | N                | N                 |
| Marion       | M         | -              | -                | -                 |
| Polk         | M         | -              | -                | -                 |
| Northwestern |           |                |                  |                   |
| Clackamas    | M         | M              | -                | -                 |
| Multnomah    | M         | M              | -                | -                 |
| Washington   | M         | M              | -                | -                 |
| Eastern      |           |                |                  |                   |
| Klamath      | M         | -              | M                | N                 |
| Lake         | -         | -              | M                | -                 |
| Union        | -         | -              | M                | -                 |

Notes: A – Attainment; N – Nonattainment; M – Maintenance.

Source: USEPA 2016.

Maintenance areas have associated maintenance plans to ensure continued compliance with pollutant standards and plan for future growth. Additionally, the Oregon SIP also provides control strategies for nonattainment areas. Oregon is in attainment for all other criteria pollutants (USEPA 2016).

Two Nevada counties, Washoe and Humboldt counties also underlie a small part of the existing Juniper/Hart MOA Complex and the proposed Juniper/Hart MOA Complex expansion area. Washoe has its own distinct Air Quality jurisdiction apart from the Nevada Bureau of Air Pollution Control which manages air quality for the state (with the exception of Washoe and Clark counties) (Nevada Division of Environmental Protection [NDEP] 2016).

Washoe County contains a maintenance area for CO and a nonattainment area for PM<sub>10</sub>. Maintenance plans have been developed for CO management. Additionally, the Nevada SIP also provides control strategies for nonattainment areas. Humboldt County is managed by the Nevada Bureau of Air Quality Control and is in attainment for all criteria pollutants (USEPA 2012).

A small sliver of Modoc County, in northeastern California, is located below the existing Juniper/Hart MOA Complex airspace area. Modoc County air quality is managed by the Modoc County Air Pollution Control District. The county is in attainment for all criteria pollutants.

The existing Eel ATCAA and W-570 airspace areas extend over a small portion of Pacific County, Washington. Air quality in Pacific County is managed by the Washington State Department of Ecology. Pacific County is in attainment for all criteria pollutants.

### **3.6.2 Existing Conditions**

Existing uses of the airspace areas comprise aircraft training exercises. Mobile emission sources are not included in the determination for an entity's participation in the Title V Permitting Regulations of the Clean Air Act (CAA). Consequently, allocated flight hours do not contribute to either the 142 FW's or the 173 FW's Title V requirements. This section presents the existing air quality conditions encompassed by the airspace boundaries.

Combustion emissions from F-15 aircraft utilizing the existing airspace are directly related to JP-8, the type of fuel used for F-15 flight activity. JP-8 is a kerosene-based fuel used in part because of its lower vapor pressure and reduced potential for fire and explosion. Emissions generated during the combustion of JP-8 include CO, NO<sub>x</sub>, SO<sub>x</sub>, HAPs, and VOCs (Agency for Toxic Substances and Disease Registry [ATSDR] 1998).<sup>10</sup> JP-8 is essentially commercial grade Jet-A aviation kerosene with three additives: Corrosion Inhibitor/Lubricity Enhancer, Fuel System Icing Inhibitor, and Static Dissipater Additive (USAF 1994, U.S. Army 2007). The chemical composition profile of JP-8 developed by the Center for Disease Control (CDC). In addition to combustion emissions, exercises involving chaff and flare also contribute to pollutants generated within the airspaces (see Section 3.8, *Hazardous Materials and Wastes*). No other chemicals or substances are added to or emitted during F-15 training exercises.

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<sup>10</sup> VOCs generated by JP-8 combustion are Ethylbenzene, Benzene, Xylenes, and Toluene.

Emission factors for JP-8 combustion were derived from studies employing JP-4 aviation fuel because of their similarities in combustion emissions.<sup>11</sup> Summaries of individual military flight-related airspace emissions are located in the corresponding airspace sections below. The emission estimates were generated using maximum sortie rates and aircraft operational data obtained from personnel responsible for scheduling the airspace (refer to Table 2-1). Emissions occur over a wide area and at a range of altitudes and disperse throughout the region.

Chaff and flare emissions are only generated during exercises featuring chaff and flare release (i.e., the routine storage and handling of chaff and flare do not inherently result in pollutant emissions). Previous studies have concluded that the use of chaff and flare does not result in a significant impact within the area or in areas adjacent to where the chaff and flares are deployed (National Guard Bureau [NGB] 2002; Air National Guard Readiness Center [ANGRC] 2003; USAF 1997; USAF 2008). Additionally, given the large area of airspace utilized, the contribution of chaff and flare to the total quantity of pollutants generated is negligible. The use of chaff and flare is conducted in accordance with AFI 11-214, the AFI 11-2MDS series, and local directives. AFI 11-2MDS establishes specific training programs and AFI 11-214 allows chaff and flare use only in approved airspace and establishes a minimum altitude of 700 feet AGL for release of a flare by an F-15. However, the Oregon ANG has elected to set a more conservative floor of 5,000 feet AGL for flare use (see Section 3.7, *Safety*). Composition of chaff and flares are identified in Table 3.6-2 and Table 3.6-3, below.

Aircraft contrails are formed when atmospheric conditions cause water vapor from JP-8 combustion to condense on NO<sub>x</sub>, SO<sub>x</sub>, or PM particles and effectively form clouds following the path of jet exhaust. Contrails are temporary and pose no direct threat to public health (USEPA 2000).

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<sup>11</sup> A comparison study of emissions for JP-8 and JP-4 anticipated slight differences in CO production and slightly increased VOC production, neither of which was considered to be significant amounts. Smoke production (PM) is anticipated to increase due to JP-8's lower volatility and higher aromatic content; however, technology incorporated on newer aircraft engines mitigates this increase.

**Table 3.6-2. Composition of Chaff used by Oregon ANG F-15 Aircraft**

| Element                                        | Chemical Symbol                        | Percent (by weight) |
|------------------------------------------------|----------------------------------------|---------------------|
| <i>Silica Core</i>                             |                                        |                     |
| Silicon dioxide                                | SiO <sub>2</sub>                       | 52-56               |
| Alumina                                        | Al <sub>2</sub> O <sub>3</sub>         | 12-16               |
| Calcium Oxide and Magnesium Oxide              | CaO and MgO                            | 16-25               |
| Boron Oxide                                    | B <sub>2</sub> O <sub>3</sub>          | 5-13                |
| Sodium Oxide and Potassium Oxide               | Na <sub>2</sub> O and K <sub>2</sub> O | 1-4                 |
| Iron Oxide                                     | Fe <sub>2</sub> O <sub>3</sub>         | 1 or less           |
| <i>Aluminum Coating (Typically Alloy 1145)</i> |                                        |                     |
| Aluminum                                       | Al                                     | 99.45 minimum       |
| Silicon and Iron                               | Si and Fe                              | 0.55 maximum        |
| Copper                                         | Cu                                     | 0.05 maximum        |
| Manganese                                      | Mn                                     | 0.05 maximum        |
| Magnesium                                      | Mg                                     | 0.05 maximum        |
| Zinc                                           | Zn                                     | 0.05 maximum        |
| Vanadium                                       | V                                      | 0.05 maximum        |
| Titanium                                       | Ti                                     | 0.03 maximum        |
| Others                                         |                                        | 0.03 maximum        |

Source: USAF 1997.

**Table 3.6-3. Typical Composition of Oregon ANG F-15 Flares**

| Part                                    | Components                                                                                                                                                      |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Combustible</i>                      |                                                                                                                                                                 |
| Flare Pellet                            | Polytetrafluoroethylene (Teflon) (-[C <sub>2</sub> F <sub>4</sub> ] <sub>n</sub> -n=20,000 units)<br>Magnesium (Mg)<br>Fluoroelastomer (Viton, Fluorel, Hytemp) |
| First Fire Mixture                      | Boron (B)<br>Magnesium (Mg)<br>Potassium perchlorate (KClO <sub>4</sub> )<br>Barium chromate (BaCrO <sub>4</sub> )<br>Fluoroelastomer                           |
| Immediate Fire/Dip Coat                 | Polytetrafluoroethylene (Teflon) (-[C <sub>2</sub> F <sub>4</sub> ] <sub>n</sub> -n=20,000 units)<br>Magnesium (Mg)<br>Fluoroelastomer                          |
| <i>Assemblage (Residual Components)</i> |                                                                                                                                                                 |
| Aluminum Wrap                           | Mylar or filament tape bonded to aluminum tape                                                                                                                  |
| End Cap                                 | Plastic (nylon)                                                                                                                                                 |
| Felt Spacers                            | Felt pads (0.25 inches by cross section of flare)                                                                                                               |
| Safe & Initiation (S&I) Device          | Plastic (nylon, tefzel, zytel)                                                                                                                                  |
| Piston                                  | Plastic (nylon, tefzel, zytel)                                                                                                                                  |

Source: USAF 1997.

### 3.6.2.1 Eel MOA/ATCAA and W-570

#### Attainment Status

Under the Proposed Action Eel MOA A through D would be established beneath the existing Eel ATCAA over coastal Oregon within the counties of Clatsop, Tillamook, Yamhill, Polk, and Lincoln in Oregon, and Pacific County in Washington. Proposed modifications to the existing W-570 and Bass/Bass South ATCAAs would only affect the internal boundaries as well as the floor and ceiling of the airspace areas. The existing location and external boundaries of the airspace above the Pacific Ocean would remain the same.

All counties underlying the proposed Eel MOA/ATCAA and W-570, with the exception of Polk County are in attainment for criteria pollutants (USEPA 2012). Within Polk County the City of Salem is a *maintenance* area for CO; however, this area is located approximately 30 miles to the west of the proposed Eel MOA/ATCAA (USEPA 2012).

#### Existing W-570 Airspace Emissions

Existing military aircraft-related emissions (i.e., mobile-source emissions) from training operations in the existing W-570 airspaces contribute to the total emissions within this area. Table 3.6-4 provides a summary of current aircraft emissions and pollutant concentrations in the existing W-570 airspace. A study conducted by the FAA concluded that aircraft operations at or above the average mixing height of 3,000 feet AGL have a very small effect on ground level concentrations and could not directly result in a violation of the NAAQS in a local area (FAA 2000) (see Appendix F, *Air Quality*, for additional information). Consequently, due to the altitude of the existing Eel, Bass, and Bass South ATCAAs, these airspaces are not included in emissions calculations. The emissions estimates were generated using the existing airspace volume of approximately 236,829 cubic kilometers (km<sup>3</sup>), and the existing allocated annual flight hours, 900 hours (refer to Table 2-2; see Appendix F, *Air Quality*, for full modeling results and input parameters).

**Table 3.6-4. Summary of Existing Mobile Source Pollutant Emissions within Existing W-570 Airspace**

| Pollutant       | Total (tpy) | Concentration (µg/m3) |
|-----------------|-------------|-----------------------|
| CO              | 12.30       | 0.047                 |
| VOCs            | 1.37        | 0.005                 |
| SO <sub>x</sub> | 13.67       | 0.052                 |
| PM              | 4.65        | 0.018                 |
| NO <sub>x</sub> | 369.07      | 1.414                 |
| HAPs            | 0.53        | 0.002                 |

Note: Mobile-source emissions are not regulated under Title V permitting requirements.

Source: AMEC 2013; see Appendix F, *Air Quality*, for full air quality modeling results and parameters.

### 3.6.2.2 Juniper/Hart MOA Complex

#### Attainment Status

Proposed modifications to the existing Juniper/Hart MOA Complex would extend the training airspace east from the existing Juniper North MOA and Juniper South MOA. This extension of the Juniper MOAs would remain within Harney County and the extension of Hart North MOA and Hart South MOA would extend the airspace eastward within Harney County, Oregon and establish new airspace over Humboldt County and Washoe County in northwestern Nevada.

Washoe County, Nevada is the only county below the Juniper and Hart airspaces that is not in full attainment with all criteria pollutants. Washoe County is a maintenance area for CO and O<sub>3</sub>, and a nonattainment area for PM<sub>10</sub> (see Table 3.6-5) (USEPA 2012).

**Table 3.6-5. Juniper/Hart MOA Complex NAAQS Attainment Status**

| County       | Pollutant |                 |                 |                |                   |                  |    |
|--------------|-----------|-----------------|-----------------|----------------|-------------------|------------------|----|
|              | CO        | SO <sub>x</sub> | NO <sub>x</sub> | O <sub>3</sub> | PM <sub>2.5</sub> | PM <sub>10</sub> | Pb |
| Harney, OR   | A         | A               | A               | A              | A                 | A                | A  |
| Humboldt, NV | A         | A               | A               | A              | A                 | A                | A  |
| Washoe, NV   | M         | A               | A               | A              | A                 | N                | A  |
| Modoc, CA    | A         | A               | A               | A              | A                 | A                | A  |

Notes: A – Attainment; N – Nonattainment; M – Maintenance.

Source: USEPA 2016.

### Existing Juniper /Hart MOA Complex Airspace Emissions

Emissions in the existing Juniper/Hart MOA Complex are produced by aircraft flight operations (i.e., mobile sources) conducted by the 142 FW and 173 FW. Table 3.6-6 provides a summary of current aircraft emissions and pollutant concentrations in the existing Juniper/Hart MOA Complex. The emissions estimates were generated using the existing airspace volume of approximately 114,672 km<sup>3</sup>, and an existing allocated total annual flight hours, 2,377 hours (refer to Table 2-3; see Appendix F, *Air Quality*, for full modeling results and input parameters).

**Table 3.6-6. Summary of Existing Mobile Source Pollutant Emissions within the Existing Juniper/Hart MOA Complex.**

| Pollutant       | Total (tpy) | Concentration (µg/m3) |
|-----------------|-------------|-----------------------|
| CO              | 22.63       | 0.179                 |
| VOCs            | 2.52        | 0.020                 |
| SO <sub>x</sub> | 25.15       | 0.199                 |
| PM              | 8.56        | 0.068                 |
| NO <sub>x</sub> | 679.01      | 5.371                 |
| HAPs            | 1.52        | 0.012                 |

Note: Mobile-source emissions are not regulated under Title V permitting requirements.

Source: AMEC 2013; see Appendix F, *Air Quality*, for full air quality modeling results and parameters. Redhawk MOA Complex

### 3.6.2.3 Redhawk MOA Complex

#### Attainment Status

The proposed establishment of the Redhawk MOA Complex would create additional training airspace in the central region of Oregon overlying Sherman, Gilliam, Morrow, Grant, Wheeler, Jefferson and Wasco counties. All counties covered by the Redhawk airspace are in attainment for NAAQS criteria pollutants (USEPA 2012).

### Existing Redhawk MOA Complex Emissions

The proposed Redhawk MOA Complex is not currently designated as a military training area for air-to-air maneuvering training. While military flight activity

occurs within the MTRs in the area, there are no emissions currently generated by air-to-air military aircraft training exercises, or chaff and flare deployment.



### **3.7 SAFETY**

#### **3.7.1 Introduction**

##### **3.7.1.1 Definition of Resource**

The primary safety concern associated with military training flights, including patterned flights in the airfield environment as well as training activities within established MOAs, is the potential for aircraft mishaps (i.e., crashes), which may be caused by mid-air collisions with other aircraft or objects, weather difficulties, or bird-aircraft strikes. Safety of aircraft operations is often described in terms of the aircraft's "mishap rate," represented by the number of mishaps per 100,000 flying hours for each aircraft type, the interval between mishaps as calculated by comparing mishap rate with the proposed number of hours to be flown annually, and the calculated BASH.

Mishaps are categorized by the USAF based on the severity of injury and the amount of damage measured in monetary value resulting from the mishap. A mishap resulting in a human fatality or permanent total disability with a total cost in excess of \$2 million for injury, occupational illness, or destruction of an aircraft is considered a Class A mishap. A mishap resulting in permanent partial disability with a total cost in excess of \$500,000, but less than \$2 million for injury, occupational illness, and property damage or inpatient hospitalization of three or more personnel is considered a Class B mishap. A Class C mishap is defined as a mishap that results in total damage in excess of \$50,000 but less than \$500,000, an injury resulting in any loss of time from work beyond the day or shift on which it occurred, occupational illness that causes loss of time from work at any time, or an occupational injury or illness resulting in a permanent change of job. Mishaps not meeting the requirements for Class A, B, or C, including Class D and E mishaps, are categorized as High Accident Potentials (AFI 91-204).

In-flight bird collision risks have been addressed by the ANG through the development of the Avian Hazard Advisory System (AHAS), a Bird Avoidance Model (BAM) used to generate projected and geospatially confirmed bird data for use in military airspace, including MOAs, ranges, visual routes, instrument routes, slow routes, and International Civil Aviation Organization (ICAO) airspaces (e.g., Class A, B, C, etc.). The AHAS uses Geographic Information System (GIS)

technology combined with data associated with bird habitat, migration, and breeding characteristics to create a visual tool for analyzing bird aircraft collision risk. This information, in tandem with responsible planning can reduce the likelihood of collisions, though complete elimination of mishaps is not possible (USAF 2012).

In addition to aircraft safety issues, safety issues associated with chaff and flare use, including fire risk and strike risk, have also been included for analysis in order to address comments provided during public scoping meetings conducted in support of this EIS. Additional analyses regarding the potentially hazardous chemical components of chaff and flare can be found in Section 3.8, *Hazardous Materials and Wastes*.

#### 3.7.1.2 Regional Setting

The 142 FW and the 173 FW are both located in western Oregon. The 142 FW is located in the northwestern part of the state at Portland International Airport and the 173 FW is located in the southwestern part of the state at Kingsley Field in Klamath Falls.

Flight training missions conducted by the 142 FW primarily utilize the existing Eel ATCAA and the existing W-570 and Bass/Bass South ATCAAs, though occasionally the Juniper/Hart MOA Complex is used if conditions in the Eel and W-570 airspace areas are not conducive to training exercises (e.g., sea-states; see Section 2.0, *Description of Proposed Action and Alternatives*). Missions flown by pilots from the 173 FW primarily utilize the Juniper/Hart MOA Complex. Safety issues associated with the 142 FW and 173 FW encompass any incidents or mishaps that occur in transit to or from the airspaces or during training exercises within the airspace areas.

#### 3.7.2 Existing Conditions

##### 3.7.2.1 BASH-related Safety

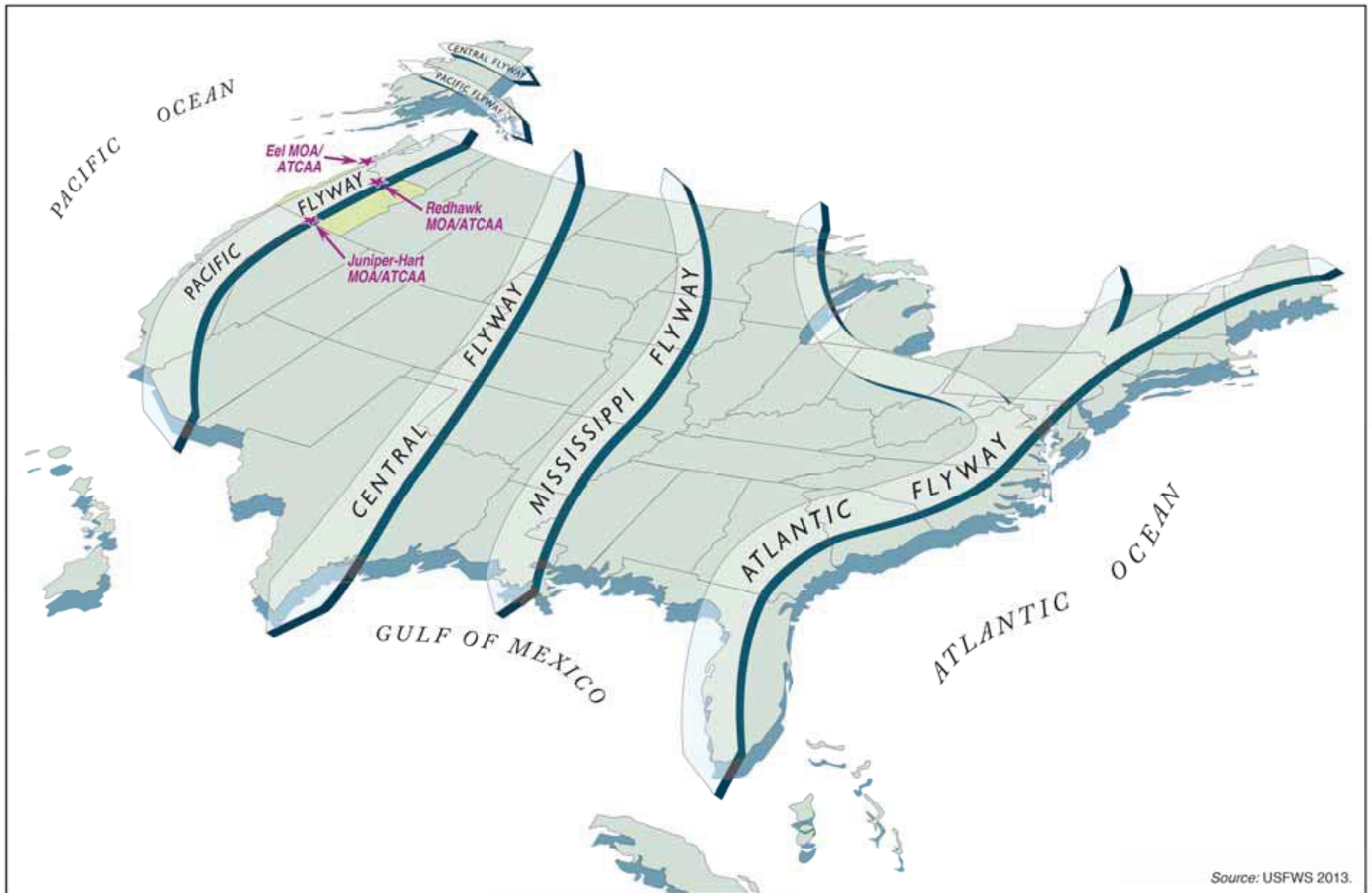
Bird-aircraft strikes present a potential safety issue for both the 142 FW and the 173 FW aircraft due to resident and migratory bird populations. The marshy landscape prevalent in the vicinity of the 173 FW and the geographical location of

the 142 FW at the confluence of two major river systems is conducive to year-round congregation of resident and migratory bird species at both installations. Historically, bird-strikes have presented an operational constraint to aircraft operations, particularly during peak migration periods (i.e., mid-November through March). Wildlife refuges in the area (refer to Section 3.4, *Biological Resources*) serve as migratory stopover and wintering habitat for most Pacific Flyway waterfowl species; peak fall concentrations in the region typically exceed one million birds (USFWS 1994).

In order to minimize the potential for bird-aircraft strikes, all ANG installations are required to develop and implement a BASH Plan (AFI 91-202 and AFI 91-212). The 142 FW and the 173 FW have developed BASH Plans specific to wildlife conditions found at each installation. Key elements common to the 142 FW and 173 FW BASH Plans, and required by AFI 91-202, include:

- Establishment of a Bird Hazard Working Group that designates responsibilities and establishes procedures that aid supervisors in preventative actions intended to reduce bird-strike hazards;
- Establishment of procedures for reporting hazardous bird activity and altering or discontinuing flying operations;
- Provision of appropriate channels for timely dissemination of bird hazard information and procedures for avoidance of such hazards (e.g., migratory flocks);
- Establishment of procedures to eliminate or reduce environmental conditions that attract birds and other wildlife to the airfield; and
- Incorporation of standardized guidelines for reporting bird sightings and strikes.

Flyways are routes that migratory birds have historically used as they move between seasonal habitats. Four primary flyways are generally recognized in the U.S.: the Atlantic, Mississippi, Central (or Rocky Mountain), and Pacific Flyways (see Figure 3.7-1). During the spring and autumn migratory seasons, migratory birds can often be found in higher concentrations along these routes than elsewhere in the country. Although flyways are often referred to and sometimes depicted as single pathways with well-defined boundaries, they are in reality



composed of numerous smaller migratory routes that are subject to change based on environmental factors. Consequently, it is difficult to accurately determine the precise physical boundaries of flyways at a given point in time and the highest numbers or concentrations of migrating birds are not always confined within the boundaries of mapped flyways.

The Pacific Flyway is the principal flyway in closest proximity to the affected and proposed airspace areas. The Pacific Flyway is generally understood to follow the west coast of the U.S., including Washington, Oregon, and California. The flyway occurs over the 142 FW and 173 FW installation as well as the existing Eel ATCAA and parts of the proposed Redhawk MOA Complex and Juniper/Hart MOA Complex. Consequently, many species of waterfowl, passerines, and raptors migrate through these airspaces. Migration altitudes vary by species and further depend on migration distance (long distance migrants fly higher to reduce drag and conserve energy), time of day (nocturnal migrants typically fly at higher altitudes), and weather (poor weather conditions can cause migrants to fly lower). Inland waterfowl commonly migrate at lower altitudes (near the surface to several hundred feet AGL), while migratory shorebirds will fly over the ocean as high as 15,000 to 20,000 feet MSL (Lincoln et al. 1998).

In recognition of the dynamic nature of bird migrations, the 142 FW and 173 FW has implemented a scaled training response that adapts to BASH risk based on three AHAS threat levels: Low, Moderate, and Severe.

- Bird Watch Condition Severe: Wildlife activity or birds on or immediately above the active runway or other specific locations that represent an immediate hazard to safe flying operations. Pilots and aircrews must thoroughly evaluate mission need before operating in areas under condition Severe.
- Bird Watch Condition Moderate: Wildlife activity or birds observable in locations that represent a probable hazard to safe flying operations. This condition requires increased vigilance by all agencies and extreme caution by aircrews.
- Bird Watch Condition Low: Normal bird activity on and above the airfield with a low probability of hazard. Continue with operations as normal.

During periods of “low” bird-related hazards in affected airspace areas, pilots are briefed on bird hazards prior to low-level flight, but no modifications are made to the flight path, altitudes, or training missions. When the bird-related hazard is “moderate” in the training airspace during planned low-level training, pilots are briefed on bird hazards and the flight path or altitude of the training missions is adjusted to avoid areas known to be hazardous. If the bird hazard is “severe” in the training airspace, the unit modifies the training mission to avoid the altitude blocks affected by the “severe” rating by either flying at a higher altitude if the severe hazard is in the low-altitude structure, or moving the entire activity to a different location in the MOA to avoid the areas affected by the severe hazard. In the very unlikely event that 100 percent of an airspace area is designated as “severe,” the unit would train in another airspace area, if possible, or postpone the training activities.

### 3.7.2.2 Other Aircraft Related Safety Issues

#### Aircraft Collisions

In order to avoid non-participating aircraft, sorties are flown only when see-and-avoid tactics can be used (i.e., VFR conditions). See-and-avoid refers to the practice of locating other aircraft by sight and avoiding them using right-of-way rules established by Federal regulations at 14 CFR 91. All military aircraft operations in MOAs, at all altitudes, utilize see-and-avoid tactics because civilian VFR aircraft may transition through an active MOA at any altitude.

#### Collisions with Surface Objects

The current flight floor (i.e., the lowest extent) of the existing W-570 is at the surface above open water. The current flight floor of the existing Juniper Low MOA is at 300 feet AGL; however, because of safety considerations F-15s do not fly lower than 500 feet AGL within this area. There are currently no structures within the existing W-570 or Juniper Low MOA that rise above existing operational flight floors. Further, all other existing MOAs have a flight floor at 11,000 feet MSL and the existing ATCAAs have floors at 18,000 feet MSL. While no structures occur within the existing MOAs and ATCAAs, ongoing and

proposed wind development presents a circumstance that could potentially result in future safety concerns (see Section 5.0, *Cumulative Impacts*).

#### Weather-Related Incidents

In addition to BASH-related incidents and collisions with aircraft or surface objects, aircraft mishaps may also be caused by hazardous weather. Weather conditions may pose a safety hazard and may require alteration or cancellation of planned training missions. Weather conditions over the Pacific Ocean, referred to as sea-states, prohibit training when wind velocity is greater than 25 knots and sea conditions that have wind-wave heights exceeding five feet. Due to operational safety guidelines contained in AFI 11-2F-15V3 KF CH 8, these conditions prohibit over-water training operations in the existing W-570 and the Bass/Bass South ATCAAs (refer to Section 1.5.3, *Establishment of Eel MOA and Modification of the Eel ATCAA*). On average, sea-states were out of limits approximately 23 percent of the scheduled time from 2008 through 2011, reaching as high as 75 percent in a given month.

The 142 FW and 173 FW monitor weather conditions, and based on the size and location of a severe weather system, may either cancel training missions, or modify the training altitude to fly around the storm systems. Under USAF guidelines, pilots must maintain VFR plus 2,000 feet vertical and 1 NM horizontal clearance from clouds and 5 NM visibility and a discernable horizon for all training activities (AFI 11-214). The ANG requires a 3,000-foot cloud ceiling and 5 NM visibility to conduct operations along the existing low-level routes.

#### 3.7.2.3 Recorded Mishap Data for the 142 FW and 173 FW

The nationwide F-15 mishap data for the last 10 years reveals the mishap rate (per 100,000 hours of flying) for all F-15s flown in the country. The Class A and B mishap rates are 1.88 and 4.97 mishaps per 100,000 hours of flying, respectively. Causes of reported mishaps were not available at a national level, nor was information available indicating any link between mishaps and BASH incidents (NGB 2013).

### Mishaps and BASH Data

Mishap and BASH records specific to the 142 FW and 173 FW were provided for all mishap classes between 2003 and 2013. During that time, the 142 FW experienced one Class A mishap (2007), two Class B mishaps (2005, 2013), 16 Class C mishaps, 16 Class D mishaps, and 36 Class E mishaps. The Class A incident in 2007 involved an F-15 controlled flight into terrain, which resulted in one fatality and destruction of the aircraft. The Class B incident in 2005 occurred due to damage to the motor from a foreign object. The Class B incident in 2013 occurred due to tire failure in the wheel well, which resulted in engine damage. BASH incidents totaled 28 recorded incidents, all of which were identified as Class E (see Table 3.7-1) (Oregon ANG 2013a). During that same period the 173 FW experienced no Class A or Class B mishaps, 13 Class C mishaps, six Class D mishaps, and 99 Class E mishaps. BASH incidents totaled 66 recorded incidents, and all were identified as Class E (see Table 3.7-1; Oregon ANG 2013a, 2013b).

**Table 3.7-1. Recorded Bird-Strike Occurrence for the 142 FW and 173 FW (2003-2013)**

| Unit   | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|--------|------|------|------|------|------|------|------|------|------|------|------|
| 142 FW | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 5    | 14   | 6    | 3    |
| 173 FW | 2    | 5    | 12   | 6    | 7    | 4    | 2    | 8    | 3    | 12   | 5    |

Note: Data for the 142 FW is complete through August 2013 and 173 FW Data complete through July 2013.  
Sources: ORANG 2013a; ORANG 2013b.

#### 3.7.2.4 Chaff and Flare Safety

Risks associated with the use of flares can be divided into two main categories: the risk of flare igniting a fire, and the risk of damage or injury from a falling flare strike. Information regarding chaff and flare toxicity can be found in Section 3.8, *Hazardous Materials and Wastes*.

### Fire Risk

The 142 FW and 173 FW release self-protection flares within existing MOAs during military training operations. Existing regulations and military instructions (e.g., Title 14 CFR Part 91.15 and AFI 11-202) require precautions to be taken to avoid injury or damage to persons or objects. This includes precautions for activities that



increase the potential for fires, such as the release of flares. The risk of fire due to the release of flares involves environmental, procedural, and operating factors. Assessing the probability of a fire starting due to a burning item landing on the ground is difficult because of the many variables involved, including fuel type, abundance of fuel, fuel moisture, residual energy of the burning item, and environmental conditions (e.g., wind and rainfall) (NGB 2002).

Based on information reported by Air Combat Command (ACC), fires are rare when release altitude and restrictions are based on site-specific conditions. USAF (1997) concluded, based on interviews with range and airspace schedulers and management personnel, that information linking flare use to fires is not sufficient; fire occurrence data for DoD lands are not systematically reported to national fire occurrence databases; categories used for the national fire occurrence database cannot differentiate fires caused by flares; and flare-caused fires cannot be evaluated based on flare type. The lack of flare-linked fire information makes it difficult to quantify the existing risk of fire associated with flares in general (NGB 2002).

Based on arid conditions beneath them, the existing Juniper and Hart MOAs are considered to be among some of the most at-risk MOAs for fire. The months at highest risk for fire for the Juniper MOAs are July, August, and September; while the high-risk fire season for the Hart MOAs extends through October. Per AFI 11-214, the minimum altitude for flare use by F-15s over all federal land is 700 feet AGL, in order to ensure flares are completely extinguished before reaching the ground. However, due to increased fire risk beneath the Juniper/Hart MOA Complex, the Oregon ANG have voluntarily raised the minimum elevation flare use for all training operations to 5,000 feet AGL (AFI 11-2F-15V3 KF CH 8; NGB 2002). As a result of this conservative approach, fire hazard as a result of flare use by the 142 FW or 173 FW is negligible.

### Flare Strike Risk

Under current airspace utilization, flares are only released within the Juniper/Hart MOA Complex. Flare materials that are not completely consumed during ignition and descent, create the risk of striking a person or property. Given a set of assumptions regarding reliability rate, aircraft speed, aircraft height above

ground, and behavior of the flare after release, USAF (1997) calculated the probability of a dud flare hitting a person in an area with a population density of 100 persons per square mile would be one in 5.8 million (NGB 2002). Consequently, safety hazards resulting from flare strike risk are also considered negligible.

### 3.8 HAZARDOUS MATERIALS AND WASTES

#### 3.8.1 Introduction

##### 3.8.1.1 Definition of Resource

Hazardous materials are defined as substances with strong physical properties of ignitability, corrosivity, reactivity, or toxicity, which may cause an increase in mortality, a serious irreversible illness, incapacitating reversible illness, or pose a substantial threat to human health or the environment. Hazardous wastes are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes, which pose a substantial present or potential hazard to human health or the environment.

To protect habitats and people from inadvertent and potentially harmful releases of hazardous substances, DoD has dictated that all facilities develop and implement *Hazardous Waste Management Plans* and *Spill Prevention and Response Plans*. Also, DoD has developed the Environmental Restoration Program (ERP), intended to facilitate thorough investigation and cleanup of contaminated sites located at military installations. These plans and programs, in addition to established legislation (e.g., the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] and Resource Conservation and Recovery Act [RCRA]) effectively form the “safety net” intended to protect the human and natural environment.

Issues associated with hazardous materials and wastes typically center around ground disturbing activities in the vicinity of underground storage tanks (USTs); aboveground storage tanks (ASTs); and areas used for the storage or transport of pesticides, bulk fuel, and petroleum, oils and lubricants (POL). When such resources are improperly handled, they can threaten the health and well-being of wildlife species, botanical habitats, soil systems, water resources, and people. However, as no ground disturbing activities are included in the Proposed Action public concern over hazardous materials and wastes during the public scoping process generally focused on fuel dumping procedures and the use of chaff and flare during training missions.

Additionally, existing siting requirements for explosive materials storage, quantity-distance (QD) arcs, runway protection zones (RPZs), and emergency services provided on the ground are not included as part this analysis because there would be no change in ground-based operations or materials requirements and no change in the number of flight hours allocated to either unit.

### 3.8.1.2 Regional Setting

The majority of the areas affected by the proposed airspace initiative are located within the State of Oregon. However, the proposed expansion of the Juniper/Hart MOA Complex would include airspace over portions of Humboldt and Washoe counties in northwestern Nevada. Additionally, modifications to the Eel ATCAA would include airspace over a small portion of Pacific County in Washington. These areas are generally characterized by low population densities.

## 3.8.2 Existing Conditions

### 3.8.2.1 Emergency Fuel Dump Operations

Under extremely rare emergency circumstances where potential exists for loss of life for the pilot, excess aircraft fuels must be dumped as a safety precaution to facilitate landings during in-flight emergencies. If the fuel load is not jettisoned prior to an emergency landing, it can cause the aircraft to land too heavy, resulting in critical damage to the aircraft and potential loss of life for the pilot operating the aircraft. Emergency fuel dumping is not a part of routine flight training missions and occurs only during emergency circumstances (FAA Order JO 7110.65U Section 4, *Fuel Dumping*).

Jet fuel (i.e., JP-8) is a hazardous material that has the potential to impact human health and the environment. Therefore, when fuel jettison is necessary over agricultural or populated areas, federal regulations require that fuel be dumped at an altitude of at least 10,000 feet AGL (see AFI 11-2F-15V3). This allows the fuel to evaporate and atomize before it reaches the ground or surface water. In the event of an in-flight emergency, Oregon ANG pilots are instructed to vent fuel above 10,000 feet AGL within a 20-mile arc of the installation over unpopulated areas. These areas are generally uninhabited due to land use encroachment protection measures. Additionally, vented fuel at 10,000 feet AGL has almost no potential of

reaching the ground surface before it vaporizes (American Petroleum Institute 2010).

### 3.8.2.2 Chaff and Flare

Chaff and flares are passive, defensive countermeasures deployed by military aircraft. Their purpose is to confuse and divert radar-guided or infrared-guided anti-aircraft missiles fired by other aircraft or from ground installations. Deployment of chaff and flare is a regular element of training exercises conducted within the existing W-570 and Juniper/Hart MOA Complex by the 142 FW and 173 FW. Under the Proposed Action chaff and flare would also be used within the proposed Eel MOAs as well as the Redhawk MOA Complex and Juniper/Hart MOA Complex expansion area. The allocation of chaff (e.g., “rapid bloom” or RR-188) and flares (i.e., MJU-7) for Fiscal Year (FY) 2013 was 17,249 and 16,216, respectively. On average, approximately 15 flares are used per sortie.

#### Effects of Chaff Use

Chaff utilized by the 173 FW and 142 FW is composed of aluminum or zinc coated fibers stored on-board the aircraft in tubes. When an aircraft is threatened by radar tracking missiles, the pilot ejects the contents of these tubes into the turbulent wake of air behind the plane. The chaff reacts with the turbulent air and blooms into a decoy cloud of metallic material with a radar signature much larger than the aircraft itself. Depending on the altitude of release and wind speed and direction, the chaff from a single bundle can be spread over distances ranging from less than a quarter mile to over 100 miles (USAF 1997). The most confined distribution would be from a low-altitude release in calm conditions.

The principal components of chaff (i.e., aluminum, silica glass fibers, and stearic acid) do not pose an adverse risk to human and environmental health, based upon the general low-level toxicity of the components, their dispersion patterns, and the unlikelihood that the components would interact with other substances in nature to produce synergistic toxic effects (USAF 1997). The materials in chaff are generally nontoxic except in exorbitantly large quantities that humans or wildlife would not encounter as a result of chaff use associated with Oregon ANG operations. Levels of use and accumulation would have to be extremely high to

generate any significant adverse effects. However, while no adverse impacts to biological resources have been identified as a result of chaff use, adverse effects to sensitive aquatic organisms, although unlikely, may be possible in certain small, confined water bodies (USAF 1997). Freshwater aquatic environments are potentially more sensitive to chemicals released from chaff than terrestrial environments for the following reasons: 1) dissolution of materials occurs faster in water than on land; 2) chemicals are more mobile and more available to organisms; and, 3) the thresholds of toxicity tend to be lower for sensitive aquatic species. However, since the establishment of the Juniper/Hart MOA Complex and the use of chaff within this airspace by the Oregon ANG, there have been no identified adverse effects to water bodies below (Oregon ANG 2013).

Chaff use also results in limited potential for adverse effects to the human environment. Chaff components degrade naturally in the environment following deployment (USAF 1997). Particulate tests and a health risk screening/assessment concluded that the potential for chaff to break down into respirable particle sizes was not significant (USAF 1997). Further, neither chemical nor physical effects are expected to occur to drinking water sources exposed to chaff, because the quantities of chemicals released are too small to be of concern, and filtering systems in place would remove any fibers. For additional discussion of health and safety topics associated with chaff, refer to Section 3.7, *Safety*.

#### Effects of Flare Use

Chemical flares comprise magnesium pellets ejected from tubes to ignite in the wake behind the aircraft. Countermeasure flares are designed to burn out before reaching the ground in order to minimize fire hazards (refer to Section 3.7, *Safety*). Even if deployed at 500 feet AGL, most system debris would decelerate to terminal velocity before reaching the ground surface (refer to Section 3.7, *Safety*).

The primary components of flare combustion are magnesium oxide, magnesium chloride, and magnesium fluoride. Magnesium oxide produces moderate toxic effects if directly ingested in large doses; the lethal oral dose in humans is estimated to be between one ounce and one pound. Additionally, occupational exposure studies have shown that magnesium oxide dust may cause metal fume fever (USAF 1997). Magnesium chloride, another component of flare combustion,

is a naturally occurring salt and normally functioning kidneys can readily excrete magnesium ions after oral ingestion (USAF 1997). The Occupational Safety and Health Administration (OSHA) standard for worker exposure for an hour time weighted average is 2.5 milligrams per cubic meter of air (USAF 1997).

Another component of flares is oxygen difluorine. This compound is used in general as an oxidant in missile propellant systems. It is usually in a gaseous phase and is incompatible with numerous materials including metal oxides and moist air. Potential routes of exposure to humans and wildlife include inhalation and dermal contact. Toxic health effects as a result of direct exposure to large quantities of oxygen difluorine may include pulmonary edema, respiratory system irritation, and skin and eye burns. However, due to the altitude of flare usage these gases are diluted and do not come into contact with residents below the existing Juniper/Hart MOA Complex. Additionally, some of the initiator cartridges used with flares contain chromium or lead compounds; however, these compounds are emitted in negligible quantities (USAF 1997).

Emissions from flare usages occur over large areas and over long periods of time, and therefore have not previously resulted in any violations (i.e., declarations of nonattainment status) with regard to NAAQS. Flare ash is widely dispersed by wind, and the likelihood that a sufficient quantity would accumulate in a particular pond, stream, or estuary to measurable affect its chemical make-up is also remote (USAF 1997).

### **3.9 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN’S HEALTH AND SAFETY**

#### **3.9.1 Introduction**

##### **3.9.1.1 Definition of Resource**

###### Socioeconomics

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Human population is affected by regional birth and death rates as well as net in- or out-migration. Economic activity typically comprises employment, personal income, and industrial growth. Impacts on these two fundamental socioeconomic indicators can also influence other components such as housing availability and public services provision.

Socioeconomic data in this section are presented at the county, state, and national level to analyze baseline socioeconomic conditions in the context of state and national trends. Data have been collected from previously published documents issued by federal, state, and local agencies (e.g., U.S. Census Bureau) and from state and national databases (e.g., U.S. Bureau of Economic Analysis’ [BEA] *Regional Economic Information System*).

###### Environmental Justice

In 1994, EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, was issued to focus the attention of federal agencies on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. Additionally, because children may suffer disproportionately from environmental health and safety risks, EO 13045, *Protection of Children From Environmental Health and Safety Risks*, was introduced in 1997 to prioritize the identification and assessment of environmental health risks and safety risks that may affect children and to ensure that federal agencies’ policies, programs,



activities, and standards address environmental health and safety risks to children.

Similar to socioeconomic, environmental justice data in this section are presented at the county, state, and national level. Data used for the environmental justice and protection of children analyses were collected from the U.S. Census Bureau 2010 *Census of Population and Housing* and the 2007-2011 *American Community Survey*.

#### 3.9.1.2 Regional Setting

The majority of proposed airspace actions are located within the State of Oregon. However, the proposed expansion of the Juniper/Hart MOA Complex would include airspace over portions of Humboldt and Washoe counties in northwestern Nevada. Additionally, modifications to the Eel ATCAAs would include airspace over a small portion of Pacific County in Washington. These areas are generally characterized by low population densities and predominantly rural economies. Eastern Oregon and northwestern Nevada are predominately comprised of arid farmland and rangeland, while western Oregon and southwestern Washington are predominately comprised of coastal forestland. Areas of high-density development are concentrated in northwestern Oregon with Portland, located approximately 30 miles to the east of the proposed Eel MOAs, having the largest population at approximately 583,776 residents (U.S. Census Bureau 2010).

Oregon is characterized by a predominantly rural economy; land use throughout the state has historically been centered on timber, fishing, and agriculture. In the past two decades, Oregon has attempted to move away from a resource-based economy and transition to a more mixed manufacturing and marketing economy, with an increased emphasis on technological innovation (State of Oregon 2009). Areas of high development are concentrated in the western portion of the state, particularly in the vicinity of larger metropolitan areas, such as the City of Portland.

Oregon airports provide a large contribution to the state economy. The Oregon Aviation Plan (2008) showed all public-use airports in the state contributed more than \$8 billion to the economy with the potential to contribute more than \$9 billion by 2014. Thousands of jobs in the state and many aviation and non-aviation

businesses benefit from the millions of dollars spent by those that fly into the smaller airports of Oregon from elsewhere in the state, region, and country.

### **3.9.2 Existing Conditions**

#### **3.9.2.1 Eel MOA/ATCAA and W-570**

The proposed Eel MOAs and Eel High ATCAA would be located along the northern coast of Oregon, extending slightly into southern coastal Washington. Eel A would overlie the southern portion of Pacific County and the northern half of Clatsop County; Eel B would overlie the south half Clatsop County and the northern half of Tillamook County; Eel C would be located within Tillamook and slightly within Yamhill County; and, Eel D would include southern Tillamook, western Yamhill, and northern Lincoln counties.

#### Population

The populations of Oregon and Washington have increased between 1990 and 2010. The growth within Washington has been slightly more substantial, increasing approximately 38.2 percent during this time period, at a rate approximately 14 percent greater than the national population growth rate of 24.1 percent (see Table 3.9-1). Among the counties underlying the proposed Eel MOAs and Eel High ATCAA, Polk County, Oregon has experienced the greatest population growth, approximately 52.2 percent between 1990 and 2010. Additionally, Yamhill County, Oregon has also experienced substantial growth, with a 51.3 percent growth rate. Pacific County, Washington has experienced the least growth within the underlying counties, with approximately 11.2 percent growth, approximately 13 percent less than the national average.

**Table 3.9-1. Population Overview within Proposed Eel MOAs and Eel High ATCAA**

| Jurisdiction      | Census<br>1990 | Census<br>2000 | Census<br>2010 | Total Percent<br>Change<br>1990-2010 |
|-------------------|----------------|----------------|----------------|--------------------------------------|
| United States     | 248,709,873    | 281,421,903    | 308,745,538    | 24.1%                                |
| Oregon            | 2,842,321      | 3,421,399      | 3,831,074      | 34.8%                                |
| Washington        | 4,866,692      | 5,894,121      | 6,724,540      | 38.2%                                |
| Clatsop Co., OR   | 33,301         | 35,630         | 37,039         | 11.2%                                |
| Lincoln Co., OR   | 38,889         | 44,479         | 46,034         | 18.4%                                |
| Pacific Co., WA   | 18,822         | 20,984         | 20,920         | 11.1%                                |
| Polk Co., OR      | 49,541         | 62,380         | 75,403         | 52.2%                                |
| Tillamook Co., OR | 21,570         | 24,262         | 25,250         | 17.1%                                |
| Yamhill Co., OR   | 65,551         | 84,992         | 99,193         | 51.3%                                |

Sources: U.S. Census Bureau 1990, 2000, 2010.

### Economic Activity

#### *Employment*

The employment sectors providing the greatest number of jobs in Oregon in 2010 included *Government and Government Enterprises, Health Care and Social Assistance, Retail Trade, Manufacturing, and Accommodation and Food Services* (see Table 3.9-2). Together, these five industrial sectors provided jobs for 52.4 percent of the industrial workforce, which totaled 2,127,025 people in 2010.

Of the industrial employment sectors, *Education Services* and *Mining* experienced the greatest increase in jobs between 2001 and 2010 with a 53.1 percent and 46.5 percent increase, respectively. During this same period, *Manufacturing* experienced the greatest jobs losses with a decrease of approximately 21.9 percent (U.S. BEA 2013).

**Table 3.9-2. Jobs by Industrial Sector, Oregon (2001, 2005, 2010)**

| Industrial Sector                                | Total Number of Jobs |                    |                    | Total Percent Change<br>2001-2010 |
|--------------------------------------------------|----------------------|--------------------|--------------------|-----------------------------------|
|                                                  | 2001                 | 2005               | 2010               |                                   |
| Forestry, fishing, and related activities        | 28,829<br>(1.4%)     | 29,640<br>(1.4%)   | 28,213<br>(1.3%)   | -2.1%                             |
| Mining                                           | 3,325<br>(0.2%)      | 3,512<br>(0.2%)    | 4,870<br>(0.2%)    | 46.5%                             |
| Utilities                                        | 5,546<br>(0.27%)     | 5,048<br>(0.2%)    | 4,856<br>(0.2%)    | -12.4%                            |
| Construction                                     | 119,886<br>(5.9%)    | 132,242<br>(6.2%)  | 103,626<br>(4.9%)  | -13.6%                            |
| Manufacturing                                    | 226,667<br>(11.2%)   | 214,422<br>(10.1%) | 176,916<br>(8.3%)  | -21.9%                            |
| Wholesale trade                                  | 81,566<br>(4.0%)     | 85,652<br>(4.0%)   | 80,893<br>(3.8%)   | -0.8%                             |
| Retail trade                                     | 235,673<br>(11.7%)   | 243,411<br>(11.4%) | 229,397<br>(10.8%) | -2.7%                             |
| Transportation and warehousing                   | 63,613<br>(3.2%)     | 65,983<br>(3.1%)   | 61,740<br>(2.9%)   | -2.9%                             |
| Information                                      | 45,774<br>(2.3%)     | 40,665<br>(1.9%)   | 39,753<br>(1.9%)   | -13.2%                            |
| Finance and insurance                            | 80,952<br>(4.0%)     | 83,319<br>(3.9%)   | 91,035<br>(4.3%)   | 12.5%                             |
| Real estate and rental and leasing               | 80,224<br>(4.0%)     | 88,865<br>(4.2%)   | 103,554<br>(4.8%)  | 29.1%                             |
| Professional, scientific, and technical services | 114,982<br>(5.7%)    | 119,488<br>(5.6%)  | 132,113<br>(6.2%)  | 14.9%                             |
| Management of companies and enterprises          | 27,632<br>(1.4%)     | 28,513<br>(1.3%)   | 31,661<br>(1.5%)   | 14.6%                             |
| Administrative and waste management services     | 108,813<br>(5.4%)    | 120,183<br>(5.6%)  | 111,645<br>(5.3%)  | 2.6%                              |
| Educational services                             | 34,850<br>(1.7%)     | 47,854<br>(2.2%)   | 53,340<br>(2.5%)   | 53.1%                             |
| Health care and social assistance                | 194,087<br>(9.6%)    | 224,423<br>(10.5%) | 252,251<br>(11.9%) | 30.0%                             |
| Arts, entertainment, and recreation              | 42,183<br>(2.1%)     | 46,476<br>(2.2%)   | 52,476<br>(2.5%)   | 24.4%                             |
| Accommodation and food services                  | 140,719<br>(6.7%)    | 150,252<br>(7.1%)  | 154,380<br>(7.3%)  | 9.7%                              |
| Other services, except public administration     | 107,570<br>(5.3%)    | 116,874<br>(5.5%)  | 113,676<br>(5.3%)  | 5.7%                              |
| Government and government enterprises            | 278,120<br>(13.8%)   | 285,109<br>(13.4%) | 300,630<br>(14.3%) | 8.1%                              |
| <b>Total Employment</b>                          | <b>2,021,011</b>     | <b>2,131,931</b>   | <b>2,127,025</b>   | <b>9.1%</b>                       |

Source: U.S. BEA 2013.

Employment in the *Government and Government Enterprises* sector includes *State and Local, Military, and Federal, Civilian* jobs. Total government employment increased slightly by 3.8 percent (22,510 jobs) between 2001 and 2010. Of the 558,325 wage and salary government jobs in the state in 2010, approximately 257,695 (46.2 percent) comprised *state and local government* personnel, 12,350 (2.2 percent) comprised *military* personnel, and 30,585 (5.5 percent) comprised *Federal, Civilian* employees (U.S. BEA 2013).

During 2010, *Government and Government Enterprise* jobs were one of the top three industrial sector jobs by employment in each of the counties underlying the proposed Eel MOAs and Eel High ATCAA. Additionally, *Health Care and Social Assistance, Retail Trade, Manufacturing, and Accommodation and Food Services*, which were top employment sectors within the state, were also top employment sectors in at least two of the affected counties. In general, these industrial sectors continue to grow within the affected counties, with Clatsop, Lincoln, Polk, and Yamhill, each experiencing substantial growth in the *Health Care and Social Assistance* industrial sector (U.S. BEA 2013).

### *Unemployment*

In 2012, the annualized unemployment rates in Oregon and Washington were 8.2 and 8.7 percent (not seasonally adjusted), respectively, slightly greater than the national average of 8.1 percent (not seasonally adjusted). Table 3.9-3 shows annualized non-seasonally adjusted labor and employment rates for each of the counties underlying the proposed Eel MOAs and Eel High ATCAA.

Between 2007 and 2012, the annualized non-seasonally adjusted unemployment rate in Oregon increased by 3.5 percent, from 5.2 to 8.7 percent (U.S. Bureau of Labor Statistics 2013). Similarly, in Washington the unemployment rate increased from 4.6 to 8.2 percent, during this same time period (U.S. Bureau of Labor Statistics 2013). Further, all of the affected counties experienced slight increases in unemployment ranging from increases of 3.0 to 3.8 percent.

**Table 3.9-3. 2012 Annualized Labor and Employment in Oregon, Washington, and Affected Counties**

| Location          | Labor Force | Employed  | Unemployed | Unemployment Rate |
|-------------------|-------------|-----------|------------|-------------------|
| Oregon            | 1,962,908   | 1,791,730 | 171,178    | 8.7%              |
| Washington        | 3,481,463   | 3,197,293 | 284,170    | 8.2%              |
| Clatsop Co., OR   | 20,664      | 19,066    | 1,598      | 7.7%              |
| Lincoln Co., OR   | 22,592      | 20,492    | 2,100      | 9.3%              |
| Pacific Co., WA   | 8,729       | 7,740     | 989        | 11.3%             |
| Polk Co., OR      | 38,442      | 35,198    | 3,244      | 8.4%              |
| Tillamook Co., OR | 12,504      | 11,440    | 1,064      | 8.5%              |
| Yamhill Co., OR   | 48,611      | 44,475    | 4,136      | 8.5%              |

Note: Data not seasonally adjusted.

Source: U.S. Bureau of Labor Statistics 2013.

### *Earnings*

In 2010, the total non-farm earnings for the State of Oregon were approximately \$98.5 billion, increasing approximately 27.9 percent from \$77.0 billion in 2001. The total farm earnings were approximately \$1.1 billion, increasing approximately 34.7 percent from \$828 million in 2001. The greatest earnings in Oregon in 2010 were reported in *Government and Government Enterprises* (\$17.9 billion), *Health Care and Social Assistance* (\$12.8 billion), and *Manufacturing* (\$12.5 billion). Included within the *Government and Government Enterprises* sector are *State and Local*, *Military*, and *Federal Civilian* categories, which reported 2010 earnings of \$14.2 billion, \$665 million, and \$3.0 billion, respectively (U.S. BEA 2013). Per capita personal income (PCPI) in the State of Oregon for 2010 was \$35,906, increasing approximately 22.8 percent from \$29,250 in 2001 (U.S. BEA 2013).

Within the counties underlying the proposed Eel MOAs and Eel High ATCAA, total non-farm earnings ranged from \$277 million in Pacific County, Washington to \$1.5 billion in Yamhill County, Oregon. *Government and Government Enterprises* was the top industrial sector by earnings in five of the six underlying counties, reporting earnings ranging from \$102 million in Tillamook County to \$298 million in Polk County. Other top industrial sectors by earnings included *Manufacturing* and *Health Care and Social Assistance*, which were within the top three industrial sectors in five of six underlying counties and four of six underlying counties, respectively. Additionally, PCPI within the underlying counties ranged from \$30,267 in Polk

County to \$32,985 in Clatsop County, approximately 84 percent and 92 percent of the state average PCPI, respectively (U.S. BEA 2013).

### Environmental Justice

In order to comply with EO 12898, ethnicity and poverty status in the counties underlying the proposed Eel MOAs and Eel High ATCAA were examined and compared to state and national data to determine if any minority or low-income communities could potentially be disproportionately affected by implementation of the Proposed Action.

Based on data obtained from the 2010 *Census of Population and Housing* and the 2007-2011 *American Community Survey*, the percentage of population within the counties underlying the proposed Eel MOAs living below the poverty level ranged from 12.7 percent in Polk County, Oregon to 18 percent in Pacific County, Washington. Within these underlying counties, approximately 15.3 percent of the population, on average, lives below the poverty level. This poverty rate is slightly greater than that within the State of Oregon (14.8 percent) and within the State of Washington (12.5 percent). Further, this poverty rate was slightly higher than that of the U.S. (14.3 percent) (U.S. Census Bureau 2010).

The percentage of minority residents in the counties underlying the proposed Eel MOAs range from 8.5 percent in Tillamook County to 14.5 percent in Yamhill County. The average percent of minority residents within the six underlying counties (12.7 percent) is lower than the average for the State of Oregon and the State of Washington. Further, nationally, minority residents comprise a much larger percentage of the total population (U.S. Census Bureau 2010).

### Protection of Children

In order to comply with EO 13045, the number of children under age 18 in the six counties underlying the proposed Eel MOAs was compared to state and national levels. The percentage of the population represented by children under age 18 ranged from 17.3 percent in Lincoln County to 25.0 percent in Yamhill County.

**Table 3.9-4. 2010 Minority and Low Income Populations by County Beneath the Proposed Eel MOA/ATCAA**

| Location          | Minority | Below Poverty |
|-------------------|----------|---------------|
| Oregon            | 16.4%    | 14.8%         |
| Washington        | 22.7%    | 12.5%         |
| United States     | 27.6%    | 14.3%         |
| Clatsop Co., OR   | 9.1%     | 14.2%         |
| Lincoln Co., OR   | 12.3%    | 16.2%         |
| Pacific Co., WA   | 12.6%    | 18.0%         |
| Polk Co., OR      | 14.1%    | 12.7          |
| Tillamook Co., OR | 8.5%     | 17.6%         |
| Yamhill Co., OR   | 14.6%    | 12.8%         |

Source: U.S. Census Bureau 2010.

The average percentage of the total population represented by children under age 18 within these counties is 20.8, which is slightly lower than the average in the State of Oregon (22.6 percent), the State of Washington (23.5 percent), and the nation (24.0 percent) (U.S. Census Bureau 2010).

### 3.9.2.2 Juniper/Hart MOA Complex

The proposed expansion of the Juniper/Hart MOA Complex would be located immediately adjacent to south and east of the existing Juniper/Hart MOA Complex. This extension would overly parts of eastern Oregon and northern Nevada. Juniper C and Juniper D as well as Hart C and Hart D would overly Harney County, Oregon; Hart D would as also overly the northeastern corner of Humboldt County, Nevada; Hart E would cover portions of Washoe County and a sliver of Humboldt County in Nevada; and Hart F would cover portions of Washoe and Humboldt counties in Nevada.

### Population

The populations of Oregon and Nevada have both increased between 1990 and 2010; however, the growth within Nevada has been far more substantial, increasing approximately 124.7 percent during this time period at a rate approximately five times greater than the national population growth rate. Within



the counties underlying the proposed Juniper/Hart MOA Complex expansion area, Washoe County, Nevada has experienced the greatest population growth, approximately 65.5 percent between 1990 and 2010. Additionally, Humboldt County, Nevada has also experienced substantial growth, with a 28.7 percent increase in total population. Harney County, Oregon has experienced the least growth within the three counties underlying the expansion area, with approximately 5.1 percent growth, approximately 19 percent less than the national average.

**Table 3.9-5. Population Overview within Proposed Juniper/Hart MOA Complex Expansion Area**

| Jurisdiction     | Census<br>1990 | Census<br>2000 | Census<br>2010 | Total percent<br>Change<br>1990-2010 |
|------------------|----------------|----------------|----------------|--------------------------------------|
| United States    | 248,709,873    | 281,421,903    | 308,745,538    | 24.1%                                |
| Nevada           | 1,201,833      | 1,998,257      | 2,700,551      | 124.7%                               |
| Oregon           | 2,842,321      | 3,421,399      | 3,831,074      | 34.8%                                |
| Harney Co., OR   | 7,060          | 7,609          | 7,422          | 5.1%                                 |
| Humboldt Co., NV | 12,844         | 16,106         | 16,528         | 28.7%                                |
| Washoe Co., NV   | 254,667        | 339,486        | 421,407        | 65.5%                                |

Sources: U.S. Census Bureau 1990, 2000, 2010.

### Economic Activity

#### *Employment*

In 2010, *Government and Government Enterprises* ranked first and second in terms of industry by employment within Oregon and Nevada, respectively. Similarly, during this same time period, *Government and Government Enterprises* ranked second by employment in Humboldt and Washoe counties and first by employment in Harney County. Additionally, *Retail Trade* also comprised a top-three industry by employment in each of the affected counties underlying the Juniper/Hart MOA Complex expansion area. *Government and Government Enterprises* jobs have experienced modest growth in Humboldt and Washoe counties; however, this job sector decreased in terms of employment by 2.1 percent in Harney County between 2001 and 2010. Humboldt County also experienced substantial growth in *Mining*, and *Education* saw an 86.1 percent increase in

Washoe County during this same period. Further, Harney County saw a 251.7 percent increase in *Finance and Insurance* jobs.

### *Unemployment*

In 2012, the annualized unemployment rates in Oregon and Nevada were 8.7 and 11.1 percent (not seasonally adjusted), respectively. Both Oregon and Nevada have unemployment rates greater than the national average of 8.1 percent (not seasonally adjusted), and Nevada has the highest unemployment rate in the nation, approximately 3.0 percent greater than the national average. Table 3.9-6 shows annualized non-seasonally adjusted labor and employment rates for each of the counties underlying the proposed Juniper/Hart MOA Complex expansion area.

**Table 3.9-6. 2012 Annualized Labor and Employment in Oregon, Washington, and Affected Counties**

| Location         | Labor Force | Employed  | Unemployed | Unemployment Rate |
|------------------|-------------|-----------|------------|-------------------|
| Oregon           | 1,962,908   | 1,791,730 | 171,178    | 8.7%              |
| Nevada           | 1,379,000   | 1,226,000 | 152,000    | 11.1%             |
| Harney Co., OR   | 20,664      | 19,066    | 1,598      | 7.7%              |
| Humboldt Co., NV | 22,592      | 20,492    | 2,100      | 9.3%              |
| Washoe Co., NV   | 48,611      | 44,475    | 4,136      | 8.5%              |

Note: Data not seasonally adjusted.

Source: U.S. Bureau of Labor Statistics 2013.

Between 2007 and 2012, the annualized non-seasonally adjusted unemployment rate in Oregon increased by 3.5 percent, from 5.2 to 8.7 percent. Similarly, in Nevada the unemployment rate increased from 4.7 to 11.1 percent, during this same time period (U.S. Bureau of Labor Statistics 2013). Harney County, Oregon experienced only modest increases in unemployment between 2007 and 2012, with the unemployment rate increasing by 0.4 percent. However, Humboldt County and Washoe County experienced increases of 5.6 and 4.0 percent, respectively.

### *Earnings*

In 2010, the total non-farm earnings for the three counties underlying the proposed Juniper/Hart MOA Complex expansion area ranged from approximately \$110 million in Harney County, Oregon to \$11.4 billion in Washoe County. During this same period, total farm earnings ranged from approximately \$5.1 million in Washoe County, Nevada to \$20.4 million in Humboldt County, Nevada. The greatest earnings in 2010 were reported for *Government and Government Enterprises* in Washoe County and Harney County, with \$2.2 billion reported in Washoe County and \$59.9 million reported in Harney County. Mining was the top industry by earnings in Humboldt County, reporting \$184 million in earnings; however, *Government and Government Enterprises* was the second industry by earnings reporting \$93.0 million (U.S. BEA 2013). PCPI within the underlying counties ranged from \$27,807 in Harney County to \$40,322 (U.S. BEA 2013).

### Environmental Justice

In order to comply with EO 12898, ethnicity and poverty status in the counties underlying the proposed Juniper/Hart MOA Complex expansion area were examined and compared to state and national data to determine if any minority or low-income communities could potentially be disproportionately affected by implementation of the Proposed Action.

Based on data obtained from the 2010 *Census of Population and Housing* and the 2007-2011 *American Community Survey*, the percentage of population below the poverty level within the three underlying counties ranged from 12.7 percent in Washoe County, Nevada to 17.6 percent in Humboldt County, Nevada. Within these underlying counties, approximately 14.4 percent of the population, on average, lives below the poverty level. This poverty rate is roughly equal to the poverty level within the State of Oregon (14.8 percent) and but slightly higher relative to the poverty level within the State of Nevada (12.5 percent).

The percentage of minority residents in the counties underlying the proposed Juniper/Hart MOA Complex expansion area range from 8.1 percent in Harney County, Oregon to 48.3 percent in Humboldt County, Nevada. The average percent of minority residents within the three underlying counties (26.5 percent)

is higher than the average for the State of Oregon (16.4 percent) but slightly lower than the average for the State of Nevada (33.8 percent). Nationally, minority residents comprise a relatively equal percentage of the total population (27.6 percent) (U.S. Census Bureau 2010). While the percentage of minority residents within Washoe County is greater than the average for the State of Nevada, a more detailed analysis at the census tract level reveals that the percentage of minority residents within the Census Tract 35.01, underlying the proposed Hart E and Hart F Airspace areas within Washoe County, is 13.6 percent, which is below the average for the State of Nevada.

**Table 3.9-7. 2010 Minority and Low Income Populations by County Beneath the Proposed Juniper/Hart MOA Complex**

| Location         | Minority | Below Poverty |
|------------------|----------|---------------|
| Oregon           | 16.4%    | 14.8%         |
| Nevada           | 33.8%    | 12.5%         |
| United States    | 27.6%    | 14.3%         |
| Harney Co., OR   | 8.1%     | 12.8%         |
| Humboldt Co., NV | 48.3%    | 17.6%         |
| Washoe Co., NV   | 23.1%    | 12.7%         |

Source: U.S. Census Bureau 2010.

### Protection of Children

In order to comply with EO 13045, the number of children under age 18 in the three counties underlying the proposed Juniper/Hart MOA Complex expansion area was compared to state and national levels. The percentage of the population represented by children under age 18 ranged from 17.9 percent in Humboldt County, Nevada to 23.6 percent in Washoe County, Nevada. The average percentage of the total population represented by children under age 18 within these counties is 21.3, which is slightly lower than the average in the State of Oregon (22.6 percent), the State of Nevada (24.6 percent), and the nation (24.0 percent) (U.S. Census Bureau 2010).

## Schools

The proposed expansion of the Juniper Low MOA would include Juniper C and part of Juniper D, which overly Harney County, Oregon. The floor of this proposed low MOA would terminate at 500 feet AGL and for this reason, schools located within this county have been identified. (The remaining proposed airspace actions [e.g., proposed Hart MOAs] would occur at altitudes that would not affect underlying schools.) Public education in Harney County is provided by ten school districts. Harney County also has a number of private schools, which provide elementary, middle, and high school educations.

Although schools that are not located beneath the proposed Juniper Low MOA would not likely be affected by low-altitude aircraft operations under the Proposed Action, all schools within a 50-mile radius of the Juniper Low MOA have been identified in order to conservatively capture any potential direct or indirect effects. There are 11 schools located within an approximately 50-mile radius of the Juniper Low MOA (see Table 3.9-8).

### 3.9.2.3 Redhawk MOA Complex

The proposed Redhawk MOA Complex would be located within central Oregon, just south of the Washington-Oregon border. Redhawk A would include portions of Sherman, Gilliam, Wasco, Wheeler counties; Redhawk B would include parts of Gilliam, Morrow, Wheeler, and Grant counties; and, Redhawk C would include portions of Wasco, Jefferson, Crook, Wheeler, and Grant counties.

## Population

Of the eight counties underlying the proposed Redhawk MOA, six have experienced population growth, with three counties experiencing growth greater than the national average of 24.1 percent (see Table 3.9-9). However, Sherman and Grant counties have experienced negative growth, -8.0 and -5.2 percent, respectively. Further, Wheeler County exhibited stagnant population growth during this time period, experiencing only a 3.2-percent increase in population.

**Table 3.9-8. Schools within an Approximately 50-mile Radius of the Proposed Juniper Low MOA**

| School                           | Address                              | Type (Grades)  | Approximate Distance from Proposed Juniper Low MOA |
|----------------------------------|--------------------------------------|----------------|----------------------------------------------------|
| Suntex Elementary School         | 68178 Silver Creek Road, Riley, OR   | Public (K-8)   | 6 miles NW                                         |
| Henry L Slater Elementary School | 800 North Fairview Avenue, Burns, OR | Public (K-5)   | 5 miles N                                          |
| Silvies River Web Academy        | 550 North Court Avenue, Burns, OR    | Private (7-12) | 7 miles N                                          |
| Burns High School                | 1100 Oregon Avenue, Burns, OR        | Public (9-12)  | 6 miles N                                          |
| Double O School                  | 60077 Double O Road, Hines, OR       | Public (K-8)   | Within Juniper C                                   |
| Frenchglen Elementary School     | 39235 Oregon 205, Frenchglen, OR     | Public (K-8)   | Within Juniper D - 7 miles S of Low MOA            |
| Crane Elementary School          | 43277 Cranevenator Lane, Crane, OR   | Public (K-8)   | 23 miles E                                         |
| Hines Middle School              | 500 West Barnes Avenue, Hines, OR    | Public (6-8)   | 4 miles N                                          |
| Monroe School                    | 1800 West Monroe Street, Burns, OR   | Public (6-12)  | 7 miles N                                          |
| Bible Baptist Christian Academy  | 267 South Egan Avenue, Burns, OR     | Private (6-10) | 7 miles N                                          |
| Burns Alternative School         | 550 North Court Avenue, Burns, OR    | Public (6-12)  | 8 miles N                                          |

Source: Google Earth 2013.

**Table 3.9-9. Population Overview within Proposed Redhawk MOA Complex**

| Jurisdiction      | Census 1990 | Census 2000 | Census 2010 | Total percent Change 1990-2010 |
|-------------------|-------------|-------------|-------------|--------------------------------|
| United States     | 248,709,873 | 281,421,903 | 308,745,538 | 24.1%                          |
| Oregon            | 2,842,321   | 3,421,399   | 3,831,074   | 34.8%                          |
| Sherman Co., OR   | 1,918       | 1,934       | 1,765       | -8.0%                          |
| Wasco Co., OR     | 21,683      | 23,791      | 25,213      | 16.3%                          |
| Gilliam Co., OR   | 1,717       | 1,915       | 1,871       | 9.0%                           |
| Morrow Co., OR    | 7,625       | 10,995      | 11,173      | 46.5%                          |
| Jefferson Co., OR | 13,676      | 19,009      | 21,720      | 58.8%                          |
| Wheeler Co., OR   | 1,396       | 1,547       | 1,441       | 3.2%                           |
| Crook Co., OR     | 14,111      | 19,182      | 20,978      | 48.7%                          |
| Grant Co., OR     | 7,853       | 7,935       | 7,445       | -5.2%                          |

Sources: U.S. Census Bureau 1990, 2000, 2010.

## Economic Activity

### *Employment*

*Government and Government Enterprises* jobs comprise the top industry by employment in each of the counties underlying the proposed Redhawk MOA Complex, except for Morrow County, in which *Manufacturing* is the top industry by employment. Further, *Manufacturing* comprises one of the top three industries by employment in three of the other underlying counties, including Crook, Jefferson, and Wheeler counties. However, *Government and Government Enterprises* jobs have experienced negative growth in five of the eight affected counties, including a -23.0 percent decrease in Wheeler County. *Manufacturing* jobs have also seen dramatic decreases between 2001 and 2010 in Jefferson County and Crook County, with -43.0 and -44.0 percent decreases, respectively.

### *Unemployment*

As previously described, in 2012, the annualized unemployment rate in Oregon was 8.7 percent (not seasonally adjusted), just greater than the national average, 8.1 percent (not seasonally adjusted). Table 3.9-10 shows annualized non-seasonally adjusted labor and employment rates for each of the counties underlying the proposed Redhawk MOA Complex.

**Table 3.9-10. 2012 Annualized Labor and Employment in Oregon, Washington, and Affected Counties**

| Location          | Labor Force | Employed  | Unemployed | Unemployment Rate |
|-------------------|-------------|-----------|------------|-------------------|
| Oregon            | 1,962,908   | 1,791,730 | 171,178    | 8.7%              |
| Crook Co., OR     | 8,846       | 7,600     | 1,246      | 14.1%             |
| Gilliam Co., OR   | 1,192       | 1,104     | 88         | 7.4%              |
| Grant Co., OR     | 3,426       | 2,968     | 458        | 13.4%             |
| Jefferson Co., OR | 9,459       | 8,308     | 1,151      | 12.2%             |
| Morrow Co., OR    | 5,528       | 5,074     | 454        | 8.2%              |
| Sherman Co., OR   | 1,072       | 982       | 90         | 8.4%              |
| Wasco Co., OR     | 14,584      | 13,428    | 1,156      | 7.9%              |
| Wheeler Co., OR   | 709         | 655       | 54         | 7.6%              |

Note: Data not seasonally adjusted.

Source: U.S. Bureau of Labor Statistics 2013.

As described previously, between 2007 and 2012, the annualized non-seasonally adjusted unemployment rate in Oregon increased by 3.5 percent. During this same period all of the counties underlying the proposed Redhawk MOA Complex experienced increases in unemployment, ranging from 2.0 to 7.9 percent. Additionally, half of the counties underlying the proposed Redhawk MOA Complex experienced increases in unemployment equal to or greater than the increase experienced by the state. Crook County experienced the greatest rise in unemployment, from 6.2 to 14.1 percent (U.S. Bureau of Labor Statistics 2013).

### *Earnings*

In 2010, total non-farm earnings for the counties underlying the proposed Redhawk MOA Complex ranged between \$10.6 million in Wheeler County and \$475.8 million in Wasco County. During this same period total farm earnings ranged between -\$7.8 million in Crook County to \$100.5 million in Morrow County. *Government and Government Enterprises* was the top industrial sector by earnings in six of the eight underlying counties, reporting earnings ranging from \$4.7 million in Wheeler County to \$138.7 million in Jefferson County. Top industrial sectors in the remaining two counties included *Construction* in Gilliam County (\$14.6 million) and *Manufacturing* in Morrow County (\$100.4 million); however, *Government and Government Enterprises* was the second largest industrial sector by earnings in each of these counties. Other top industrial sectors by earnings included *Manufacturing* and *Retail Trade*, which were among the top three industrial sectors in three and four of the eight underlying counties, respectively (U.S. BEA 2013). Additionally PCPI within the underlying counties ranged from \$26,327 in Wheeler County to \$51,264 in Sherman County, approximately 73 percent and 143 percent of the state average PCPI (U.S. BEA 2013).

### Environmental Justice

In order to comply with EO 12898, ethnicity and poverty status in the counties underlying the proposed Redhawk MOA Complex were examined and compared to state and national data to determine if any minority or low-income communities could potentially be disproportionately affected by implementation of the Proposed Action.



Based on data obtained from the 2010 *Census of Population and Housing* and the 2007-2011 *American Community Survey*, the percentage of population living below the poverty level within the counties underlying the proposed Redhawk MOA ranged from 9.9 percent in Gilliam County to 20.2 percent in Morrow County. Within these underlying counties, approximately 21.9 percent of the population, on average, lives below the poverty level. This poverty rate is substantially greater than that within the State of Oregon. This poverty rate is also higher than that of the U.S. (U.S. Census Bureau 2010).

The percentage of minority residents in the counties underlying the proposed Redhawk MOA Complex ranged from 4.8 percent in Gilliam County to 31.0 percent in Jefferson County. The average percent of minority residents within the eight underlying counties (12.3 percent) is lower than the average for the State of Oregon. Further, nationally, minority residents comprise a much larger percentage of the total population (U.S. Census Bureau 2010).

**Table 3.9-11. 2010 Minority and Low Income Populations by County Beneath the Proposed Redhawk MOA Complex**

| Location          | Minority | Below Poverty |
|-------------------|----------|---------------|
| Oregon            | 16.4%    | 14.8%         |
| United States     | 27.6%    | 14.3%         |
| Crook Co., OR     | 7.3%     | 15.8%         |
| Gilliam Co., OR   | 4.8%     | 9.9%          |
| Grant Co., OR     | 5.0%     | 15.8%         |
| Jefferson Co., OR | 31.0%    | 20.2%         |
| Morrow Co., OR    | 22.3%    | 16.4%         |
| Sherman Co., OR   | 6.6%     | 18.6%         |
| Wasco Co., OR     | 13.9%    | 19.4%         |
| Wheeler Co., OR   | 7.6%     | 12.6%         |

Source: U.S. Census Bureau 2010.

### Protection of Children

In order to comply with EO 13045, the number of children under age 18 in the eight counties underlying the proposed Redhawk MOA Complex was compared to state and national levels. The percentage of the population represented by children

under age 18 ranged from 18.0 percent in Wheeler County to 28.6 percent in Morrow County. The average percentage of the total population represented by children under age 18 within these counties is 21.6, which is slightly lower than the average in the State of Oregon (22.6 percent) and the nation (24.0 percent) (U.S. Census Bureau 2010).

### **3.10 DISMISSED RESOURCE AREAS**

Per NEPA guidelines and CEQ regulations, those resource areas that are anticipated to experience either no or negligible environmental impact under implementation of the Proposed Action or its alternatives are not examined in detail in this EIS. These environmental resources include:

- Utilities and Infrastructure;
- Ground Transportation;
- Geological Resources; and
- Water Resources.

A brief summary of the rationale for not including detailed analyses of these resource areas in the EIS is provided below.

*Utilities and Infrastructure.* The Proposed Action *would be limited to the modification and establishment of airspace only* and its implementation would not require or result in any facility construction or modification, infrastructure upgrades, or demolition. Consequently, no additional utility services or modification of existing utility services would be necessitated by the Proposed Action and there would be no impact to utilities and infrastructure associated with the Proposed Action. Further, there would be no construction related impacts associated with the Proposed Action.

*Ground Transportation.* The Proposed Action *would be limited to the modification and establishment of airspace only* and would not include any project components that would involve or otherwise directly affect the ground surface or existing transportation networks underlying the affected or proposed airspace areas. Local and regional road networks and transportation infrastructure would remain unchanged from their current conditions. Additionally, there would be no short- or long-term change in the volume of traffic experienced on these transportation networks as a result of the Proposed Action. Therefore, there would be no impact to ground transportation networks, carrying capacities, or other important transportation-related metrics associated with the Proposed Action.

*Geological Resources.* The Proposed Action *would be limited to the modification and establishment of airspace only* and would not include any project components that would touch or otherwise directly disturb the topographic features, soils, or subgrade geological resources underlying the affected or proposed airspace areas. Geology, topography, and soils, including farmland soils, would remain unchanged from their current conditions. Consequently, there would be no impact to geological resources associated with the Proposed Action.

*Water Resources.* The Proposed Action *would be limited to the modification and establishment of airspace only* and would not include any project components that would touch or otherwise directly affect the quantity, flows, percolation rate, or accessibility of regional surface or ground water resources. Consequently, there would be no direct impact to water resources, including wetland and floodplains, as a result of the Proposed Action. Analyses of potential water quality-related impacts (i.e., potential impacts from chaff and flare on water quality) are presented in Sections 3.8 and 4.8, *Hazardous Materials and Wastes*. Additionally, a presentation and analysis of aquatic habitat impacts as they relate to biological resources can be found in Sections 3.4 and 4.4, *Biological Resources*.

## SECTION 4

### ENVIRONMENTAL CONSEQUENCES

Environmental impacts that could potentially result from implementation of the Proposed Action and alternatives by the 142d Fighter Wing (142 FW) and the 173d Fighter Wing (173 FW) of the Oregon Air National Guard (ANG) are evaluated in this section. Analyses are presented by resource area, as presented in Section 3.0, *Affected Environment*, which includes:

- Airspace Management;
- Noise;
- Land Use and Visual Resources;
- Biological Resources;
- Cultural Resources;
- Air Quality;
- Safety;
- Hazardous Materials and Wastes; and
- Socioeconomics, Environmental Justice, and Children's Health and Safety.

For a brief discussion of resource areas that are anticipated to experience no environmental impact under implementation of the Proposed Action or its alternatives refer to Section 3.10, *Dismissed Resources Areas*. These resource areas include:

- Utilities and Infrastructure;
- Ground Transportation;
- Geological Resources; and
- Water Resources.

## **4.1 AIRSPACE MANAGEMENT**

### **4.1.1 Approach to Analysis**

The significance of potential impacts to airspace management depends on the degree to which the proposed modifications to existing Military Operations Areas (MOAs) and Air Traffic Controlled Assigned Airspaces (ATCAAs), and establishment of new MOAs and ATCAAs would affect the regional airspace environment. Significant impacts could potentially result if the Proposed Action or its alternatives: 1) substantially affected movement of other air traffic in the area; 2) compromised air traffic control (ATC) systems or facilities; or 3) caused an increase in midair collision potential between military and non-participating civilian operations.

### **4.1.2 Impacts**

#### **4.1.2.1 Proposed Action**

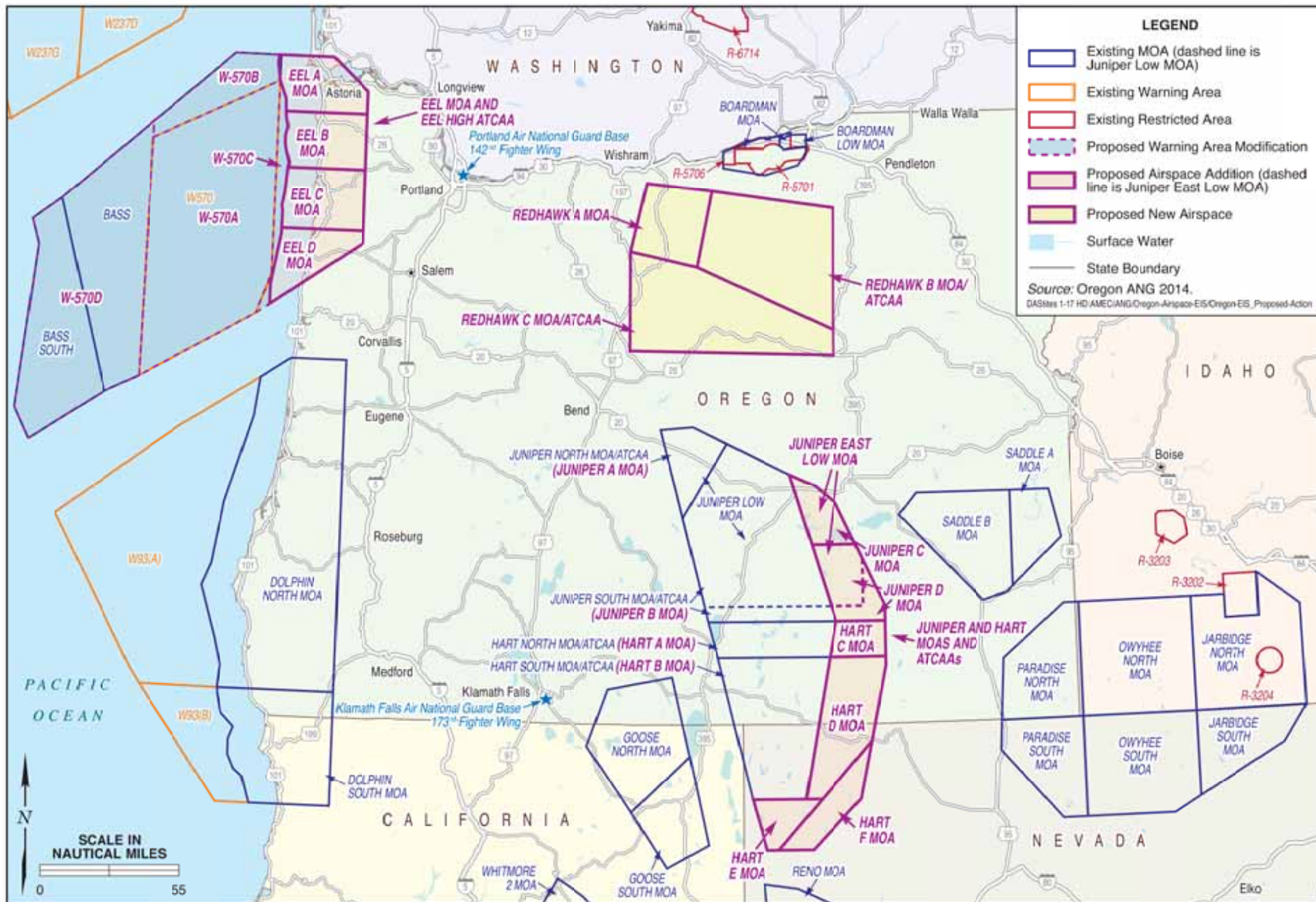
##### Airspace Use and Flight Procedures

The Proposed Action includes modifications to existing MOAs and ATCAAs operated by the Oregon ANG, as well as establishment of new MOAs and ATCAAs. Proposed airspace elements would be used predominantly by the 142 FW and the 173 FW of the Oregon ANG based in Portland and Klamath Falls, respectively. Importantly, the Proposed Action does not include any changes to the existing inventories of F-15 aircraft at the 142 FW and 173 FW, and its implementation would not result in any increases to total annual flight hour authorizations for either unit. Increases in training hours under the Proposed Action would be offset by an overall reduction in transit time to weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex (i.e., the total number of hours spent in flight would be equal to existing conditions and only the distribution of *where* those hours are flown would change). Implementation of the Proposed Action would result in the redistribution of flight training operations within existing and proposed Oregon ANG special use airspace (SUA; i.e., warning areas, MOAs, and ATCAAs) located over coastal and eastern Oregon, northern Nevada, and southern Washington (refer to Figure 4.1-1).



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

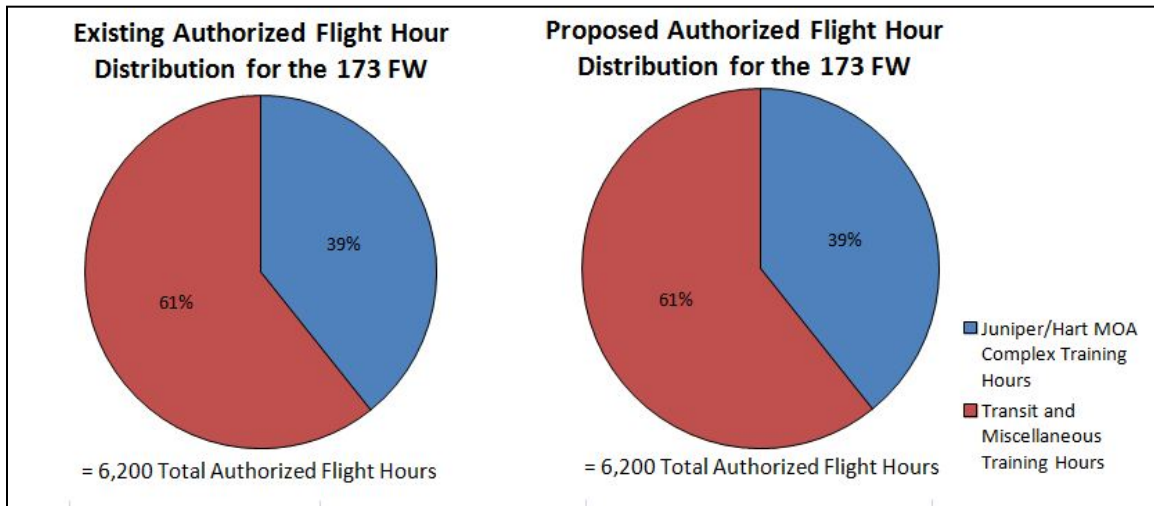
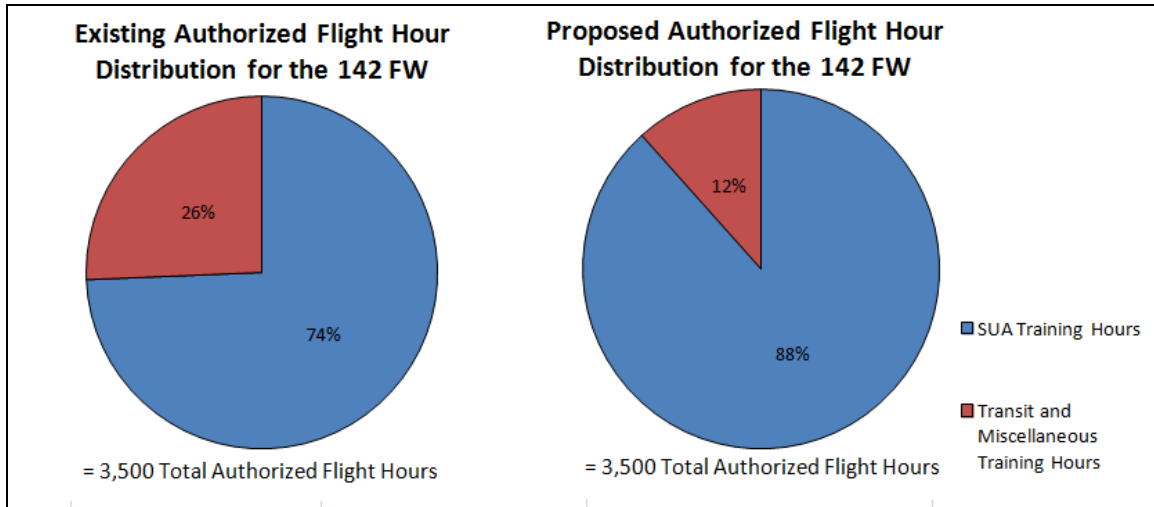
4-3



EIS

**Proposed Action Overview**  
**Oregon ANG Airspace Establishment and Modification**

**FIGURE**  
**4.1-1**



Oregon ANG pilots transit to and from airspace under Instrument Flight Rules (IFR) and do not follow Military Training Routes (MTRs) or other formalized routes. While transit hours would be reduced as a result of the implementation of the Proposed Action indirect beneficial impacts resulting from this reduction are not quantitatively analyzed within the Environmental Impact Statement (EIS) as they would occur outside of the region of influence (ROI).<sup>1</sup>

<sup>1</sup> For example, noise modeling in Section 4.2, *Noise* only assesses the proposed increases in training hours within W-570, Eel MOA/ATCAA, Juniper/Hart MOA Complex, and Redhawk MOA Complex. Modeling was not performed for the corresponding decrease in transit hours as these hours are flown under IFR and outside of the ROI.



*W-570 and Bass/Bass South ATCAAs Modifications*

Under the Proposed Action, the vertical limits and lateral configuration of Warning Area (W)-570, Bass ATCAA, and Bass South ATCAA would be modified within their existing boundaries to meet training requirements of the 142 FW. The proposed modification of the W-570 and Bass/Bass South ATCAA complex would not result in an increase in total 142 FW sorties (i.e., take-offs and landings) authorized or conducted. However, it would result in increased 142 FW operations (i.e., number of times an aircraft crosses an airspace boundary line into or out of an airspace block) and hours spent within this airspace area, resulting in an increase over existing conditions within this airspace complex. (Refer to Table 2-1 for a breakdown of existing and proposed operations and hours in the W-570 and Bass/Bass South ATCAA airspaces.) As previously described, this increase in training hours under the Proposed Action would be offset by an overall reduction in transit time to weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex.

The anticipated increase of approximately 253 flying hours<sup>2</sup> annually within this airspace would be in part due to the fact that the expanded vertical limits of the airspace would accommodate additional training operations that cannot currently be supported. In addition, the creation of additional segments within the existing boundaries of the W-570 and Bass/Bass South ATCAA complex would result in an increase in operations counts. The same number of sorties flown within the overall boundaries of airspace complex would now transit between a larger number of airspace segments, which results in a higher total count for operations within overall airspace complex.

The proposed W-570A, B, C, and D segments would be activated on an as-needed basis as a whole or individually (i.e., no regularly scheduled daily hours of use would be posted on aviation charts), allowing for more responsible and efficient stewardship of the airspace by the Oregon ANG. For example, if training mission

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<sup>2</sup> The term flying hours, or flight hours, refers to the total cumulative flying time spent by Oregon ANG aircraft during a given period. Because Oregon ANG flying operations typically utilize multiple aircraft simultaneously, a training scenario including four aircraft and lasting one hour would result in a recorded total of four flying hours.

requirements call for Basic Fighter Maneuvers (BFM) and do not require large volumes of airspace, there could be training days when W-570C and D would not have to be activated while W-570A and B are in use. Further, when high wind velocity (greater than 25 knots) and rough sea conditions (wind wave heights exceeding five feet) in one of the proposed W-570 segments, a different segment could be activated individually if weather conditions are appropriate for training operations there.

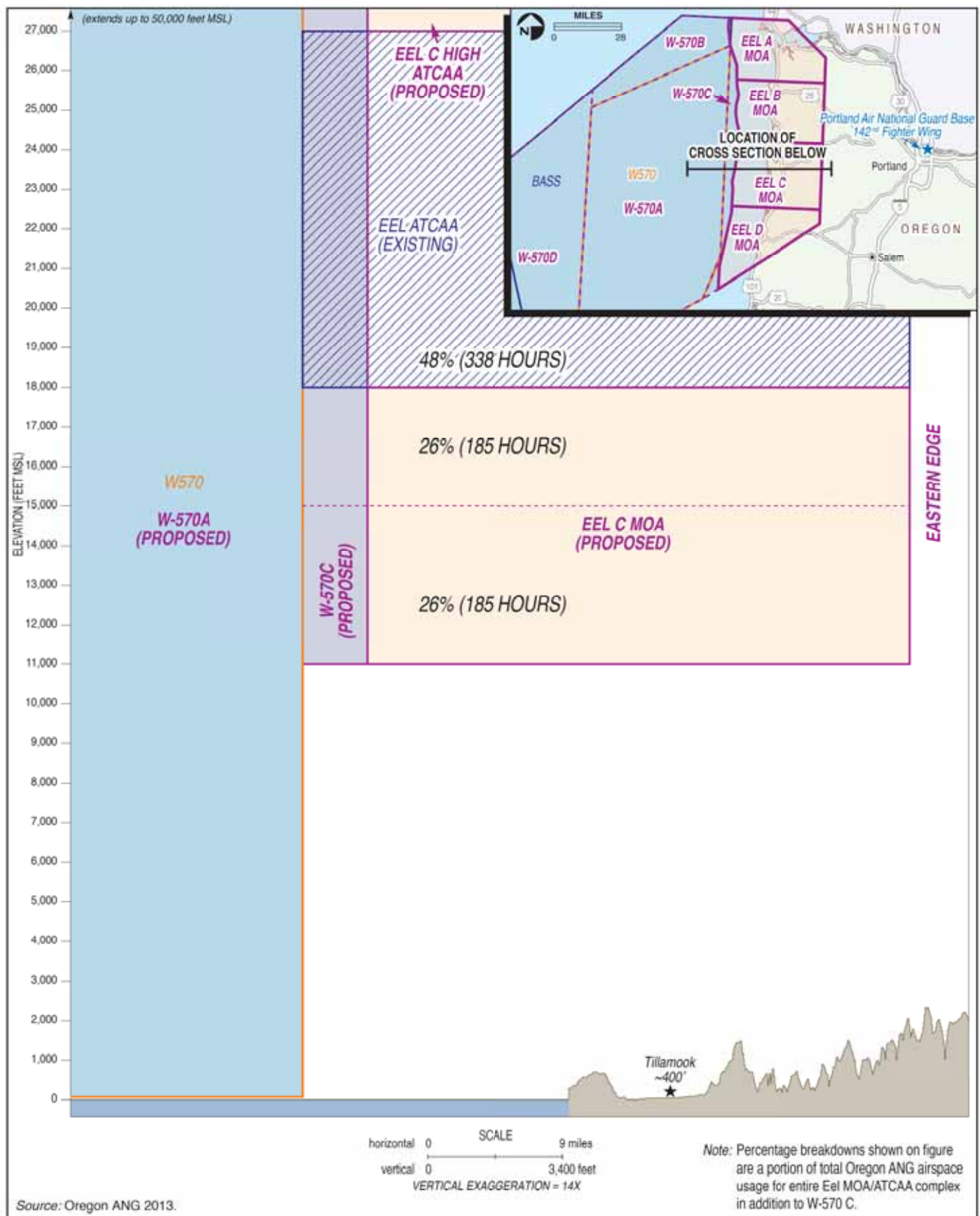
#### *Establishment of Eel MOAs and Modification of Eel ATCAA*

Under the Proposed Action, the western portion of the existing Eel ATCAA would be converted into W-570C and the vertical limits would be expanded to include airspace from 11,000 feet above Mean Sea Level (MSL) to Flight Level (FL) 500 (50,000 feet MSL) (refer to Figure 2-1).

The proposed establishment and modifications to the Eel MOA/ATCAA would not result in an increase of total 142 FW sorties. Sorties currently flown to other over-land airspace as a result of sea-states or other training requirements would be largely redistributed to the Eel MOA/ATCAA Complex which would see an increase of activity of approximately 306 flying hours annually over existing conditions (refer to Table 2-2), due to a reduction in transit time to backup airspace which would leave more allocated training hours available to be spent within SUA. Figure 4.1-2 provides a representative cross-sectional view of the proposed Eel MOA/ATCAA Complex with a breakdown of percent usage by altitude block. Upon implementation of the Proposed Action, 142 FW pilots would spend approximately 26 percent of their overall flying hours (i.e., approximately 185 hours) within the proposed Eel MOA/ATCAA Complex (including W-570C) between 11,000 feet MSL and 15,000 feet MSL, the lowest portion of the airspace.

#### *Juniper/Hart MOA Complex Expansion*

The proposed new MOAs would be established from 11,000 feet MSL to FL 180 (18,000 feet MSL), with the exception of the Juniper Low MOA, which would be



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**Existing and Proposed Eel MOA/ATCAA Complex and W-570  
Cross-Section showing Percentage Breakdowns  
for Usage by Altitude Block**

**FIGURE  
4.1-2**

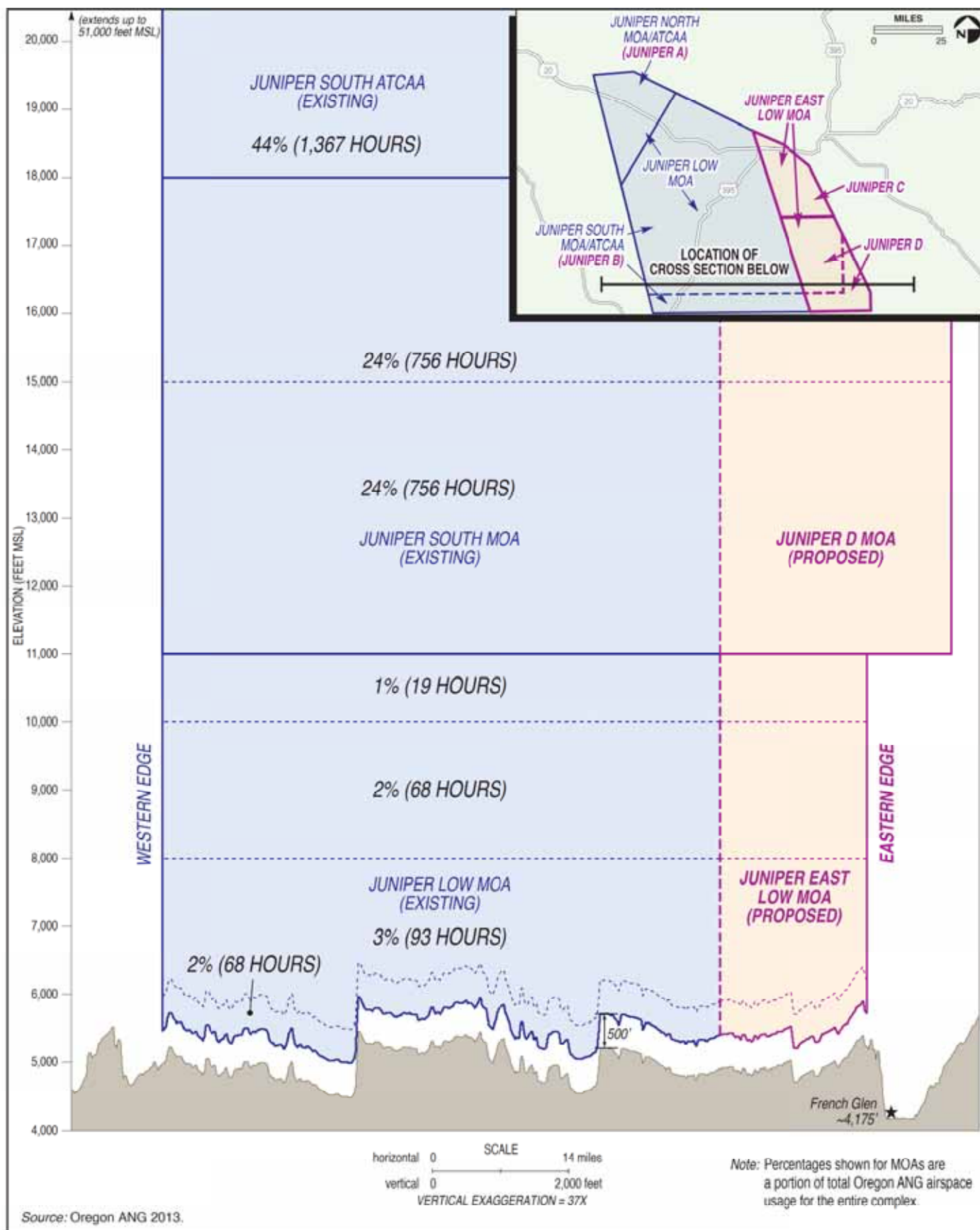


No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

established from 500 feet AGL to 11,000 feet MSL, underlying the Juniper C MOA and portions of the Juniper D MOA. Additionally, each of the expanded airspace areas, with the exception of the Hart F MOA would have an overlying ATCAA extending from FL 180 (18,000 feet MSL) to FL 510 (51,000 feet MSL). At the direction of the Federal Aviation Administration (FAA), the Hart F MOA would be overlain by an ATCAA extending to just FL 280 (28,000 feet MSL) in order to accommodate commercial flight traffic traveling from Boise, Idaho to San Francisco, California (refer to Section 2.3.2, *Alternatives Considered but Eliminated*). The proposed configuration in this area would deconflict overlying airspace and would allow for continued safe transit of air carrier aircraft over the proposed Hart F ATCAA. The proposed airspace expansion would be activated on an as-needed basis as a whole or individually, allowing for more responsible stewardship of the airspace. When the 173 FW conducts BFM, they would not require the utility of the entire airspace.

As detailed in Table 2-3, 173 FW training activity within the existing portions of the Juniper/Hart MOA Complex would decrease given that the distribution of total airspace usage would now be spread out to include operations within the expanded Juniper/Hart MOA Complex, distributing flight activities across a broader geography. Further, use of the Juniper/Hart MOA Complex by the 142 FW would actually decrease upon establishment and modification of other airspace complexes included under the Proposed Action that would provide the 142 FW with more usable airspace located nearer its home airport in Portland. As depicted in Figure 4.1-3, after implementation of the Proposed Action, Oregon ANG pilots would spend the majority of their training time within the overall Juniper/Hart MOA Complex above 11,000 feet MSL.

By segmenting the proposed MOAs and ATCAAs, the 173 FW would be able to activate the required airspace to meet the mission objectives during any specific training exercise. Further, the Juniper/Hart MOA Complex has been expanded in the past to similar lateral dimensions on a temporary basis support the ANG's biannual Sentry Eagle Exercise – the ANG's largest air-to-air combat exercise, which typically includes multiple units from across the country.



EIS

**Existing and Proposed Juniper MOA/ATCAA Complex  
Cross-Section showing Percentage Breakdowns  
for Usage by Altitude Block**

**FIGURE  
4.1-3**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

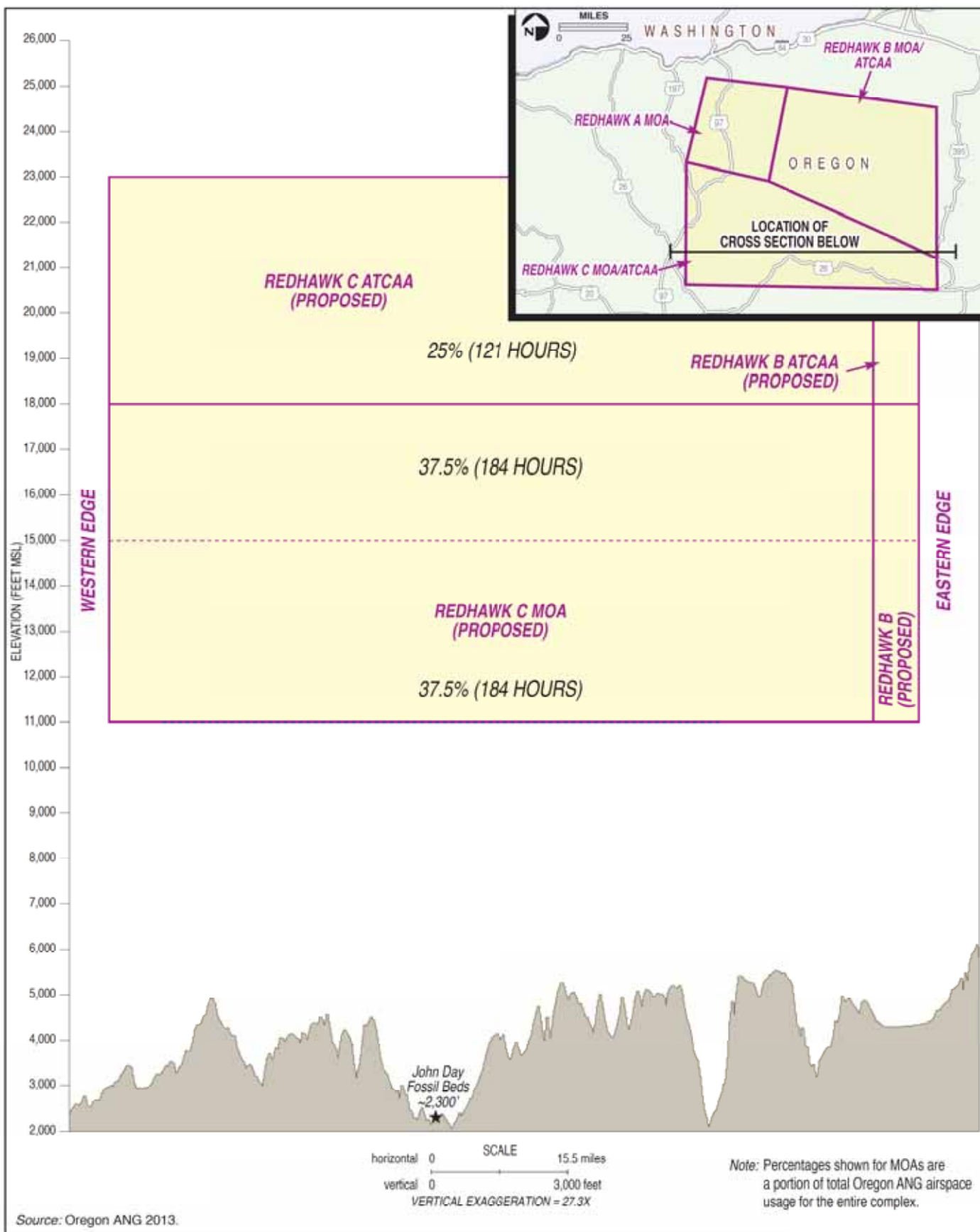
*Redhawk MOA Complex Establishment*

Under the Proposed Action, the proposed over-land Redhawk MOA Complex would be established approximately 100 miles east-southeast of Portland in central/northern Oregon, roughly bound by Highway 97/197 on the west, the towns of Wasco and Lexington on the north, U.S. Highway 395 on the east, and U.S. Highway 26 on the south (refer to Figure 2-3). This specific location and the proposed configuration were determined through direct coordination with the FAA's Seattle Air Route Traffic Control Center (ARTCC), which controls the affected airspace.

The proposed Redhawk MOAs (A, B, and C) would be established from 11,000 feet MSL to FL 180 (18,000 feet MSL). Given that the majority of residents in this region of Oregon generally reside at elevations of 5,000 feet MSL or below, the proposed MOAs would be established at an average elevation equivalent to approximately 7,500 feet above ground level (AGL). The associated Redhawk B ATCAA and Redhawk C ATCAA would be established directly above the proposed Redhawk B MOA and Redhawk C MOA and would extend from FL 180 (18,000 feet MSL) to FL 230 (23,000 feet MSL).

Establishment of the proposed Redhawk MOA Complex would alleviate concerns related to scheduling conflicts and prohibitive weather conditions with other airspace currently utilized by the 142 FW (i.e., the Juniper/Hart MOA Complex). Dividing the complex into three segments would allow for the greatest scheduling flexibility and facilitate the efficient use of the airspace. Proposed airspace segments would be activated on an as-needed basis as a whole or individually, allowing for more responsible stewardship of the airspace. Implementation of the Proposed Action would result in the 142 FW utilizing the proposed Redhawk MOAs and ATCAAs for approximately 500 flying hours per year, with approximately 37.5 percent of these hours (i.e., approximately 184 flying hours) spent between 11,000 feet MSL and 15,000 feet MSL (see Figure 4.1-4).





EIS

**Proposed Redhawk MOA/ATCAA Complex  
Cross-Section showing Percentage Breakdowns  
for Usage by Altitude Block**

**FIGURE  
4.1-4**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

### Potential Effects on Air Traffic

Specific modifications and improvements to military training airspace included under the Proposed Action were initially developed by the Oregon ANG in coordination and consultation with the FAA's Seattle ARTCC, Salt Lake ARTCC, and Portland Terminal Radar Approach Control (TRACON) as well as the U.S. Air Force's (USAF) Western Air Defense Sector. In the process of developing this airspace proposal (refer to Section 1.5.1, *Considerations for Military Training Airspace*), the controlling ARTCC applied evaluative and exclusionary criteria to preliminarily design the placement of airspace boundaries, resulting in suggested revisions to the proposed configurations throughout the Environmental Impact Analysis Process (EIAP). The resulting proposed airspace modifications and establishments were specifically developed to account for computer modeling of actual aircraft flight path histories in the region, in order to identify the most ideal locations and configurations for the proposed airspace with the least potential impact on surrounding military, commercial, and general aviation.

The dimensions and configurations for the proposed expansion of the Juniper/Hart MOA Complex to the east and south were developed based on previous coordination with FAA (Seattle, Salt Lake City, and Oakland ARTCCs) during the biannual Sentry Eagle Exercises. Previous coordination with FAA has resulted in minimal impacts to commercial and other air traffic flow during the temporary expansions of the Juniper/Hart MOA Complex in support of the Sentry Eagle Exercises. Additionally, as described in Section 2.3.2, *Alternatives Considered but Eliminated*, this element of the Proposed Action was further refined based on input and suggestions gathered during early stages of the EIAP. The originally proposed airspace was decreased in terms of both footprint and volume in order to accommodate existing commercial and recreational air traffic.

Finally, all proposed new Oregon ANG airspace segments would only be activated on an as-needed basis – as a whole or individually – allowing for more responsible stewardship of the airspace regionally and helping to minimize conflicts with other users and reducing the overall amount of time an airspace area would be activated. As with existing Oregon ANG ATCAAs, proposed new ATCAAs would also remain under the control of the FAA and, when not in use by military aircraft,



would continue to be used to support civil aviation activities. Therefore, potential impacts to regional air traffic would be less than significant.

#### Effects on Air Traffic Control Facilities

Implementation of the Proposed Action is not expected to compromise or require changes to existing ATC systems, facilities, or procedures. Flight schedules for the Oregon ANG are currently filed weekly with FAA's Seattle ARTCC, the controlling agency of regional airspace. In addition, prior to initiating a training mission, Oregon ANG pilots file a flight plan with Seattle ARTCC and receive takeoff clearance from ATC at their respective airfields. Pilots fly in accordance with Instrument Flight Rules and remain under ATC until reaching a designated location; at that point, clear of conflicting aircraft, Oregon ANG aircraft are cleared to enter the MOAs or other SUA. Upon returning to base, Oregon ANG pilots maintain the same coordination with Seattle ARTCC and ATC at their respective airfield, entering ATC at a fixed point and remaining under that control until landing. Implementation of the Proposed Action would not require any changes to these procedures or compromise existing regional ATC facilities.

Oregon ANG aircraft currently use chaff and flares during training operations in the existing SUA.<sup>3</sup> These training tools do not interfere with ATC radar or facilities (Air National Guard 2003). Consequently, potential impacts to ATC facilities would be less than significant.

#### Effects on Collision Potential

As described in Section 4.7, *Safety*, in order to avoid non-participating aircraft, sorties are flown only when see-and-avoid tactics can be used (i.e., Visual Flight Rules [VFR] conditions). See-and-avoid refers to the practice of locating other aircraft by sight and avoiding them using right-of-way rules established by Federal regulations at 14 CFR 91. All military aircraft operations in MOAs, at all altitudes, utilize see-and-avoid tactics as civilian VFR aircraft may transition

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<sup>3</sup> USAF policy requires units that use chaff to obtain a frequency clearance from the USAF Frequency Management Center and Headquarters FAA prior to using chaff, to ensure training with chaff is conducted such that interference with civilian radar is avoided. This requirement ensures electromagnetic compatibility between the FAA, the Federal Communications Commission, and Department of Defense agencies.

through an active MOA at any altitude. Oregon ANG would terminate training or move to different areas within the airspace if civilian aircraft are detected.

Civilian air traffic, including private airport use and general aviation, currently fly under VFR within or adjacent to the existing Juniper Low MOA as well as regional low-altitude MTR corridors that are located underneath or near the affected portions of Oregon ANG airspace (refer to Section 3.1.2.2, *Affected Airspace Use and Flight Procedures*). This indicates that civilian air traffic is compatible with existing low-altitude military training activity. General aviation activity within the proposed Juniper East Low MOA would have the potential to encounter increased levels of low-altitude military flights; however, four active low-altitude MTRs currently pass through the proposed Juniper East Low MOA, and established floor elevations of these MTRs are as low as 100 feet AGL. Under the Proposed Action, Oregon ANG pilots would continue to comply with the procedures and regulations under which they currently operate, within the existing Juniper Low MOA and all other affected airspace areas. Therefore, the Proposed Action is not expected to significantly increase the likelihood of mid-air collisions with civilian aircraft.

At least two recreational glider clubs, including the Willamette Valley Soaring Club and the Nevada Soaring Association, are known to use airspace in the vicinity of the Juniper/Hart MOA Complex. The Willamette Valley Soaring Club, a glider club based in Portland, Oregon utilizes airspace in the Steens Mountain area for approximately two weeks a year for recreational gliding (Oregon ANG 2014). These flights generally take place between FL 180 (18,000 feet MSL) and FL 270 (27,000 feet MSL) and would encroach within the proposed Juniper and Hart MOAs and ATCAAs when activated. Past communication with this club has revealed that approximately 10 percent of these gliders have transponders, 40 to 60 percent of gliders have radios (though they are used on a frequency different than that used by Oregon ANG pilots), and there is no cell service available to aid in communication between pilots and gliders regarding scheduling. Outreach to the Willamette Valley Soaring Club is ongoing. Attempts by the Oregon ANG to communicate with the Nevada Soaring Association, including the most recent attempt in March 2017, have not yet been successful and a dialogue has not been established to date (Oregon ANG 2014). However, Oregon ANG has made contact with the Pacific Soaring Council regarding the Proposed Action. The Pacific

Soaring Council is a non-profit volunteer organization that sponsors, promotes, and carries out plans, policies, and activities to further the growth and development of the soaring movement in California, Nevada, and Hawaii. The Pacific Soaring Council has agreed to be a signatory on a Memorandum of Understanding to assist with lines of communication and information dissemination between the Oregon ANG and glider pilots based in Portland Oregon and Reno, Nevada.

While glider club operations within this area have the potential to result in airspace conflicts during certain discrete periods of the year, if the Proposed Action or one of its alternatives is implemented the Oregon ANG shall develop a Memorandum of Understanding (MOU) to outline procedures that shall be implemented to ensure the continued safety of both glider and Oregon ANG pilots (see Section 6.0, *Special Procedures*). Oregon ANG shall draft a MOU that shall include requirements to meet annually with the glider club representatives to discuss procedures. Among other topics, during these discussions the Oregon ANG shall communicate airborne operations, scheduling, and execution for both units. Glider pilots shall notify the 173 FW when there would be a desire to operate within Oregon ANG airspace. Both parties would agree upon deconflicting procedures (Oregon ANG 2014).

### Indirect Impacts

Additional indirect or induced impacts to Airspace Management would not be anticipated under the Proposed Action. Potential economic impacts resulting from impacts to general aviation are discussed further in Section 4.9, *Socioeconomics, Environmental Justice, and Children's Health and Safety*.

#### 4.1.2.2 Alternative B: No Modifications to Eel ATCAA

This alternative would include the same airspace changes as described under the Proposed Action; however, the proposed Eel MOAs and Eel High ATCAAs would not be established. When coastal weather and sea-states preclude the use of the proposed W-570 Complex, the increase in 142 FW operations in the Eel MOA/ATCAA Complex under the Proposed Action would instead be redistributed to the proposed Redhawk MOA Complex under this scenario. As

with the Proposed Action, no changes to existing inventories of aircraft or total annual flight hour or sortie authorizations would occur for either the 142 FW or 173 FW. Oregon ANG usage of the existing Eel ATCAA would remain unchanged from the baseline conditions of 333 flying hours per year. Potential impacts to airspace management under this alternative would be identical for the W-570 and Juniper/Hart complex compared to the Proposed Action and would remain unchanged from existing conditions for the Eel ATCAA.

Potential impacts to airspace management with regard to the proposed Redhawk MOA Complex would be slightly greater than under the Proposed Action. Under Alternative B, utilization of the proposed Redhawk MOA Complex would increase by approximately 305 flying hours per year over the Proposed Action (see Table 4.1-1). Although potential impacts within the proposed Redhawk MOA Complex would be greater, this increase would not be expected to significantly impact movement of other air traffic in the area, regional ATC facilities, or collision potential given that Oregon ANG aircraft would still coordinate with regional ARTCCs and operate under the same regulations and procedures in order to avoid potential conflicts.

**Table 4.1-1. Comparison of Total Oregon ANG Airspace Complex Usage by Alternative**

| Scenario               | Annual Flying Hours within Airspace Complex<br>(+/- change from Proposed Action) |                               |                                 |                           |
|------------------------|----------------------------------------------------------------------------------|-------------------------------|---------------------------------|---------------------------|
|                        | W-570                                                                            | Eel                           | Juniper/ Hart                   | Redhawk                   |
| <b>Proposed Action</b> | 1,212 hrs                                                                        | 638 hrs                       | 3,178 hrs                       | 488 hrs                   |
| <b>Alternative B</b>   | 1,212 hrs<br>(no change)                                                         | 333 hrs<br>(-305 hrs)         | 3,178 hrs<br>(no change)        | 793 hrs<br>(+305 hrs)     |
| <b>Alternative C</b>   | 1,212 hrs<br>(no change)                                                         | 784 hrs<br>(+146 hrs)         | 3,520 hrs<br>(+342 hrs)         | 0 hrs<br>(-488 hrs)       |
| <b>Alternative D</b>   | 1,212 hrs<br>(no change)                                                         | 638 hrs<br>(no change)        | 3,178 hrs<br>(no change)        | 488 hrs<br>(no change)    |
| <b>No-Action</b>       | 959 hrs<br>(same as baseline)                                                    | 333 hrs<br>(same as baseline) | 3,744 hrs<br>(same as baseline) | N/A<br>(same as baseline) |

Note: The term flying hours refers to the total cumulative flying time spent by Oregon ANG aircraft during a given period. Because Oregon ANG flying operations typically utilize multiple aircraft simultaneously, a training scenario including four aircraft and lasting one hour would result in a total of four flying hours.

Sources: Oregon ANG 2013b, 2013c.

#### 4.1.2.3 Alternative C: No Redhawk MOA Complex

This alternative includes the same airspace changes as described under the Proposed Action; however, establishment of the Redhawk MOA Complex would not take place. Under Alternative C, approximately 30 percent of proposed utilization of the Redhawk airspace by Oregon ANG pilots would be redistributed to the Eel MOA/ATCAA Complex while approximately 70 percent would be relocated to the Juniper/Hart MOA Complex (refer to Table 4.1-1). This is largely due to the fact that the Redhawk MOA Complex was designed to accommodate over-land training when coastal weather conditions preclude the use of the Eel MOA/ATCAA Complex by the 142 FW. As with the Proposed Action, no changes to the existing inventories of aircraft or total annual flight hour or sortie authorizations would occur for either the 142 FW or 173 FW. Therefore, potential impacts to airspace management under this alternative would be identical for the W-570 Complex compared to the Proposed Action.

Implementation of Alternative C would result in reduced benefits to 142 FW mission readiness as 70 percent of training operations (refer to Table 4.1-1) intended for the Redhawk MOA Complex would instead have to transit a greater distance in order to reach the Juniper/Hart MOA Complex. This would result in a decrease in training time spent within usable airspace due to increased transit times. 142 FW usage of the overall Juniper/Hart MOA Complex would increase by approximately 315 flying hours per year over the Proposed Action (which accounts for an approximate 10 percent loss in airspace training time due to the increased transit distance compared to the proposed Redhawk MOA Complex) (refer to Table 4.1-1). In addition, 142 FW would increase utilization of the proposed Eel MOA/ATCAA Complex by approximately 150 flying hours per year. Potential impacts to airspace management under this alternative would be greater than the Proposed Action with regard to the proposed modifications to the Eel MOA/ATCAA Complex and Juniper/Hart MOA Complex. This increase, particularly within the Juniper/Hart MOA Complex could impact recreational pilots; however, it would not be expected to significantly impact movement of other air traffic in the area, regional ATC facilities, or collision potential given that Oregon ANG aircraft would still coordinate with regional ARTCCs and operate under the same regulations and procedures in order to avoid potential conflicts.

#### 4.1.2.4 Alternative D: No Expansion of Juniper/Hart MOA Complex

This alternative includes the same airspace changes as described under the Proposed Action; however, the Juniper/Hart MOA Complex would not be expanded. While the 142 FW would still be able to utilize other training airspace proposed for modification of establishment under this scenario, the 173 FW would continue to operate within the existing boundaries of the Juniper/Hart MOA Complex, which currently limit efficient and realistic mission-oriented training requirements of the increased aircraft inventory and advanced technology within the aircraft. While potential impacts would remain identical to the Proposed Action with regard to the W-570 Complex (refer to Section 4.1.2.1, *Proposed Action*), Eel MOA/ATCAA Complex, and the Redhawk MOA Complex, potential impacts to the Juniper/Hart MOA Complex would be slightly greater under this alternative.

As summarized in Table 4.1-1, overall annual Oregon ANG flying hours within the Juniper/Hart MOA Complex would remain unchanged under this alternative. However, under Alternative D, the existing boundaries of the Juniper/Hart complex would not be expanded to the east and south. As a result, Oregon ANG operations under this scenario would not be spread out over a larger geographical area and would continue to be confined to the existing boundaries of the airspace. Selection of this Alternative would therefore result in a continuation of conditions under which the existing Juniper/Hart MOA Complex would need to be activated for greater periods of time as a result of the compressed dimensions that preclude ideal pilot training scenarios as proposed in the unit's syllabus. This alternative would result in continued negative impacts to 173 FW mission readiness and training and result in a higher concentration of Oregon ANG training operations within the existing airspace than under the Proposed Action.

Although potential impacts to airspace management with regard to the Juniper/Hart MOA Complex would be greater under this alternative and would result in impacts to Oregon ANG mission readiness, implementation of this alternative would result in a decreased usage of the Juniper/Hart MOA Complex compared to existing conditions. Potential impacts would not be expected to significantly impact movement of other air traffic in the area, regional ATC facilities, or collision potential given that Oregon ANG aircraft would continue to

coordinate with regional ARTCCs and operate under the same regulations and procedures in order to avoid potential conflicts.

#### 4.1.2.5 No-Action Alternative

If the No-Action Alternative were selected, the Oregon ANG would not implement the Proposed Action. Therefore, conditions would remain as described in Section 3.1, *Airspace Management* and no changes to airspace management would occur.

## 4.2 NOISE

### 4.2.1 Approach to Analysis

Noise impact analyses typically evaluate potential changes to existing noise environments that would result from the implementation of a proposed action. These potential changes may be beneficial if they reduce the number of sensitive receptors exposed to unacceptable noise levels. Conversely, impacts may be significant if they result in an introduction to unacceptable noise levels or increased exposure to unacceptable noise levels. Noise associated with a Proposed Action is compared with existing noise conditions to determine the magnitude of potential impacts.

According to FAA Order 1050.1E, Change 1, a significant noise impact would occur if the Proposed Action would cause noise-sensitive areas to experience an increase in noise of 1.5 decibels (dB) or more at or above the 65 Day-Night Average A-weighted Sound Level (DNL) noise exposure when compared to the No-Action Alternative for the same timeframe. With regard to determining noise levels from aircraft operations within SUA, Onset Rate-Adjusted Monthly Day-Night Average ( $L_{dnmr}$ ) metric is the accepted noise metric (see Appendix E, *Noise*) and is carried forwarded for use in the analysis of potential noise impacts. As described in Section 3.2, *Noise*, due to the onset penalty associated with the  $L_{dnmr}$  metric,  $L_{dnmr}$  always equals or exceeds DNL values. Consequently, the  $L_{dnmr}$  metric used for quantifying noise levels in SUA can be compared to DNL thresholds (e.g., the 65 DNL threshold established via FAA Order 1050.1E, Change 1). This comparison is conservative in that noise levels of 65  $L_{dnmr}$  are often less than 65 DNL (see Appendix E, *Noise*).

During the scoping process conducted in support of this EIS, several federal agencies as well as members of the public indicated that noise was a concern within and beneath affected and proposed airspaces, and that the underlying areas would be sensitive to increases in noise resulting from implementation of the Proposed Action. Consequently, the ANG elected to include a discussion of Sound Exposure Level (SEL) and Maximum Sound Level ( $L_{max}$ ), which serve as supplemental noise metrics (refer to Section 3.2, *Noise*, and Appendix E, *Noise*). While there are no established thresholds regarding noise exposure from



individual flyover events, these metrics have been provided to enhance public understanding of noise impacts from aircraft activity within the proposed and affected airspaces. The flight activity within the existing Juniper Low MOA is (and would continue to be) infrequent, and flight activities with the proposed Juniper East Low MOA would also be infrequent; further, the actual location of flight operations within the SUA is unpredictable. Therefore, the  $L_{\max}$  describes potential worst case peak noise levels associated with an F-15 flyover at a vertical distance of 500 feet AGL and a horizontal distance of 200 feet.

#### **4.2.2 Impacts**

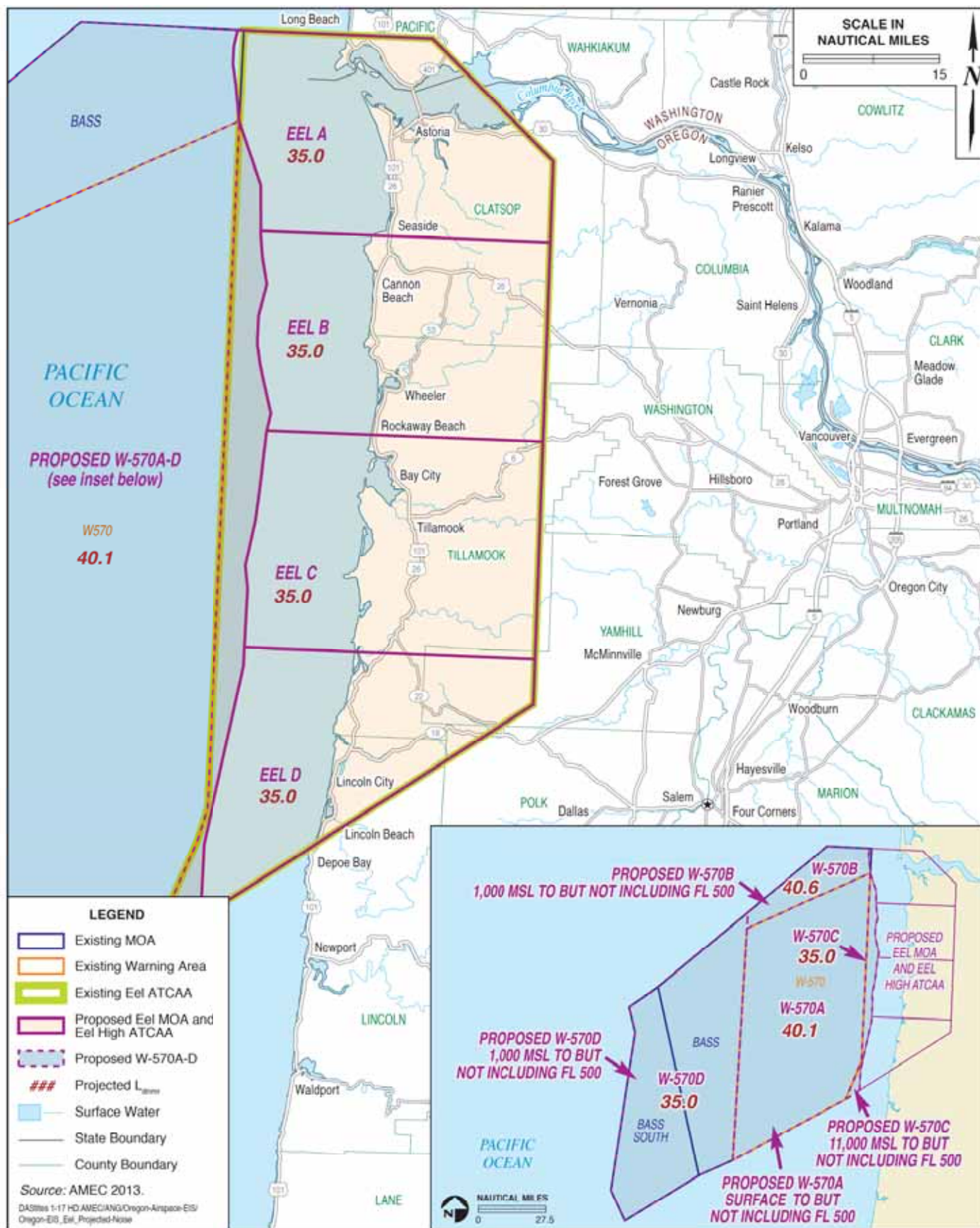
The noise analysis presented below is based on running operational scenarios through the noise model MRNMAP version 3.0 to determine noise levels associated with aircraft operations within proposed SUA; these data were then compared to existing noise levels within the footprint of existing and proposed SUA. The MRNMAP program was used to calculate uniform, distributed  $L_{dnmr}$  levels and the average daily number of events that would exceed 65 dB SEL within the MOAs. The analytical parameters considered in this analysis included aircraft type, airspeed, power settings, proposed aircraft operations, vertical training profile, and a conservative estimate of the amount of time spent within each airspace block (see Appendix E, *Noise*).

In addition to the noise modeling results presented within this analysis, the Oregon ANG qualitatively demonstrated the noise levels associated with military flight activity at various altitudes. Representatives of the Oregon ANG hosted congressional officials, city and county officials, and representatives of federal and state agencies for a briefing and flight demonstration on 28 January 2013 at Boardman Range, 30 January 2013 at Alkali Airfield, and 1 February 2013 at Cape Blanco Airport. Oregon ANG representatives presented a summary of the purpose and need for the Proposed Action, and following the briefing flight demonstrations were conducted and included three scenarios: 1) two F-15 aircraft in full afterburner at 11,000 feet MSL (i.e., worst case scenario); 2) two F-15s in full afterburner at 11,000 feet MSL at a distance of 10 miles from the receptors; and 3) two F-15 aircraft in cruise power between 18,000 and 20,000 feet MSL (typical scenario). Officials generally responded positively during the noise demonstration.

### Summary of Impacts under the Proposed Action

Flight activity within the existing and proposed MOAs is and would continue to be random (i.e., aircraft would not operate along set routes or specific corridors within MOAs). As described in Table 4.2-1 and depicted in Figure 4.2-1, operations conducted within the proposed airspace would not cause any underlying areas to experience noise levels greater than 65 DNL. Further, noise levels beneath the proposed airspace would not exceed 55 DNL, which is the USEPA-recommended threshold for noise in rural areas or places in which quiet is a basis for use. Following the publication of the Draft EIS, a comment letter was received from the U.S. Department of the Interior (DOI) on 11 September 2015 (see Appendix C, *Draft EIS Comments and Responses*) suggesting the use of American National Standards Institute (ANSI) S12.9, “Quantities and Procedures for Description and Measurement of Environmental Sound – Part 4: Noise Assessment and Prediction of Long-term Community Response.” Even when adding 10 dB to modeled sound levels, per ANSI S12.9 / Part 4, noise levels projected to result following implementation of the Proposed Action would remain below the FAA’s 65 DNL threshold and the 55 DNL threshold recommended by the USEPA for residential areas, farms, and other outdoor areas where quiet is a basis for use.

The Oregon ANG has also elected to include a discussion of  $L_{\max}$  and SEL, which serve as supplemental noise metrics. While there are no established thresholds regarding noise exposure from individual flyover events, these metrics have been provided to enhance public understanding of noise generated by aircraft activity within the existing and proposed airspace. The  $L_{\max}$  describes the maximum sound level measured (using time integration of either 1/8 second or 1 second) during a noise event. The  $L_{\max}$  associated with a direct-overhead F-15 flyover at 500 feet AGL within the Juniper Low MOAs could approach up to 116 dB. By comparison, an F-15 flyover event at 11,000 feet AGL would result in an  $L_{\max}$  of less than 87 dB; these measurements are typically influenced by multiple factors, including the underlying topography and atmospheric conditions (e.g., air temperature, relative humidity, etc.). However, these events are and would continue to be extremely infrequent for the following reasons: (1) aircraft operations at the airspace floor (i.e., 500 feet AGL within the proposed low MOAs and 11,000 feet MSL for the other proposed MOAs) are a small fraction of total aircraft operations; (2) pilots



Projected Noise Levels Associated with Oregon ANG Operations in the Expanded Eel MOA/ATCAA and W-570 Airspace



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

**Table 4.2-1. Sound Levels Associated with Military Aircraft Operations in the Proposed and Affected Airspaces under the Proposed Action**

| Airspace                  | Existing<br>Airspace<br>L <sub>dnmr</sub> | Proposed<br>Airspace<br>L <sub>dnmr</sub> | Change | Significant? | Number of Daily<br>Events Above<br>65 dB SEL |
|---------------------------|-------------------------------------------|-------------------------------------------|--------|--------------|----------------------------------------------|
| W-570 & Eel MOAs          |                                           |                                           |        |              |                                              |
| Eel A MOA                 | -                                         | 35.0                                      | -      | No           | 0.4                                          |
| Eel B MOA                 | -                                         | 35.0                                      | -      | No           | 0.4                                          |
| Eel C MOA                 | -                                         | 35.0                                      | -      | No           | 0.4                                          |
| Eel D MOA                 | -                                         | 35.0                                      | -      | No           | 0.5                                          |
| W-570A                    | 40.1                                      | 40.1                                      | 0.0    | No           | 0.1                                          |
| W-570B                    | -                                         | 40.6                                      | -      | No           | 0.1                                          |
| W-570C                    | -                                         | 35.0                                      | -      | No           | 0.7                                          |
| W-570D                    | -                                         | 35.0                                      | -      | No           | 0.0                                          |
| Juniper/Hart MOA Complex  |                                           |                                           |        |              |                                              |
| Juniper A (Juniper North) | 43.9                                      | 42.2                                      | -1.7   | No           | 0.1                                          |
| Juniper B (Juniper South) | 41.5                                      | 38.5                                      | -3.0   | No           | 0.2                                          |
| Juniper C                 | -                                         | 38.5                                      | -      | No           | 0.2                                          |
| Juniper D                 | -                                         | 36.3                                      | -      | No           | 0.1                                          |
| Juniper Low               | 46.5                                      | 45.8                                      | -0.7   | No           | 0.0                                          |
| Juniper Low East          | -                                         | 46.3                                      | -      | No           | 0.0                                          |
| Hart A (Hart North)       | 41.4                                      | 41.0                                      | -0.4   | No           | 0.3                                          |
| Hart B (Hart South)       | 38.2                                      | 37.1                                      | -1.1   | No           | 0.2                                          |
| Hart C                    | -                                         | 39.7                                      | -      | No           | 0.3                                          |
| Hart D                    | -                                         | 35.0                                      | -      | No           | 0.1                                          |
| Hart E                    | -                                         | 36.9                                      | -      | No           | 0.2                                          |
| Hart F                    | -                                         | 35.0                                      | -      | No           | 0.1                                          |
| Redhawk MOA Complex       |                                           |                                           |        |              |                                              |
| Redhawk A                 | -                                         | 35.0                                      | -      | No           | 0.0                                          |
| Redhawk B                 | -                                         | 35.0                                      | -      | No           | 0.0                                          |
| Redhawk C                 | -                                         | 35.0                                      | -      | No           | 0.0                                          |

Note: Existing L<sub>dnmr</sub> levels were only modeled for existing airspace areas. It is assumed that the areas beneath the proposed airspace experience ambient noise characteristic of rural environments, between 30 and 50 DNL (FICON 1992; USEPA 1974).

Source: AMEC 2013; Please see Appendix E, *Noise* for full noise modeling criteria and results.

are instructed to avoid direct-overhead flights of sensitive receptors (e.g., NWRs, residences, livestock, etc.); and (3) aircraft operations within airspace are random.

SEL is a measure that takes into account the effect of both the duration and intensity of a noise event by summing the noise energy from each second in an event, which typically lasts several seconds, into a single second. Based on the size of the MOAs, the random nature of flight paths within the MOAs, and the altitudes at which the aircraft operate, the number of daily events where the SELs exceed 65 dB would be less than one (i.e., on average, daily aircraft utilization within the MOAs would not result in a sensitive receptor experiencing a SEL above 65 dB). For example, aircraft operations within the Juniper Low and Juniper Low East MOAs, the floors of which would be established at 500 feet AGL under the Proposed Action, would result in less than one (approximately 0.1) daily event where the SEL exceeded 65 dB.

#### 4.2.2.1 Proposed Action

##### Long-term Operational Impacts

Using  $L_{dnmr}$  noise measurements as a quantitative metric, this subsection describes the noise levels associated with aircraft training in newly expanded and established airspace areas following implementation of the Proposed Action. As described in Section 3.2, *Noise*, the  $L_{dnmr}$  metric is the most useful single metric for characterizing the long-term noise environment within SUA. Additionally, the number of events above 65 dB SEL and the  $L_{max}$  metric were used to supplement this analysis in the interest of enhancing the public's understanding of single-event aircraft noise levels. However, as previously described, based on subjectivity to single event noise levels and the duration of event associated with a single aircraft flyover, no impact thresholds have been established at the state and/or federal level; therefore, these data are provided as a supplement to further describe noise levels associated with aircraft operations.

##### *Monthly Day-Night Average Airspace Noise Levels*

Table 4.2-1 presents the baseline and proposed noise modeling results for operations within affected and proposed MOAs under the Proposed Action. Ultimately, the operations conducted within the proposed and affected airspace under the Proposed Action would not cause any underlying areas to experience a

65 DNL or greater noise environment.<sup>4</sup> Further, noise levels beneath the proposed and affected airspaces would not approach 55 DNL, which would be considered loud in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (U.S. Environmental Protection Agency [USEPA] 1974).

Additionally, there would be an overall *decrease* in  $L_{dnmr}$  levels beneath the existing MOAs based on a broader geographic distribution of aircraft training operations. For example, the existing Juniper North MOA would experience a decrease of approximately 1.7  $L_{dnmr}$ . This decrease in noise levels throughout the existing airspaces would result from the expansion of the Juniper/Hart MOA Complex and the establishment of W-570A, B, C, and D as well as the Eel MOAs and Redhawk MOA Complex, which would provide additional airspace for military aircraft operations. Aircraft operations would be more spread out as a result of the Proposed Action and therefore average noise levels experienced beneath the existing MOAs would experience a nominal decrease.

Under the Proposed Action the existing W-570 would be renamed as W-570A and a new section, W-570C, would be created adjacent its eastern boundary (refer to Section 3.1, *Airspace Management*). Additionally, the existing Bass and Bass South ATCAA would be converted and reconfigured to W-570B and D, respectively. Total training hours within the proposed W-570 Complex would be approximately 1,200 hours distributed throughout the combined 13,000-square-mile airspace area.

The existing W-570 would not experience a change in noise levels as military aircraft operations within W-570A would not increase above existing levels. Under the Proposed Action, training operations within W-570B, C, and D would result in noise levels of 40.6-, 35.0-, and 35.0- $L_{dnmr}$ , beneath the affected airspaces. However, sound levels from military flight operations would be similar to the ambient noise levels beneath the proposed airspaces resulting from wind and waves within the open marine environment. Consequently, as the noise resulting from the implementation of the Proposed Action would not enter into or exceed the 65 DNL

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<sup>4</sup> Refer to Section 3.2, *Noise*. Due to the onset penalty associated with the  $L_{dnmr}$  metric,  $L_{dnmr}$  equals or exceeds DNL values. Consequently, the  $L_{dnmr}$  metric used for quantifying noise levels in SUA can be conservatively compared to DNL thresholds.

threshold for average noise levels, noise-related impacts beneath the proposed W-570A, B, C, and D would be less than significant. Further, noise levels beneath the proposed and affected airspaces would not approach 55 DNL, which would be considered loud in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (USEPA 1974).

The proposed Eel MOAs would be established directly beneath the existing Eel ATCAA upon implementation of the Proposed Action. Total training hours within the proposed Eel MOAs would be approximately 300 hours distributed throughout the combined 3,200-square-mile airspace area. Additionally, approximately 50 percent of the flying hours within the Eel MOAs (i.e., approximately 185 flying hours) would be flown above 15,000 feet AGL (i.e., approximately 4,000 feet above the floor of the proposed Eel MOAs). Consequently, under the Proposed Action, operations within Eel MOAs A, B, C, and D would result in noise levels of 35.0- $L_{dnmr}$  beneath the newly expanded airspace areas. The average noise of military flight operations would be within the range of ambient noise levels characteristic of rural communities (i.e., between 30 to 50 DNL) (Federal Interagency Committee on Noise [FICON] 1992; USEPA 1974). Additionally, as the average noise level would not enter into or exceed the 65 DNL threshold for noise sensitive areas, the implementation of the Proposed Action would result in less than significant impacts beneath the proposed Eel MOAs. Further, noise levels beneath the proposed and affected airspaces would not approach 55 DNL, which would be considered loud in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (USEPA 1974).

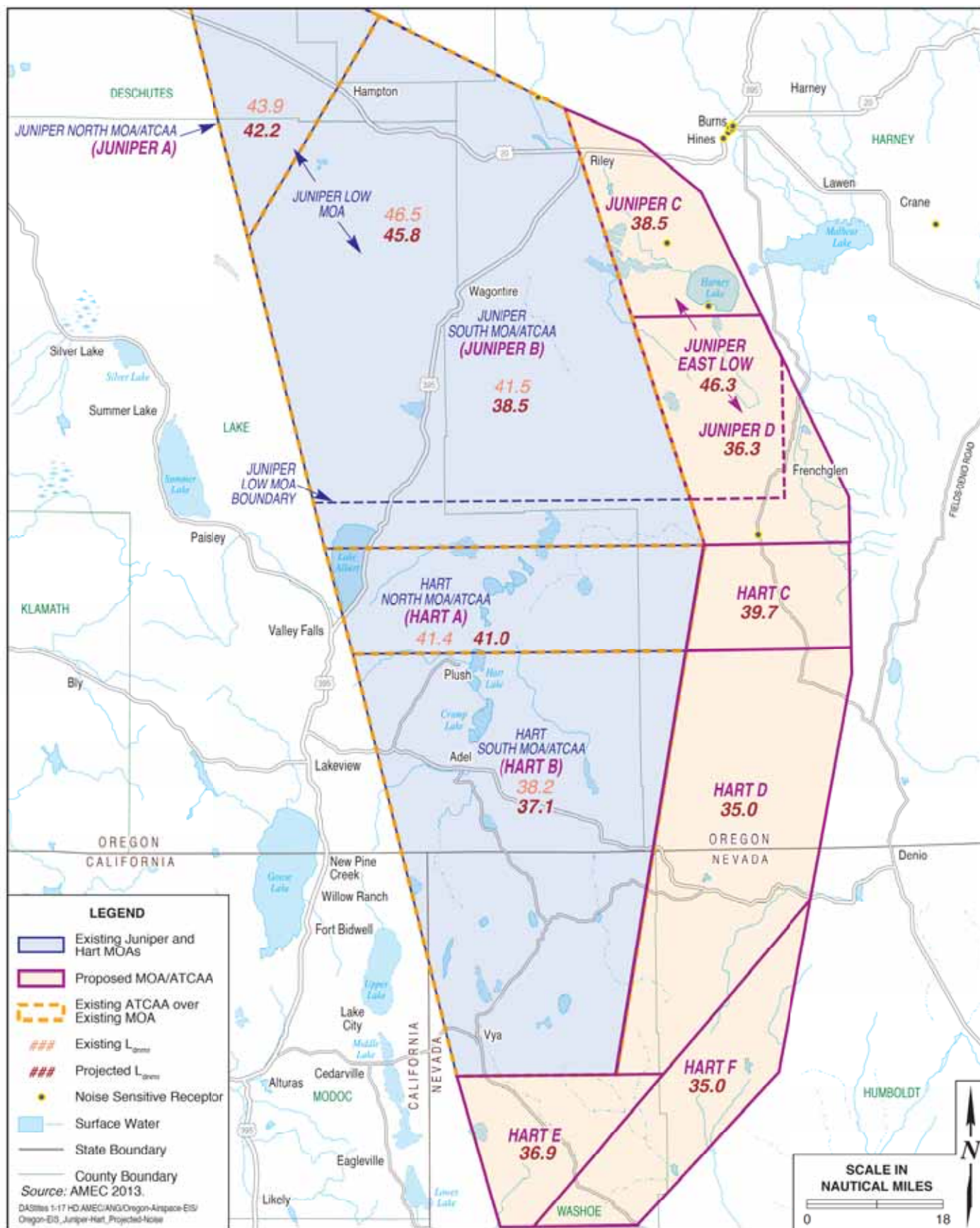
Under the Proposed Action, the eastern and southern boundaries of the existing Juniper/Hart MOA Complex would be extended. Additionally, expansion of the existing Juniper Low MOA would include the proposed Juniper East Low MOA, which would be located directly underneath the proposed Juniper C airspace and a majority of the proposed Juniper D airspace (refer to Section 3.1, *Airspace Management*). The proposed Juniper East Low MOA would be established from 500 feet AGL to but not including 11,000 feet MSL.

In addition, the Proposed Action would include raising the floor of the existing Juniper Low MOA from 300 feet AGL to 500 feet AGL, further decreasing potential environmental impacts and enhancing stewardship of airspace by using only what is required to meet realistic mission-oriented training (refer to Section 3.1, *Airspace Management*).

Implementation of the Proposed Action would reduce the noise levels within the existing Juniper North (i.e., the new Juniper A) and the existing Juniper South (i.e., new Juniper B) airspaces by approximately 1.7- and 3.0- $L_{dnmr}$ , respectively. Additionally, it would reduce the noise levels in the existing Hart North (i.e., new Hart A) and the existing Hart South (i.e., new Hart B) airspaces by 0.4- and 1.1- $L_{dnmr}$ , respectively. These reductions in noise levels would occur as a result of military aircraft operations being redistributed between the existing MOA complex and throughout the proposed Juniper/Hart MOA Complex expansion area (see Appendix E, *Noise*, and refer to Section 4.1, *Airspace Management*). Additionally, beneath the newly established airspaces under the Proposed Action (i.e., Juniper C and D as well as Hart C, D, E, and F), the noise levels would be within the range typically experienced by rural communities (FICON 1992) and would not enter into or exceed the 65 DNL threshold for noise sensitive areas. Further, noise levels beneath the proposed and affected airspaces would not approach 55 DNL, which would be considered loud in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (USEPA 1974). Consequently, implementation of the Proposed Action would not result in significant impacts beneath the proposed Juniper/Hart MOA Complex expansion area and would result in moderately beneficial impacts to the noise environment within the existing Juniper/Hart MOA Complex (i.e., Juniper North and South as well as Hart North and South).

Additionally, under the Proposed Action, the Juniper Low MOA would be expanded to the east, creating a Juniper East Low MOA. Establishment of the Juniper East Low MOA would result in a 0.7- $L_{dnmr}$  decrease in noise levels currently experienced within the existing Juniper Low MOA as current operations with the Juniper Low MOA would be spread throughout the existing Juniper Low





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**Projected Noise Levels Associated with Oregon ANG Operations in the Expanded Juniper/Hart MOA Complex**

**FIGURE 4.2-2**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

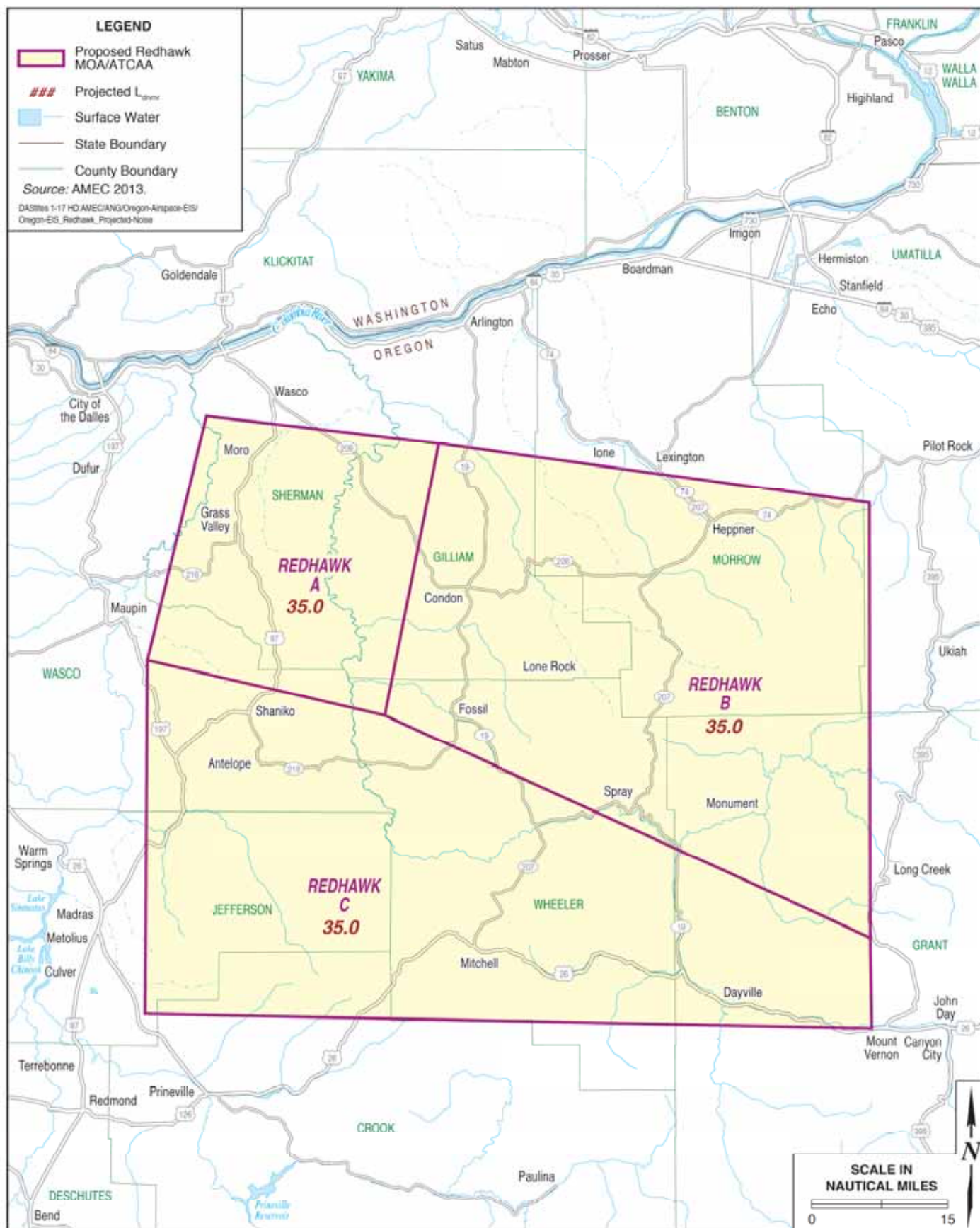
MOA and the proposed Juniper East Low MOA (see Appendix E, *Noise*, and refer to Section 4.1, *Airspace Management*). Operations within the newly expanded Juniper East Low MOA would result in noise levels of 46.3- $L_{dnmr}$ .

Noise levels beneath the Juniper Low MOA and the Juniper East Low MOA would not enter into or exceed the 65 DNL threshold for impact significance, implementation of the Proposed Action would have less than significant impacts.

Total training hours within the proposed Redhawk MOA Complex would be approximately 488 hours distributed throughout the combined 6,500-square-mile airspace area. Additionally, approximately 50 percent of the flying hours within the Redhawk MOAs (i.e., approximately 185 flying hours) would be flown above 11,500 feet AGL (see Appendix E, *Noise*, and refer to Section 4.1, *Airspace Management*). Consequently, similar to the Eel MOAs, the proposed Redhawk MOA Complex would result in noise levels of 35.0- $L_{dnmr}$  beneath Redhawk A, B, and C. These noise levels would be within the ambient noise levels characteristic of rural communities (FICON 1992), and would not exceed 65 DNL threshold for noise sensitive areas. Further, noise levels beneath the proposed and affected airspaces would not approach 55 DNL, which would be considered loud in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (USEPA 1974). Consequently, the implementation of the Proposed Action would result in less than significant impacts beneath the proposed Redhawk MOA Complex.

#### *Single-event Aircraft Noise Levels*

As described above and defined in Section 3.2, *Noise*  $L_{max}$  and SEL metrics are used to address single-event noise levels resulting from the Proposed Action. The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV, or radio listening, sleeping, or other common activities. However, individual time-varying noise events have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. Although the maximum sound level,



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**Projected Noise Levels Associated with Oregon ANG Operations  
in the Proposed Redhawk MOA Complex**

**FIGURE  
4.2-3**



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The SEL combines both of these characteristics into a single metric. SEL is a composite metric that represents both the intensity of a sound and its duration (see Appendix E, *Noise*, and refer to Section 3.2, *Noise*).

As a result of the Proposed Action, short-term exposure to noise generated by military flight operation would increase as military aircraft activity would be introduced within the proposed airspace areas, including W-570, Eel MOAs, Juniper/Hart MOA Complex expansion area, and Redhawk MOA Complex.

Table 4.2-1 presents the proposed average number of daily short-term SEL events above 65 dB that would be experienced beneath the proposed and affected airspace areas.

The average number of daily short-term events above 65 dB SEL would remain the same or decrease within the existing airspaces as military operations would be spread throughout the existing and proposed airspaces following implementation of the Proposed Action. Within Juniper South (i.e., new Juniper B) the average number of daily events above 65 dB SEL would decrease dramatically, by 0.6 events per day, throughout the airspace as training hours would be reduced by approximately 650 flight hours. Similarly, within Juniper North (i.e., new Juniper A) the average number of daily events above 65 dB SEL would decrease by 0.2 events per day (refer to Table 3.2-4 and 4.2-1).

The Proposed Action would introduce new military flight operations within the proposed W-570B, C, and D airspaces, each of which would have floors of 1,000 feet AGL. Consequently, the open marine environment below these airspaces would experience a slight increase in short-term noise exposure associated with military flight activity. The  $L_{max}$  of an F-15 at 1,000 feet AGL (i.e., the distance from the floor of the W-570B, C, and D airspaces to the water surface) would be 111 dB (see Appendix E, *Noise*). This would be representative of an extremely rare, worst-case noise impact to a receptor within the path of a flyover along the floor of the airspace. However, while the noise environment beneath W-570B, C, and D would be punctuated by occasional events above 65 dB SEL, these events would occur on average less than once per day (refer to Table 4.2-1). Additionally, no sensitive



receptors (i.e., schools or childcare facilities) are located beneath the proposed W-570 as it would be established over the Pacific Ocean. Additionally, due to the size of the airspace (i.e., approximately 13,000 square miles) direct flyovers over sailing vessels would be extremely unlikely.

New military flight operations would also be introduced within the proposed Eel MOAs, which would have an airspace floor at 11,000 feet MSL. The  $L_{max}$  of an F-15 at 9,000 feet AGL (i.e., the distance from the floor of the proposed Eel MOAs to the ground surface) would be between 87 dB and 90 dB (see Appendix E, *Noise*). However, due to the size of the airspace (i.e., approximately 3,200 square miles) and the distribution of aircraft throughout the Eel MOAs direct flyovers would be rare events. Additionally, approximately 74 percent of all training activity within the Eel MOA/ATCAA Complex (i.e., approximately 523 flying hours) would occur above 15,000 feet AGL. Consequently, while the noise environment beneath Eel A, B, C, and D would be punctuated by occasional events above 65 dB SEL, these events would occur on average less than once per day (refer to Table 4.2-1).

The proposed Juniper/Hart MOA Complex expansion area would also have a floor at 11,000 feet MSL, with the exception of the proposed Juniper East Low MOA (located below the proposed Juniper C and D airspaces), which would have a floor of 500 feet AGL (refer to Section 3.1, *Airspace Management*). Due to the proposed military flight operations in Juniper C and Juniper D as well as Hart C, D, E, and F these airspaces would be punctuated by occasional events above 65 dB SEL; however, these events would occur on average less than once per day within the airspace (refer to Table 4.2-1). The operations within the Juniper Low MOA and proposed Juniper East Low MOA would be approximately 249 hours under the Proposed Action (refer to Section 3.1 and Section 4.1, *Airspace Management*). These operations would be distributed throughout the proposed Low MOA airspaces (i.e., a combined 5,000 square miles), with only approximately 27 percent of flying hours within the Juniper Low MOAs occurring below 1,000 feet AGL (i.e., approximately 68 flying hours). Consequently, while individual receptors may experience rare events above 65 dB SEL, on average receptors beneath the Juniper Low MOA and Juniper East Low MOA would experience virtually no short-term events above 65 dB SEL per day (refer to Table 4.2-1).

Further, the 142 FW and 173 FW would continue to implement existing noise abatement procedures and aircraft operations within the Juniper East Low MOA and would avoid sensitive receptors identified in Table 3.2-7 in Section 3.2, *Noise*.

Similarly, new military flight operations would also be introduced within the proposed Redhawk MOA Complex, which would also have a floor at 11,000 feet MSL. The  $L_{max}$  of an F-15 at 7,500 feet AGL (i.e., the distance from the floor of the proposed Redhawk MOAs to the ground surface) would be just over 90 dB (see Appendix E, *Noise*). However, due to the size of the airspace (i.e., approximately 6,500 square miles) and the distribution of aircraft throughout the Redhawk MOA Complex direct flyovers would be extremely rare events. Additionally, approximately 50 percent of all training activity would occur above 11,500 feet AGL and 100 percent of training activity would occur above 7,500 feet AGL. Consequently, while individual receptors may experience rare events above 65 dB SEL, on average Redhawk A, B, and C would experience virtually no short-term events above 65 dB SEL per day (refer to Table 4.2-1).

#### Supersonic Aircraft Noise

Under the Proposed Action, 40 percent of 142 FW sorties and 60 percent of 173 FW sorties would involve at least one training component or flight maneuver that would require F-15 aircraft to operate at supersonic air speeds. Supersonic events would generally occur as the aircraft accelerate toward each other, during dives in the engagement itself, and during disengagement.

32 CFR Part 989 Appendix B lists the actions that are categorically excluded from NEPA. Within 32 CFR Part 989 Appendix B, Section A2.3.34 states that “[s]upersonic flying operations over land and above 30,000 feet MSL, or over water and above 10,000 feet MSL and more than 15 NM miles from land” are categorically excluded from NEPA in the absence of unique circumstances as listed in Section A2.2. The proposed supersonic training operations included in the Proposed Action would not be unique or of substantially greater scope or size than the operations described in 32 CFR Part 989 Appendix B, Section A2.3.34. Similar supersonic flight operations already occur within the existing Juniper/Hart MOA Complex as well as W-570 airspace. Under the Proposed Action, these existing operations would be more widely distributed throughout a larger airspace area, thus reducing the overall probability of a boom occurring in a given location beneath the airspace.

**Table 4.2-2. Estimated Supersonic Time Spent in Airspace (Hours per Year) under the Proposed Action**

| Airspace                              | Number of Sorties<br>Involving Supersonic<br>Activities | Total Time of Supersonic<br>Activity per Year<br>(hrs/year) |
|---------------------------------------|---------------------------------------------------------|-------------------------------------------------------------|
| W-570A<br>(10,000 feet MSL to FL 500) | 720                                                     | 45 hours                                                    |
| W-570B<br>(10,000 feet MSL to FL 500) | 240                                                     | 5 hours                                                     |
| W-570C<br>(10,000 feet MSL to FL 500) | 220                                                     | 3.5 hours                                                   |
| W-570D<br>(10,000 feet MSL to FL 500) | 280                                                     | 7.1 hours                                                   |
| Juniper ATCAAs<br>(FL 300 to FL 510)  | 2,300                                                   | 50 hours                                                    |
| Hart ATCAAs<br>(FL 300 to FL 510)     | 936                                                     | 16.5 hours                                                  |

Notes: No supersonic activities would occur within the Eel ATCAAs or High ATCAAs or within the Redhawk ATCAAs. Further, while supersonic activities occur in 40 percent of 142 FW training flights and 60 percent of 173 FW training flights, these maneuvers only last for brief periods of time (i.e., less than one minute).

A large number of technical studies have been conducted by the USAF, U.S. Navy, FAA, and National Aeronautics and Space Administration (NASA) (e.g., USAF 1966, 1968; U.S. Navy 1985; FAA 1968; NASA 1965, 1992) to examine potential noise-related impacts of sonic booms. Additionally, long-term sonic boom measurement projects have been conducted in four supersonic air combat training airspaces: White Sands, New Mexico (Plotkin et al. 1989); the eastern portion of the Goldwater Range, Arizona (Plotkin et al. 1992); the Elgin MOA at Nellis Air Force Base, Nevada (Frampton et al. 1993); and the western portion of the Goldwater Range (Page et al. 1994). These technical studies and long-term measurement projects, among others, have informed the USAF in establishing accepted over-water and over-land supersonic flight procedures for the purpose of reducing the probability and intensity of sonic booms at ground level. Consistent with USAF procedures, supersonic operations under the Proposed Action would only occur above 30,000 feet MSL within the Juniper/Hart ATCAAs or above 10,000 feet MSL and 15 nautical miles (NM) offshore, with the nose of the aircraft pointing away from the coastline, within the proposed W-570 Complex. The area beneath the proposed Juniper/Hart MOA Complex is characterized by rural, largely undeveloped lands and the proposed W-570 Complex is located over

water. Consequently, supersonic flight operations within these areas would not be expected to expose large numbers of people beneath the airspace to sonic booms. Under the Proposed Action, the 142 FW and 173 FW would not conduct any training activities that would require F-15 aircraft to reach supersonic airspeeds within the Eel ATCAAs or High ATCAAs or the Redhawk ATCAAs, which overlie more densely populated areas. Further, the 142 FW and 173 FW would not reach supersonic speeds at lower altitudes within any of the existing or proposed MOAs or along existing MTRs.

While humans and wildlife beneath the Juniper/Hart MOA Complex and W-570 Complex might occasionally experience annoyance and startle effects associated with sonic booms, numerous variables determine if a sonic boom would even be audible at both the ground and sea level (e.g., altitude, airspeed, maneuver, etc.). As described in Section 3.2.2.3, *Supersonic Aircraft Noise*, the change in the speed of sound with altitude typically results in pressure waves, which create sonic booms, to be turned upward as they move toward the ground. Depending on the altitude of the aircraft and the Mach number (i.e., speed), many pressure waves can be bent upward such that they never reach the ground. When sonic booms do reach the ground surface, an F-15 aircraft flying at Mach 1.2 to Mach 1.3 at 30,000 feet MSL would generate an average overpressure of approximately 1.34 pound per square foot (psf) (NASA 1992), which is below the pressures that generally illicit human reaction (see Section 3.2.2.3, *Supersonic Aircraft Noise*; NASA 2015). Further, at 30,000 feet an aircraft generates a relatively narrow boom carpet with a width of approximately 30 miles. Therefore, given the relatively short duration of the supersonic operations as well as the relatively small area of impact, the overall potential for human exposure to supersonic booms beneath the proposed airspaces would be relatively low. Further, when exposed to sonic booms, it is not likely that the overpressures, which would be less than 1.5 psf would generate substantial public response. Flight activities associated with Proposed Action would be consistent with accepted USAF procedures for supersonic flight within military airspace and would result in less than significant noise impacts.

#### Sensitive Receptors

The floor of the proposed Eel MOA/ATCAA Complex, proposed Redhawk MOA Complex, and the majority of the proposed Juniper/Hart MOA Complex



expansion area would be located above 11,000 feet MSL. As demonstrated above, sensitive receptors beneath these areas would not experience any noticeable change in daily noise exposure. However, the floor of the Juniper Low MOAs would be established at 500 feet AGL. Two sensitive receptors were identified below the proposed Juniper East Low MOA (refer to Table 3.2-7). As described in Section 3.2, *Noise* and demonstrated above, due to the randomness and distribution of flight operations throughout the proposed Juniper Low MOAs, the average military aircraft-related noise would be lower than ambient levels for rural areas (refer to Table 4.2-1). However, a low-altitude flyover event in the immediate vicinity of a sensitive receptor, the timing and location of which would be unpredictable, could result in loud and sudden noise that would be experienced by the receptors located within the footprint beneath the existing and proposed Juniper Low MOA elements. A direct overhead flight at the floor of the proposed Juniper Low MOAs would result in the exposure of sensitive receptors to noise levels of approximately 116 dB (refer to Table 3.2-2; see Appendix E, *Noise*). However, due to the randomness of flight activity within the proposed Juniper Low MOAs it is unlikely that these events would occur frequently. On average, sensitive receptors beneath the Juniper Low MOAs would experience virtually no short-term events above 65 dB SEL per day (refer to Table 4.2-1).

Avoidance of noise-sensitive areas is emphasized to all flying units utilizing SUAs and is noted in Special Operating Procedures (SOPs) established for each SUA within the U.S. standard noise abatement procedures that would be implemented to reduce noise impacts are discussed in Section 3.2, *Noise* and Section 6.0, *Special Procedures*.

### Indirect Impacts

Indirect impacts of aircraft noise are discussed in Section 4.4, *Biological Resources*; Section 4.5, *Cultural Resources*; and Section 4.9, *Socioeconomics, Environmental Justice, and Children's Health and Safety*. Additional indirect or induced impacts resulting from noise would not be anticipated under the Proposed Action.

#### 4.2.2.2 Alternative B: No Modifications to Eel ATCAA

This alternative would include the same airspace changes as described under the Proposed Action; however, the Eel MOA/ ATCAA Complex and Eel High ATCAA would not be established (refer to Section 2.0, *Description of Proposed Action and Alternatives*). Consequently, the existing Eel ATCAA would not be modified and there would be no military flight activity within this airspace at altitudes lower than the existing floor of FL 270 (27,000 feet MSL). While the 173 FW operations described for the Proposed Action would remain the same, the 142 FW operations that would have been assigned to the Eel MOAs under the Proposed Action would be assigned to the Redhawk MOA Complex. Therefore, while existing noise from military operations in the existing Eel ATCAA would remain additional noise from Oregon ANG's 142 FW and 173 FW aircraft operations within the Eel MOAs under the Proposed Action would not occur. However, noise levels would slightly increase in the area beneath the Redhawk MOA Complex as additional operations would occur within this airspace relative to those included in the Proposed Action.

#### Long-term Operational Impacts

This subsection describes the operational effects of the Alternative B on sound levels in areas underlying the affected airspaces using the  $L_{dnmr}$  noise metric. As described in Section 3.2, *Noise*, the  $L_{dnmr}$  metric is the most useful single metric for characterizing the long-term noise environment within an SUA. Additionally, the number of events above 65 dB SEL and the  $L_{max}$  metric were used to supplement this analysis, providing public disclosure and enhancing public understanding of single-event aircraft noise levels. However, as previously described, based on the subjectivity and duration of event associated with a single aircraft flyover, no impact thresholds have been established at the state and/or federal level. The ANG has elected to use these single event metrics in addition to the standard  $L_{dnmr}$  metric as a supplement to further describe aircraft noise events as a result of the Proposed Action.

*Monthly Day-Night Average Airspace Noise Levels*

Table 4.2-3 presents a comparison of the baseline noise environment, the proposed noise environment under the Proposed Action, and the noise environment under Alternative B. Similar to the Proposed Action, military flight activity under Alternative B would not result in any underlying areas becoming exposed to a noise level of 65 DNL or greater. Further, noise levels beneath the proposed and affected airspaces would not approach 55 DNL, which would be considered loud in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (USEPA 1974). Similar to the Proposed Action there would be an overall decrease in  $L_{dnmr}$  levels experienced by areas beneath the existing MOAs that would be affected by the Proposed Action, including the existing Juniper Low MOA.

Under Alternative B, the existing Eel ATCAA would not be modified and the 142 FW flight operations assigned to the Eel MOAs would be reassigned to the Redhawk MOA Complex. Consequently, the noise levels that would have been generated beneath the Eel MOAs would not occur under this alternative. Under Alternative B, the existing Eel ATCAA would not be modified and the 142 FW flight operations assigned to the Eel MOAs would be reassigned to the Redhawk MOA Complex. Consequently, the noise levels that would have been generated beneath the Eel MOAs would not occur under this alternative.

While additional flight activity would occur within the Redhawk MOA Complex, as a result of the altitude of operations (i.e., above 11,000 feet MSL) and the limited number of military flight operations within the airspace, the  $L_{dnmr}$  beneath the Redhawk MOA would not increase measurably relative to the noise levels described for the Proposed Action (refer to Table 4.2-3). Additionally, the noise levels in the remaining airspace would remain identical to those described for the Proposed Action. Therefore, similar to the Proposed Action, the implementation of Alternative B would not result in any underlying areas becoming exposed to a noise level of 65 DNL or greater. Further, noise levels beneath the proposed and affected airspaces would not approach 55 DNL, which would be considered loud in residential areas and farms and other outdoor areas where people spend widely

**Table 4.2-3. Sound Levels Associated with Military Aircraft Operations in the Proposed and Affected Airspaces under the Alternative B**

| Airspace                  | Existing<br>Airspace<br>L <sub>dnmr</sub> | Proposed<br>Airspace<br>L <sub>dnmr</sub> | Alt B<br>Airspace<br>L <sub>dnmr</sub> | Significant<br>? | Alt B Number of<br>Daily Events<br>Above<br>65 dB SEL |
|---------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------|------------------|-------------------------------------------------------|
| W-570                     |                                           |                                           |                                        |                  |                                                       |
| W-570A                    | 40.1                                      | 40.1                                      | 40.1                                   | No               | 0.1                                                   |
| W-570B                    | -                                         | 40.6                                      | 40.6                                   | No               | 0.1                                                   |
| W-570C                    | -                                         | 35.0                                      | 35.0                                   | No               | 0.7                                                   |
| W-570D                    | -                                         | 35.0                                      | 35.0                                   | No               | 0.0                                                   |
| Juniper/Hart MOA Complex  |                                           |                                           |                                        |                  |                                                       |
| Juniper A (Juniper North) | 43.9                                      | 42.2                                      | 42.2                                   | No               | 0.1                                                   |
| Juniper B (Juniper South) | 41.5                                      | 38.5                                      | 38.5                                   | No               | 0.2                                                   |
| Juniper C                 | -                                         | 38.5                                      | 38.5                                   | No               | 0.2                                                   |
| Juniper D                 | -                                         | 36.3                                      | 36.3                                   | No               | 0.1                                                   |
| Juniper Low               | 46.5                                      | 45.8                                      | 45.8                                   | No               | 0.0                                                   |
| Juniper Low East          | -                                         | 46.3                                      | 46.3                                   | No               | 0.0                                                   |
| Hart A (Hart North)       | 41.4                                      | 41.0                                      | 41.0                                   | No               | 0.3                                                   |
| Hart B (Hart South)       | 38.2                                      | 37.1                                      | 37.1                                   | No               | 0.2                                                   |
| Hart C                    | -                                         | 39.7                                      | 39.7                                   | No               | 0.3                                                   |
| Hart D                    | -                                         | 35.0                                      | 35.0                                   | No               | 0.1                                                   |
| Hart E                    | -                                         | 36.9                                      | 36.9                                   | No               | 0.2                                                   |
| Hart F                    | -                                         | 35.0                                      | -                                      | No               | 0.1                                                   |
| Redhawk MOA Complex       |                                           |                                           |                                        |                  |                                                       |
| Redhawk A                 | -                                         | 35.0                                      | 35.0                                   | No               | 0.0                                                   |
| Redhawk B                 | -                                         | 35.0                                      | 35.0                                   | No               | 0.0                                                   |
| Redhawk C                 | -                                         | 35.0                                      | 35.0                                   | No               | 0.0                                                   |

Note: Existing L<sub>dnmr</sub> levels were only modeled for existing airspaces. It is assumed that the areas beneath the proposed airspace experience ambient noise characteristic of rural environments, between 30 and 50 DNL (FICON 1992; USEPA 1974).

Source: AMEC 2013; Please see Appendix E, *Noise* for full noise modeling criteria and results.

varying amounts of time and other places in which quiet is a basis for use (USEPA 1974). The implementation of Alternative B would have less than significant impacts beneath each of the affected and proposed airspaces.

### *Single -event Aircraft Noise Levels*

Similar to the Proposed Action, under Alternative B new military flight operations, including those that would have been assigned to the Eel MOAs under the Proposed Action, would occur within the Redhawk MOA Complex. However, due to the limited number of training hours as well as the size of the airspace and distribution of flight activity above the floor of the Redhawk MOA (i.e., 11,000 feet MSL) the daily number of events above 65 dB SEL would not increase measurably from those described for the Proposed Action.

### Supersonic Aircraft Noise

Under this Alternative, similar to the Proposed Action, supersonic training operations would occur within the W-570 Complex. As described for the Proposed Action, the 142 FW would continue to implement USAF supersonic flight procedures to limit the probability of a sonic boom being audible at the ground and sea levels. While humans and wildlife might experience annoyance and startle effect associated with supersonic flight activity, impacts from Alternative B regarding sonic booms would be less than significant.

#### 4.2.2.3 Alternative C: No Redhawk MOA Complex

This alternative would include the same airspace changes as described under the Proposed Action; however, the Redhawk MOA Complex would not be established (refer to Section 2.0, *Description of Proposed Action and Alternatives*). The 173 FW operations described for the Proposed Action would remain the same under this alternative; however, approximately 30 percent of proposed 142 FW utilization of the Redhawk MOA Complex would be redistributed to the Eel MOAs while approximately 70 percent would be relocated to the Juniper/Hart MOA Complex, including the Juniper/Hart MOA Complex expansion area. Consequently, noise impacts under the Proposed Action would not occur in the area beneath the Redhawk MOA Complex and would be slightly increased in the area beneath the Juniper/Hart MOA Complex. However, due to the increased transit time for the 142 FW to the Juniper/Hart MOA Complex, approximately 20 minutes of every training hour transferred from the proposed Redhawk MOA Complex to the Juniper/Hart MOA Complex would be lost due to transit. Therefore, increases in

noise beneath the Juniper/Hart MOA Complex would be limited; however, training capabilities would be reduced relative to the Proposed Action.

### Long-term Operational Impacts

This subsection describes the operational effects of the Alternative C on average sound levels in areas underlying the affected airspaces using the  $L_{dnmr}$  noise metric. As described in Section 3.2, *Noise*, the  $L_{dnmr}$  metric is the most useful single metric for characterizing the long-term noise environment within an SUA. Additionally, the number of events above 65 dB SEL and the  $L_{max}$  metric were used to supplement this analysis, providing public disclosure and enhancing public understanding of single-event aircraft noise levels. However, as previously described, based on the subjectivity and duration of event associated with a single aircraft flyover, no impact thresholds have been established at the state and/or federal level. The ANG has elected to use these single event metrics in addition to the standard  $L_{dnmr}$  metric as a supplement to further describe aircraft noise events as a result of the Proposed Action.

#### *Monthly Day-Night Average Airspace Noise Levels*

Table 4.2-4 presents a comparison of the baseline noise environment, the proposed noise environment under the Proposed Action, and the noise environment under Alternative C.

Under the Alternative C, the Redhawk MOA Complex would not be established and the 142 FW flight operations assigned to the Redhawk MOA Complex would be reassigned to the Eel MOAs and the Juniper/Hart MOA Complex. Consequently, noise levels that would have been generated beneath the Redhawk MOA Complex would not occur under this alternative. However, while additional flight activity would occur within the Eel MOAs, as a result of the altitude of operations (i.e., above 11,000 feet MSL) and the limited number of military flight operations within the airspace, the  $L_{dnmr}$  experienced beneath these airspaces would not increase measurably over that described for the Proposed Action (refer to Table 4.2-4). Additionally, the noise levels in the Juniper/Hart MOA Complex would increase slightly relative to the Proposed Action, but would remain below the baseline noise levels for the existing Juniper/Hart MOAs.

**Table 4.2-4. Sound Levels Associated with Military Aircraft Operations in the Proposed and Affected Airspaces under the Alternative C**

| Airspace                        | Existing<br>Airspace<br>L <sub>dnmr</sub> | Proposed<br>Airspace<br>L <sub>dnmr</sub> | Alt C<br>Airspace<br>L <sub>dnmr</sub> | Significant? | Alt C Number of<br>Daily Events<br>Above<br>65 dB SEL |
|---------------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------|--------------|-------------------------------------------------------|
| <b>W-570 &amp; Eel MOAs</b>     |                                           |                                           |                                        |              |                                                       |
| Eel A MOA                       | -                                         | 35.0                                      | 35.0                                   | No           | 0.0                                                   |
| Eel B MOA                       | -                                         | 35.0                                      | 35.0                                   | No           | 0.0                                                   |
| Eel C MOA                       | -                                         | 35.0                                      | 35.0                                   | No           | 0.2                                                   |
| Eel D MOA                       | -                                         | 35.0                                      | 35.0                                   | No           | 0.5                                                   |
| W-570A                          | 40.1                                      | 40.1                                      | 40.1                                   | No           | 0.1                                                   |
| W-570B                          | -                                         | 40.6                                      | 40.6                                   | No           | 0.1                                                   |
| W-570C                          | -                                         | 35.0                                      | 35.0                                   | No           | 0.7                                                   |
| W-570D                          | -                                         | 35.0                                      | 35.0                                   | No           | 0.0                                                   |
| <b>Juniper/Hart MOA Complex</b> |                                           |                                           |                                        |              |                                                       |
| Juniper A (Juniper North)       | 43.9                                      | 42.2                                      | 43.6                                   | No           | 0.1                                                   |
| Juniper B (Juniper South)       | 41.5                                      | 38.5                                      | 39.0                                   | No           | 0.2                                                   |
| Juniper C                       | -                                         | 38.5                                      | 39.1                                   | No           | 0.2                                                   |
| Juniper D                       | -                                         | 36.3                                      | 36.7                                   | No           | 0.1                                                   |
| Juniper Low                     | 46.5                                      | 45.8                                      | 45.8                                   | No           | 0.0                                                   |
| Juniper Low East                | -                                         | 46.3                                      | 46.3                                   | No           | 0.0                                                   |
| Hart A (Hart North)             | 41.4                                      | 41.0                                      | 41.3                                   | No           | 0.3                                                   |
| Hart B (Hart South)             | 38.2                                      | 37.1                                      | 37.2                                   | No           | 0.2                                                   |
| Hart C                          | -                                         | 39.7                                      | 39.8                                   | No           | 0.3                                                   |
| Hart D                          | -                                         | 35.0                                      | 35.0                                   | No           | 0.1                                                   |
| Hart E                          | -                                         | 36.9                                      | 36.9                                   | No           | 0.2                                                   |
| Hart F                          | -                                         | 35.0                                      | 35.0                                   | No           | 0.1                                                   |

Note: Under Alternative C, 30 percent of the proposed operations that would occur within the Redhawk MOA Complex under the Proposed Action would be transferred to the Eel MOAs under Alternative C. Further, 70 percent of the proposed Redhawk operations would be transferred to the Juniper/Hart MOA Complex. However, approximately 20 minutes from every hour transferred from Redhawk to Juniper/Hart would be lost due to additional transit time from the 142 FW installation to the Juniper/Hart MOA Complex. Flight activity would be distributed within the Juniper/Hart MOA Complex according to the proposed ratio of flight activity under the Proposed Action. However, approximately 10 flight hours would be moved from Hart A to Juniper B due to overcrowding in Hart A, which is a smaller airspace relative to Juniper B.

Source: AMEC 2013; Please see Appendix E, *Noise* for full noise modeling criteria and results.

Similar to the Proposed Action, military flight activity anticipated under Alternative C would not result in any underlying areas becoming exposed to a noise level of 65 DNL or greater. Further, noise levels beneath the proposed and affected airspaces would not approach 55 DNL, which would be considered loud

in residential areas, farms, and other outdoor areas where people spend widely varying amounts of time and in other places in which quiet is a basis for use (USEPA 1974). Similar to the Proposed Action, there would be an overall decrease in  $L_{dnmr}$  levels experienced by areas beneath the existing MOAs that would be affected by the Proposed Action, including the existing Juniper Low MOA.

#### *Single-event Aircraft Noise Levels*

Similar to the Proposed Action, under Alternative C new military flight operations, including those that would have been assigned to the Redhawk MOA Complex under the Proposed Action, would occur within the Eel MOAs and the Juniper/Hart MOA Complex. The number of daily events within the Juniper/Hart MOA Complex above 65 dB SEL would remain the same as those described for the Proposed Action and the number of events above 65 dB SEL would occur on average no more than once per day throughout the airspaces. Due to the distribution of flight activity within the Eel MOAs under Alternative C, the number of daily events above 65 dB SEL within these airspaces would remain the same or slightly decrease relative to the Proposed Action (refer to Table 4.2-1 and 4.2-4).

#### Supersonic Aircraft Noise

Given that no supersonic training activities are proposed for Redhawk ATCAA under the Proposed Action, implementation of Alternative C would be identical to impacts to those described for the Proposed Action. The 142 FW and 173 FW would continue to implement USAF supersonic flight procedures within both existing and proposed ATCAAs and Warning Areas. While not all sonic booms are audible at ground and sea levels (based on multiple variables), humans and wildlife might experience annoyance and startle effect; however, impacts from the supersonic flight activities would be less than significant.

##### 4.2.2.4 Alternative D: No Expansion of Juniper/Hart MOA Complex

This alternative would include the same airspace changes as described under the Proposed Action; however, the Juniper/Hart MOA Complex expansion area would not be established, including the expansion of the Juniper East Low MOA



(refer to Section 2.0, *Description of Proposed Action and Alternatives*). Under Alternative D, the 173 FW operations within the existing Juniper/Hart Complex would remain the same as described for the baseline conditions. The 142 FW would continue to operate within the existing Juniper/Hart MOA Complex; however, operations within this airspace would be reduced relative to existing conditions due to the establishment of the Redhawk MOA Complex. Consequently, noise impacts would not occur in the area beneath the proposed Juniper/Hart MOA Complex expansion area and would be slightly increased in the area beneath the Redhawk MOA Complex.

### Long-term Operational Impacts

This subsection describes the operational effects of the Alternative D on average sound levels in areas underlying the affected airspaces using the  $L_{dnmr}$  noise metric. As described in Section 3.2, *Noise*, the  $L_{dnmr}$  metric is the most useful single metric for characterizing the long-term noise environment within an SUA. Additionally, the number of events above 65 dB SEL and the  $L_{max}$  metric were used to supplement this analysis, providing public disclosure and enhancing public understanding of single-event aircraft noise levels. However, as previously described, based on the subjectivity and duration of event associated with a single aircraft flyover, no impact thresholds have been established at the state and/or federal level. The ANG has elected to use these single event metrics in addition to the standard  $L_{dnmr}$  metric as a supplement to further describe aircraft noise events as a result of the Proposed Action.

### *Monthly Day-Night Average Airspace Noise Levels*

Table 4.2-5 presents a comparison of the baseline noise environment, the proposed noise environment under the Proposed Action, and the noise environment under Alternative D.

**Table 4.2-5. Sound Levels Associated with Military Aircraft Operations in the Proposed and Affected Airspaces under the Alternative D**

| Airspace                  | Existing<br>Airspace<br>L <sub>dnmr</sub> | Proposed<br>Airspace<br>L <sub>dnmr</sub> | Alt D<br>Airspace<br>L <sub>dnmr</sub> | Significant? | Alt D Number of<br>Daily Events<br>Above<br>65 dB SEL |
|---------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------|--------------|-------------------------------------------------------|
| W-570 & Eel MOAs          |                                           |                                           |                                        |              |                                                       |
| Eel A MOA                 | -                                         | 35.0                                      | 35.0                                   | No           | 0.4                                                   |
| Eel B MOA                 | -                                         | 35.0                                      | 35.0                                   | No           | 0.4                                                   |
| Eel C MOA                 | -                                         | 35.0                                      | 35.0                                   | No           | 0.4                                                   |
| Eel D MOA                 | -                                         | 35.0                                      | 35.0                                   | No           | 0.5                                                   |
| W-570A                    | 40.1                                      | 40.1                                      | 40.1                                   | No           | 0.1                                                   |
| W-570B                    | -                                         | 40.6                                      | 40.6                                   | No           | 0.1                                                   |
| W-570C                    | -                                         | 35.0                                      | 35.0                                   | No           | 0.7                                                   |
| W-570D                    | -                                         | 35.0                                      | 35.0                                   | No           | 0.0                                                   |
| Juniper/Hart MOA Complex  |                                           |                                           |                                        |              |                                                       |
| Juniper A (Juniper North) | 43.9                                      | 42.2                                      | 42.8                                   | No           | 0.1                                                   |
| Juniper B (Juniper South) | 41.5                                      | 38.5                                      | 39.6                                   | No           | 0.2                                                   |
| Juniper Low               | 46.5                                      | 45.8                                      | 46.5                                   | No           | 0.0                                                   |
| Hart A (Hart North)       | 41.4                                      | 41.0                                      | 40.9                                   | No           | 0.3                                                   |
| Hart B (Hart South)       | 38.2                                      | 37.1                                      | 38.1                                   | No           | 0.2                                                   |
| Redhawk MOA Complex       |                                           |                                           |                                        |              |                                                       |
| Redhawk A                 | -                                         | 35.0                                      | 35.0                                   | No           | 0.0                                                   |
| Redhawk B                 | -                                         | 35.0                                      | 35.0                                   | No           | 0.0                                                   |
| Redhawk C                 | -                                         | 35.0                                      | 35.0                                   | No           | 0.0                                                   |

Source: AMEC 2013; Please see Appendix E, *Noise* for full noise modeling criteria and results.

Under the Alternative D, the Juniper/Hart MOA Complex expansion area (i.e., Juniper C, D, East Low as well as Hart C, D, E, and F) would not be established and the 142 FW flight operations assigned to the Juniper/Hart MOA Complex expansion area under the Proposed Action would occur within the existing Juniper/Hart MOA Complex or reassigned to the Redhawk MOA Complex. Consequently, noise levels that would have been generated beneath the Juniper/Hart MOA Complex expansion area would not occur under this alternative.

However, while additional flight activity would occur within the Redhawk MOA Complex, as a result of the altitude of flight (i.e., above 11,000 feet MSL) and the limited number of military flight operations within the airspace, the L<sub>dnmr</sub> beneath these airspaces would not increase measurably relative to the noise levels

described for the Proposed Action (refer to Table 4.2-4). Additionally, the noise levels within the existing Juniper/Hart MOA Complex would be increased slightly above those described for the Proposed Action, but would be reduced as compared to the existing conditions due to the establishment and use of the Redhawk MOA Complex (refer to Table 4.2-5). Further, the noise levels in the remaining airspace (i.e., W-570 Complex and Eel MOAs) would remain identical to those described for the Proposed Action.

Similar to the Proposed Action, the military flight activity under Alternative D would not result in any underlying areas becoming exposed to a noise level of 65 DNL or greater. Further, noise levels beneath the proposed and affected airspaces would not approach 55 DNL, which would be considered loud in residential areas, farms, and other outdoor areas where people spend widely varying amounts of time and where quiet is a basis for use (USEPA 1974). Similar to the Proposed Action there would be an overall decrease in  $L_{dnmr}$  levels experienced by areas beneath the existing MOAs that would be affected by the Proposed Action, including the existing Juniper Low MOA.

#### *Single-event Aircraft Noise Levels*

Under Alternative D military flight operations that would have been assigned to the Juniper/Hart MOA Complex expansion area under the Proposed Action would occur within the Redhawk MOA Complex and the existing Juniper/Hart MOA Complex. Consequently, the number of events above 65 dB SEL within the proposed Juniper/Hart MOA Complex expansion area described for the Proposed Action would not occur. However, as the 142 FW would continue to utilize the Redhawk MOA, as described for the Proposed Action, under Alternative D the number of daily events above 65 dB SEL within the existing Juniper/Hart MOA Complex would remain identical to those described for the Proposed Action (refer to Table 4.2-1). Further, the number of events above 65 dB SEL within the Redhawk MOA Complex would not increase measurably under Alternative D due to the distribution of additional flight activity throughout the airspace and altitude of operations above the floor of the proposed airspace (i.e., 11,000 feet MSL).

### Supersonic Aircraft Noise

As described for the Proposed Action, under Alternative D, 40 percent of 142 FW sorties and 60 percent of 173 FW sorties would involve a training component that would require F-15 aircraft to operate at supersonic airspeeds. However, under this alternative the Juniper/Hart MOA Complex would not be expanded, and consequently, there would be no expansion of the associated ATCAAs. Under this alternative the 142 FW and 173 FW would continue to supersonic air speeds within the existing Juniper and Hart ATCAAs and the proposed W-570 Complex. Aircraft only operated at supersonic speeds within these airspaces when above 30,000 feet MSL over land within the ATCAAs or above 10,000 feet MSL over sea and 15 NM offshore with the nose of the aircraft pointed away from the coastline when operating within the Warning Areas.

As described for the Proposed Action, new overwater areas under proposed Warning Areas would be exposed to F-15 aircraft training activities that reach supersonic airspeeds for short durations. However, numerous variables come into play when determining if a sonic boom would be audible at both the ground and sea level (e.g., altitude, airspeed, maneuver, etc.) and the USAF has developed supersonic flight procedures to reduce the probability of a sonic boom being audible at sea level. While not all sonic booms are audible at ground and sea levels (based on multiple variables), humans and wildlife might experience annoyance and startle effect; however, impacts from the supersonic flight activities would be less than significant.

#### 4.2.2.5 No-Action Alternative

If the No-Action Alternative were selected, no changes in flight activity would occur within the existing airspaces. Therefore, no impacts with regard to noise would occur. Under the No-Action Alternative, conditions would remain as described in Section 3.2, *Noise*.

### **4.3 LAND USE AND VISUAL RESOURCES**

#### **4.3.1 Approach to Analysis**

##### **4.3.1.1 Land Use**

The determination of land use impacts is based on the degree of land use sensitivity in the area. In general, a land use impact would be potentially significant if it would: 1) be inconsistent or non-compliant with applicable land use plans or policies; 2) preclude an existing land use of concern from continuing to exist; 3) preclude continued use of an area; 4) be incompatible with adjacent or vicinity land use to the extent that public health or safety is endangered (e.g., related to increased noise levels); 5) use impact land from a publicly owned park, recreation area, wildlife or waterfowl refuge, or historic site; or 6) visually, audibly, or atmospherically affect a publicly owned park, recreation area, wildlife or waterfowl refuge, or historic site. Additionally, consistent with FAA Order 1050.1E, Change 1, a land use impact would occur if a land use was placed into a noise level greater than what it is considered compatible with. FAA Order 1050.1E, Change 1 includes a table that presents compatible noise levels associated with a range of land use activities. For FAA purposes, a significant impact would occur if noise levels increased by 1.5 dB or more at or above 65 DNL. However, the FAA recognizes that there are settings where the 65 DNL standard may not apply (e.g., in land uses where natural quiet is an expected attribute). The analysis of potential impacts to land use includes: 1) identification and description of land use areas that may be affected by implementation of a Proposed Action; 2) examination of the Proposed Action and its potential effects on land use; and 3) assessment of the significance of potential impacts to land use based on the criteria described above.

Per FAA Order 1050.1E, Change 1, Section 6.0, the EIS does not provide a Section 4(f) analysis in accordance with the Department of Transportation Act. Paragraph 6.1c of the FAA Order describes that designation of airspace for military flight operations is exempt from Section 4(f). The Department of Defense (DoD) reauthorization in 1997 provided that “[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303(c) of Title 49, U.S. Code (USC) (PL 105-85).”

#### 4.3.1.2 Visual Resources

Determination of the significance of impacts to visual resources is based on the level of visual sensitivity in the area. Visual sensitivity is defined as the degree of public interest in a visual resource and concern over adverse changes in the quality of that resource. In general, consistent with FAA Order 1050.1E, Change 1, an impact to a visual resource would be considered significant if the implementation of the Proposed Action would result in a substantial alteration to an existing sensitive visual setting.

The Visual Resources Management (VRM) program developed by the BLM and Visual Management System (VMS) developed by the U.S. Forest Service (USFS) are used to identify and manage scenic landscapes managed by the BLM and USFS (see Appendix G, *Land Use and Land Management* for special land use types managed by each agency). These methodologies are limited to terrestrial landscapes, and are not applicable to airspace or aerial visual resources. The visual resource classes (VRM) and objectives (VMS) used to assign value to and manage landscapes ultimately determine acceptable levels of landscape modification based on visual values of the existing terrestrial landscape. The Proposed Action extends above a number of landscapes subject to BLM or USFS visual management; however, because implementation of the Proposed Action would not involve any new construction or modification to existing landscapes, structures, or scenic viewsheds, these methodologies are not applicable to airspace establishment or modification. Consequently, potential impacts resulting from the Proposed Action would be limited to short-term discrete effects resulting for aircraft overflights, including associated contrails, and deployment of chaff and flare during air-to-air training exercises.

#### 4.3.2 Impacts

##### 4.3.2.1 Proposed Action

The affected and proposed airspace included in the Proposed Action extends above a number of areas that are considered sensitive including: 1) private lands; 2) federal and state managed lands; and 3) tribal lands (refer to Section 3.3, *Land Use and Visual Resources*. Land use is affected by changes in the natural or built environment that alter, detract, or eliminate use or enjoyment of a place. Since the

Proposed Action would not involve any ground disturbance, the primary effects of project implementation on land use would be associated with noise and visual resources (refer to Section 4.2, *Noise* for additional detailed analysis). Potential impacts that could affect the use or enjoyment of sensitive land uses or visual resources would be limited to those possibly resulting from: 1) the release of chaff and flare during air-to-air training exercises; and 2) new or increased aircraft overflights (including associated contrails).

During the public scoping process, several federal agencies as well as members of the public indicated that noise was a concern beneath the affected and proposed airspace areas, and that the underlying areas would be sensitive to increases in noise levels resulting from Oregon ANG flight training operations conducted in expanded and newly established SUA following implementation of the Proposed Action. The FAA considers 65 DNL as the threshold of significance for assessing noise impacts (refer to Section 4.2, *Noise*). Under the Proposed Action, none of the areas beneath the affected or proposed airspaces would experience noise levels greater than or equal to the 65 DNL threshold. Further, noise levels would remain under 55 DNL which would be considered loud in residential areas, farms, and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (USEPA 1974; refer to Section 4.2, *Noise*). Potential impacts to the noise environment beneath the affected and proposed airspaces are described in greater detail in Section 4.2, *Noise*.

Visual resources are affected by changes in the natural or built environment that may detract from a viewshed or alter personal perceptions of a viewshed. Concerns are typically the greatest in areas where the views are rare, unique, or otherwise special to the region or locale, especially in those areas which are remote or pristine and where present-day human influence is not readily apparent. In highly sensitive areas, the public can be expected to react adversely if visual qualities are impaired.

### Chaff and Flare

#### *Effects of Chaff and Flare on Land Use*

The USAF conducted studies to examine the effects of chaff and flare use on visual resources, which included: review of applicable laws associated with sensitive

land use areas and visual resources; a literature and database review; and a field study to determine the visibility of chaff debris in various settings (USAF 1997). At the time of the study, a review of applicable laws suggested that chaff use is potentially inconsistent with some policies contained within state and federal environmental management programs. Studies indicated that the use of chaff use over, or immediately adjacent to, highly sensitive areas such as Wilderness Areas, Wilderness Study Areas (WSAs), Lands with Wilderness Characteristics (LWCs), Wild and Scenic Rivers, National Parks and Monuments, and other pristine natural areas could potentially conflict with the land use management objectives for those areas (USAF 1997). Visitors to these areas and the land managers responsible for them could perceive chaff debris as undesirable and unattractive if it conflicts with expectations of visual character and management objectives to preserve a natural appearance.

However, chaff components degrade naturally in the environment following deployment (USAF 1997). Further, military installations have the authority to create local procedures that restrict the use of chaff and flare near environmentally sensitive areas or population centers. Agreements between agencies such as the U.S. Fish and Wildlife Service (USFWS) and Bureau of Land Management (BLM), and military installations have limited chaff use over sensitive land uses such National Wildlife Refuges (NWRs), Native American reservations, and public lands near military training grounds which have the potential to support sensitive land uses and/or visual resources. Examples of these agreements include arrangements between the USFWS and Luke Air Force Base, Arizona which limits chaff use near Cabeza Prieta NWR; arrangements between the USFWS and Nellis Air Force Base, Nevada, which limits chaff use near the Desert NWR; and arrangements between the BLM and Mountain Home Air Force Base, Idaho for limited chaff use above nearby public lands (General Accounting Office [GAO] 1998).

The only potential for direct adverse impacts on sensitive land uses from flare use would be related to accidental wildfires. Despite the extremely low risk of occurrence of ignition from flares given the altitudes at which flares are normally deployed and their short burn time, there may still remain a very low risk for wildfires. Wildfires can burn and damage elements essential to the economic and recreational value of land use resources (e.g., trees, structures, campgrounds,



vegetation, etc.), adversely affecting the use and visual aesthetics of such lands over numerous years. Consequently, the Oregon ANG has conservatively set a floor for flare use of 5,000 feet AGL (AFI 11-2F-15V3 KF CH 8). Given that flares are consumed on average after approximately five seconds, this floor for flare use dramatically reduces the potential for wildfire to virtually nonexistent levels. Fire risk associated with the use of flares in the affected airspace areas considered in this EIS is more fully addressed in Section 4.7, *Safety*.

#### *Effects of Chaff on Visual Resources*

Field studies conducted by the USAF (1994) in temperate and arid environments and in high-use and low-use areas determined the impacts of chaff on the visual environment. Two methods were used during field investigations including an in situ method and a “placed” method. The in situ method consisted of walking through selected areas to count the number of sightings of chaff debris and filaments, and to observe factors affecting their visibility in the natural environment. The “placed” method consisted of placing chaff debris items in different natural contexts, and evaluating at what distances the items were visible and whether visibility was affected by the context (USAF 1994a; USAF 1994b).

A successive evaluation of impacts to visibility from chaff and incidental debris, which used data from the 1994 field studies, concluded that significant impacts on visual resources were unlikely (USAF 1997). Overall, chaff debris has low visibility and little effect on the aesthetic quality of the visual environment. Chaff debris does not accumulate in quantities that make it objectionable or even noticeable to most persons in low-use areas. Chaff debris is only visible in fairly open contexts where vegetation is sparse, along a road or pathway, or in cleared and maintained areas.

A total of 17,249 chaff canisters were estimated to be used by the 142 FW during fiscal year (FY) 2013.<sup>5</sup> Chaff use by 173 FW is similar to the 142 FW (Oregon ANG 2013).

Overall, chaff debris has very low visibility and little effect on the aesthetic character or quality of the environment (USAF 1997); however, the use of chaff

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<sup>5</sup> The number of sorties and the number of chaff used per sortie were not readily available.

over or immediately adjacent to highly sensitive areas such as Wilderness Areas, WSAs, LWCs, Wild and Scenic Rivers, National Parks and Monuments, and other pristine natural areas could conflict with the land use management objectives for those areas (USAF 1997). Visitors to these areas and the land managers responsible for them could perceive chaff debris as undesirable and unattractive if it would conflict with expectations of visual character and management objectives established to preserve an appearance of naturalness.

#### *Effects of Flares on Visual Resources*

The potential impacts related to visual resources from flare use are limited in frequency and duration. The flash associated with a flare release typically lasts between 3.5 and five seconds before the flare burns out. Given the limited and periodic use of flares and the short duration of the associated flash, impacts to visual resources associated with an ignited flare would be less than significant. The majority of the flare and associated packaging would be consumed during flare ignition.

Flare use by the 142 FW is anticipated to take place during 1,081 training sorties per year; for each training sortie involving flares, on average 15 flares would be released. Flare use by the 173 FW is similar to the 142 FW (Oregon ANG 2013). If site-specific concerns should arise, resource agencies (e.g., BLM) and individual military entities (e.g., USAF/ANG) could develop and enforce agreements to limit the use of chaff or flares near sensitive land uses such as NWRs and public recreation lands, or Native American reservations and population centers.

The USAF (1997) study indicated that though flares could contribute visual resource impacts through debris in the same way chaff use could; however, impacts from flare use more heavily influenced land use through the risk of fire (National Guard Bureau [NGB] 2002). A discussion of fire risk related to flare use can be found in Section 4.7, *Safety*. However, in general, the impact to visual resources from flare use is limited in frequency and duration. The flash of a flare release is expected to last between 3.5 and five seconds before the flare burns out. Given the periodic deployment and short-term duration of the flare, impacts to visual resources associated with an ignited flare would be less than significant.

### *Summary of Impacts on Visual Resources*

Considering the infrequent and short-term nature of any actual observations of chaff and flare use from the ground below, impacts on aesthetic characteristics in sensitive land use areas associated with the use of chaff and flares would not be considered significant.

Chaff and flares associated with the Proposed Action would not be expected to result in significant impacts on visual resources. The following observations for chaff and flare suggest that neither would have a significant adverse impact on visibility:

- Chaff has low visibility, is similar in chemical composition to desert dust, and has little effect on the aesthetic quality of the environment (USAF 1997). Chaff debris does not accumulate in quantities that make it objectionable or even noticeable to most individuals below large airspace areas such as those associated with the Proposed Action (USAF 1997). Even in open areas, impacts from chaff debris are minor when compared to accumulated roadside trash or other more common visual intrusions.
- Impacts associated with flare debris are consistent with impacts associated with chaff debris based on similarities in size and visibility characteristics once these debris have settled on the ground (USAF 1997).
- If site-specific concerns should arise, resource agencies (e.g., BLM) and individual military entities (e.g., USAF/ANG) can enact local agreements to limit the use of chaff or flares near environmentally sensitive areas such as NWRs and public lands, or Native American reservations.
- Fire risk associated with the use of flares is low and is addressed in more detail in Section 4.7, *Safety*.

### *Aircraft Overflights and Contrails*

Though implementation of the Proposed Action would not impact terrestrial landscape elements, the addition of increased or newly introduced overflights and periodically the occurrence of aircraft-generated noise and aircraft contrails above scenic and otherwise sensitive land use settings may be perceived as annoying or intrusive. However, because no component of the Proposed Action would alter or modify any part of the existing physical landscape, any noise or visual impacts associated with aircraft overflights would be periodic, short-term, and temporary.

Physical characteristics of an affected landscape that provides or contributes to the value associated with a viewshed, landscape, or scenery would remain unchanged. Ultimately, any notable increase in aircraft activity and associated contrails would by nature be transitory and short-term visual intrusions, which would not block or obstruct views of any visual resource from any vantage point.

The cloudy weather typically experienced in Oregon can mask the appearance of visual aerial distractions, including aircraft. The number of days recorded as clear from representative cities for each airspace block calculates to substantially less than 50 percent of the year for all airspaces (see Table 4.3-1). Thus, given the masking effect of clouds on aircraft and associated contrails, visual impacts associated with implementing the Proposed Action would be further reduced. Given their transient and short-term nature, impacts to visual resources associated with aircraft activities in the affected airspace areas would be less than significant.

**Table 4.3-1. Average Annual Cloudy and Clear Days by Airspace Area**

| Airspace Area | Reporting City | Cloudy            |                 | Clear             |                 |
|---------------|----------------|-------------------|-----------------|-------------------|-----------------|
|               |                | Average Days/Year | Percent of Year | Average Days/Year | Percent of Year |
| Eel           | Astoria        | 239               | 65.5 %          | 38                | 10.4%           |
| Juniper/Hart  | Burns          | 151               | 41.4%           | 120               | 32.9%           |
| Redhawk       | Pendleton      | 173               | 47.4%           | 101               | 27.7%           |

Notes: A clear day denotes zero to 30% cloud coverage during the daylight hours; partly cloudy is 40% to 70% cloud coverage during the daylight hours and , cloudy is cloud coverage over 80% to 100% of the sky. The percentage of partially cloudy days is identified in the above table, which accounts for why the percentages do not add up to 100. To find the number of partially cloudy days add the number of clear days with cloudy days and subtract from total days in the month to get number of partly cloudy days. Annual totals may differ from the 12 month totals due to rounding.

Source: Western Regional Climate Center (WRCC) 2013.

Ultimately, any notable increase in aircraft activity and associated noise and contrails would by nature be transitory and short-term intrusions that would not interfere with or obstruct sensitive land uses or visual resources located beneath the proposed airspace modifications.

#### Eel MOA/ATCAA Complex and W-570

Sensitive land uses beneath the proposed Eel MOA/ATCAA Complex consist primarily of federal and state-owned lands, and pockets of urban areas. Sensitive

land uses and scenic resources managed by federal and state agencies include substantial areas underlying the airspace, consisting of 72 State Parks and two State Forests, one National Forest, five NWRs, three Areas of Critical Environmental Concern (ACECs), one National Historic Park, and one Conservation Area (refer to Figure 3.3-1 and 3.3-2). Additionally, the proposed Eel A MOA is located over a small portion of the Lewis and Clark National Historic Trail along the Columbia River (refer to Figure 3.3-2). Specific sensitive land use areas beneath these airspaces are described in detail within in Appendix G, *Land Use and Land Management*. Areas located beneath existing airspace experience regular overflights, whereas areas located outside of the existing airspace footprints experience less frequent overflights associated with MTRs and other VFR and IFR air traffic. As discussed in Section 4.2, *Noise*, implementation of the Proposed Action would not result in any underlying areas becoming exposed to a noise level of 65 DNL or greater. Further, noise levels beneath proposed and affected airspaces would not approach 55 DNL. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, short-term intrusions; therefore, implementation of the Proposed Action would not result in significant land use impacts beneath the proposed Eel MOA/ATCAA Complex.

Visual resources beneath the proposed airspace area would be affected by increased training operations in the area (refer to Section 4.1, *Airspace Management*). However, the modification of the Eel ATCAA would result in a larger volume of designated airspace available for aircraft maneuvering, resulting in a broader distribution of training operations and a reduced probability of viewing an Oregon ANG aircraft overflight from any given location below the airspace. For a complete discussion on airspace modifications and proposed operations refer to Section 3.1 and Section 4.1, *Airspace Management*.

#### Juniper/Hart MOA Complex

Implementation of the proposed expansion of the Juniper/Hart MOA Complex would extend its boundaries to the east, increasing useable airspace vertically as well as laterally. The land areas beneath the Juniper/Hart MOA Complex are sparsely populated, consisting predominantly of BLM and private ranch and agricultural lands. Sensitive land uses and visual resources beneath the proposed

Juniper/Hart MOA Complex consist primarily of federal and state-owned lands, and pockets of urban areas. Federally and state-managed lands underlying the existing and proposed airspace include three NWRs, 14 Wild and Scenic Rivers, 10 National Wilderness Areas, a number of WSAs and LWCs, two National Forests, one Cooperative Management and Protection Area, 30 State Parks, and three ACECs (refer to Figure 3.3-3 and 3.3-4). The proposed Hart B, Hart E, and Hart F MOAs overlies small segments of the California National Historic Trail. Additionally, the proposed Juniper C MOA, including the proposed Juniper East Low MOA, and the existing Juniper A and Juniper B MOAs overlies segments of a proposed route of the Oregon National Historic Trail (refer to Figure 3.3-4). Specific sensitive land use areas beneath these airspaces are described in detail within in Appendix G, *Land Use and Land Management*. Areas located beneath existing airspace experience regular overflights, whereas areas located outside of the existing airspace footprints experience less frequent overflights associated with MTRs and other VFR and IFR air traffic.

An increase in training exercises and flying hours within the Juniper/Hart MOA Complex expansion area could potentially lead to increased aircraft visibility within public and private lands below the airspace. However, the modification would result in a larger volume of designated SUA available for aircraft maneuvering, resulting in a broader geographic distribution of training sorties and a reduced probability of visual and noise effects from any individual location below the airspace. Additionally, the activation time is expected to decrease under the Proposed Action, as more training could be accomplished in a larger airspace, shortening the required time of use. Within the Juniper Low MOA, lower altitude flights would also be obscured from many viewing areas by geographical features such as hills, mountains, and plateaus common to the landscape in eastern Oregon.

As discussed in Section 4.2, *Noise*, reductions in noise levels would occur within the existing Juniper North (i.e., new Juniper A), Juniper South (i.e., new Juniper B), Hart North (i.e., new Hart A) and Hart South (i.e., new Hart B) airspace areas as a result of military aircraft operations being spread out throughout the proposed Juniper/Hart MOA Complex expansion area. Additionally, in the newly established MOAs under the Proposed Action (i.e., Juniper C and D as well as Hart C, D, E, and F), the noise levels would be within the range typically experienced

by rural communities (FICON 1992) and would not enter into or exceed the 65 DNL threshold (refer to Section 4.2, *Noise*).

The areas that would have the highest potential to be adversely impacted by noise from overflights would be the sensitive land uses and visual resources below the Juniper Low MOA and Juniper East Low MOA, which would have an airspace floor of 500 feet AGL; the lowest proposed airspace floor in the Proposed Action. Sensitive land uses and visual resources below the Juniper Low MOA include: portions of the Malheur NWR, a portion of the Hart Mountain National Antelope Refuge, a small part of Malheur National Forest, Frenchglen Corral State Park and Hotel, as well as seven ACECs.

Within the proposed Juniper Low MOA and Juniper East Low MOA, lower-altitude flights are anticipated to be obscured from many viewing areas by geographical features such as hills, mountains, and plateaus common to the landscape in eastern Oregon. Due to the proposed military flight operations these airspace areas would be punctuated by occasional events above 65 dB SEL; however, these events would occur on average less than once per day within the airspace (refer to Section 4.2, *Noise*).

Based on this analysis, implementation of the Proposed Action would result in less than significant impacts to sensitive land use and visual resources beneath the proposed Juniper/Hart MOA Complex expansion area as well as beneficial impacts within the existing Juniper/Hart MOA Complex (i.e., Juniper North and South as well as Hart North and South) resulting from a broader geographic distribution of flight activities and the increasing/raising of the airspace floor within the Juniper Low MOA.

#### Redhawk MOA Complex

As described in Section 3.3, *Land Use and Visual Resources*, lands underlying the proposed Redhawk MOA Complex are predominantly privately owned. Private land holdings are governed at the local level by county and city governments. State controlled lands include 12 State Parks and one State Recreation Area. Federally managed lands underlying the proposed airspace include portions of five National Forests, two National Wilderness Areas, a number of WSAs and LWCs, one

National Monument, one National Grassland, and two Wild and Scenic Rivers segments (refer to Figure 3.3-5 and 3.3-6). Additionally, the proposed Redhawk A and Redhawk C MOAs are located over a small segment of a proposed route of the Oregon National Historic Trail (refer to Figure 3.3-6). Specific sensitive land use areas beneath these proposed airspaces are described in detail within Appendix G, *Land Use and Land Management*. Areas located beneath existing airspace experience regular overflights, whereas areas located outside of the existing airspace footprints experience less frequent overflights associated with MTRs and other VFR and IFR air traffic.

Establishment and use of the Redhawk MOA Complex would introduce Oregon ANG aircraft training exercises to an area that has not previously been used for training by these aircraft. Although there are four established and active MTRs in the vicinity of the proposed MOA – entirely separate from the Proposed Action – newly authorized training by Oregon ANG aircraft under the Proposed Action would result in potential visibility of training aircraft in this region of the state. However, Oregon ANG flight operations would be limited to a floor of 11,000 feet MSL. Additionally, aircraft operations would be distributed throughout the airspace and limited to approximately 500 flight hours per year within the airspace, limiting the opportunity of viewing an Oregon ANG aircraft overflight.

Similar to the Eel MOA/ATCAA Complex, modeling conducted for this EIS indicates that the Oregon ANG flight activities within the proposed Redhawk MOA Complex would result in noise levels of 35.0-L<sub>dnmr</sub> beneath Redhawk A, B, and C (refer to Section 4.2, *Noise*). These noise levels would be within the ambient noise levels characteristic of rural communities (FICON 1992), and would not enter into or exceed the 65 DNL threshold. Consequently, implementation of the Proposed Action would result in less than significant impacts to land use beneath the proposed Redhawk MOA Complex. Ultimately, given their transient and short-term nature, impacts to sensitive land uses and visual resources associated with aircraft activities in the affected airspace areas would not be significant.

#### Indirect Impacts

Additional indirect or induced impacts to land use would not be anticipated under the Proposed Action.



#### 4.3.2.2 Alternative B: No Modifications to Eel ATCAA

This alternative would include the same airspace changes as described under the Proposed Action; however, under this alternative the existing Eel ATCAA would not be modified. Consequently, there would be no military flight activity within this airspace at altitudes lower than the existing floor of FL 270 (27,000 feet MSL). While the 173 FW operations described for the Proposed Action would remain the same, the 142 FW operations that would have been assigned to the Eel MOAs under the Proposed Action would be assigned to the Redhawk MOA Complex.

Environmental impacts to land use and visual resources resulting from the selection of Alternative B would be consistent with impacts identified for the Proposed Action, with the exception of the changes described above within the footprint the existing Eel ATCAA. Under Alternative B, modification of the Eel ATCAA would not be implemented as proposed and land use conditions and visual resources beneath this airspace would remain unchanged. Under Alternative B military aircraft operations within the proposed Redhawk MOA Complex would be slightly increased; however, impacts to the noise environment and visual resources beneath the proposed airspace would remain consistent with those described for the Proposed Action. Consequently, there would be a less than significant impact to land use and visual resources associated with Alternative B.

#### 4.3.2.3 Alternative C: No Redhawk MOA Complex

This alternative would include the same airspace changes as described under the Proposed Action; however, the Redhawk MOA Complex would not be established (refer to Section 2.0, *Description of Proposed Action and Alternatives*). The 173 FW operations described for the Proposed Action would remain the same under this alternative; however, approximately 30 percent of proposed 142 FW utilization of the Redhawk MOA Complex would be redistributed to the Eel MOAs while approximately 70 percent would be relocated to the Juniper/Hart MOA Complex, including the Juniper/Hart MOA Complex expansion area.

Environmental effects impacting land use and visual resources associated with selection of Alternative C would be consistent with effects identified for the Proposed Action, with the exception of effects within the footprint of the Redhawk

MOA Complex described above. Under Alternative C, the establishment of the Redhawk MOA Complex would not be implemented as proposed and conditions would remain unchanged. Under Alternative C military aircraft operations within the proposed Eel MOA/ATCAA Complex and Juniper/Hart MOA Complex would be slightly increased; however, impacts to the noise environment and visual resources beneath these proposed airspaces would remain consistent with those described for the Proposed Action. Consequently, Alternative C would result in less than significant effects to land use and visual resources.

#### 4.3.2.4 Alternative D: No Expansion of Juniper/Hart MOA Complex

This alternative would include the same airspace changes as described under the Proposed Action; however, the Juniper/Hart MOA Complex expansion area would not be established, including the expansion of the Juniper Low MOA (refer to Section 2.0, *Description of Proposed Action and Alternatives*). Under Alternative D, the 173 FW operations within the existing Juniper/Hart Complex would remain the same as described for the baseline conditions. The 142 FW would continue to operate within the existing Juniper/Hart MOA Complex; however, operations within this airspace would be reduced relative to existing conditions due to the establishment of the Redhawk MOA Complex.

Environmental effects impacting land use and visual resources associated with Alternative D would be comparable to effects identified for the Proposed Action; however, while the 142 FW would utilize other training airspace under this scenario, the 173 FW would continue to operate within the Juniper/Hart MOA Complex as described for the existing setting. Impacts to the noise environment and visual resources associated with ongoing operations in the Juniper/Hart MOA Complex would remain consistent because no modifications would be implemented to increase the airspace volume in this area. Consequently, while impacts to the areas beneath the proposed Eel MOA/ATCAA Complex and the Redhawk MOA Complex would remain similar to those described for the Proposed Action, under Alternative D, conditions beneath the existing Juniper/Hart MOA Complex would remain unchanged. Additionally, conditions beneath the proposed Juniper/Hart MOA Complex expansion area would also remain unchanged from existing conditions. Therefore, Alternative D would result in less than significant effects to land use and visual resources.

#### 4.3.2.5 No-Action Alternative

If the No-Action Alternative were selected, the Oregon ANG would not implement the Proposed Action and conditions would remain as described in Section 3.3, *Land Use and Visual Resources*. No impacts to land use or visual resources would result from the selection of the No-Action Alternative.

## **4.4 BIOLOGICAL RESOURCES**

### **4.4.1 Approach to Analysis**

Determination of the significance of potential impacts to biological resources is based on applicable legal protection of sensitive resources (e.g., Oregon State Law, federal Endangered Species Act [ESA], Migratory Bird Treaty Act [MBTA], Bald and Golden Eagle Protection Act [BGEPA]). Impacts to biological resources would be considered significant if special status plant or wildlife species or habitats of special concern were adversely affected or disturbances caused substantial reductions in population size or distribution. The federal ESA further provides that an impact to biological resources would be considered significant if the USFWS or National Marine Fisheries Service (NMFS) determines that the proposed action would 1) jeopardize the continued existence of a federally listed threatened or endangered species; or 2) result in the destruction or adverse modification of federally designated critical habitat.

Data from the USFWS, Oregon Department of Fish and Wildlife (ODFW), and Oregon Department of Forestry (ODF) were reviewed to determine the presence or potential occurrence of sensitive species and habitats in the ROI for the Proposed Action. Potential physical impacts such as habitat loss, noise-related disturbance, and impacts to surface water were evaluated to assess potential impacts to biological resources resulting from implementation of the Proposed Action and identified alternatives.

Impact analyses conducted for each of the federally listed threatened or endangered species potentially affected by the Proposed Action are consistent with and support Section 7 consultation effect determinations (USFWS 2012c). Federal agencies are required to determine whether their actions may affect listed or proposed species and/or designated or proposed critical habitat. Once a “may affect” determination is made, the federal agency must either request USFWS concurrence with a “may affect, but not likely to adversely affect” finding or request initiation of formal consultation (USFWS 2012c). The classification of determinations with regard to potential effects of a proposed action are defined

below. The USFWS confirmed that this approach to analysis was appropriate during initial outreach by NGB/A4AM.<sup>6</sup>

- *May affect and likely to adversely affect* - Listed resources are likely to be exposed to the action or its environmental consequences and will respond in a negative manner to the exposure. These determinations require written concurrence from the USFWS (USFWS 2012c).
- *May affect, but not likely to adversely affect* - All effects are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat. Insignificant effects relate to the size of the impact and include those effects that are undetectable, not measurable, or cannot be evaluated. Discountable effects are those extremely unlikely to occur. These determinations require written concurrence from the USFWS (USFWS 2012c).
- *No effect* - there will be no impacts, positive or negative, to listed or proposed resources. Generally, this means no listed resources will be exposed to the action and its environmental consequences. Concurrence from the USFWS is not required (USFWS 2012c).

In a letter dated 9 September 2015 and in accordance with Section 7 of the Federal ESA, the NGB requested USFWS concurrence with its determinations regarding federally listed species presented in the Draft EIS. The USFWS provided review of the Draft EIS and concurred with the determinations presented below in a letter dated 8 February 2016 (see Appendix B, *Public Involvement and Agency Correspondence*).

#### **4.4.2 Impacts**

##### **4.4.2.1 Proposed Action**

The Proposed Action would not result in any construction or ground-disturbing activities. Potential direct impacts would include bird-aircraft collisions within the air column during transit or training operations; however, secondary effects may also include noise impacts to sensitive wildlife species as well as indirect impacts to sensitive biological resources, including sensitive habitats, resulting from

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<sup>6</sup> NGB/A4AM contacted Mr. Ted Buerger on 21 April 2014 and described the approach to analysis in the EIS as well as the timing for coordination and consultation. Mr. Buerger confirmed that this approach was appropriate through Mr. Larry Salata, ESA Consultation Lead in the USFWS Region 1 Office located in Portland.

emergency fuel dumping (refer to Section 3.7, *Safety*), and byproducts from the use of chaff and flare (refer to Section 3.8, *Hazardous Materials and Wastes*).

### *Bird-Aircraft Strikes*

A variety of relevant factors affect the frequency of bird-aircraft strikes, such as sortie rate, locations of birds, time of day, etc. Bird strikes may occur during any phase of flight but are most likely to occur during the take-off, initial climb, approach and landing phases due to the greater number of birds flying at lower altitudes. As there would be no net increase in total allocated flying hours (including training and transit hours) under the Proposed Action (refer to Section 2.0, *Description of Proposed Action and Alternatives*), the number of bird strikes would be expected to remain consistent with the number of bird strikes occurring under the current airspace configuration. The existing and proposed airspace areas are located within the Pacific North American Flyway; therefore, the greatest potential for bird strikes under existing and proposed conditions would occur during spring and fall migrations, when the number of birds in the air column increases and birds are typically flying at higher altitudes. Approximately 95 percent of bird migration flights occur below 10,000 feet AGL, with the majority below 3,000 feet AGL (U.S. Geological Survey 2010). While there is considerable variation, most birds fly below 500 feet AGL except during migratory flights, with the favored altitude for most small birds being between 500 and 1,000 feet AGL (Erich et al. 1988; Naval Facilities Engineering Command Southwest [NAVFAC SW] 2012). Consequently, the redistribution of flights within the affected and proposed airspaces under the Proposed Action would result in negligible increases in strike risk, as each of the proposed airspaces (with the exception of the Juniper Low MOAs) would be established with a floor of 11,000 feet MSL.

Further, the ANG has developed the Avian Hazard Advisory System (AHAS) to address and mitigate in-flight bird collision risks. The AHAS includes a Bird Avoidance Model (BAM) used to generate projected and actual geospatial bird data for use in airspaces, including MOAs, ranges, visual routes, instrument routes, and slow routes. The AHAS uses Geographic Information System (GIS) technology combined with data on bird habitat, migration, and breeding characteristics to create a visual tool for analyzing bird-aircraft collision risk. Additionally, each installation maintains and implements a Bird Aircraft Strike

Hazard (BASH) Plan that outlines procedures to minimize bird and other wildlife strikes by aircraft. This information, and the effective application of associated planning and management tools, can reduce the likelihood of collisions, though complete elimination of mishaps is not possible (U.S. Air Force [USAF] 2012). Refer to Sections 3.7 and 4.7, *Safety* for a summary of existing safety procedures (e.g., BASH plan, mishap data, etc.) and a discussion of project-related safety concerns.

### *Noise*

The effects of noise on sensitive wildlife are highly variable, both in terms of the response and duration of the response (Katona et al. 2000; Maci et al. 1988; Lamp 1989; Ellis et al. 1991; White and Sherrod 1973; Black et al. 1984); however, it is difficult to extrapolate effects from one study to another because the effects of sound are dependent on numerous variables including sound intensity, duration of exposure, and rapid or gradual onset of the noise. Most effects appear to be minor and temporary with no acute (i.e., sudden) effects on reproduction, mortality, or survivorship. However, sound levels above about 90 dB are more likely to result in adverse effects on special status mammal species and are associated with a number of startle responses (Katona et al. 2000; Mancini et al. 1988).

Research on the effects of noise on terrestrial wildlife has focused primarily on mammals and birds. Although the potential exists for a variety of physiological and behavioral impacts on special status terrestrial wildlife as a result of the Proposed Action, effects on wildlife underlying the affected and proposed airspaces, including the proposed Juniper Low MOA and Juniper East Low MOA, are anticipated to be less than significant. Resident wildlife are already habituated to military air traffic due to the military overflights currently occurring as low as 500 feet AGL over the 4,516-square-mile area under the existing Juniper Low MOAs<sup>7</sup> and at higher altitudes under the Eel ATCAA as well as the remainder of the existing Juniper/Hart MOA Complex. Under the Proposed Action, areas beneath the newly established airspaces would experience an increase in flights above 11,000 feet MSL. Additionally, the areas beneath the proposed Juniper East Low MOA would experience an increase in military flight operations as low as 500 feet AGL. However, areas beneath existing airspaces (e.g., existing Juniper/Hart

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<sup>7</sup> The floor of the existing Juniper Low MOA is 300 feet AGL; however, military aircraft operations within the MOA do not occur below 500 feet AGL due to flight safety precautions.

MOA Complex, including the existing Juniper Low MOA) would experience a *decrease* in flight activity as flight operations would be redistributed to the newly established airspaces under the Proposed Action. Consequently, some special status wildlife species may be temporarily disturbed or startled by increased noise levels and/or low-level overflights in areas identified as having increased flights (refer to Table 2-3 as well as Section 3.1 and 4.1, *Airspace Management*), but based on observational studies of mammals and the reproductive studies of birds referenced below, they would likely acclimate to low-altitude flight activities and would not suffer any long-term, adverse effects such as reduced reproductive success or reduced fertility.

There is limited information available on the specific responses of terrestrial wildlife from aircraft noise during low-altitude overflights. Deer (*Odocoileus* spp.) are known to acclimate to intense exposure to aircraft noise, and in some cases have become nuisances on airfields (Katona et al. 2000). Additionally, incidental observations of moose suggest that they are less sensitive than some other ungulates to aircraft noise (Manci et al. 1988). These studies suggest that the potential for long-term, population-level, noise-related adverse impacts on special status mammals such as reduced reproductive success or increased mortality is remote. Similarly, raptors and other birds (e.g., waterfowl) have been shown to be relatively unaffected by low-level aircraft flights; in most cases reactions were brief and not detrimental to reproductive success (Lamp 1989; Ellis et al. 1991). Documented responses of bald eagles (*Haliaeetus leucocephalus*) and other raptors to aircraft overflights range from no response to startle responses, including temporary movement from the affected area during flight activity (White and Sherrod 1973). Lamp (1989) studied the effects of military aircraft overflights less than 3,000 feet AGL on numerous species of waterfowl and found that reactions ranged from no response to minor behavior changes and temporary movement from the affected area during flight activity (Lamp 1989). Burger (1981) concluded that subsonic overflights have no measureable effects on nesting herring gulls (*Larus smithsonianu*). Similarly, Black et al. (1984) found that military aircraft overflights at altitudes of less than 500 feet AGL had no effect on colony establishment, colony size, nesting behavior, or breeding success of various species of egrets, cormorants (*Phalacrocorax* spp.), and ibis. A study of the effects of low-level air traffic on red-tailed hawks (*Buteo jamaicensis*) suggested that individuals in affected areas eventually acclimate to low-level air traffic (Anderson



1989); however, individuals that have not experienced such aircraft activity could temporarily move from the affected areas and leave their nests unattended or dislodge eggs or young during a quick departure. Consequently, the establishment of infrequent low-altitude military operations in the proposed Juniper East Low MOA is not likely to adversely affect (e.g., population decline) special status wildlife species below.

Further, there would be no surface or underwater disturbances beneath the proposed W-570 and noise impacts within the footprint of the airspace would be less than significant (refer to Section 4.2, *Noise*). Therefore, the Proposed Action is not likely to adversely affect marine wildlife.

#### Eel MOA/ATCAA Complex and W-570

##### *Federally Listed Species*

Federally listed threatened and endangered species are known to occur beneath and within the existing Eel ATCAA and W-570 airspace as well as the proposed expansions thereof. A discussion of existing Marine Protected Areas (MPAs) occurring below the coastal airspace areas can be found in Appendix G, *Land Use and Land Management*. As described in Section 3.4, *Biological Resources*, federally threatened and endangered species with the potential to occur beneath the Eel MOA/ATCAA Complex include Columbian white-tailed deer (*Odocoileus virginianus leucurus*), western snowy plover (*Charadrius nivosus nivosus*), marbled murrelet (*Brachyramphus marmoratus*), short-tailed albatross (*Phoebastria albatrus*), and northern spotted owl (*Strix occidentalis caurina*).

As described in Section 3.4, *Biological Resources*, the Columbian white-tailed deer has been managed according to a USFWS recovery plan since 1983. Two refuges have been established specifically for the protection and benefit of Columbian white-tailed deer: the North Bank Habitat Management Area (NBHMA) and the Julia Butler Hansen Refuge for Columbian White-tailed Deer. The Proposed Action would not affect the size or quality of these protected habitat areas. Any impacts resulting from implementation of the Proposed Action would be limited to noise disturbance and startle affect. As discussed above, while the specific response of Columbian white-tailed deer to noise from overflight is unknown,

evidence suggests that deer, in particular, may be more readily adaptable to changes in noise environment. This has been observed at airports where deer have become acclimated to the point of being nuisances on airfields (Katona et al. 2000). Further, under implementation of the Proposed Action the airspace floor of the proposed Eel MOAs would remain at approximately 9,000 feet above the ground surface in the region. Consequently, there would be no significant increase in average noise exposure associated with military overflights (refer to Section 4.2, *Noise*). Therefore, it is anticipated that the Proposed Action and future operations associated with training conducted in the proposed Eel MOA/ATCAA Complex would have no effect on Columbian white-tailed deer.

Wintering western snowy plovers have been shown to be disturbed by low-flying aircraft (e.g., within 500 feet of the ground). Hatch (1997) found that low-flying aircraft potentially may be perceived by western snowy plovers to be predators. During scoping for the Proposed Action, the USFWS recommended that aircraft fly no lower than 1,000 feet above plover nesting areas. The airspace floor for the proposed Eel MOAs under the Proposed Action would be 11,000 feet MSL, well above the 1,000-foot recommendation. Maximum instantaneous noise levels at the floor of the proposed airspace would be between 87 dB and 90 dB, but direct overflights would be of very short duration, and disturbance levels are anticipated to be low given the distance between the plovers and the aircraft (i.e., still effectively two miles above the ground). Therefore, implementation of the Proposed Action would have no effect on western snowy plovers.

Noise level thresholds to determine disturbance impacts are the same for marbled murrelets and northern spotted owls, as identified by the Biological Opinion (BO) for the Olympic National Forest program of activities by the USFWS (Under Secretary of Defense for Intelligence [USDI] 2003). The noise level identified as the threshold for noise-only harassment/injury has been identified as 92 A-weighted decibels (dBA) (Washington State Department of Transportation 2013). Noise disturbance impacts specific to short-tailed albatross were not available; therefore, the same threshold of 92 dBA was utilized for this analysis. The minimum distance between the noise generating aircraft and the average position of marbled murrelets, spotted owls, or short-tailed albatross individuals can be approximated based the elevation of ground level where the birds are found and the floor of the airspace limiting the minimum height at which the aircraft can fly. Based on these

criteria, estimated maximum noise exposure for murrelets, spotted owls, and short-tailed albatross would be between 87 dB and 90 dB; therefore, average noise levels are not anticipated to exceed the scientifically accepted disturbance threshold (AMEC 2013; please see Appendix E, *Noise*, for full noise modeling criteria and results). Additionally, as flight activity would be distributed throughout the entire airspace, direct overflights would be infrequent and of very short duration. Therefore, implementation of the Proposed Action would have no effect on marbled murrelets, northern spotted owls, or short-tailed albatross.

#### *State-listed Species*

As previously described in Section 3.4, *Biological Resources*, state listed threatened and endangered species with the potential to occur beneath and within the Eel ATCAA and W-570 airspace areas as well as the proposed expansions thereof include gray wolf (*Canis lupus*), sea otter (*Enhydra lutris*), red tree vole (*Arborimus longicaudus*), marbled murrelet, western snowy plover, short-tailed albatross, northern spotted owl, and brown pelican (*Pelecanus occidentalis*).

Impacts to state-listed species would be consistent with noise- and strike-related impacts discussed for federally identified species. As previously described, flight activity would be distributed throughout the entire airspace area. Consequently, direct overflights would be infrequent and of short durations. Forest and shrub habitats underlying the proposed airspaces would provide some shelter from noise exposure to species such as gray wolves and northern spotted owls that prefer forested environments. State-listed wildlife species in more open habitats, such as the marine air/water interface (e.g. sea otter), would be more exposed to noise impacts since there would be no vegetative buffer blocking aircraft-generated noise. However, marine species would have subaquatic environments available as an alternative source for cover and shelter from perceived or actual threats. Studies indicate that most secondary noise-related impacts appear to be minor and temporary and, when evaluated, did not cause acute effects on reproduction, mortality, or survivorship (Katona et al. 2000; Mancini et al. 1988; Lamp 1989; Ellis et al. 1991). Further, studies have shown the ability of many species to adapt and acclimate to the noise of aircraft overflights. Therefore, the implementation of the Proposed Action would have no effect on state-listed species.

## Juniper/Hart MOA Complex

### *Federally Listed Species*

Federally listed species with the potential to occur beneath and within the existing Juniper/Hart MOA Complex and the proposed expansions thereof include the federally endangered gray wolf. Additionally, the federally threatened yellow-billed cuckoo (*Coccyzus americanus*) may also occur beneath the existing Juniper/Hart MOA Complex as well as the proposed Juniper/Hart MOA Complex expansion area; however, as described in Section 3.4, *Biological Resources* there have been very few recorded observations of this species in Oregon (USFWS 2015).

As described above, forest and shrub habitats underlying the proposed airspaces would provide some shelter from noise exposure to species such as gray wolves. Further, studies have shown the ability of many species to adapt and acclimate to the noise of aircraft overflights (refer to the general noise discussion above). Additionally, flight activity within the Juniper Low MOA and Juniper East Low MOA would be limited to 249 total flight hours distributed throughout the combined approximately 5,000 square mile Low MOAs. Additionally, only 27 percent of those hours (i.e., approximately 68 flying hours) would be flown below 1,000 feet AGL. Therefore, the implementation of the Proposed Action may affect, but is not likely to adversely affect gray wolves or yellow-billed cuckoos beneath the proposed Juniper/Hart MOA Complex.

As described in Section 3.4, *Biological Resources* in October 2015 the USFWS determined that the greater sage-grouse was not warranted for listing under the federal ESA (80 Federal Register [FR] 59857). However, this species is still considered sensitive by the ODFW (ODFW 2008). Further, the Nevada Department of Wildlife (NDOW) raised concerns during the scoping process that noise generated from low-flying aircraft may impact greater sage-grouse during its breeding season. A conservation plan to maintain and enhance populations of the greater sage-grouse was finalized in 2010. Greater sage-grouse protection has been focused on conservation and protection of critical habitat or designated "core areas." Core areas consist of sagebrush habitat which is found throughout the eastern Oregon. Counties containing greater sage-grouse core areas that would be

below affected or proposed airspaces include: Crook, Grant, and Harney counties, underlying the existing and proposed Juniper/Hart MOA Complex. Similar to the analysis above for marbled murrelets and northern spotted owls the estimated noise exposure for greater sage-grouse was determined based on the minimum distance between the noise generating aircraft and the core areas at the ground surface. Based on these criteria, estimated maximum noise exposure for greater sage-grouse would be approximately 116 dB, with the greatest exposure occurring beneath the Juniper Low MOA and Juniper East Low MOA. The Oregon ANG has been operating within the Juniper Low MOA for more than 20 years, since long before the establishment of the underlying Low Density Areas, with no reported impacts to underlying species, including the greater sage grouse. Further, as previously described, flight activity within the Juniper Low MOA and Juniper East Low MOA would be limited to 249 total flight hours distributed throughout the combined approximately 5,000 square mile Low MOAs. Additionally, only 27 percent of those hours (i.e., approximately 68 flying hours) would be flown below 1,000 feet AGL. Consequently, maximum noise events resulting from direct aircraft overflights would be infrequent and of short duration. Additionally, in order to avoid impacts to the greater sage-grouse leks (i.e., aggregations of breeding males), the Oregon ANG would avoid greater sage-grouse core areas to the maximum extent practicable during the breeding season (i.e., 1 March to 31 May; Harrell 2008) and would only fly over these areas if it were necessary to accomplish the training mission. Consequently, the Proposed Action would have less than significant impacts on the greater sage-grouse.

#### *Other Federally Protected Species*

Though bald eagles are no longer listed under the federal ESA, and golden eagles have never been federally listed as threatened or endangered, these species are still protected under the Bald and Golden Eagle Protection Act (BGEPA), Migratory Bird Treaty Act, and Lacey Act. Activities that disturb foraging and breeding eagles such as aircraft activity can cause them to temporarily relocate from the area.

Existing MTRs – entirely separate from the Proposed Action – occur beneath the existing Juniper/Hart MOA Complex, and the proposed Redhawk MOA Complex. Eagles exposed to overflights within existing MTRs are expected to be

relatively habituated to the noise associated with low-altitude aircraft activities. Overflights may temporarily disturb some eagles, particularly those in the areas outside the corridors of existing MTRs, but they would be expected to acclimatize to low-altitude overflights or temporarily emigrate from the site during flight activities. Further, considering the large area within which aircraft would be operating, potential impacts would be distributed over a broad geography resulting in very few discrete occurrences of direct overflights resulting in maximum noise exposure. In light of the documented ability of eagles to adapt to low-level overflights, the Proposed Action is not likely to adversely affect bald or golden eagles (Lamp 1989; Ellis et al. 1991). The maximum noise level would be approximately 116 dB (refer to Table 3.2-2), but direct overflights would be infrequent and of very short duration.

Although the Proposed Action is unlikely to have significant impacts on bald and golden eagles, the USFWS expressed concerns during the scoping process over the potential for noise-related impacts on nesting pairs of bald eagles. The USFWS recommends avoiding flights below 1,000 feet AGL over these sites during the nesting season (USFWS 2013c). All airspace floors, with the exception of the proposed Juniper Low MOA and Juniper Low East MOA, would have minimum altitude limits for flights at 11,000 feet MSL which corresponds to approximately 4,500 feet AGL so there would be no potential for aircraft to be within 1,000 feet of a nest site. However, the minimum altitude limit for the Juniper Low MOA and Juniper East Low MOA would be 500 feet AGL under the Proposed Action, which would allow for an aircraft to potentially be within 1,000 feet of a nest site. Consequently, implementation of the Proposed Action would include special procedures to mitigate potential impacts to bald and golden eagles in areas underlying the proposed Juniper Low MOA and Juniper East Low MOA (see Section 6.0, *Special Procedures*).

The USFWS has determined that aircraft flights within 1,000 feet of eagle nesting sites during nesting season (1 January – 15 August) may cause disturbance to eagles and constitute “take” of the species. Take is defined as to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct,” and would require application and approval of an Incidental Take Permit from the USFWS. There are no recorded bald eagle nesting locations beneath the existing Juniper Low MOA (refer to Figure 3.4-2), therefore no

Incidental Take Permits are maintained or required for the existing airspace, which has an existing floor of 300 feet AGL. While there are currently 195 recorded golden eagle nesting sites below the existing Juniper Low MOA, at this time the USFWS has not formalized protection buffer distances and permit requirements (USFWS 2013c). However, as previously described, implementation of the Proposed Action would include special procedures to mitigate potential impacts to golden eagles in areas underlying the proposed Juniper Low MOA and Juniper East Low MOA (see Section 6.0, *Special Procedures*).

The expansion of the Juniper Low MOA would not extend the airspace area above any recorded bald eagle nesting locations (refer to Figure 3.4-2); therefore, an Incidental Take Permit would not be required at this time. However, the 500-foot AGL floor of the proposed Juniper Low MOA and Juniper East Low MOA would be within the recommended buffer distance for underlying golden eagle nests. Additionally, the floor of the proposed airspace may be within the 1,000 foot protection buffer distance for future bald eagle nesting locations below the airspace. Consequently, the Oregon ANG would comply with all USFWS requirements and would coordinate with the USFWS on an annual basis to identify eagle-related avoidance areas for low-altitude training activities (see Section 6.0, *Special Procedures*). In order to mitigate these potential impacts, the ANG proposes to implement the following mitigation measures:

- Establish buffer areas from surface to 1,000 feet AGL with a radius of 0.25 mile from mapped bald and golden eagle nests, and refrain from flying within these buffers from 1 January – 15 August;
- Coordinate with USFWS and ODFW to obtain current nesting information on an annual basis at the beginning of each nesting season, and adjust the bald and golden eagle nesting buffer areas accordingly; and
- Provide contact information for a website ([e.g., https://sua.faa.gov/sua/siteFrame.app](https://sua.faa.gov/sua/siteFrame.app)) where biologists studying and monitoring regional bald and golden eagle activity can check schedules for military sorties the Juniper/Hart MOA Complex prior to flying annual nest surveys within the airspaces.

### *State-listed Species*

The kit fox (*Vulpes macrotis*), gray wolf, and wolverine are state-listed threatened and endangered species with potential to occur beneath and within the existing Juniper/Hart MOA Complex airspace areas and proposed expansions thereof.

Impacts to state-listed species would be consistent with noise- and strike-related impacts discussed for federally listed species. Forest and shrub habitats underlying the airspaces would provide some shelter from noise exposure to species such as gray wolves, which prefer forested or shrubby environments. Wildlife species that occur in open grassland habitats, such as the kit fox, would be more exposed to noise impacts since there would be no vegetative buffer reducing aircraft-generated noise. However, many species in open habitats utilize subterranean burrows for shelter and protection from perceived or actual threats. Studies indicate that most secondary noise-related impacts appear to be minor and temporary and, when evaluated, did not cause acute effects on reproduction, mortality, or survivorship (Katona et al. 2000; Mancini et al. 1988; Lamp 1989; Ellis et al. 1991). Further, studies have shown the ability of many species to adapt and acclimate to the noise of aircraft overflights. Therefore, the Proposed Action would have no effect on state-listed species.

### Redhawk MOA Complex

#### *Federally listed Threatened and Endangered Species*

The federally threatened northern spotted owl, endangered gray wolf, and federal candidate Washington ground squirrel (*Urocitellus washingtoni*), have potential to occur in the area beneath the proposed Redhawk MOA Complex.

The approximate elevation between endangered wildlife and proposed aircraft activities is estimated to result in a maximum exposure of just over 90 dB during a direct overflight (AMEC 2013; please see Appendix E, *Noise*, for complete noise modeling criteria and results). Flight activity below 14,500 feet AGL would be limited to 367 flight hours, which would be distributed throughout the entire 6,500 square mile airspace area. Additionally, only 50 percent of those hours (i.e., approximately 184 flying hours) would be flown below 11,500 feet AGL down to 7,500 feet AGL. Consequently, short-term noise events reaching more than 90 dB



would be infrequent. Further, these events would be of short-duration. Therefore, the Proposed Action would have no effect on federally listed species below the proposed Redhawk MOA Complex.

#### *State-listed Species*

The state-listed gray wolf, wolverine, Washington ground squirrel, and northern spotted owl have the potential to occur beneath the proposed Redhawk MOA Complex.

Impacts to state-listed species would be consistent with noise- and strike-related impacts discussed for federally identified species. Forest and shrub habitats underlying the proposed airspaces would provide some shelter from noise exposure to species such as the gray wolf, wolverine, and northern spotted owl that prefer forested or shrubby environments. Wildlife species in open grassland habitats, such as the Washington ground squirrel, would be more exposed to noise impacts since there would be no vegetative buffer from aircraft generated noise. However, many species in open habitats utilize subterranean burrows for shelter and protection from perceived or actual threats. Studies indicate that most secondary noise-related impacts appear to be minor and temporary and, when evaluated, did not cause acute effects on reproduction, mortality, or survivorship (Katona et al. 2000; Mancini et al. 1988; Lamp 1989; Ellis et al. 1991). Further, studies have shown the ability of many species to adapt and habituate to the noise of aircraft overflights. Therefore, the Proposed Action would have no effect on state-listed species below the proposed Redhawk MOA Complex.

#### Indirect Impacts

##### *Fuel Dumping*

Under the Proposed Action, emergency fuel dumps could potentially occur during rare in-flight emergency circumstances involving increased loss of life potential for the pilot. However, such actions are not included on any established training syllabus and would only occur under extreme circumstances where human or aircraft survival is a concern (FAA Order JO 7110.65U Section 4, Fuel Dumping). Federal regulations require that fuel be dumped at an altitude of at least 10,000 feet AGL (see AFI 11-2F-15V3). This allows the fuel to evaporate and atomize

before it reaches the ground or surface water (American Petroleum Institute 2010). In the event of an in-flight emergency, Oregon ANG pilots are instructed to vent fuel above 10,000 feet AGL within a 20-mile arc of the installation over unpopulated areas to ensure complete dissipation of the fuel before it makes contact with the ground or water surface (see Section 4.8, *Hazardous Materials and Wastes*).<sup>8</sup> Due to the infrequent nature of fuel dumps as well as the in-place safety precautions, these emergency procedures are not likely to adversely affect sensitive habitats or special status species.

### *Chaff and Flare*

Current training operations within the existing airspace would be redistributed in newly established airspace under the Proposed Action (refer to Section 4.1, *Airspace Management*). All training activities under the Proposed Action – similar to existing conditions – would be limited strictly to flight training. Neither existing nor proposed training operations include discharge of ammunition or ballistic materials that could result in residual casings, spent rounds, or shells.

Materials released during training operations under the Proposed Action would be limited to defensive chaff and flare. Studies evaluating the environmental effects of the use of chaff and flare indicate that they are not likely to adversely affect special status wildlife for the following reasons (USAF 1997):

- Startle effects from chaff and flare deployment are minimal or insignificant relative to the noise of the aircraft;
- Birds and bats or other wildlife species are unlikely to be struck in flight or on the ground by debris from chaff or deployed flares due to the small amount and light-weight nature of materials ejected and the visibility of the flare; and
- Inhalation of flare combustion products or ingestion of chaff components would be unlikely on the ground surface and is unlikely to cause adverse effects because of the nontoxic nature of the materials at the concentrations to which terrestrial or aquatic wildlife could be expected to be exposed.

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<sup>8</sup> Catastrophic aircraft failure could result in the asset (i.e., aircraft) colliding with the ground surface or water before fuel is jettisoned. However, these instances are extremely rare, much more so than even the infrequent nature of fuel dumps. This has only happened once in the past 11 years, during a Class A mishap that occurred over the Pacific Ocean.

Further, studies evaluating the environmental effects of the use of chaff and flare indicate that they are not likely to adversely affect marine wildlife for the following reasons (USAF 1997; Arfsten et al. 2002; Hullar et al. 1999):

- Impacts resulting from the ingestion of chaff and flare material by marine mammals would be expected to be negligible based on the low concentrations of the materials when dispersed, the small size of chaff fibers (one millimeter in diameter, and 0.25 to two inches long), and the available data on the toxicity of chaff components (e.g., silicon dioxide and aluminum) as well as the evidence indicating the lack of significant accumulation of aluminum in sediments after prolonged training (National Oceanic and Atmospheric Administration [NOAA] 2011; USAF 2010).
- Silicon and aluminum are two of the most abundant geological elements. Marine mammals that forage on the bottom routinely ingest sediment containing these elements. Any increase in these elements as a result of chaff and flare use would be expected to be undetectable and consequently would not result in significant adverse impacts to marine mammals.
- In the very unlikely event that unconsumed chaff and flare components were encountered and ingested by a marine mammal, the small size of chaff end-caps and pistons (i.e., 1.3-inch diameter and 0.13-inch thick) suggest it would likely pass through the digestive tract and be voided without causing harm.

Evaluation of the potential for chaff to be inhaled by humans and large wildlife found that the fibers are too large to be inhaled into the lungs (USAF 1997).

The primary environmental concern related to flare use is the increased potential for wildland fire. However, flare use is not likely to cause a fire under normal fire hazard conditions (see Section 4.7, *Safety*). Additionally, extreme precautions are taken with the use of flares, particularly in times of high fire hazard conditions. The minimum altitude for flare release (i.e., 2,000 feet AGL) during periods of high fire hazard, can be raised, or use can be suspended entirely to alleviate the risk of flare-induced fires (Air National Guard Readiness Center [ANGRC] 2003). In order to minimize safety risks, including fire hazards, the Oregon ANG has elected to implement a floor of 5,000 feet AGL for flare use (see Section 3.7, *Safety*). Training operations involving the use of flares in newly established airspace under the Proposed Action would continue to observe this floor for flare use. Consequently, the use of flares would not be anticipated to result in a significant

fire hazard (see Section 4.7, *Safety*) or associated adverse impacts to terrestrial vegetation or wildlife.

#### 4.4.2.2 Alternative B: No Modifications to Eel ATCAA

Impacts from the selection of Alternative B would be consistent with impacts identified for the Proposed Action. However, under this alternative the existing Eel ATCAA would not be modified, therefore there would be no military flight activity within this airspace at altitudes lower than the existing floor of 27,000 feet MSL. Consequently, biological resources beneath the footprint of the Eel ATCAA would remain unchanged from their current conditions and would not experience the impacts described for the Proposed Action. As the operations intended for the Eel MOA Complex would be flown in the Redhawk MOA Complex under this alternative, impacts to biological resources below the Redhawk MOA Complex would increase slightly in severity relative to those described for the Proposed Action. As described in Section 4.2, *Noise*, while noise impacts would increase slightly under this alternative, given the marginal levels of increase, the implementation of Alternative B would have no increased effects on federally listed species below the proposed Redhawk MOA Complex.

#### 4.4.2.3 Alternative C: No Redhawk MOA Complex

Impacts from the selection of Alternative C would be consistent with impacts identified for the Proposed Action. However, under this alternative the Redhawk MOA Complex would not be established, therefore there would be no military flight activity within this airspace other than those existing operations along the existing MTRs – entirely separate from the Proposed Action. Within the proposed Redhawk MOA Complex, biological resources would remain unchanged from their current conditions. As the operations intended for the Redhawk MOA Complex would be flown in the Eel MOA/ATCAA Complex and the Juniper/Hart MOA Complex under this alternative, impacts to biological resources below these airspaces would increase slightly relative to those described for the Proposed Action. While the noise impacts would increase slightly under this alternative, given the marginal levels of increase, the implementation of Alternative C would have no increased effects on federally listed species below the proposed Eel MOA/ATCAA Complex or the Juniper/Hart MOA Complex.

#### 4.4.2.4 Alternative D: No Expansion of Juniper/Hart MOA Complex

Impacts from the selection of Alternative D would be consistent with impacts identified for the Proposed Action. However, under this alternative the existing Juniper/Hart MOA Complex, including the existing Juniper Low MOA, would not be expanded. There would be no military flight activity in the Juniper/Hart MOA Complex expansion area, other than those existing operations along the existing MTRs - entirely separate from the Proposed Action. Within the existing Juniper/Hart MOA Complex as well as the proposed Juniper/Hart MOA Complex expansion area, biological resources would remain unchanged from their current conditions and impacts to biological resources associated with Alternative D remain less than significant. As the 142 FW would utilize the Eel MOA/ATCAA Complex and the Redhawk MOA Complex for flights intended for the expanded Juniper/Hart MOA Complex, impacts to biological resources below the Eel MOA/ATCAA Complex and the Redhawk MOA Complex would increase slightly relative to those described for the Proposed Action. While the noise impacts would increase slightly in these airspace under this alternative, given the marginal levels of increase, the implementation of Alternative D would have no increased effects on federally listed species below these airspaces.

#### 4.4.2.5 No-Action Alternative

If the No-Action Alternative were selected, the Oregon ANG would not implement the Proposed Action and conditions would remain as described in Section 3.4, *Biological Resources*. No impacts to biological resources would result from the selection of the No-Action Alternative.

## **4.5 CULTURAL RESOURCES**

### **4.5.1 Approach to Analysis**

Cultural resources are subject to review under both federal and state laws and regulations. Section 106 of the NHPA of 1966, as amended, empowers the Advisory Council on Historic Preservation (ACHP) to comment on federally initiated, licensed, or permitted projects that have the potential to affect cultural sites listed or eligible for inclusion in the National Register of Historic Places (NRHP).

Once cultural resources have been identified, the evaluation of their significance is the process by which those resources are assessed in the context of significance criteria for scientific or historic research, for the general public, and for traditional cultural groups (e.g., Native American Tribes). Only cultural resources determined to be significant (i.e., eligible for inclusion in the NRHP) are protected under the NHPA.

Analyses of potential impacts to cultural resources consider both direct and indirect impacts. Direct impacts may occur by any of the following: 1) physically altering, damaging, or destroying all or part of a resource; 2) altering the characteristics of the surrounding environment that contribute to resource significance; 3) introducing visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or 4) neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts can be assessed by identifying the locations of disturbance and determining if the action would coincide with the locations of identified significant cultural resources and thereby have the potential to result in a direct, adverse impact to that cultural resource.

Indirect impacts can result from the effects of project-induced changes in the local communities or environment. These activities can disturb or destroy cultural resources.

An analysis of potential impacts to historic structures and Traditional Cultural Properties is provided below. Potential impacts to National Historic Trails and other sensitive land uses are provided in Section 3.4, *Land Use and Visual Resources*.

## **4.5.2 Impacts**

### **4.5.2.1 Proposed Action**

Implementation of the Proposed Action would only involve changes to airspace, and would not include any project components that would touch or otherwise directly affect the ground surface. Archaeological resources such as surface or subsurface artifacts or other intact cultural deposits would not be disturbed since there would be no ground-disturbing activities (e.g., construction or demolition) associated with any project components included in the Proposed Action. Consequently, the only potential effects of the Proposed Action on cultural resources underlying the affected or proposed airspaces would result from noise and/or noise generated vibrations, or the visual impact of military overflights within the affected and proposed airspace. Consultation with the Oregon, Washington, and Nevada State Historic Preservation Offices (SHPOs) began on 7 June 2013.<sup>9</sup> The Oregon, Washington, and Nevada SHPOs have responded to requests to review the Draft EIS during the public comment period and have concurred with its findings, closing consultation under Section 106 of the NHPA (see Appendix B, *Public Involvement and Agency Correspondence*). For a detailed description of impacts to visual resources, refer to Section 4.3, *Land Use and Visual Resources*.

### **Indirect Impacts to Historic Structures**

The footprint of the proposed W-570 Complex is located entirely over the Pacific Ocean, with no cultural resources identified on the sea surface below the airspace. Therefore, there would be no potential for adverse effects to cultural or historic resources associated with modifications to the W-570 airspace or Bass ATCAAs under the Proposed Action. Table 3.2-2 provides corresponding noise levels at various flight altitudes. All noise levels were calculated using a conservative, worst-case scenario of continuous flight activity using power settings and thruster and afterburner engagement used during aircraft takeoff (i.e.,  $L_{max}$ , refer to Section 3.2, *Noise* and see Appendix E, *Noise*). However, as described in Section 3.2, *Noise*

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<sup>9</sup> While a small portion of the existing Hart South MOA/ATCAA is located over Modoc County, California, there are no proposed changes to the boundaries of or operations within this airspace segment. Consequently, the California SHPO was not included in scoping for the Proposed Action.

flight operations within an airspace are not patterned, and therefore the location events that would cause these noise levels are unpredictable and would be distributed throughout the airspace.

Counties affected by the modification of the existing Eel ATCAA include portions of Clatsop, Tillamook, Yamhill, and Lincoln counties in coastal Oregon as well as a small area of Pacific County in Washington.

Under the Proposed Action, the floor of the proposed Eel MOA/ ATCAA Complex would be established at 11,000 feet MSL (approximately 9,000 feet AGL), which would correlate with maximum noise levels between 87 dB and 90 dB at the ground surface (refer to Table 3.2-2). Consequently, there would be no potential for structural damage to historical structures located beneath this airspace complex, which can occur at approximately 130 dB (Wyle 2008; National Research Council/National Academy of Sciences 1977). Additionally, while individual flyover events may result in noticeable noise levels at the ground surface, due to the altitude and frequency of these events, historic properties would not be subject to significant increases in average noise levels (refer to Section 4.2, *Noise*); therefore, there would be no significant adverse effect to the feeling or atmosphere of historic structures located beneath this airspace complex.

The counties affected by the establishment of the proposed Redhawk MOA Complex would include portions of Sherman, Gilliam, Morrow, Grant, Wheeler, Jefferson, and Wasco counties in central Oregon. Existing military operations within this area include flights along existing MTRs – entirely separate from the Proposed Action – that are linearly routed beneath the proposed Redhawk MOA Complex. However, no existing training airspace is established within this area that currently allows for un-routed training exercises. The proposed establishment of the Redhawk MOA Complex would allow military training operations in the region at altitudes between 11,000 feet MSL (approximately 7,500 feet AGL) and FL 230 (23,000 feet MSL). Flight operations at this airspace floor would correlate with maximum noise levels between 87 dB and 90 dB (refer to Table 3.2-2), which would be substantially lower than the noise exposure threshold associated with the potential to cause damage to historic structures (i.e., 130 dB). Additionally, while individual flyover events may result in noticeable noise levels at the ground surface, due to the altitude and frequency of these events historic properties would



not be subject to significant increases in average noise levels (refer to Section 4.2, *Noise*). Therefore, there no adverse effect to existing historic structures would be expected below the proposed Redhawk MOA Complex.

Counties affected by the expansion of the Juniper/Hart MOA Complex in eastern Oregon would include portions of Harney County in Oregon and Humboldt and Washoe counties in northwestern Nevada. The floor of military operations, excluding the existing Juniper Low MOA and proposed Juniper East Low MOA, would be established at 11,000 feet MSL (approximately 4,500 feet AGL). Flight operations at this airspace floor would correlate with maximum noise levels less than 98 dB (refer to Table 3.2-2), which would be substantially lower than the noise exposure threshold associated with the potential to cause damage to historic structures. Additionally, while individual flyover events may result in noticeable noise levels at the ground surface, due to the altitude and frequency of these events historic properties would not be subject to significant increases in average noise levels (refer to Section 4.2, *Noise*). Therefore, no adverse effect to existing historic structures would be expected beneath the proposed Juniper/Hart MOA Complex, excluding the existing Juniper Low MOA as well as the proposed Juniper East Low MOA.

Under the Proposed Action, the floor of the existing Juniper Low MOA would be raised from 300 feet AGL to 500 feet AGL and the proposed Juniper East Low MOA would be established at 500 feet AGL. Based on the calculations presented in Table 3.2-2, aircraft operations within the existing Juniper Low MOA and proposed Juniper East Low MOA would have the greatest potential to generate noise at levels high enough to cause vibration-related structural damage to historic structures. The noise level exposure identified in Table 3.2-2 corresponds to a worst-case scenario of a military aircraft flying at 500 feet AGL using the same power settings, and thruster and afterburner engagement as is used during aircraft takeoff. Based on these assumptions, a sensitive receptor beneath an aircraft would be exposed to maximum noise levels (and associated vibration measurements) of 116 dB. However, as described in Section 3.5, *Cultural Resources*, Wyle (2008) and the National Research Council/National Academy of Sciences (1977) have determined that this noise level would not be great enough to cause vibration-related structural damage to historic structures. Therefore, noise or vibration-related impacts to historic structures located beneath the existing Juniper Low

MOA or proposed Juniper East Low MOA would not be expected under the Proposed Action.

#### Tribal Concerns

Since the initiation of the ANG's EIAP, consultation with federally recognized Native American representatives has been underway to identify land, structures, or resources potentially of concern related to the Proposed Action (see Appendix H, *Tribal Outreach*). The Coquille Tribe has responded to outreach efforts with an acknowledgement letter confirming the tribe has no objections or comments regarding the Proposed Action. The Warm Springs Tribe has responded to outreach by requesting additional information and clarification on land disturbances; however, no comments regarding objections or concerns were received. Additional information was sent to the Warm Springs Tribe and coordination is ongoing. Appendix H, *Tribal Outreach* summarizes all correspondence between the project proponents and affected Native American Tribes.

Based on noise level calculations for tribal lands beneath the affected and proposed airspaces as well as feedback received in response to outreach to Native American representatives, no adverse effect to cultural resources, historic structures, or Traditional Cultural Properties would be expected as a result of the implementation of the Proposed Action.

#### Indirect Impacts

Additional indirect or induced impacts to cultural resources would not be anticipated under the Proposed Action.

#### 4.5.2.2 Alternative B: No Modifications to the Eel ATCAA

Impacts resulting from the selection of Alternative B would be consistent with impacts identified for the Proposed Action. However, under this alternative the existing Eel ATCAA would not be modified, therefore there would be no military flight activity within this airspace at altitudes lower than the existing floor of FL 270 (27,000 feet MSL). As the operations intended for the Eel MOA Complex

would be flown in the Redhawk MOA Complex under this alternative, noise impacts to historic structures below the Redhawk MOA Complex would increase slightly relative to those described for the Proposed Action. While the noise impacts would increase slightly under this alternative, given the marginal levels of increase, areas beneath the proposed Redhawk MOA Complex and Juniper/Hart MOA Complex would not experience maximum noise levels that would result in potential adverse effects on historic structures. Consequently, cultural resources would remain unchanged from their current conditions and no adverse effects would be expected.

#### 4.5.2.3 Alternative C: No Redhawk MOA Complex

Impacts resulting from the selection of Alternative C would be consistent with impacts identified for the Proposed Action. However, under this alternative the Redhawk MOA Complex would not be established, therefore there would be no military flight activity within this airspace other than those existing operations along the existing MTRs - entirely separate from the Proposed Action. As the operations intended for the Eel MOA Complex would be flown in the proposed Eel MOA/ATCAA Complex and Juniper/Hart MOA Complex under this alternative, noise impacts to historic structures below these airspaces would increase slightly relative to those described for the Proposed Action. While the noise impacts would increase slightly under this alternative, given the marginal levels of increase, areas beneath the proposed Eel MOA/ATCAA Complex and Juniper/Hart MOA Complex would not experience maximum noise levels that would result in potential adverse effects on historic structures. Consequently, cultural resources would remain unchanged from their current conditions and no adverse effects would be expected.

#### 4.5.2.4 Alternative D: No Expansion of Juniper/Hart MOA Complex

Impacts resulting from the selection of Alternative D would be consistent with impacts identified for the Proposed Action. However, under this alternative the existing Juniper/Hart MOA Complex, including the existing Juniper Low MOA, would not be expanded. There would be no military flight activity in the Juniper/Hart MOA Complex expansion area, other than those existing operations along the existing MTRs - entirely separate from the Proposed Action. As the

operations intended for the Juniper/Hart MOA Complex would be flown in the proposed Eel MOA/ATCAA Complex and Redhawk MOA Complex under this alternative, noise impacts to historic structures below these airspaces would increase slightly relative to those described for the Proposed Action. While the noise impacts would increase slightly under this alternative, given the marginal levels of increase, areas beneath the proposed Eel MOA/ATCAA Complex and Redhawk MOA Complex would not experience maximum noise levels that would result in potential adverse effects on historic structures. Consequently, cultural resources would remain unchanged from their current conditions and no significant impacts would be expected.

#### 4.5.2.5 No-Action Alternative

If the No-Action Alternative were selected, the Oregon ANG would not implement the Proposed Action and conditions would remain as described in Section 3.5, *Cultural Resources*. No impacts to cultural resources would result from the selection of the No-Action Alternative.

## 4.6 AIR QUALITY

### 4.6.1 Approach to Analysis

The 1990 Amendments to the Clean Air Act (CAA) require that federal agency activities conform to the State Implementation Plan (SIP) with respect to achieving and maintaining *attainment* of National Ambient Air Quality Standards (NAAQS) and addressing air quality impacts. Consistent with FAA Order 1050.1E, Change 1, an air quality impact would be considered significant if it would exceed one or more of the NAAQS for any of the time periods analyzed. The USEPA General Conformity Rule requires that a conformity analysis be performed which demonstrates that a proposed action does not: 1) cause or contribute to any new violation of any NAAQS in the area; 2) interfere with provisions in the SIP for maintenance or attainment of any NAAQS; 3) increase the frequency or severity of any existing violation of any NAAQS; or 4) delay timely attainment of any NAAQS, any interim emission reduction, goals, or other milestones included in the SIP. Provisions in the General Conformity Rule allow for exemptions from performing a conformity determination only if total emissions of individual *nonattainment* area pollutants resulting from the Proposed Action fall below the significant threshold values.

With respect to the General Conformity Rule, effects on air quality would be considered significant if a proposed action would result in an increase of the Regional Emissions Inventory above the *de minimis* threshold levels established in 40 Code of Federal Regulations (CFR) §93.153(b) for individual nonattainment or maintenance pollutants.

### 4.6.2 Impacts

As a part of the scoping process for the EIAP, the USEPA, Oregon Department of Environmental Quality, and Nevada Division of Environmental Protection were contacted on 7 June 2013 requesting the identification of any potential issues relevant to air quality monitoring or regulatory conditions under their purview. No responses were received from the Oregon Department of Environmental Quality or the Nevada Division of Environmental Protection; however, the USEPA

requested an analysis of the effects of the Proposed Action on air quality, which has been prepared and is provided below.

The following air quality analysis is based on air quality modeling conducted to determine the total emissions and concentrations of pollutants associated with aircraft operations within the affected and proposed SUA; these data were then compared to existing military aircraft-related criteria pollutant emissions within the affected and proposed SUA. The analytical parameters considered in this analysis included aircraft type, proposed aircraft operations, and a conservative estimate of the amount of time spent within each airspace block (see Appendix F, *Air Quality*).

#### 4.6.2.1 Proposed Action

Implementation of the Proposed Action would neither increase the number of aircraft departures or arrivals to or from either the 142 FW or the 173 FW, nor would it result in an increase in the total number of allocated annual flight hours for either unit. Increases in training hours under the Proposed Action would be offset by an overall reduction in transit time to weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex.<sup>10</sup> The fuel savings realized by the establishment and expansion of more local SUA would be reallocated to training activities conducted during sorties and would not translate into an increase in operations tempos at either unit's home airfield. The Proposed Action would increase the total amount of airspace available for aircraft operation, which would result in existing emissions being distributed over larger areas and diluted within existing airspace. Consequently, the concentration of pollutants generated by mobile sources would be reduced even though the actual quantity of mobile source emissions would not change.

Emission composition and the total quantity of criteria pollutant emissions from fuel combustion and chaff and flare use would remain the same as is described in Section 3.6, *Air Quality*. No additional chemicals, additives or substances would

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<sup>10</sup> As described in Section 4.1, *Airspace Management*, decreases in transit time were not modeled as transit hours are flown under IFR and outside of the ROI.

be introduced to the existing inventory of fuel or chaff and flare used by the Oregon ANG.

Implementation of the Proposed Action would affect multiple counties in Oregon, Washington, and Nevada. All counties below the proposed Eel MOA/ATCAA Complex and W-570 Complex as well as the Redhawk MOA Complex, with the exception of Polk County, are in attainment for all criteria pollutants. The attainment status for counties below the proposed Juniper/Hart MOA Complex, including the Juniper/Hart MOA Complex expansion area is summarized in Table 4.6-1.

**Table 4.6-1. Juniper/Hart MOA Complex NAAQS Attainment Status**

| County       | Pollutant |                 |                 |                |                   |                  |    |
|--------------|-----------|-----------------|-----------------|----------------|-------------------|------------------|----|
|              | CO        | SO <sub>x</sub> | NO <sub>x</sub> | O <sub>3</sub> | PM <sub>2.5</sub> | PM <sub>10</sub> | Pb |
| Harney, OR   | A         | A               | A               | A              | A                 | A                | A  |
| Humboldt, NV | A         | A               | A               | A              | A                 | A                | A  |
| Washoe, NV   | M         | A               | A               | A              | A                 | N                | A  |

Notes: A - Attainment; N - Nonattainment; M - Maintenance  
Source: USEPA 2016.

While Harney County and Humboldt County are in attainment for all criteria pollutants Washoe County is in nonattainment for particulate matter equal to or less than ten microns in diameter (PM<sub>10</sub>) and has a maintenance status for carbon monoxide (CO). Maintenance status is a designation to prevent backsliding and is a federally enforceable part of Oregon's SIP. An Applicability Analysis was performed for Polk County and Washoe County. For additional information refer to the General Conformity discussion below.

#### Eel MOA and W-570

Total flight hours, sortie counts, and chaff and flare use within the proposed Eel MOA/ATCAA Complex and W-570 would not differ from the existing activities described in Section 3.6, Air Quality. However, under the Proposed Action total training hours within the proposed Eel MOA/ATCAA Complex and W-570 Complex would increase slightly due to the expanded training airspace (refer to Table 2-2 and Section 4.1, Airspace Management) and reduced transit time to weather backup and over-land training airspace, as the proposed Eel MOA

Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex. Under the Proposed Action the concentration of each pollutant within the existing airspace would decrease within the proposed Eel MOA/ATCAA Complex and W-570 Complex as training operations would occur throughout the airspace utilizing newly available altitude blocks and diluting emissions. Table 4.6-2 compares the existing pollutant concentrations and concentrations of pollutants under implementation of the Proposed Action. The existing volume of the W-570 airspace area is approximately 236,829 cubic kilometers (km<sup>3</sup>). The volume of the proposed Eel MOA and W-570 under the Proposed Action would be approximately 258,353 km<sup>3</sup>.

**Table 4.6-2. Concentration of Pollutants in Proposed Eel MOA and W-570**

| Pollutant       | Existing Total Emissions (tpy) | Concentration of Pollutant in Existing W-570 Airspace (µg/m <sup>3</sup> ) | Proposed Total Emissions (tpy) | Concentration of Pollutant in Proposed Airspace (µg/m <sup>3</sup> ) |
|-----------------|--------------------------------|----------------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------|
| CO              | 12.30                          | 0.047                                                                      | 11.42                          | 0.040                                                                |
| VOCs            | 1.37                           | 0.005                                                                      | 1.27                           | 0.004                                                                |
| SO <sub>x</sub> | 13.67                          | 0.052                                                                      | 12.70                          | 0.045                                                                |
| PM              | 4.65                           | 0.018                                                                      | 4.32                           | 0.015                                                                |
| NO <sub>x</sub> | 369.07                         | 1.414                                                                      | 342.79                         | 1.204                                                                |
| HAPs            | 0.53                           | 0.002                                                                      | 0.75                           | 0.003                                                                |

Notes: While the Proposed Action would result in mobile NO<sub>x</sub> emissions greater than 100 tons per year (tpy), these emissions would be spread throughout the entire airspace complex. Further, these emissions would occur above the average mixing height of 3,000 feet AGL (see *General Conformity* discussion).

Source: AMEC 2013; Please see Appendix F, *Air Quality* for full air quality modeling criteria and results.

Under the Proposed Action, the proposed modification of the W-570 airspace areas and the establishment of the Eel MOAs would not increase pollutant emissions or increase the likelihood of a source emitting pollutants exceeding one or more of the NAAQS for any of the time periods analyzed. Additionally, a study conducted by the FAA determined that aircraft operations at or above the average mixing height of 3,000 feet AGL have a negligible effect on ground level concentrations and could not directly result in a violation of the NAAQS in a local area (FAA 2000) (see Appendix F, *Air Quality*, for additional information). Therefore, the Proposed Action would not have a significant impact on air quality in these airspace areas.



### Juniper/Hart MOA Complex

Total flight hours, sortie counts, and chaff and flare use within the Juniper/Hart MOA Complex would not differ from the existing activities described in Section 3.6, *Air Quality*. However, under the Proposed Action total training hours within the existing Juniper Hart MOA Complex would be reduced as these operations would be redistributed within the proposed Juniper/Hart MOA Complex expansion area (refer to Table 2-2 and Section 4.1, *Airspace Management*). Consequently, as the proposed Juniper/Hart MOA Complex expansion area would increase the total available training airspace, air emissions within the existing Juniper/Hart MOA Complex would be slightly reduced. Military aircraft-related emissions would increase slightly within the proposed Juniper/Hart MOA Complex expansion area; however, as training operations would occur throughout the airspace complex utilizing newly available altitude blocks in newly established airspace, air emissions throughout the entire Juniper/Hart MOA Complex would be diluted (i.e., the concentration of pollutants would be reduced). Table 4.6-3 compares the existing pollutant concentrations and concentrations of pollutants after implementation of the Proposed Action.

**Table 4.6-3. Concentration of Pollutants in Proposed Juniper/Hart MOA Complex**

| Pollutant       | Existing Total Emissions (tpy) | Concentration of Pollutant in Existing Airspace ( $\mu\text{g}/\text{m}^3$ ) | Proposed Total Emissions (tpy) | Concentration of Pollutant in Proposed Airspace ( $\mu\text{g}/\text{m}^3$ ) |
|-----------------|--------------------------------|------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------|
| CO              | 22.63                          | 0.179                                                                        | 17.22                          | 0.107                                                                        |
| VOCs            | 2.52                           | 0.020                                                                        | 1.92                           | 0.012                                                                        |
| SO <sub>x</sub> | 25.151                         | 0.199                                                                        | 19.14                          | 0.119                                                                        |
| PM              | 8.56                           | 0.068                                                                        | 6.51                           | 0.041                                                                        |
| NO <sub>x</sub> | 679.01                         | 5.371                                                                        | 516.76                         | 3.226                                                                        |
| HAPs            | 1.52                           | 0.012                                                                        | 1.29                           | 0.008                                                                        |

Notes: While the Proposed Action would result in mobile NO<sub>x</sub> emissions greater than 100 tpy, these emissions would be spread throughout the entire airspace complex. Further, these emissions would occur within attainment areas (Juniper Low MOA and Juniper East Low MOA) or above the average mixing height of 3,000 feet AGL (see *General Conformity* discussion).

Source: AMEC 2013; Please see Appendix F, *Air Quality* for full air quality modeling criteria and results.

The volume of the existing Juniper/Hart MOA Complex is 114,672 km<sup>3</sup>. The volume of the proposed Juniper/Hart MOA Complex, including the proposed Juniper/Hart MOA Complex expansion area, would be 145,339 km<sup>3</sup>.

The proposed modification and establishment of the Juniper/Hart airspace areas would not increase emission of a pollutant or the potential of a source to emit pollutants exceeding one or more of the NAAQS for any of the time periods analyzed. Additionally, a study conducted by the FAA determined that aircraft operations at or above the average mixing height of 3,000 feet AGL have a negligible effect on ground level concentrations and could not directly result in a violation of the NAAQS in a local area (FAA 2000) (see Appendix F, *Air Quality*, for additional information). Therefore, the proposed modification of the existing Juniper/Hart MOA Complex and establishment of the proposed Juniper/Hart MOA Complex, including the Juniper/Hart MOA Complex expansion area, would not have a significant impact on air quality.

#### Redhawk MOA Complex

Under the Proposed Action, the Redhawk MOA Complex would be established as military training airspace and air-to-air F-15 training exercises would be introduced to the area. Utilization of the airspace would be consistent with schedule of operations and the description of training activities described in Section 2.0, *Description of Proposed Action and Alternatives*. Table 4.6-4 provides a summary and comparison of military aircraft-related emissions and pollutant concentrations under existing conditions and the implementation of the Proposed Action. The emissions estimates were generated using the proposed airspace volume of 200,667 km<sup>3</sup>, and the proposed total training time of 367 flight hours (refer to Table 2-4).

**Table 4.6-4. Concentration of Pollutants in Proposed Redhawk MOA Complex**

| Pollutant       | Existing Total Emissions (tpy) | Concentration of Pollutant in Existing Airspace ( $\mu\text{g}/\text{m}^3$ ) | Proposed Total Emissions (tpy) | Concentration of Pollutant in Proposed Airspace ( $\mu\text{g}/\text{m}^3$ ) |
|-----------------|--------------------------------|------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------|
| CO              | 0.0                            | 0.0                                                                          | 3.49                           | 0.016                                                                        |
| VOCs            | 0.0                            | 0.0                                                                          | 0.39                           | 0.001                                                                        |
| SO <sub>x</sub> | 0.0                            | 0.0                                                                          | 3.88                           | 0.018                                                                        |
| PM              | 0.0                            | 0.0                                                                          | 1.32                           | 0.006                                                                        |
| NO <sub>x</sub> | 0.0                            | 0.0                                                                          | 104.54                         | 0.474                                                                        |
| HAPs            | 0.0                            | 0.0                                                                          | 0.20                           | 0.001                                                                        |

Notes: While the Proposed Action would result in mobile NO<sub>x</sub> emissions greater than 100 tpy, these emissions would be spread throughout the entire airspace complex. Further, these emissions would occur above the average mixing height of 3,000 feet AGL (see General Conformity discussion).

Source: AMEC 2013; Please see Appendix F, *Air Quality* for full air quality modeling criteria and results.

A study conducted by the FAA concluded that aircraft operations at or above the average mixing height of 3,000 feet AGL have a negligible effect on ground level concentrations and could not directly result in a violation of the NAAQS in a local area (FAA 2000) (see Appendix F, *Air Quality*, for additional information). Therefore, while establishment of the Redhawk MOA Complex would introduce new military aircraft related criteria pollutant emissions, the Proposed Action would not increase emission of a pollutant or the potential of a source to emit pollutants exceeding one or more of the NAAQS for any of the time periods analyzed. Accordingly, the establishment of the Redhawk MOA Complex under the Proposed Action would not have a significant impact on air quality.

#### Summary of Impacts to Air Quality

Under the Proposed Action, the total number of annual allocated flight hours would not change relative to existing conditions. Increases in training hours under the Proposed Action would be offset by an overall reduction in transit time to weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex. Consequently, the total military aircraft-related emissions, including transit and training operations, would not change following implementation of the Proposed Action. The quantity of criteria pollutants within each of the existing airspaces would decrease or remain the same and the

concentration of pollutants within each of the existing airspace complexes (i.e., Eel MOA and Juniper/Hart MOA Complex) would decrease due to redistribution of flights within new airspace areas and altitude blocks. Within newly established airspaces (e.g., Redhawk MOA Complex) the total military aircraft-related criteria pollutant emissions would slightly increase due to new flight activities. However, pollutant concentrations within each airspace would not exceed the NAAQS thresholds; therefore, there would be a less than significant impact associated with the Proposed Action.

#### General Conformity

As described above, only Polk County, Oregon and Washoe County, Nevada are in *nonattainment* or *maintenance* for at least one criteria pollutant. However, the proposed airspace above these counties would be established at 11,000 feet MSL under the Proposed Action. The FAA conducted a study of ground level concentrations caused by elevated aircraft emissions at altitude using USEPA-approved models and conservative assumptions. The study concluded that aircraft operations at or above the average mixing height of 3,000 feet AGL have a negligible effect on ground level concentrations and could not directly result in a violation of the NAAQS in a local area (FAA 2000). Therefore, USEPA's final rule (40 CFR §93.153) exempts as *de minimis* aircraft emissions above the 3,000 foot AGL mixing height, including the subject mobile aircraft emissions resulting from the implementation of the Proposed Action.<sup>11</sup> All other proposed airspaces would be established over counties that are in *attainment* for all criteria pollutants. Consequently, a General Conformity Determination would not be needed for the Proposed Action (see Appendix F, *Air Quality*).

#### Greenhouse Gas Emissions

Under the Proposed Action, the total number of annual allocated flight hours would not change relative to existing conditions. Increases in training hours under the Proposed Action would be offset by an overall reduction in transit time to weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer to the 142 FW

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<sup>11</sup> Oregon, Washington, and Nevada SIPs do not specify a mixing height, consequently 3,000 feet AGL has been used per 40 CFR §93.153.

installation in Portland than the Juniper/Hart MOA Complex. Consequently, the total Oregon ANG aircraft-related greenhouse gas (GHG) emissions, measured in terms of carbon dioxide equivalent (CO<sub>2</sub>e) would not change following implementation of the Proposed Action.<sup>12</sup> Consequently, the Proposed Action would not have any measurable impacts on climate change.

In addition, the Proposed Action would not result in any construction-related activities that would locate new facilities in areas susceptible to the effects of climate change (e.g., increased risk of wildfire risk, increased potential for inundation from severe storm events or sea level rise). Consequently, climate change would have no impact on the Proposed Action.

#### Indirect Impacts

Additional indirect or induced impacts to air quality would not be anticipated under the Proposed Action.

#### 4.6.2.2 Alternative B: No Modification of Eel ATCAA

Impacts resulting from the selection of Alternative B would be consistent with impacts identified for the Proposed Action. However, under this alternative the existing Eel ATCAA would not be modified, therefore there would be no military flight activity within this airspace at altitudes lower than the existing floor of FL 270 (27,000 feet MSL). While the 173 FW operations described for the Proposed Action would remain the same, the 142 FW operations that would have been assigned to the Eel MOAs under the Proposed Action would be assigned to the Redhawk MOA Complex. Under this alternative, the overall quantity of greenhouse gas emissions and impacts relevant to climate change would remain identical to those described for the Proposed Action. Additionally, while air quality impacts within the Redhawk MOA Complex would increase slightly due to additional flight activity, the overall impact to air quality would remain consistent with the Proposed Action as the military aircraft-related criteria

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<sup>12</sup> Carbon dioxide equivalent (CO<sub>2</sub>e) is a standard unit for measuring carbon footprints. CO<sub>2</sub>e is intended to capture the impact of each different greenhouse gas (e.g., CH<sub>4</sub>, N<sub>2</sub>O, CFCs, HCFCs, etc.) in terms of the amount of CO<sub>2</sub> that would create the same amount of warming.

pollution emissions would remain below NAAQS thresholds. Consequently, there would be a less than significant impact to air quality.

#### 4.6.2.3 Alternative C: No Redhawk MOA Complex

Impacts resulting from the selection of Alternative C would be consistent with impacts identified for the Proposed Action. However, under this alternative the Redhawk MOA Complex would not be established, therefore there would be no military flight activity within this airspace other than those existing operations along the existing MTRs – entirely separate from the Proposed Action. The 173 FW operations described for the Proposed Action would remain the same under this alternative; however, approximately 30 percent of proposed 142 FW utilization of the Redhawk MOA Complex would be redistributed to the Eel MOAs while approximately 70 percent would be relocated to the Juniper/Hart MOA Complex. Consequently, military aircraft-related air quality impacts under the Proposed Action would not occur in the area beneath the Redhawk MOA Complex and would be slightly increased in the area beneath the Eel MOAs and the Juniper/Hart MOA Complex. Under this alternative, overall greenhouse gas emissions and impacts to climate change would remain identical to those described for the Proposed Action. Additionally, the impacts to air quality would remain consistent with the Proposed Action as the military aircraft-related criteria pollution emissions would remain below NAAQS thresholds. Consequently, there would be a less than significant impact to air quality.

#### 4.6.2.4 Alternative D: No Expansion of Juniper/Hart MOA Complex

Impacts resulting from the selection of Alternative D would be consistent with impacts identified for the Proposed Action. Under Alternative D, the 173 FW operations within the existing Juniper/Hart Complex would remain the same as described for the baseline conditions. The 142 FW would continue to operate within the existing Juniper/Hart MOA Complex; however, operations within this airspace would be reduced due to the establishment of the Redhawk MOA Complex. Consequently, military aircraft-related air quality impacts under the Proposed Action would not occur in the area beneath the proposed Juniper/Hart MOA Complex expansion area and would be slightly increased in the area beneath the Redhawk MOA Complex. Under this alternative, overall greenhouse gas

emissions and impacts to climate change would remain identical to those described for the Proposed Action. Additionally, the impacts to air quality would remain consistent with the Proposed Action as the military aircraft-related criteria pollution emissions would remain below NAAQS thresholds, and there would be a less than significant impact to air quality.

#### 4.6.2.5 No-Action Alternative

If the No-Action Alternative were selected, the Oregon ANG would not implement the Proposed Action and conditions would remain as described in Section 3.6, *Air Quality*. No impacts to air quality would result from the selection of the No-Action Alternative.

## **4.7 SAFETY**

### **4.7.1 Approach to Analysis**

If implementation of the Proposed Action would substantially increase risks associated with aircraft mishap potential or flight safety relevant to the public or the environment, it would represent a significant impact. For example, if an action involved an increase in aircraft operations such that mishap potential would increase substantially, air safety would be compromised and impacts would be significant.

Changes in flight tracks or missions can also result in impacts to safety if the Proposed Action would increase the risk of bird strikes. The BASH risk is determined by comparing BASH data for the routes previously flown to data projected to occur based on conditions following implementation of the Proposed Action.

Implementation of the Proposed Action would not result in any changes at the 142 FW or 173 FW installations, including their respective facilities and airfields. Therefore, an assessment of safety implications that are typically addressed in National Environmental Policy Act (NEPA)-compliant documentation (e.g., incompatible land use with regard to criteria such as Runway Protection Zones [RPZs], quantity-distance [QD] arcs, or Anti-Terrorism/Force Protection [AT/FP] standards) is not included in this EIS.

### **4.7.2 Impacts**

#### **4.7.2.1 Proposed Action**

##### BASH and Mishap Hazards

Implementation of the Proposed Action would result in the establishment and use of the Redhawk MOA complex and would increase the area and volume of the existing W-570, Bass/Bass South ATCC, Eel ATCAA, and Juniper/Hart airspace areas. This action would increase the amount of overlap between training space and potential bird flight paths within the Pacific Flyway (refer to Section 3.7, *Safety* and Figure 3.7-1). However, the total number of sorties would not change from



existing conditions (i.e., the number of flight training hours authorized would be unchanged) and operations within the proposed airspace areas would generally present the same risk of in-flight bird collision as those occurring within existing airspace areas. Additionally, the 142 FW and the 173 FW would continue to implement their respective BASH plans, which would include evaluation of BASH hazards within the training airspaces on a mission-by-mission basis as well as continued BASH-related pilot briefings (refer to Section 3.7, *Safety*). Consequently, while new airspace areas would be established and existing airspace would be expanded under the Proposed Action, the overall activity levels associated with Oregon ANG pilot training would not increase; therefore, BASH risk would not be expected to increase substantially relative to existing conditions.

**Table 4.7-1. Number of Mishaps per Year at the 142 FW and 173 FW**

| Installation | Existing Flight Hours | Proposed Flight Hours | Proposed and Existing      |                            |
|--------------|-----------------------|-----------------------|----------------------------|----------------------------|
|              |                       |                       | Class A mishaps (per year) | Class B mishaps (per year) |
| USAF-wide    | -                     | -                     | 1.88                       | 4.97                       |
| 142 FW*      | 2,602                 | 3,093                 | 0.06                       | 0.15                       |
| 173 FW       | 2,434                 | 2,434                 | 0.05                       | 0.12                       |

Note: \*The number of flight hours has been calculated for the amount of time flown within the boundaries of the existing airspace areas. The difference between existing and proposed flight hours for the 142 FW is attributed to the *decreased* amount of transit time (i.e., time spent traveling to and from the training airspace). When both transit time and training time is considered, the total amount of existing and proposed flight hours for the 142 FW would be equal.

Source: Oregon ANG 2013b.

As previously described, mishap rates are calculated per 100,000 hours of flying time. Under implementation of the Proposed Action, the total number of flight hours flown by the 142 FW and the 173 FW would not change. Increases in training hours under the Proposed Action would be offset by an overall reduction in transit time to weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex. Additionally, the 142 FW and 173 FW would continue to implement the same in-flight safety protocols, including see-and-avoid tactics, as described in Section 3.7, *Safety*. Further, the proposed airspace floors would not be interrupted or penetrated by surface objects, and aircraft would not be flown at altitudes below 500 feet AGL under any circumstances; in fact, the majority of training operations would be conducted at several thousand feet AGL. Therefore, the rate of Class A and B mishaps associated with training conducted

by the 142 FW and the 173 FW would not be expected to change relative to existing conditions and would remain far below the national average for Class A and B mishaps, 1.88 and 4.97, respectively. Existing Class A and B mishap rates have been calculated and are provided for each installation in Table 4.7-1.

### Risks Associated with Flare Use

#### *Fire Risk*

The Oregon ANG does not use live ammunition during training exercises within the airspace; however, aircraft are equipped with MJU-7 flares during training missions. As described in Section 3.8, *Hazardous Materials and Wastes*, the 142 FW and 173 FW are allocated a total of approximately 16,500 flares per fiscal year and use an average of 15 flares per sortie, when flare use is included in the training mission. These flares are self-protection flares that are used to distract heat-seeking missiles fired by enemy aircraft and ground forces. Additionally, pilots must develop the critical skill of reacquiring the enemy aircraft after the enemy aircraft has deployed flares. Facility with flare use in both of the above examples is a crucial and critical knowledge and a life-saving skill that a military pilot must develop.

The flares consist of magnesium and Teflon pellets that, when ignited, burn for a short period (i.e., less than 10 seconds) at high temperatures. Burn-out time is typically 3.5 to five seconds, during which time the flare would have fallen between 200 and 400 feet (see Table 4.7-2). The Oregon ANG has developed and routinely implements safety precautions related to chaff and flare use. In particular, neither unit deploys flares below 5,000 feet AGL, in order to minimize the impacts to public safety resulting from training exercises involving flare use (AFI 11-2F-15V3 KF CH 8). Oregon ANG pilots engage a safety on the aircraft that prevents the release of flares on Low A/A training missions, which effectively eliminates the potential to release a flare below 5,000 feet AGL, barring any pilot error. Table 4.7-2 demonstrates the time it takes a MJU-7 flare to fall a given distance, assuming zero aerodynamic drag and a constant acceleration rate of 32.2 feet per second.

**Table 4.7-2. MJU-7 Fall Speed and Distance from Ground at Burnout**

| <b>Time<br/>(Seconds)</b> | <b>Drop Distance<br/>(Feet)</b> | <b>Distance from Ground<br/>(Feet AGL)</b> |
|---------------------------|---------------------------------|--------------------------------------------|
| 0.5                       | 4                               | 4,996                                      |
| 1.0                       | 16                              | 4,984                                      |
| 1.5                       | 36                              | 4,964                                      |
| 2.0                       | 64                              | 4,936                                      |
| 2.5                       | 101                             | 4,900                                      |
| 3.0                       | 145                             | 4,855                                      |
| 3.5                       | 197                             | 4,803                                      |
| 4.0                       | 258                             | 4,742                                      |
| 4.5                       | 326                             | 4,674                                      |
| 5.0*                      | 403                             | 4,598                                      |
| 5.5                       | 487                             | 4,513                                      |
| 6.0                       | 580                             | 4,420                                      |
| 6.5                       | 680                             | 4,320                                      |
| 7.0                       | 789                             | 4,211                                      |
| 7.5                       | 906                             | 4,094                                      |
| 8.0                       | 1,030                           | 3,970                                      |
| 8.5                       | 1,163                           | 3,837                                      |
| 9.0                       | 1,304                           | 3,696                                      |
| 9.5                       | 1,453                           | 3,547                                      |
| 10.0                      | 1,610                           | 3,390                                      |

Note: MJU-7 flares generally burn out in 3.5 to five seconds. Consequently, flares deployed at the USAF minimum altitude of 700 feet AGL would burn out approximately 300 feet AGL. However, Oregon ANG pilots deploy flares at a minimum altitude of 5,000 feet AGL, ensuring that flares would be completely extinguished no less than approximately 4,600 feet AGL, leaving virtually no possibility of surface wildfire ignition.

Source: USAF 1997.

Based on the burnout time for an MJU-7 flare of five seconds and the minimum release elevation of 5,000 feet AGL, the difference between the estimated burn out elevation and contact with any potentially flammable material is approximately 4,598 feet AGL (see Table 4.7-2), nearly 1 mile (or the equivalent of approximately 13 football fields<sup>13</sup>) above the ground surface. Even under rare circumstances in which a flare might require double the amount of time predicted for burnout (i.e., 10 seconds), there would still be a 3,390-foot buffer before the flare would contact flammable materials at the ground surface. Due to the limited physical quantity of

<sup>13</sup> One football field includes 100 yards in the field of play as well as two 10-yard end zones, totaling approximately 360 feet.

flammable material, flares released at 5,000 feet AGL could not possibly reach the ground surface before extinguishing. In the rare event that a flare fails to ignite and contacts the ground surface, it is handled by the ANG as unexploded ordnance. If an unburned broken or whole flare struck the ground, it would not burn unless subject to temperatures or friction generating temperatures in the 1,000- to 2,000-degree range (USAF 2011).

“Extreme” wildfire risk areas typically are only designated or established for the current or following day for a given area. Limited advance warning of these “extreme” fire conditions would not give the Oregon ANG the appropriate amount of time to adjust the weekly flight scheduling with FAA and established daily flight plans. Changes to the flight plan without the appropriate amount of notice may result in loss of flare training for one or more days. The annual number of days considered as “extreme” wildfire risk is also very unpredictable and has the potential to restrict the ability of the Oregon ANG to fully execute pilot training if extreme conditions exist for an extended period. The inability to deploy flares, even if just for a few days a year, could delay or inhibit critical training for the Oregon ANG. In order to minimize wildfire risks, while also accomplishing mission objectives, the Oregon ANG would continue to prohibit flare use below 5,000 feet AGL. However, limiting use of airspace for flare training based on fire ratings would significantly reduce the Oregon ANG pilots’ ability to train and would not provide additional fire safety benefits. Consequently, additional restrictions on the deployment of flares based on the National Fire Danger Rating System (NFDRS) have not be included in the Final EIS.

The continued implementation of the Oregon ANG’s standard operating procedure per AFI 11-2F-15V3 KF CH 8 would effectively eliminate the potential for wildfire related to flare use by the Oregon ANG, regardless of the underlying fire danger rating. Because this is a special procedure for purposes of the EIS, it would be a requirement in the airspace used by the Oregon ANG, not simply an Oregon ANG policy that might be subject to variation. Due to the highly conservative operating procedures (i.e., altitude restrictions) and standards throughout its mission-critical use of flares during training, impacts associated with fire safety from introduced flare use in proposed or modified airspace areas would be less than significant.

Due to mission-critical training requirements and other important safety considerations, the Oregon ANG has adopted and employs highly conservative operating procedures (i.e., altitude restrictions) and standards throughout its mission-critical use of flares during training. The Draft EIS included a special procedure restricting the use of flares over areas deemed to be in the “extreme” wildfire risk category as determined under the National Fire Danger Rating System (NFDRS). However, upon further analysis, this additional measure has been determined unnecessary and impracticable due to the Oregon ANG’s standard operating procedures of restricting flare use below 5,000 feet AGL. Flares released at an altitude of 5,000 feet AGL would not have the potential to ignite wildfires. The remainder of this technical analysis explains, details, and provides support for the Oregon ANG’s decisions, as reflected in the Final EIS.

For additional technical analysis of wildfire danger, particularly within the vicinity of the Juniper/Hart MOA Complex, and a discussion of Oregon ANG standard operating procedures for deploying flares during training refer to Appendix I, *Wildfire Hazard Assessment*.

#### *Flare Strike Risk*

Upon ejection, if a flare fails to ignite, it is possible that the flare cartridge could contact a person or habitable structure on the ground surface. However, based on a set of assumptions regarding reliability rate, aircraft speed, aircraft height above ground, and behavior of the flare after release, Air Combat Command (ACC) calculated the probability of a dud flare hitting a person in an area with a population density of 100 persons per square mile would be approximately one in 5.8 million (USAF 1997).

The modeling, referenced in Section 3.7, *Safety*, which was conducted by the ACC to estimate the probability of a dud flare hitting a person was based on a population density of 100 persons per square mile. Keeping all other variables constant, it is possible to compare the population densities within the areas beneath the proposed airspace areas to the modeling value of 100 persons per square mile in order to determine the probability of contact at the ground surface. Population densities for counties underlying MOAs ranged from 0.7 persons per square mile in Harney County to 66.9 persons per square mile in Washoe County

(see Table 4.7-3). Because these population densities are lower than the modeling value of 100 persons per square mile, the probability of a dud flare striking a person as it falls to the ground is even less than one in 5.8 million. Based on this low probability of an individual being hit by a falling un-ignited flare, the strike hazard from flare use would have a negligible impact on safety.

### Indirect Impacts

Additional indirect or induced impacts to safety would not be anticipated under the Proposed Action.

**Table 4.7-3. Population Densities of Counties Potentially Impacted by Flares**

| County    | Population Density<br>(people per sq. mile) |
|-----------|---------------------------------------------|
| Harney    | 0.7                                         |
| Humboldt  | 1.7                                         |
| Washoe    | 66.9                                        |
| Crook     | 7.0                                         |
| Deschutes | 52.3                                        |
| Lake      | 1.0                                         |
| Sherman   | 2.1                                         |
| Gilliam   | 1.6                                         |
| Morrow    | 5.5                                         |
| Grant     | 1.6                                         |
| Wheeler   | 0.8                                         |
| Jefferson | 12.2                                        |
| Wasco     | 10.6                                        |

Source: U.S. Census Bureau 2010.

#### 4.7.2.2 Alternative B: No Modifications to Eel ATCAA

Impacts associated with the implementation of Alternative B would be consistent with impacts identified for the Proposed Action. Under Alternative B, total flight hours flown by the 142 FW and 173 FW would remain identical to the Proposed Action and existing conditions. However, when coastal weather and sea-states preclude the use of the proposed W-570 Complex, the 142 FW operations in the Eel MOA/ATCAA Complex under the Proposed Action would instead be redistributed to the proposed Redhawk MOA.

As mishap rates are calculated per 100,000 hours flown, no change in overall mishap rates would be expected and Class A and Class B mishaps rates at the 142 FW and 173 FW would remain less than the national average for F-15s. Additionally, the existing Eel ATCAA does not currently support chaff and flare use and would not support chaff and flare training activities under implementation of Alternative B. Further, Oregon ANG safety precautions regarding flare use (i.e., minimum 5,000-foot AGL deployment elevations), would remain in place. Therefore, there would be no change to safety regarding chaff and flare use within the existing Eel ATCAA and increases in flare use within the Redhawk MOAs would result in negligible impacts.

#### 4.7.2.3 Alternative C: No Redhawk MOA Complex

Impacts associated with the implementation of Alternative C would be consistent with impacts identified for the Proposed Action. Under Alternative C, the total flight hours flown by the 142 FW and 173 FW would remain identical to the Proposed Action and existing conditions. However, 142 FW operations that would have been flown in Redhawk MOA Complex under the Proposed Action would be redistributed with approximately 30 percent assigned to the Eel MOA/ATCAA Complex and the remaining 70 percent assigned to the Juniper/Hart MOA Complex.

As mishap rates are calculated per 100,000 hours flown, no change in overall mishap rates would be expected and Class A and Class B mishaps rates at the 142 FW and 173 FW would remain less than the national average for F-15s. Additionally, Oregon ANG safety precautions regarding flare use (i.e., minimum 5,000-foot AGL deployment elevations), would remain in place. Therefore, there would be no change to safety regarding increases in chaff and flare exercises within the Eel MOA/ATCAA Complex and the Juniper/Hart MOA Complex.

#### 4.7.2.4 Alternative D: No Expansion of Juniper/Hart MOA Complex

Impacts associated with the implementation of Alternative D would be consistent with impacts identified for the Proposed Action. Under Alternative D, total flight hours flown by the 142 FW and 173 FW would remain identical to the Proposed Action and existing conditions. However, 142 FW operations that would have

been flown in the area provided by the expansion of the Juniper/Hart MOA Complex would be flown within the existing Juniper/Hart airspace.

As mishap rates are calculated per 100,000 hours flown, no change in overall mishap rates would be expected and Class A and Class B mishaps rates at the 142 FW and 173 FW would remain less than the national average for F-15s. Additionally, Oregon ANG safety precautions regarding flare use (i.e., minimum 5,000-foot AGL deployment elevations), would remain in place. Therefore, there would be no change to safety regarding increases in chaff and flare exercises within the Redhawk MOA Complex and the existing Juniper/Hart airspace.

#### 4.7.2.5 No-Action Alternative

If the No-Action Alternative were selected, the Oregon ANG would not implement the Proposed Action and conditions would remain as described in Section 3.7, *Safety*. No impacts to safety would result from the selection of the No-Action Alternative.



## **4.8 HAZARDOUS MATERIALS AND WASTES**

### **4.8.1 Approach to Analysis**

Numerous local, state, and federal laws regulate the storage, handling, disposal, and transportation of hazardous materials and wastes; the primary purpose of these laws is to protect public health and the environment. The significance of potential impacts associated with hazardous substances is based on their toxicity, ignitability, and corrosivity. Impacts associated with hazardous materials and wastes would be significant if the storage, use, transportation, or disposal of hazardous substances substantially increases the human health risk or environmental exposure.

### **4.8.2 Impacts**

#### **4.8.2.1 Proposed Action**

##### Short-term Impacts

###### *Hazardous Materials and Wastes*

No ground disturbing activities (e.g., construction or demolition) would occur as a part of the Proposed Action. Consequently, upon implementation of the Proposed Action, there would be no increase in the temporary storage of construction-related hazardous materials and wastes. Therefore, short-term impacts associated with hazardous materials and wastes would not occur as a result of implementation of the airspace initiative.

##### Long-term Impacts

###### *Hazardous Materials and Wastes*

Implementation of the Proposed Action would not result in a change in the handling, storage, or use of petroleum, oils and lubricants (POL) by the 142 FW and 173 FW. There would be no increase in the number of aircraft or total flight hour allocation for either the 142 FW or 173 FW. Increases in training hours under the Proposed Action would be offset by an overall reduction in transit time to

weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex. Therefore, established safe handling, storage, and use procedures would continue to be implemented at the 142 FW and 173 FW as directed under the installations' *Hazardous Waste Management Plan* and *Spill Prevention and Response Plan*, which have been developed and are maintained in accordance with all federal, state, and local regulations (Oregon ANG 2004, 2010). Consequently, long-term impacts associated with hazardous materials and wastes at both the 142 FW and 173 FW installations would be less than significant.

### *Fuel Dumping*

The 142 FW and 173 FW would continue to adhere to USAF fuel dumping procedures, when necessary (i.e., in life-threatening emergency situations). As described in Section 3.8, *Hazardous Materials and Wastes*, fuel dumping is not a component of any routine flight training syllabus and only occurs during in-flight emergency circumstances with a loss of life potential for the pilot. During these circumstances fuel is vented at high altitudes (i.e., over 10,000 feet AGL) over an identified and uninhabited area in the immediate vicinity of the installation (i.e., with 20-mile radius) (refer to Section 3.8, *Hazardous Materials and Wastes*).<sup>14</sup> Fuel dump locations would remain unchanged under the Proposed Action and fuel venting would not be anticipated to occur within the expanded and new airspace areas. Additionally, as there would be no increase in the number of flight hours allocated for the 142 FW or the 173 FW, there would be no anticipated change in the frequency of fuel dumping (although this is difficult to ascertain because such activities are never scheduled). Therefore, impacts associated with fuel dumping would be less than significant.

### *Chaff and Flare*

Under the Proposed Action, allocations of chaff and flare would not be increased above existing levels (refer to Section 3.8, *Hazardous Materials and Wastes*).

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<sup>14</sup> As described in Section 4.4, *Biological Resources*, catastrophic aircraft failure could result in the asset colliding with the ground surface or water before fuel is jettisoned. However, these instances are extremely rare, much more so than even the infrequent nature of fuel dumps. This has only happened once in the past 11 years, during a Class A mishap over the Pacific Ocean.

Additionally, the storage, transport, and use of chaff and flare would continue to be implemented consistent with current procedures and training operation requirements. For example, use of these training tools within the Proposed Action airspace areas would occur at altitudes above 5,000 feet AGL, the lower limit of chaff and flare use described in the in-flight guide (Oregon ANG 2011). Under the Proposed Action chaff and flare would be used in the Eel MOAs as well as the Redhawk MOA Complex and the Juniper/Hart MOA Complex expansion area. Use of chaff and flare would be consistent with the restrictions for use set by the Oregon ANG in the existing Juniper/Hart MOA Complex. As described in Section 3.8, *Hazardous Materials and Wastes*, studies have demonstrated that chaff and flare use do not pose substantial environmental or human health risks when properly stored, transported, and deployed (USAF 1997). Consequently, there would be no significant impacts to the physical or human environment as a result of chaff and flare use within proposed airspace areas.

As described in Section 4.7, *Safety*, due to mission-critical training requirements and other important safety considerations the Oregon ANG has adopted and employs highly conservative operating procedures (i.e., altitude restrictions) and standards throughout its mission-critical use of flares during training. The Draft EIS included a special procedure restricting the use of flares over areas deemed to be in the “extreme” wildfire risk category as determined under the NFDRS. However, upon further analysis, this additional measure has been determined unnecessary and impracticable due to the Oregon ANG’s standard operating procedures of restricting flare use below 5,000 feet AGL. Flares released at an altitude of 5,000 feet AGL would not have the potential to ignite wildfires. The remainder of this technical analysis explains, details, and provides support for the Oregon ANG’s decisions, as reflected in the Final EIS.

#### Indirect Impacts

Indirect impacts to biological resources resulting from hazardous materials and wastes are discussed in Section 3.4, *Biological Resources*. No other indirect or induced impacts resulting from hazardous materials and wastes would not be anticipated under the Proposed Action.

#### 4.8.2.2 Alternative B: No Modifications to Eel ATCAA

Implementation of Alternative B would result in impacts consistent with the impacts identified for the Proposed Action. Impacts associated with hazardous materials and wastes at the 142 FW and 173 FW would remain unchanged from their current conditions. Under Alternative B the proposed Eel MOA and Eel High ATCAA would not be established, resulting in no use of chaff and flare within these areas. As flight operations intended for the Eel MOA/ATCAA Complex would be flown in the Redhawk MOA Complex under this alternative, impacts resulting from chaff and flare use would be slightly more severe. However, the use of chaff and flare has not been identified to result in hazardous human or environmental effects. Therefore, impacts would be less than significant.

#### 4.8.2.3 Alternative C: No Redhawk MOA Complex

Impacts resulting from the selection of Alternative C would be consistent with impacts identified for the Proposed Action. Impacts associated with hazardous materials and wastes at the 142 FW and 173 FW would remain unchanged from their current conditions. Under Alternative C the proposed Redhawk MOA Complex would not be established, resulting in no chaff and flare use within these areas. As flight operations intended for the Redhawk MOA Complex would be flown in the Eel MOA/ATCAA Complex and the Juniper/Hart MOA Complex under this alternative, impacts resulting from chaff and flare use would be slightly more severe in these airspaces. However, the use of chaff and flare has not been identified to result in hazardous human or environmental effects. Therefore, impacts would be less than significant.

#### 4.8.2.4 Alternative D: No Expansion of Juniper/Hart MOA Complex

Impacts from the selection and implementation of Alternative D would be consistent with impacts identified for the Proposed Action. Impacts associated with hazardous materials and wastes at the 142 FW and 173 FW would remain unchanged from their current conditions. Under Alternative D, establishment of the proposed Juniper/Hart MOA Complex expansion area would not occur, resulting in no use of chaff and flare within these areas. While this would be a reduction within these areas compared to the Proposed Action, the use of chaff

and flare has not been identified to result in hazardous human or environmental effects. Therefore, impacts would be less than significant.

#### 4.8.2.5 No-Action Alternative

If the No-Action Alternative were selected, no changes to the shape of or flight activities within existing airspaces would occur. Therefore, no impacts with regard to hazardous materials or wastes would occur and conditions would remain as described in Section 3.8, *Hazardous Materials and Wastes*.

## **4.9 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S HEALTH AND SAFETY**

### **4.9.1 Approach to Analysis**

Significance of population and expenditure impacts are assessed in terms of their direct effects on the local economy and related effects on other socioeconomic resources (e.g., income or housing). The magnitude of potential impacts can vary depending on the location of a Proposed Action; for example, implementation of an action that creates 20 employment positions may be unnoticed in an urban area but may have significant impacts in a more rural region. If potential socioeconomic impacts would result in substantial shifts in population trends, or adversely affect regional spending and earning patterns, they would be considered significant. Consistent with FAA Order 1050.1E, Change 1, an impact would be considered significant if required or resulted in: 1) Extensive relocation of residents, but sufficient replacement housing is unavailable; 2) Extensive relocation of community businesses, that would create severe economic hardship for the affected communities; 3) Disruptions of local traffic patterns that substantially reduce the levels of service of the roads serving the airport and its surrounding communities; or 4) Substantial loss in community tax base.

In order to comply with Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, ethnicity and poverty status in the vicinity of the Proposed Action have been examined and compared to county, state, and national data to determine if any minority or low-income communities could potentially be disproportionately affected by implementation of the Proposed Action or alternatives. Similarly, to comply with EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, the distribution of children and locations where numbers of children may be proportionally high on and in the vicinity of the Proposed Action were determined to ensure that environmental risks and safety risks to children are addressed.

## **4.9.2 Impacts**

### **4.9.2.1 Proposed Action**

#### *Employment and Economy*

Under the Proposed Action, there would be no long-term changes in economic activity associated with the 142 FW or 173 FW, as no additional personnel would be added to either unit. Further, the Proposed Action would have negligible impacts on underlying cities and communities. The proposed Eel MOAs and Redhawk MOA Complex as well as the majority of the proposed Juniper/Hart MOA Complex expansion areas (i.e., Hart C, Hart D, Hart E, and Hart F) would have operational floors at 11,000 feet MSL, which would separate Oregon ANG training from affected populations such that ground-based economic activity – including employment – would not be impacted.

As described in Section 3.9, *Socioeconomics* Oregon airports provide a large contribution to the state economy. According to the Oregon Aviation Plan (2008), the nine Oregon airports listed in Table 3.1-1 account for more than 2,000 jobs, \$60.4 million in wages, and \$206.4 million in business sales. The altitudes of the proposed operational floors would allow for continued use of local airspace by general aviation pilots beneath the MOAs, as these pilots are permitted to fly beneath MOAs without restrictions, and even through them (including the proposed Juniper Low MOA). As described in the FAA's Airman's Information Manual, whenever a MOA is being used, nonparticipating IFR traffic may be cleared through a MOA if IFR separation can be provided by ATC and procedures are described in a Letter of Agreement between the unit and the ATC controlling agency (FAA Order 7400.2K). Otherwise, ATC will reroute or restrict nonparticipating IFR traffic. Similarly, VFR traffic may transit through active MOAs and are encouraged to contact the controlling agency before doing so. Consequently, while general aviation pilots may avoid MOAs as a matter of principle, the establishment of the MOAs would not preclude local flight traffic, and would therefore have a negligible economic impact on underlying cities or airfields that benefit from fuel sales or tie-down fees. Further, due to the 11,000 feet MSL floor height of the proposed Eel MOAs, there would be no adverse noise-

related impacts that could adversely impact the fishing fleets operating in coastal areas below the proposed MOA (refer to Section 4.2, *Noise*).

#### *Livestock*

Studies have found that the effects of aircraft noise on livestock can include reduced milk yield, increased heart rate, temporary changes in feeding behavior and feed intake, changes in the size or weight of certain internal organs, hearing impairment, and various metabolic effects (Manci et al. 1988). Most of these effects have been temporary and have not had a permanent adverse effect on test subjects (Manci et al. 1988; Pepper et al. 2003). Laboratory studies of domestic mammals have indicated that behavioral responses vary with noise types and levels, and that domestic animals appear to acclimate to some sound disturbances (Manci et al. 1988).

Several comments received during public scoping meetings and other outreach efforts conducted during the preparation of this EIS included concerns that implementation of the Proposed Action and subsequent training activities could cause livestock to stampede, escape from their enclosures, and/or injure themselves as a result of colliding with enclosures as they attempt to escape aircraft noise (see Appendix B, *Scoping Materials*). In 1994, the USAF recognized that cattle in enclosures could, in certain rare situations, stampede, escape, and/or injure themselves as a result of low-altitude overflights; however, much of the historical studies on domestic livestock's reactions to overflights suggest that these scenarios are unlikely (USAF 1994). Behavioral responses observed in livestock exposed to low-altitude subsonic flights have consisted of startle reactions that were considered minor (Manci et al. 1988). Additionally, while the Proposed Action would result in expansion of the airspace areas available to the 142 FW and 173 FW, there are already several MTRs - entirely separate from the Proposed Action - including some with corridor altitudes lower than the floors associated with the proposed airspace areas under the Proposed Action (refer to Section 3.1 and Section 4.1, *Airspace Management*). Therefore, while implementation of the Proposed Action would expand the areas within which military aircraft training would occur, it would not comprise an introduction of such training activities where no flight activities currently occur. Additionally, with the exception of the proposed Juniper East Low MOA, all other proposed over-land airspace under the



Proposed Action would have an established floor at 11,000 feet MSL. As the maximum noise levels at this floor elevation is between 87 dB and 98 dB depending on the underlying topography (refer to Table 3.2-2), military operations within these airspaces would not be anticipated to have significant indirect noise impacts on livestock or domestic animals below. Further, based on previous research associated with the effects of noise on livestock noise impacts within the existing Juniper Low MOA and proposed Juniper East Low MOA would also be less than significant (Macy et al. 1988; Pepper et al. 2003).

### *Housing*

The counties underlying the proposed Eel MOAs, Redhawk MOA Complex, and Juniper/Hart MOA Complex expansion area currently experience flight traffic overhead along federal airways (i.e., Victor [Visual] Routes and Instrument Routes) which are existing and active, independent of the Proposed Action. Specifically, the counties underlying the proposed Redhawk MOA Complex and Proposed Juniper/Hart MOA Complex expansion area currently experience infrequent low-altitude flyovers as low as 200 feet AGL. The flight activity in the proposed Eel MOAs and Redhawk MOA Complex as well as the majority of the Juniper/Hart MOA Complex expansion area (i.e., Hart C, D, E, and F) would occur at or above 11,000 feet MSL and would result generally in inaudible sound levels that would not disrupt the activities on the ground or impact regional housing characteristics. Consequently, there would be no impacts to property values beneath the vast majority of these proposed MOAs.

The area underlying the proposed Juniper Low MOA, which would have a floor of 500 feet AGL, already experiences low-altitude flights, including military operations along Military Training Routes at elevations as low as 200 feet AGL. Implementation of the Proposed Action would result in a minor increase in flight activity at low altitudes within the proposed Juniper East Low MOA; however, only 2 percent of the total flying hours within the Juniper/Hart MOA Complex (i.e., approximately 68 flying hours) would be flown from 500 to 1,000 feet AGL. Consequently, while aircraft activity within this area may result in additional single event low-altitude flyovers, flight activity in this area would not result in substantial increases in average noise experienced on the ground below the proposed MOA. Further, with expanded airspace under the Proposed Action, the

populations under the existing airspace areas are expected to experience a relative decrease in aircraft activity (refer to Section 3.1, *Airspace Management* and Section 3.2, *Noise*). Consequently, noise levels resulting from implementation of the Proposed Action and subsequent Oregon ANG aircraft activities would decrease or remain the same below existing airspaces and would remain well below the recommended sound level thresholds established to protect public health and welfare, including annoyance, in areas where quiet is a recognized resource (USEPA 1974).

In 2011, there were approximately 3,857 homes located within Harney County, the vast majority of which are located in Burns and Hines, approximately six miles to the north of the proposed Juniper Low MOA. In 2011, the median value of a housing unit in Harney County was \$252,000, an increase of 83 percent from \$137,700 in 2007 (U.S. Census Bureau 2013). While homes beneath the proposed Juniper East Low MOA would experience a slight increase in low-altitude flight activity, these areas already experience infrequent low-altitude flyovers – independent of the Proposed Action – along Military Training Routes which have not adversely impacted home values since 2007. Therefore, it is anticipated that the Proposed Action would have a negligible impact on property values beneath the proposed Juniper Low MOA.

### *Tourism*

Tourism, particularly outdoor recreation, is an important industry throughout the State of Oregon, representing approximately 9 percent of employment, and 4 percent of total non-farm industry sector earnings throughout the state. The quiet, natural settings in rural Oregon are an important component of outdoor tourist attractions and recreation. As previously described, the counties underlying the proposed Eel MOAs, Redhawk MOA Complex, and Juniper/Hart MOA Complex expansion area currently experience flight traffic overhead independent of the Proposed Action – and these operations would continue regardless of whether or not the Oregon ANG’s airspace initiative is implemented. While the Proposed Action would introduce additional flight activity, the activity in the proposed Eel MOAs and Redhawk MOA Complex as well as the majority of the Juniper/Hart MOA Complex expansion area (i.e., Hart C, Hart D, Hart E, and Hart F) would occur at or above 11,000 feet MSL and would result generally

in inaudible sound levels at the ground surface that would not disrupt activities below the affected airspace. Additionally, potential short-term, temporary impacts to gliding clubs identified in Section 4.1, *Airspace Management*, would be managed through procedures, communication, and scheduling established in an MOU and as outlined in Section 6.0, *Special Procedures*. Consequently, there would be no impacts to outdoor recreation and tourism below these proposed MOAs.

The quiet rural setting within Harney County under the proposed Juniper Low MOA is also an important element in local tourism. As described in Section 3.3, *Land Use and Visual Resources*, protected areas within Harney County include Malheur NWR and the Steens Mountain Cooperative Management and Protection Area. Additionally, Frenchglen State Park and Pete French Round Barn State Park are located in this area. Tourism-related industry sectors, including those that utilize these areas, represented approximately 4 percent of total non-farm earnings in Harney County in 2011. During this period, Harney County recognized \$4.3 million in earnings from *Accommodation and Food Services* and \$262,000 from *Arts, Entertainment, and Recreation*, both of which are fueled by tourism. Further, these earnings represented increases of 34 percent and 45 percent, respectively, above earnings in 2001 (U.S. Bureau of Economic Analysis [BEA] 2013).

Socioeconomic impacts associated with tourism are highly dependent on the effects of noise due to the importance of a quiet and natural setting to outdoor sporting and recreation activities. Harney County already experiences infrequent flyovers along Military Training Routes at altitudes as low as 200 feet AGL. While the Proposed Action would result in a slight increase in low-altitude flight activity within the Juniper East Low MOA, separate from existing flight activity along federal airways (i.e., Victor [Visual] Routes or Instrument Routes), noise levels from the Proposed Action would remain well below the recommended sound level to protect public health and welfare, including annoyance, in areas where quiet is a recognized use (USEPA 1974). Additionally, noise levels within the existing Juniper Low MOA would be expected to decrease slightly, resulting in a beneficial impact (refer to Section 4.2, *Noise*). Therefore, implementation of the Proposed Action, including operations within the proposed Juniper Low MOA, would have negligible noise-related impacts on recreation and tourism in Harney County.

*Environmental Justice and Protection of Children*

No significant, adverse long-term environmental impacts associated with the Proposed Action would occur as a result of its implementation; therefore, no populations (i.e., minority, low-income, or otherwise) would be disproportionately adversely impacted. In addition, implementation of the Proposed Action would not result in an increase in total aircraft operations or an increase in such activities in the vicinity of concentrations of children. Therefore, no increased environmental health risks or safety risks to children would occur, and no significant impact with regard to environmental justice or protection of children would result.

Indirect Impacts

Additional indirect or induced impacts to socioeconomics, environmental justice, and children's health and safety would not be anticipated under the Proposed Action.

4.9.2.2 Alternative B: No Modifications to Eel ATCAA

Impacts from the selection of Alternative B would be consistent with impacts identified for the Proposed Action. However, under Alternative B the Eel MOAs and Eel High ATCAA would not be established. Under this alternative, when coastal weather and sea-states preclude the use of the proposed W-570, the 142 FW would primarily utilize the proposed Redhawk MOA Complex. Consequently, impacts associated with the proposed Eel MOAs and Eel High ATCAA described for the Proposed Action would not occur and impacts associated with the proposed Redhawk MOA Complex would increase slightly but remain less than significant.

4.9.2.3 Alternative C: No Redhawk MOA Complex

Impacts from the selection of Alternative C would be consistent with impacts identified for the Proposed Action. However, under Alternative C the Redhawk MOA Complex would not be established. Under this alternative, when sea-states preclude the use of the proposed W-570, the 142 FW would utilize the proposed

Eel MOAs and Eel High ATCAA. Consequently, impacts associated with the proposed Redhawk MOA Complex described for the Proposed Action would not occur and impacts associated with the proposed Eel MOAs and Eel High ATCAA would increase slightly while remaining less than significant. Impacts to the Juniper/Hart MOA Complex would be beneficial, but negligible as 30 percent of the operations that are currently flown within the existing Juniper/Hart Complex would be flown in the proposed Eel MOA/ATCAA Complex.

#### 4.9.2.4 Alternative D: No Expansion of Juniper/Hart MOA Complex

Impacts from the selection of Alternative D would be consistent with impacts identified for the Proposed Action. However, under Alternative D the Juniper/Hart MOA Complex, including the Juniper Low MOA would not be established. Under this alternative, the 173 FW would continue to utilize the existing Juniper North and Juniper South Low MOAs; however, flight operations within this area would be slightly reduced as the 142 FW would also fly training missions in the proposed Redhawk MOA Complex. Consequently, the impacts associated with the proposed Juniper/Hart MOA Complex expansion area described for the Proposed Action would not occur and impacts associated with the proposed Redhawk MOA Complex would negligibly increase but remain less than significant.

#### 4.9.2.5 No-Action Alternative

If the No-Action Alternative were selected, no changes to local and regional socioeconomic characteristics would occur. Additionally, no changes to existing conditions would occur and therefore no potential impacts to environmental justice communities would result from the selection of the No-Action Alternative. Socioeconomic conditions would remain as described in Section 3.9, *Socioeconomics, Environmental Justice, and Children's Health and Safety*.

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## **SECTION 5**

### **CUMULATIVE IMPACTS**

Cumulative impacts on environmental resources result from incremental impacts of Proposed Actions when combined with other past, present, and reasonably foreseeable future projects in an affected area. Cumulative impacts can result from minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, or local) or persons. In accordance with the National Environmental Policy Act (NEPA), a discussion of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the near future is required.

#### **5.1 APPROACH TO CUMULATIVE IMPACTS ANALYSIS**

Per Council on Environmental Quality (CEQ) guidelines for considering cumulative effects under NEPA (CEQ 1997), this cumulative impact analysis includes three major considerations to:

1. Determine the scope of the cumulative analysis, including relevant resources, geographic extent, and timeframe;
2. Conduct the cumulative effects analysis; and
3. Determine the cumulative impacts to relevant resources.

##### **5.1.1 Scope of Cumulative Impact Analysis**

The Proposed Action and alternatives include modifications to existing military airspace, including Military Operations Areas (MOAs) and Air Traffic Control Assigned Airspaces (ATCAAs) operated by the 142d Fighter Wing (142 FW) and 173d Fighter Wing (173 FW) of the Oregon Air National Guard (ANG), as well as establishment of new MOAs and ATCAAs. The geographic extent of the Proposed Action and alternatives includes the affected portions of special use airspace (SUA) and the lands underlying these MOAs and ATCAAs located in coastal, central, and eastern Oregon (refer to Figure 1-1). In addition, minor portions of the affected airspace included in the Proposed Action and alternatives would be located above a small area of northwestern Nevada and the southwestern-most corner of Washington. Given the nature and intent of the Proposed Action and alternatives, which would not include the development, or construction of any facilities, result

in or require any ground-disturbing activities, or include any changes to manpower levels at either unit, the following resource areas have been considered with regard to potential cumulative impacts:

- Airspace Management;
- Noise;
- Land Use and Visual Resources;
- Biological Resources; and
- Safety.

Further, implementation of the Proposed Action would neither include any changes to the existing inventories of F-15 aircraft at the 142 FW and 173 FW nor result in an increase to total annual flight hour or sortie authorizations for either unit. Increases in training hours under the Proposed Action would be offset by an overall reduction in transit time to weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex (i.e., the total number of hours authorized to be spent in flight would ultimately be equal to existing conditions and only the distribution of *where* those hours are flown would change).

Council on Environmental Quality (CEQ) guidelines require that potential cumulative impacts be considered over a specified time period (i.e., from past through future). The appropriate time for considering past, present, and reasonably foreseeable future projects can be the design life of a project, or future timeframes used in local master plans and other available predictive data. Impacts of concurrent and reasonably foreseeable future actions are considered in this section of the Environmental Impact Statement (EIS).

Determining the timeframe for the cumulative impacts analysis requires estimating the length of time the impacts of the Proposed Action would last and considering the specific resource in terms of its history of degradation (CEQ 1997). The Proposed Action and alternatives include ongoing and anticipated future military training airspace areas and flight training activities conducted within them. While Oregon ANG training and testing requirements change over time – in response to world events and several other factors – the general types of



activities addressed in this EIS are expected to continue indefinitely, and the potential impacts associated with those operations would also occur consistently and indefinitely. Therefore, the cumulative impacts analysis presented herein is not bound by a specific future timeframe.

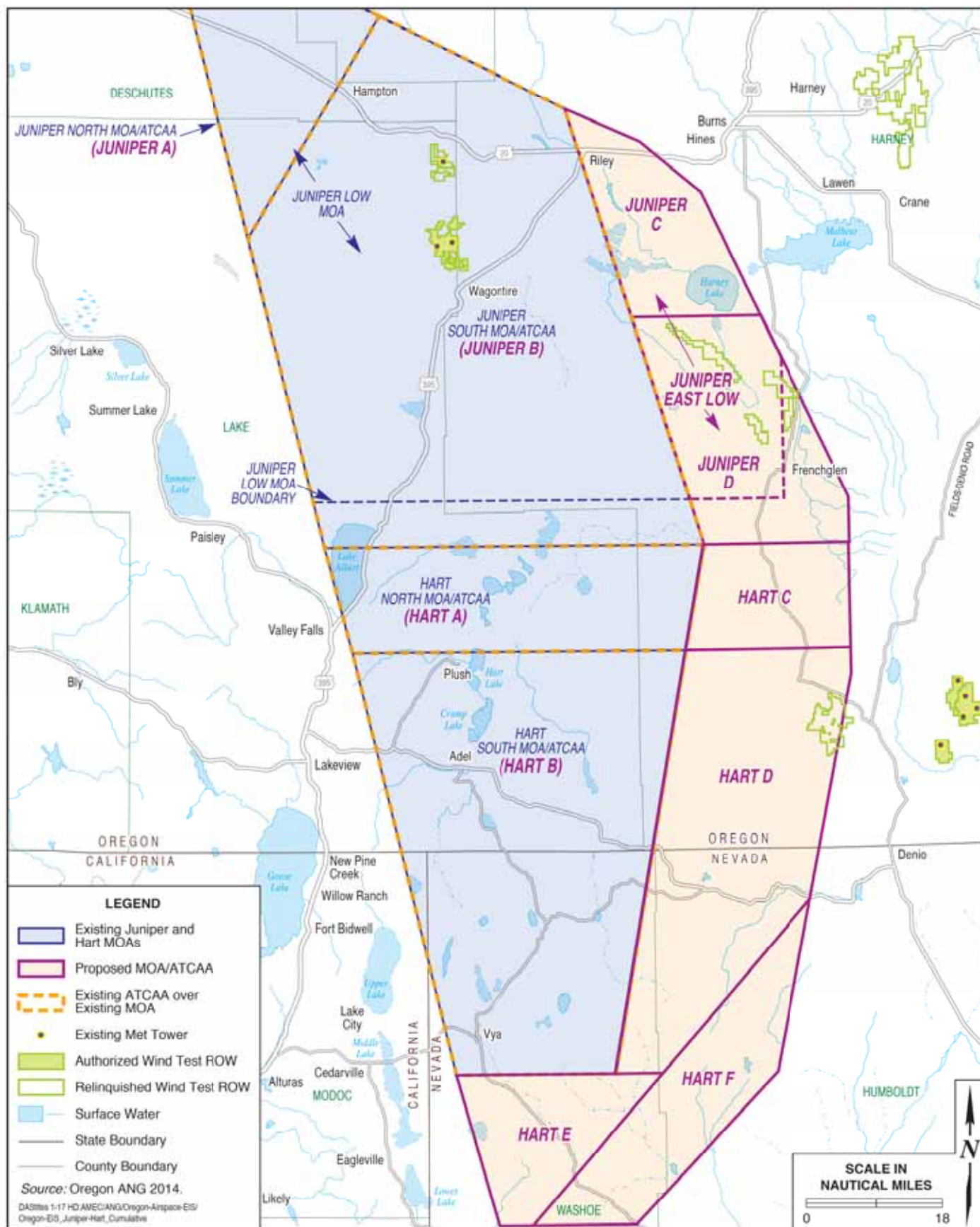
For past actions, the cumulative impacts analysis considers only those actions or activities that have ongoing impacts. In the case of this EIS, the impacts of past actions have been considered in establishing the baseline against which the Proposed Action and alternatives are compared. While the cumulative impacts analysis is not limited by a specific timeframe, it should be recognized that available information, uncertainties, and other practical constraints limit the ability to analyze cumulative impacts for the indefinite future. Consequently, future actions that are speculative are not considered in this EIS.

### **5.1.2 Cumulative Projects**

Per CEQ guidelines, in order to assess the influence of a given action, a cumulative impact analyses should be conducted using existing, readily available data and the scope of the cumulative impact analysis should be defined, in part, by data availability. Consequently, only reasonably foreseeable future projects with the potential to contribute to cumulative impacts of the Proposed Action and alternatives have been evaluated in this section. These cumulative projects are discussed below. (No cumulative projects have been identified beneath the proposed Eel MOA/ATCAA and W-570.)

#### **5.1.2.1 Regional Wind Energy Development**

Given the relatively high potential for wind energy development in Oregon, a number of wind turbine development projects have been proposed throughout the state. In administering Title 14 of the Code of Federal Regulations (CFR) §77, the Federal Aviation Administration (FAA) strives to promote air safety and the efficient use of the navigable airspace. Under 14 CFR §77, any individual or entity proposing to construct or develop a facility exceeding 200 feet AGL (or when requested) is required to provide notification in order for the FAA to conduct aeronautical studies based on information provided by proponents on



EIS

## Cumulative Projects in the Vicinity of the Juniper/Hart MOA Complex

FIGURE  
5-1

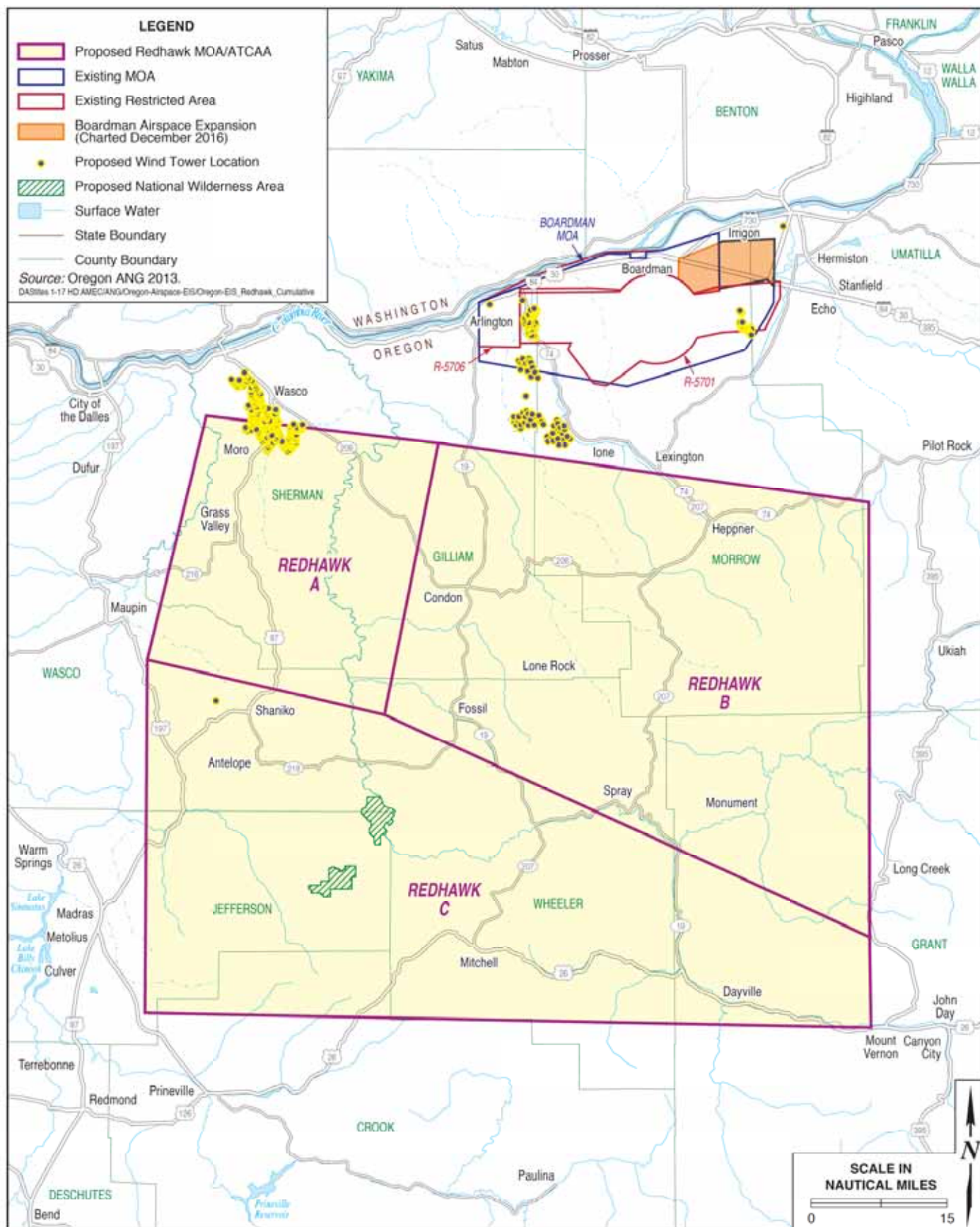


No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

an FAA Form 7460-1, *Notice of Proposed Construction or Alteration*. Through this process, the FAA is able to maintain a database of such proposed construction projects, including proposed wind energy development.

Although no proposed wind tower locations have been documented in the FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) database underneath or in the vicinity of other affected portions of Oregon ANG airspace, wind development testing is currently being evaluated on Bureau of Land Management (BLM) land underneath both existing and proposed portions of the Juniper/Hart MOA Complex. There are two stages of development identified by BLM, including Authorized Wind Test Right of Ways (ROWS) that have been approved by BLM for development and Relinquished Wind Test ROWs that have previously been authorized for wind development but development has not been pursued further (refer to Figure 5-1). In addition, BLM records indicate that three existing Meteorological (Met) Towers have been developed on ROWs underneath the existing Juniper Low MOA in Lake County; however, specific tower heights were not made available. Two Met Towers are located within the authorized Wagontire ROW while the third tower is located north of the Wagontire ROW in a Relinquished Wind Test ROW (BLM 2012, 2013).

A number of wind turbines proposed to be constructed underneath or in the vicinity of the Redhawk MOA Complex have been recorded by the FAA's OE/AAA database (see Figure 5-2). In general, these proposed wind developments range in total height (tower plus turbine) from 25 feet to 500 feet (FAA 2013). Proposed locations depicted on Figure 5-2 include only those wind turbines with a total height greater than 100 feet, which are generally concentrated underneath the northwest portion of the proposed Redhawk MOA Complex in Sherman County and just to the north of the proposed airspace in Sherman, Gilliam, and Morrow counties. In addition, a single proposed wind turbine is located under the northwest portion of Redhawk C MOA in Wasco County. However, to date, neither of these facilities have been constructed. (Oregon Department of Energy 2016).



EIS

Cumulative Projects in the Vicinity of the Proposed Redhawk MOA Complex

FIGURE  
5-2



No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.



#### 5.1.2.2 Oregon Treasures Act of 2013

The proposed Oregon Treasures Act of 2013 combines four bills introduced by Senator Mark Wyden (Oregon) and cosponsored by Senator Jeff Merkley (Oregon) in 2011: the Chetco River Protection Act; the Rogue Wilderness Area Expansion Act; the Molalla River Wild and Scenic Rivers Act; and the Cathedral Rock and Horse Heaven Wilderness Act.

With regard to potential cumulative impacts, only the proposed Cathedral Rock and Horse Heaven Wilderness areas would be located underneath or in the vicinity of airspace areas affected by the Oregon ANG Proposed Action. Under the Oregon Treasures Act of 2013, approximately 17,340 acres of land along the lower John Day River would be consolidated from what is currently splintered public/private ownership in this area by giving BLM the authority to swap land with private local landowners in order to create two large tracts that would be preserved under the National Wilderness Preservation System. The proposed Cathedral Rock Wilderness Area would be located on the west side of the lower John Day River and the proposed Horse Heaven Wilderness Area would be located to the southwest underneath the proposed Redhawk MOA Complex (refer to Figure 5-2). However, the proposed legislation was never enacted.

#### 5.1.2.3 Military Readiness Activities at Naval Weapons Systems Training Facility Boardman

Recently proposed military readiness projects at Naval Weapons Systems Training Facility (NWSTF) Boardman involve construction and operation of new range facilities and changes in existing training activities. The proposed projects would increase the types of training activities and the number of training events conducted at NWSTF Boardman; accommodate force structure changes; and provide enhancements to training facilities and operations at NWSTF Boardman and within its associated SUA.

Given the nature of the Proposed Action and alternatives addressed in this EIS, recently proposed projects at NWSTF with the potential to contribute to cumulative impacts are limited to the modifications of SUA at NWSTF Boardman. Specifically, the U.S. Navy has established new SUA adjacent to existing

Boardman Restricted Area (R)-5701A, R-5701B, and R-5701C and the existing Boardman MOA, approximately 20 miles north of the proposed Redhawk MOA Complex (see Figure 5-2). The majority of the expansion area is located from 4,000 feet MSL to 18,000 feet MSL, however, a portion of the expansion area has been established at an elevation of 500 feet above ground level (AGL) to 4,000 feet above Mean Sea Level (MSL) (U.S. Navy 2016).

The modifications to SUA, as well as the other associated cumulative projects at NWSTF Boardman, were evaluated in an EIS prepared by the U.S. Navy. The EIS addressing the Navy's airspace action was released for public review on 6 September 2012 and the associated Record of Decision (ROD) was signed on 29 August 2016 (U.S. Navy 2016; FAA 2016). Following the issuance of the ROD, the expansion area was charted in December 2016.

### **5.1.3 Cumulative Impact Analysis and Potential Effects**

#### **5.1.3.1 Airspace Management**

When considered cumulatively with the modifications of SUA at NWSTF Boardman, the Proposed Action and alternatives would have a limited potential to contribute to potential cumulative impacts with regard to airspace management. Both of these actions have been coordinated with the FAA, and relevant Air Route Traffic Control Centers (e.g., Salt Lake City and Seattle). Given that the recent modifications to the existing Boardman airspace complex are located in an area already dominated by military aircraft activity and controlled and scheduled by the U.S. Navy, potential cumulative effects of the airspace expansion at NWSTF Boardman in addition to the Proposed Action and alternatives would not be expected to alter regional air traffic patterns, require any changes to military flight procedures, compromise existing regional air traffic control (ATC) facilities, or increase the chance for mid-air collisions with civilian aircraft. Consequently, potential cumulative impacts to airspace management regionally would be expected to be less than significant.

#### **5.1.3.2 Noise**

With regard to long-term operational noise, the Proposed Action and alternatives have the potential to contribute to adverse cumulative noise impacts when

considered in addition to other projects proposed within or adjacent to affected portions of Oregon ANG airspace. However, given that the airspace expansion area at NWSTF Boardman is located approximately 20 miles north of the proposed Redhawk MOA Complex, the Proposed Action and alternatives and the airspace expansion at NWSTF Boardman would not be expected to contribute cumulatively to noise impacts in either airspace area.

Proposed wind turbine development under both the Redhawk MOA Complex and Juniper/Hart MOA Complex has the potential to generate long-term operational noise above ambient levels in the immediate vicinity of the turbines. As depicted in Figure 5-2 and discussed above, potential wind turbine development sites underneath affected portions of Oregon ANG airspace are limited to the northeast corner of the proposed Redhawk MOA Complex and the existing Juniper Low MOA. While specific sound levels generated by these proposed wind turbine developments would vary depending on their nature and size, the Proposed Action and alternatives' contribution to potential cumulative noise impacts would be negligible (refer to Section 4.2, *Noise*). With regard to the proposed Redhawk MOA Complex, the Proposed Action and alternatives would result in Onset Rate-Adjusted Day-Night Average ( $L_{dnmr}$ ) sound levels from aircraft activity of approximately 35 A-weighted decibels (dBA), substantially below the threshold of 65 day-night average sound level (DNL) (refer to Section 4.2, *Noise*). With regard to Oregon ANG noise generation in the existing Juniper Low MOA, the Proposed Action, Alternative B, and Alternative C would result in  $L_{dnmr}$  sound levels slightly below the existing conditions of 46.5 dBA. Under Alternative D, Oregon ANG aircraft noise levels would remain identical to existing conditions (refer to Section 4.2, *Noise*). Therefore, the Proposed Action and alternatives' contribution to overall cumulative noise impacts are expected to be negligible and less than significant.

#### 5.1.3.3 Land Use and Visual Resources

Given that the Proposed Action and alternatives would not involve any construction or development activities, the cumulative effects analysis on land use is related primarily to effects on noise, because noise impacts can influence the types of activities land areas beneath the affected airspace can support. The Proposed Action and alternatives would cause minor increases in noise in some areas where quiet is a recognized land use characteristic; however,  $L_{dnmr}$  noise

levels would remain well below 65 DNL. Further, these noise levels would not approach 55 DNL, which would be considered loud in residential areas and farms and other outdoor areas (U.S. Environmental Protection Agency [USEPA] 1974). With regard to the proposed Cathedral Rock Wilderness Area and Horse Heaven Wilderness Area that would be located underneath the proposed Redhawk MOA Complex (refer to Figure 5-2), anticipated  $L_{dnmr}$  levels at these proposed wilderness areas would be approximately 35 dBA under implementation of the Proposed Action and any identified alternative, well within the accepted ambient noise levels in areas where quiet is a recognized use. Therefore, the Proposed Action and alternatives are not expected to significantly contribute to cumulative impacts on land use.

Although implementation of the Proposed Action would not result in any impacts to terrestrial landscape elements, the addition of increased or newly introduced overflights and periodically the occurrence of aircraft contrails above scenic and otherwise sensitive visual resources and settings may be perceived as annoying or intrusive. When considered in addition to proposed wind turbine development underneath affected portions of Oregon ANG airspace, cumulative effects to visual resources could potentially be adverse. However, because any visual impacts associated with Oregon ANG activities would be periodic, short-term, and temporary in nature and would not block or obstruct views of any visual resource from any vantage point, the Proposed Action and alternatives' contribution to cumulative visual impacts would be limited. In addition, cloudy weather typically experienced in Oregon can mask the appearance of visual aerial distractions such as aircraft (refer to Section 4.3, *Land Use and Visual Resources* for full discussion). Further, implementation of the Proposed Action and alternatives would not introduce low-level military aircraft in any areas that do not already have existing low-altitude MOAs or low-altitude MTRs (refer to Figures 3.1-5 and 3.1-6). Therefore, the Proposed Action and alternatives' contribution to cumulative impacts to visual resources would be less than significant.

#### 5.1.3.4 Biological Resources

The Proposed Action would not result in any construction or ground disturbance; therefore, the Proposed Action and alternatives' contribution to cumulative impacts on biological communities would be limited to the effects of noise on



wildlife, and potential to bird-aircraft collisions. Implementation of the Proposed Action and/or alternatives would result in no contribution to cumulative effects on vegetation communities or wildlife habitats, including wetlands. Although proposed wind development projects or recently completed wind development project underneath or in the vicinity of affected portions of Oregon ANG airspace could potentially result in direct injury or mortality of birds and bats from collisions with the turbines, Oregon ANG aircraft training activity would avoid these proposed wind developments for safety reasons, so cumulative effects on wildlife and habitat in the vicinity of the proposed or existing turbines would be minimal. Further, in-flight bird collision risks have been addressed by the ANG through the development of the Avian Hazard Advisory System (AHAS), which is a Bird Avoidance Model used to generate projected and actual geospatial bird data for use in military airspace, including MOAs, ranges, and MTRs. The AHAS uses Geographic Information System technology combined with data on bird habitat, migration, and breeding characteristics to create a visual tool for analyzing bird-aircraft collision risk. Additionally, each installation maintains and implements a Bird Aircraft Strike Hazard Plan that outlines procedures to minimize bird and other wildlife strikes by aircraft. Under the Proposed Action and alternatives, the 142 FW and 173 FW would continue to operate under these established procedures and plans in order to continue to minimize or altogether avoid bird-aircraft strikes. Therefore, the Proposed Action and alternatives are not expected to significantly contribute to overall cumulative impacts to biological resources.

#### 5.1.3.5 Safety

As previously discussed in sections 5.1.3.1, *Airspace Management* and 5.1.3.4, *Biological Resources*, under the Proposed Action and alternatives the 142 FW and 173 FW would continue to operate under existing procedures and plans intended to minimize the potential for mid-air collisions with other aircraft and avoid bird-aircraft strikes. In addition, existing safety protocols related to low-level training activity in the vicinity of wind turbine development would be expanded to incorporate any new wind development underneath the existing Juniper Low MOA. Further, training activities associated with the Proposed Action and alternatives would not include any changes to the existing inventories of F-15 aircraft at the 142 FW or 173 FW and project implementation would not result in

any increases to total annual flight hour or sortie authorizations for either unit. Increases in training hours under the Proposed Action would be offset by an overall reduction in transit time to weather backup and over-land training airspace, as the proposed Eel MOA Complex and Redhawk MOA Complex would be located closer than the existing Juniper/Hart MOA Complex. Consequently, implementation of the Proposed Action and alternatives would not be expected to increase aircraft mishap potential for either unit and contributions to cumulative impacts to safety would be less than significant.

#### 5.1.3.6 Socioeconomics, Environmental Justice, and Children's Health and Safety

As previously described in Section 4.9, *Socioeconomics, Environmental Justice, and Children's Health and Safety*, studies of livestock responses to noise from aircraft activity, including low-level overflights, have demonstrated a range from no response at all to minor behavioral changes and have not proven to be detrimental to reproductive success. Consequently, contributions to potential impacts to livestock from aircraft noise associated with the Proposed Action and alternatives are relatively limited.

## **SECTION 6**

### **SPECIAL PROCEDURES**

Impact analyses conducted in support of this Environmental Impact Statement (EIS) have determined that no significant environmental impacts would result from the implementation of the Proposed Action (refer to Section 4.0, *Environmental Consequences*). This determination is based on a thorough review and analysis of existing baseline conditions for each resource area, the application of accepted modeling methodologies (see Appendix E, *Noise*, and Appendix F, *Air Quality*), and coordination with knowledgeable, responsible personnel from the 142d Fighter Wing (142 FW) and 173d Fighter Wing (173 FW), Oregon Air National Guard (ANG), Oregon Military Department, National Guard Bureau (NGB), Federal Aviation Administration (FAA), and relevant federal, state, and other local agencies.

Implementation of the Proposed Action would not result in any ground-disturbing activity and consequently would not require standard best management practices for construction or demolition (e.g., storm water pollution prevention, safe removal any potentially hazardous materials prior to demolition activities, etc.). However, there are several special procedures that the 142 FW and 173 FW currently implement, or propose to implement, that would reduce potential impacts to Airspace Management, Noise, Biological Resources, Safety, and Hazardous Materials resulting from the Proposed Action.

#### Airspace Stakeholder Coordination

Special procedures in place to ensure airspace safety and coordination between airspace stakeholders, including general aviation pilots and helicopter transports for Columbia River barge captains, include the following protocols and safety procedures:

- Flight schedules for the Oregon ANG are currently filed weekly with FAA's Seattle Air Route Traffic Control Center (ARTCC), the controlling agency of regional airspace.
- Prior to initiating a training mission, Oregon ANG pilots file a flight plan with Seattle ARTCC and receive takeoff clearance from air traffic control (ATC) at their respective airfields. Pilots fly in accordance with Instrument

Flight Rules (IFR) and remain under ATC until reaching a designated location; at that point, clear of conflicting aircraft, Oregon ANG aircraft are cleared to enter the Military Operations Areas (MOAs) or other special use airspace (SUA). En route from SUA to the installation, Oregon ANG pilots maintain the same coordination with Seattle ARTCC and ATC at their respective airfield, entering ATC at a fixed point and remaining under that control until landing.

- All proposed new Oregon ANG airspace segments would only be activated by the FAA scheduling authority on an *as-needed basis* – as a whole or individually – allowing for more responsible stewardship of the airspace regionally, allowing use by others when not needed for Oregon ANG training, and helping to minimize potential conflicts with other users.
- The public would be notified of the activation of the proposed Redhawk MOA Complex through a Notice to Airmen (NOTAM), which would be filed with the FAA Flight Service Station.
- Existing and proposed Air Traffic Control Assigned Airspaces (ATCAAs) would also remain under the control of the FAA and, when not in use by military aircraft, would continue to be used to support civil aviation activities.
- On-board F-15 radar would be used to detect most civilian aircraft at distances of 60 miles or more. Oregon ANG would terminate training or move to different areas within the airspace if civilian aircraft are detected. Additionally, ARTCCs in Seattle, Salt Lake City, and Oakland may advise military aircraft of the presence of civilian aircraft in the active airspace to further enable military pilots to avoid other air traffic.
- Airspace stakeholders (e.g., civilian and commercial pilots) can utilize the “siteFrame” application on the FAA website to view SUA and military training route (MTR) schedules based on their geographic location or by airspace name.<sup>1</sup> Information is available to pilots for planning purposes; the latest SUA information can be also accessed by calling a local Flight Service Station at 1-800-WX-BRIEF. Information concerning ATCAA airspace can be obtained from the Seattle ARTCC.
- Coordination between the Oregon ANG and commercial users (e.g., Brim Aviation helicopters) within Warning Area (W)-570A, B and C airspace would occur through an established Memorandum of Understanding (MOU) or Memorandum of Agreement describing regular scheduling appointments and real time unit and general airspace coordinator communications. These memoranda have yet to be formalized; however,

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<sup>1</sup> Website address current as of September 2013: <http://sua.faa.gov/sua/siteFrame.app>.

arrangement conditions are likely to resemble current, undocumented solutions for de-conflicting airspace between helicopter and ANG traffic, which includes imposing a temporary airspace floor for ANG aircraft of 3,000 feet above Mean Sea Level (MSL), which allows for helicopter pilots to utilize the space below military aircraft without risk of collision.

- Pursuant to applicable practice, when a MOA is active, IFR arrivals and departures will be afforded minimal delay (FAA JO 7400.2K). It is anticipated that other nonparticipating IFR aircraft may obtain access consistent with the FAA Joint Use Policy and the anticipated Letter of Agreement. Nonparticipating VFR aircraft are not prohibited from entering an active MOA; however, extreme caution is advised when such aircraft transit the area during military operations.

In addition, Oregon ANG has engaged in ongoing outreach with two glider clubs identified as users of the airspace in the vicinity of the Juniper/Hart MOA Complex. In order to deconflict the airspace in this area and ensure the safety of Oregon ANG and glider pilots, the Oregon ANG shall enter into a MOU with these clubs. (If additional glider clubs are identified as users of affected airspace areas, similar actions would be taken.) Procedures outlined in the MOU would include:

- Annual meetings between Oregon ANG and the glider clubs to discuss Oregon ANG operations, scheduling and execution (including mission type and priority), notification and coordination procedures, and coordination for the biennial Sentry Eagle exercise.
- Requirements for glider pilots to notify the 173 FW when the clubs wish to operate in Oregon ANG airspace (i.e., Juniper/Hart MOA Complex, Juniper Low MOA, Juniper East Low MOA).

#### Bird Aircraft Strike Hazard

Bird-aircraft strikes present a potential safety issue for both 142 FW and 173 FW aircraft due to resident and migratory bird populations. In order to mitigate Bird Aircraft Strike Hazard (BASH) risks, the 142 FW and 173 FW would be required to:

- Continue to implement a BASH Plan (Air Force Instruction [AFI] 91-202 and AFI 91-212) specific to wildlife conditions found at each installation; and

- Monitor the Avian Hazard Advisory System (AHAS) as part of the standard preflight mission requirements and modify or cancel sorties in areas or periods with “moderate” to “severe” BASH risks.

#### Noise Abatement Procedures

The need for avoidance of noise-sensitive areas during training operations would continue to be emphasized to Oregon ANG pilots. Following implementation of the Proposed Action, areas would be identified where overflights at low altitudes should be avoided to the maximum extent practicable consistent with AFI 11-202 Volume 3 and Air Education and Training Command (AETC) Supplement 12-201 (e.g., National Marine Sanctuaries [NMS], National Wildlife Refuges [NWRs], farms and ranches, nesting sites, towns, recreation areas, etc.). In particular, Oregon ANG pilots would continue avoid noise-sensitive locations identified beneath the proposed Juniper East Low MOA (refer to Section 3.2, *Noise*). Other airspace areas affected by the Proposed Action have airspace floors at elevations such that noise-sensitive receptors would not be adversely impacted (refer to Section 4.2, *Noise*).

#### Greater Sage-Grouse

As described in Section 3.4, *Biological Resources* in October 2015 the USFWS determined that the greater sage-grouse did not warrant listing under the federal ESA (80 Federal Register [FR] 59857). However, this species is still considered sensitive by the Oregon Department of Fish and Wildlife (ODFW) (ODFW 2008). Further, the Nevada Department of Wildlife (NDOW) raised concerns during the public scoping process that noise generated by low-flying aircraft may impact greater sage-grouse during its breeding season. Noise modeling demonstrated that while average noise levels within the proposed Juniper Low MOAs would be low (i.e., well below 55 L<sub>dnmr</sub>), short-term noise generated from a direct flyover above a greater sage-grouse core area underlying the proposed Juniper Low MOAs could generate noise levels as loud as 110 decibels (dB) (refer to Table 3.2-2). In order to avoid impacts to the greater sage-grouse leks (i.e., aggregations of breeding males), the Oregon ANG would avoid greater sage-grouse core areas to the maximum extent practicable during the breeding season (i.e., 1 March to 31 May; Harrell 2008) and would only fly over these areas if it were necessary to accomplish the training mission.

### Bald and Golden Eagles

The U.S. Fish and Wildlife Service (USFWS) expressed concerns over the potential for noise-related impacts on nesting pairs of bald and golden eagles and recommends avoiding flights below 1,000 feet AGL over these sites during the nesting season. Exercises taking place in the Juniper Low MOA and proposed Juniper East Low MOA have the potential to occur below 1,000 feet AGL. Consequently, special procedures to mitigate potential impacts would be initiated in coordination with the USFWS. Special procedures would include:

- The establishment of seasonal buffer areas from surface to 1,000 feet AGL with a radius of 0.25 miles from mapped bald and golden eagle nests (flight operations would not occur within these buffer areas from 1 January - 15 August);
- Coordinate with USFWS and ODFW to obtain current nesting information on an annual basis at the beginning of each nesting season (bald and golden eagle nesting buffer areas would be adjusted accordingly);
- Providing contact information for a website (e.g., <https://sua.faa.gov/sua/siteFrame.app>) where biologists studying and monitoring regional bald and golden eagle activity can check schedules for military sorties within the proposed Eel MOA/ATCAA, Redhawk MOA Complex, and Juniper/Hart MOA Complex prior to flying annual nest surveys within the airspaces; and
- Additional measures and/or measure modifications based on recommendations provided by the USFWS, as feasible.

### Chaff and Flare

The Oregon ANG uses MJU-7 self-protection flares consisting of magnesium and Teflon pellets that, when ignited, burn for a short period of time (i.e., less than 10 seconds) at high temperatures. Burn-out time averages 3.5 to five seconds, during which time the flare would have fallen between 200 and 400 feet. Special considerations and procedures based on the environmental risk of fire include:

- Per AFI 11-2F-15V3 KF CH 8 Oregon ANG has implemented a floor of 5,000 feet AGL for flare use in order to minimize risk of flare-ignited wildfire. This floor is much higher than the federal chaff and flare release altitude requirement of 700 feet AGL and effectively eliminates the potential for

wildfire related to flare use by the Oregon ANG regardless of the underlying fire danger rating (refer to Section 3.7, *Safety*).

### Emergency Fuel Dumps

Fuel venting (i.e., dumping) would occur only under rare in-flight emergency circumstances where human or aircraft survival is a concern (i.e., fuel dumps are *not* an element of any established training syllabus). The Oregon ANG procedure for an emergency fuel venting stipulates fuel dumps must:

- Occur above 10,000 feet AGL to ensure complete dissipation of the fuel before it makes contact with the ground surface (AFI 11-2F-15V3); and
- Occur over unpopulated areas to further reduce potential for exposure of terrestrial receptors (i.e., individuals, surface water, wildlife, etc.) to expelled fuel.

The Oregon ANG would be required to implement the identified special procedures following implementation of the Proposed Action, and maintain the special procedures throughout the duration of the operational lifetimes of affected and proposed airspace areas.



## **SECTION 7**

### **OTHER SECTIONS REQUIRED BY NEPA**

This section provides an overview of other National Environmental Policy Act (NEPA) considerations based on the technical analyses presented in Section 4.0, *Environmental Consequences*. This section addresses irreversible and irretrievable commitments of resources as well as short-term uses versus long-term productivity and provides a summary of adverse environmental effects that cannot be avoided.

#### **7.1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES**

NEPA requires that environmental analysis include identification of “. . . any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented.” Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources would have on future generations. Irreversible effects primarily result from use or destruction of a specific resource (e.g., fossil fuels and minerals) that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a significant cultural site).

The Proposed Action would be limited to the modification and establishment of airspace only and would not include any project components that would touch or otherwise directly disturb the ground surface. Therefore, there would be no irreversible impacts to or irretrievable commitment of physical resources (e.g., mineral resource deposits, conversion of undeveloped land to developed land, etc.), biological resources (e.g., direct take of endangered or threatened terrestrial or aquatic species, conversion of sensitive habitat, etc.), or cultural resources (e.g., disturbance of known or unknown archaeological sites, paleontological resources, artifacts, etc.). Further, as construction activities would not occur as a result of the Proposed Action no raw building materials would be irretrievably committed as an element of its implementation. Additionally, there would be no

required use of fossil fuels for the operations of construction vehicles or equipment.

The Proposed Action would modify and establish military training airspace for air-to-air flight training. The proposed establishment and modifications would allow for new types of training exercises to be conducted by the Oregon Air National Guard (ANG) in those spaces; however, it would not preclude general aviation in these areas, as civilian and commercial pilots are permitted to fly beneath military operations areas (MOAs), and even through them (including the existing Juniper Low MOA). As described in FAA Airman's Information Manual, whenever a MOA is being used, nonparticipating instrument flight rules (IFR) traffic may be cleared through a MOA if IFR separation can be provided by ATC and procedures are described in a Letter of Agreement between the unit and the ATC controlling agency (FAA Order 7400.2K). Otherwise, ATC will reroute or restrict nonparticipating IFR traffic. Similarly, visual flight rules (VFR) traffic may transit through active MOAs and are encouraged to contact the controlling agency before doing so. In the event that the airspace becomes obsolete with regard to the mission of the Oregon ANG, a decommissioning procedure could be followed to deactivate the military training space and return it to general aviation and/or commercial airspace. Therefore, the airspace establishment and modification under the Proposed Action does not classify as an irreversible or irretrievable resource commitment.

Flight operations and training exercises require the commitment and consumption of fossil fuel, which is an irreversible and irretrievable resource commitment. However, there would be no change to annual allocated flight hours for either the 173d Fighter Wing (173 FW) or the 142d Fighter Wing (142 FW) under the Proposed Action. Since there would be no change in the annual allocated flight hours, there would be no change in fuel consumption as a result of training activities in the proposed airspace areas. Therefore, there would be no commitment of an irreversible and irretrievable resource associated with the Proposed Action.

## **7.2 SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY**

NEPA requires an analysis of the relationship between a proposed action's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment.

In reference to the Proposed Action, "short-term" refers to the initial implementation phase of the airspace establishment and modification activation, while "long-term" refers to the operational life of the proposed project and beyond. Within this Environmental Impact Statement (EIS), Section 4.0, *Environmental Consequences* evaluates the short- and long-term effects that could result from the Proposed Action.

The Proposed Action would be limited to the modification and establishment of airspace only and would not include any project components that would touch or otherwise directly disturb the ground surface. Consequently, there would be no short-term, construction-related impacts or changes to land use as a result of the implementation of the Proposed Action.

The majority of activities addressed in this EIS would be categorized as long-term actions. For example, although the use of training areas for individual training activities may be of short duration, the affected and proposed airspaces would continue to receive repeated use for the foreseeable future. Responses to initial activities when first activating new or modified airspace under the Proposed Action could include temporary disturbance to birds and wildlife; however, average noise levels under the Proposed Action would remain less than the 65 DNL threshold (refer to Section 4.2, *Noise*). Further, these noise levels would not approach 55 DNL, which would be considered loud in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (USEPA 1974). Further, wildlife beneath the Juniper Low MOA and proposed Juniper East Low MOA are expected to temporarily relocate during rare short-term noise events or acclimatize to these infrequent events over the long-term. Consequently, no long-term effect on biological diversity or productivity is anticipated within or below the affected or proposed airspace areas.

Additionally, the proposed airspace configurations have been developed in close coordination with the FAA to deconflict airspace and maintain safety for commercial and general aviation traffic as well as Oregon ANG pilots. Implementation of the Proposed Action would not preclude general aviation as civilian and commercial pilots are permitted to fly beneath MOAs, and even through them (including the existing Juniper Low MOA). Additionally, special procedures outlined in Section 6.0, *Special Procedures*, would deconflict known areas of potential airspace use conflicts. Consequently, airspace operational productivity for non-military uses would not experience long-term effects from reduced accessibility to useable airspace. Further, in the event that the airspace becomes obsolete to the mission of the Oregon ANG, a decommissioning procedure could be followed to deactivate the military training space and return it to recreational and commercial airspace.

### **7.3 SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED**

Detailed analyses of potential impacts anticipated to result from implementation of the Proposed Action have been presented per resource area in Section 4.0, *Environmental Consequences*. Implementation of the Proposed Action would not result in any significant adverse environmental effects that cannot be avoided (refer to Section 6.0, *Special Procedures* for mitigations, planning and reporting requirements, and operational protocols aimed at reducing potentially significant impacts to less than significant levels). There would be no ground disturbing activities, conversion of land use, habitat loss, or commitment of irreversible or irretrievable resources required by or resulting from implementation of the Proposed Action. Additionally, potential adverse impacts related to airspace management, noise, and safety as well as the remaining resource areas would be less than significant.

## **SECTION 8**

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## **SECTION 9**

### **LIST OF PREPARERS**

This report was prepared for and under the direction of NGB/A4AM and NGB/A3A by Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler). Members of the professional staff are listed below:

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**SECTION 10**  
**PRESENTATION AND SUMMARY OF AGENCIES**  
**AND INDIVIDUALS CONTACTED**

In scoping the Environmental Impact Statement (EIS), the National Guard Bureau (NGB) has actively solicited comments from a wide group of interested parties. The U.S. Department of the Air Force published a Notice of Intent (NOI) in the *Federal Register* (see 78 F.R. No. 96, p. 29120, May 17, 2013) announcing its intent to prepare a Draft EIS, as required under the National Environmental Policy Act (NEPA) (see Appendix A, *Federal Register*). In addition, subsequent newspaper advertisements, and written correspondence to identified interested parties announced five public scoping meetings that were held on five separate evenings from 17 – 21 June 2013 in Tillamook, Astoria, Condon, Burns, and Prineville, Oregon, chronologically.

All comments received during the scoping process associated with this Draft EIS were considered in the preparation of the document. Such comments, as they relate to the Proposed Action, have shaped the preparation of the Draft EIS and have become a part of the administrative record for the proposal.

To further facilitate the coordination with intergovernmental points-of-contact, the NGB and the Oregon Air National Guard (ANG) have developed an Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) list (see Appendix C, *Intergovernmental Review*).

In addition to those receiving the Draft EIS through the initial direct mailing, anyone else desiring a copy of the Draft EIS, or wishing to comment on the document, should direct their correspondence to the address provided on the cover sheet of this document. All information received during the comment period will be considered during the preparation of the Final EIS.

**10.1 AGENCIES CONTACTED AND DRAFT EIS DISTRIBUTION LIST**

The NGB and/or Oregon ANG has contacted the following agencies and individuals regarding the Proposed Action and provided notification of the availability of the Draft EIS.

**Table 10-1. List of Agencies and Individuals Contacted**

| <b>Point of Contact</b>          | <b>Agency/Organization</b>                              |
|----------------------------------|---------------------------------------------------------|
| <b>Federal Elected Officials</b> |                                                         |
| Jeff Merkley                     | United States Senate, Senator                           |
| Ron Wyden                        | United States Senate, Senator                           |
| Greg Walden                      | United States House, Representative                     |
| Suzanne Bonamici                 | United States House, Representative                     |
| Kurt Schrader                    | United States House, Representative                     |
| Wayne Kinney                     | United States Senate, Sen. Wyden’s Office               |
| Fritz Graham                     | United States Senate, Sen. Wyden’s Office               |
| J.D. Baucom                      | United States House, Rep. Schrader’s Office             |
| Ryan Mann                        | United States House, Rep. Bonamici’s Office             |
| Kathleen Cathey                  | United States Senate, Sen. Wyden’s Field Representative |
| Cody Standiford                  | Congressman Walden’s Veteran Program Manager            |
| Dave Henderson                   | Congressman Walden’s District Director                  |
| <b>State Elected Officials</b>   |                                                         |
| Jean Cowan                       | Oregon House District 10 Representative                 |
| Betsy Johnson                    | Oregon Senate District 16 Representative                |
| Doug Whitsett                    | Oregon Senate District 28 Representative                |
| Bill Hansell                     | Oregon Senate District 29 Representative                |
| Ted Ferrioli                     | Oregon Senate District 30 Representative                |
| Deborah Boone                    | Oregon House District 32 Representative                 |
| Mike McLane                      | Oregon House District 55 Representative                 |
| Gail Whitsett                    | Oregon House District 56 Representative                 |
| Bob Jenson                       | Oregon House District 58 Representative                 |
| John Huffman                     | Oregon House District 59 Representative                 |
| Cliff Bentz                      | Oregon House District 60 Representative                 |
| Jonathan Thompson                | Oregon Senate, Sen. Ferrioli’s Chief of Staff           |
| Cameron Smith                    | Governor’s Policy Advisor                               |
| <b>Federal Agency</b>            |                                                         |
| Linda Anderson                   | United States Environmental Protection Agency           |
| Elaine Somers                    | United States Environmental Protection Agency           |
| Shelley Hall                     | National Park Service                                   |
| Lochen Wood                      | National Park Service                                   |
| Alan Schmierer                   | National Park Service                                   |
| Theodore (Ted) Buerger           | United States Fish and Wildlife Service                 |
| Larry Salata                     | United States Fish and Wildlife Service                 |



**Table 10-1. List of Agencies and Individuals Contacted (Continued)**

| <b>Point of Contact</b> | <b>Agency/Organization</b>                             |
|-------------------------|--------------------------------------------------------|
| Robyn Thorson           | United States Fish and Wildlife Service                |
| Jackie Andrew           | United States Forest Service                           |
| Robert Ensley           | United States Forest Service                           |
| Randy Fisher            | Pacific States Marine Fisheries Commission             |
| Ben Meyer               | NOAA Fisheries (NMFS)                                  |
| Max Etheridge           | United States Geological Survey                        |
| John Eisenhower         | United States Army Corps of Engineers                  |
| Ron Alvarado            | Natural Resources Conservation Services                |
| Christine Lehnertz      | National Park Service                                  |
| Jerome Perez            | Bureau of Land Management (BLM)                        |
| Julie Steward           | BLM National Airspace Program Manager                  |
| Kurt Kleiner            | BLM OR-WA State Aviation Manager                       |
| <b>State Agency</b>     |                                                        |
| Dick Pederson           | Oregon Department of Environmental Quality             |
| Tom Peterson            | Oregon Parks and Recreation Department                 |
| Carrie Lovellette       | Oregon Parks and Recreation Department                 |
| David Leal              | Oregon Fish and Wildlife Service                       |
| Jeff Everett            | Oregon Fish and Wildlife Service                       |
| Roy Elicker             | Oregon Fish and Wildlife Service                       |
| Lanny Quackenbush       | Oregon Department of State Lands                       |
| Nancy Pustis            | Oregon Department of State Lands                       |
| Dennis Griffin          | Oregon State Historic Preservation Office              |
| Mitch Swecker           | Oregon Department of Aviation                          |
| Matt Crall              | Oregon Department of Land conservation and Development |
| Mark Freese             | Nevada Department of Wildlife                          |
| Tony Wasley             | Nevada Department of Wildlife                          |
| Coleen Cripps           | Nevada Department of Conservation & Natural Resources  |
| Sherry Rupert           | Nevada Indian Commission                               |
| Jessica Axsom           | Nevada State Historic Preservation Office              |
| Rebecca Palmer          | Nevada State Historic Preservation Office              |
| <b>County Contacts</b>  |                                                        |
| Terry K. Tallman        | Morrow County, Judge                                   |
| Leann Rea               | Morrow County, Commissioner                            |
| Ken Grieb               | Morrow County, Commissioner                            |
| Carla McLane            | Morrow County, Planning Director                       |

**Table 10-1. List of Agencies and Individuals Contacted (Continued)**

| <b>Point of Contact</b>   | <b>Agency/Organization</b>                                           |
|---------------------------|----------------------------------------------------------------------|
| Steve Myren               | Morrow County, Undersheriff/Emergency Management Director            |
| Terry Harper              | Morrow County, Assistant Director Emergency Management               |
| Karen Wolff               | Morrow County, Court Executive Secretary                             |
| Ryan Swinburnson          | Morrow County, Counsel Member                                        |
| Robert Ordway             | Wheeler County, Commissioner                                         |
| Patrick Christopher Perry | Wheeler County, Judge                                                |
| Seth Crawford             | Crook County, Commissioner                                           |
| Ken Fahlgren              | Crook County, Commissioner                                           |
| Jeff Wilson               | Crook County, Counsel Member                                         |
| Rod Runyon                | Wasco County, Commissioner Chair                                     |
| Steve Shaffer             | Gilliam County, Judge                                                |
| Kenneth Kestner           | Lake County, Commissioner                                            |
| Phillip McDonald          | Lake County, Sheriff                                                 |
| Rick DuMilieu             | Lake County, Roadmaster                                              |
| Steven Grasty             | Harney County, Judge                                                 |
| Dan Nichols               | Harney County, Commissioner                                          |
| Peter Runnels             | Harney County, Commissioner                                          |
| Dennis Linthicum          | Klamath County, Commissioner                                         |
| Jim Bellet                | Klamath County, Commissioner                                         |
| Tom Mallams               | Klamath County Commissioner                                          |
| Timothy Josi              | Tillamook County, Commissioner                                       |
| William Baertlein         | Tillamook County, Commissioner                                       |
| Mark Labhart              | Tillamook County, Commissioner                                       |
| Craig Pope                | Polk County, Commissioner                                            |
| <b>Tribes</b>             |                                                                      |
| Charisse Soucie           | Burns Paiute Tribe, Tribal Chair                                     |
| Bob Garcia                | Confederated Tribes of Coos, Lower Umpqua & Siuslaw, Tribal Chair    |
| Brenda Meade              | Coquille Indian Tribe, Tribal Chair                                  |
| Dan Courtney              | Cow Creek Band of Umpqua Tribe of Indians, Tribal Chair              |
| Reynold Leno              | Confederated Tribes of Grand Ronde, Tribal Council Chair             |
| Gary Frost                | Klamath Tribes, Tribal Chair                                         |
| Delores Pigsley           | Confederated Tribes of Siletz Indians, Tribal Chair                  |
| Les Minthorn              | Confederated Tribes of the Umatilla Indian Reservation, Tribal Chair |

**Table 10-1. List of Agencies and Individuals Contacted (Continued)**

| <b>Point of Contact</b> | <b>Agency/Organization</b>                        |
|-------------------------|---------------------------------------------------|
| Austin Greene           | Confederated Tribes of Warm Springs, Tribal Chair |
| Warner Barlese          | Summit Lake Paiute Tribe, Chairman                |
| <b>Public Comments</b>  |                                                   |
| William Henningsgaard   | Citizen                                           |
| Linc Read-Nickerson     | Citizen                                           |
| Paul Speer              | Citizen                                           |
| Jan Schott              | Citizen                                           |
| Tom Schott              | Citizen                                           |
| David Will              | Citizen                                           |
| Janet Weidman           | Citizen                                           |
| Richard Leonetti        | Citizen                                           |
| William Hbranchak       | Citizen                                           |
| Melissa McCaffrey       | Citizen                                           |
| Tessa James Scheller    | Citizen                                           |
| Catherine Lee           | Citizen                                           |
| Kelly Coffelt           | City of Prineville/Crook County Airport           |
| Jeff Schott             | Citizen                                           |
| Don Wilfong             | Citizen                                           |
| Douglas Cheney          | Citizen                                           |
| Tom Rietmann            | Citizen                                           |
| Jerry Lyslo             | Citizen                                           |
| Terry Schott            | Citizen                                           |
| Robert Clark            | Veterans for Peace                                |
| Eugene Hill             | Brim Aviation                                     |
| Glen Edens              | Citizen                                           |
| Wayne Sperry            | Citizen                                           |
| Marie Sperry            | Citizen                                           |
| David Hudson            | Citizen                                           |
| Dan Morse               | Oregon Natural Desert Association (ONDA)          |
| Barbara Cannady         | Citizen                                           |
| Mary Rosenblum          | Oregon Pilots Association                         |
| Randall Henderson       | Citizen                                           |
| Christian Bates         | Citizen                                           |

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## **SECTION 11**

### **GLOSSARY**

**A-weighted decibel (dBA).** The sound pressure level in decibels as measured using the A-weighting filter network which de-emphasizes very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.

**Above Ground Level (AGL).** An aircraft flying altitude using the ground's surface (i.e., instead of mean sea level) as a point of reference.

**Advanced Handling Characteristics (AHC).** Consists of a single airplane training for proficiency in utilization and exploitation of the aircraft flight envelope consistent with operational and safety constraints including, but not limited to, high/maximum angle of attack maneuvering, energy management, minimum time turns, maximum/optimum acceleration and deceleration techniques, and confidence maneuvers.

**Aerospace Control Alert (ACA).** Aerospace Control Alert operations encompass those actions required to maintain peacetime control of U.S. and Canadian airspace.

**Air Contaminant Discharge Permit (ACDP).** Federal Air Contaminant Discharge Permit. In Oregon, the Oregon Department of Environmental Quality (DEQ) issues the ACDP.

**Air Combat Maneuvering (ACM).** Training typically involves three to four similar aircraft and emphasizes intra-flight coordination, survival tactics, and maneuvering of two aircraft against one or two adversaries.

**Air Combat Tactics (ACT).** Usually involves four to eight aircraft. This scenario involves designating friendly and enemy forces, which separate as far as possible in the maneuvering airspace to begin tactics training. The training consists of opposing forces engaging each other over a large range of altitudes.

**Air Traffic Control Assigned Airspace (ATCAA).** Airspace above 18,000 feet mean sea level (MSL) designed to accommodate non-hazardous military flight training activities. This airspace remains in the control of the Federal Aviation Administration (FAA) when not in use to support general aviation activities.

**Airspace.** A generic term that covers the different classification of airspace (i.e., Class A, Class B, Class C, Class D, and Class E airspace) and defined dimensions within which air traffic control service is provided to Instrument Flight Rule (IFR) flights and to Visual Flight Rule (VFR) flights in accordance with the airspace classification.

**Area of Critical Environmental Concern (ACEC).** Public lands managed by the Bureau of Land Management that require special management in order to protect the area's resource values. The resources may be wildlife habitat, special viewsheds, or, areas of cultural or historical importance. The ACEC may also require special management due to hazards.

**Attainment Area.** A geographic region where the concentration of a specific air pollutant does not exceed federal standards.

**Aviation Hazard Advisory System.** The Avian Hazard Advisory System (AHAS) is a Bird Avoidance Model used to generate projected and actual geospatial bird data for use in military airspace, including military operation areas (MOAs), ranges, and military training routes (MTRs) that uses Geographic Information System technology combined with data on bird habitat, migration, and breeding characteristics to create a visual tool for analyzing bird-aircraft collision risk.

**Basic Fighter Maneuvering (BFM).** Fundamental training of all air-to-air flight maneuvering. This training is normally conducted with two similar aircraft to practice individual offensive and defensive maneuvering against a single adversary.

**Bird Aircraft Strike Hazard (BASH).** The potential for aircraft to strike birds during any component of flight operations and at any altitude, time of day, or

season. Statistical data is used to evaluate BASH risk and establish policies and procedures to help minimize such risk.

**Council on Environmental Quality (CEQ).** An advisory council to the President established by the National Environmental Policy Act of 1969. The CEQ reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

**Combat Ceiling.** The altitude at which the maximum rate of climb capability at maximum continuous power and best climb speed is 500 feet per minute.

**Controlled Firing Areas (CFAs).** These non-regulatory special use airspace areas contain activities which, if not conducted in a controlled environment, could be hazardous to non-participating aircraft. Activities in these areas are suspended immediately when spotter aircraft, radar, or ground lookout positions indicate that non-participating aircraft might be approaching the area. Controlled firing areas are not charted since they do not require non-participating aircraft to change flight path.

**Critical Habitat.** Under the federal Endangered Species Act, critical habitat is defined as "the specific areas within the geographic area occupied by a species on which are found those physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and specific areas outside the geographic area occupied by a species at the time it is listed, upon determination that such areas are essential for the conservation of the species."

**Day-Night Monthly Average Sound Level ( $L_{dnmr}$ ).** The onset-rate adjusted monthly day-night average A-weighted sound level. This measurement is similar to  $L_{dn}$  in that it is an averaged metric and that a 10 decibel (dB) penalty is assigned for events occurring between 2200 and 0700 hours.

**decibel (dB).** A measurement of the amplitude of sound based on logarithmic scale, where a 10 dB increase in noise corresponds to a 100-percent increase in perceived sound. Under most conditions, a 5 dB change is necessary for noise increases to be noticeable.

**Domestic Reduced Vertical Separation Minimum (DRVSM).** A procedure that allows FAA controllers to reduce the vertical separation between aircraft from 2,000 feet to 1,000 feet at altitudes between 29,000 and 41,000 feet.

**Federal Aviation Regulation (FAR).** Regulations enforced by the FAA. These regulations are designed to manage and control U.S. airspace, including that used by commercial, civil, and military aircraft.

**Federal Interagency Committee on Noise (FICON).** FICON was formed in 1990 to review federal policies that govern the assessment of airport noise impacts.

**Formal Training Unit.** A formal training unit is a unit dedicated to the training of pilots for U.S. Air Force (USAF) and National Guard Bureau (NGB) missions. The 173 FW is the only F-15 training unit in USAF.

**Hertz (Hz).** A unit of measure for the frequency of sound, defined as the number of pressure variations per second.

**High Accident Potential.** An Air Force-defined category of aircraft mishaps, which represents minor accidents generally involving minor damage and injury that rarely affect the public.

**Instrument Flight Rules (IFR).** Rules governing procedures for conducting instrument flight as opposed to visual flight. The term is also used by pilots and controllers to indicate type of flight plan to be used.

**Instrument Flight Rules Military Training Route (IR).** Routes used by military units for conducting low-altitude navigation and tactical training in both IFR and VFR weather conditions below 10,000 feet above mean sea level at indicated airspeeds in excess of 250 knots.

**Interagency and Intergovernmental Coordination for Environmental Planning (IICEP).** A planning process implementing the Intergovernmental Coordination Act and Executive Order 12372, which requires federal agencies to cooperate with and consider state and local views in evaluating federal proposals.



**Low Altitude Navigation.** Involves training conducted below 1,000 feet AGL using onboard systems and the fundamental aspects of dead reckoning and point-to-point low-altitude navigation, with or without prior route planning.

**Low Altitude Training (LOWAT).** Normally involves two to four aircraft practicing the fundamentals of searching for and engaging an aerial target at low-altitude.

**Low/Slow Visual Identification.** Consists of identifying and engaging aerial targets at low-altitude.

**Maintenance Area.** Specific populated area where air quality is a problem for one or more pollutants.

**Marine Protected Area (MPA).** Designated ocean areas that are set aside by state or national authority for a variety of conservation and management methods. Protected areas may be established to protect ecosystems, preserve cultural resources, aid in marine or coastal research, or sustain fisheries production.

**Mean Sea Level (MSL).** The surface level between high and low water, used as a point of reference from which ground elevations and flight altitudes are measured.

**Military Operations Area (MOA).** Airspace areas of defined vertical and lateral dimensions established to separate military training activities (e.g., air combat maneuvers, air intercepts, and acrobatics) from other air traffic operating under instrument flight rules.

**MRNMAP.** MRNMAP is a general purpose, PC-based computer program that calculates the noise levels under MOAs, MTRs, and ranges. The calculations in MRNMAP are based on a U.S. Air Force dataset of measured aircraft noise levels called noise file. The program calculates standard noise metrics of  $L_{dnmr}$ ,  $L_{dn}$ , CNEL,  $L_{eq}$ , SEL and  $L_{max}$ .

**Military Training Route (MTR).** Airspace of defined vertical and lateral dimensions established for the conduct of military flight training at indicated airspeeds in excess of 250 knots.

**National Ambient Air Quality Standards (NAAQS).** Maximum pollutant concentrations established under Section 109 of the Clean Air Act that may not be exceeded more than once per year (except annual standards, which may never be exceeded) that represent standards necessary to protect public health and welfare with a reasonable margin of safety. Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (PM<sub>10</sub>), and sulfur dioxide.

**National Environmental Policy Act (NEPA).** Public Law 91-190, passed by Congress in 1969, which established a national policy designed to include potential environmental consequences of proposed actions into federal decision-making processes. The intent of NEPA is to protect, restore, or enhance the environment through well-informed federal decisions. The Council of Environmental Quality (CEQ) was established under NEPA to implement and oversee federal policy in this process.

**National Emission Standards for Hazardous Air Pollutants (NESHAP).** National Emission Standards for Hazardous Air Pollutants (NESHAPS) are stationary source standards for hazardous air pollutants. Hazardous air pollutants (HAPs) are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects.

**Nonattainment Area.** A geographic area in which air quality is worse than that allowed by federal air pollution standards.

**North American Aerospace Defense Command.** The North American Aerospace Defense Command is charged with the Aerospace Warning and Control mission and Integrated Tactical/Warning Attack assessment for North America

**Positive Control Area (PCA).** Now identified as Class A airspace, this airspace includes all flight levels or operating altitudes greater than 18,000 feet MSL. Class A airspace is dominated by commercial aircraft utilizing routes between 18,000 and 45,000 feet MSL.

**Prevention of Significant Deterioration (PSD).** A federal preconstruction permitting program that applies to areas that are not violating a National Ambient Air Quality Standard. The program applies pollutant-by-pollutant. That is, an air quality jurisdiction can be nonattainment for one pollutant and attainment or unclassified for another pollutant. The area will fall under the prevention of significant deterioration program for those pollutants that are attainment or unclassified.

**Primary Aircraft Authorization (PAA).** The aircraft officially designated to a unit so that it can perform its operational mission. The primary authorization is the basis for the approval of operating funds, which include personnel, support equipment, and flying-hour money.

**Region of Influence (ROI).** A geographic area within which the influence of a physical or human resource is confined.

**Resource Conservation and Recovery Act (RCRA).** RCRA and its amendments mandate regulations that monitor hazardous waste from its origin to ultimate treatment, storage, or disposal.

**Research Natural Area (RNA).** Reserved areas, which contain important ecological and scientific values and are managed for minimum human disturbance. The goals of RNAs are to preserve examples of all significant natural ecosystems for comparison with those influenced by man; to provide educational and research areas for ecological and environmental studies; and to preserve gene pools of typical and endangered plants and animals.

**Slow Shadow Training.** Involves practicing maneuvers to intercept slow flying rotary or fixed wing aircraft and maintaining surveillance without being detected.

**Sound Exposure Level (SEL).** SEL is defined as the constant level acting for one second which has the same amount of acoustic energy as the original sound. SEL is often used for describing the noise energy of a single event, such as an aircraft flying over. Since SEL measurements are normalized to a one-second time interval, the energy content of different types of noise events can be compared.

**Special Operating Procedure (SOP).** Procedures established for aircraft using MTRs within the U.S. SOPs identify areas where overflights at low altitudes should be avoided to the maximum extent practicable, such as national wildlife refuges, species nesting sites, towns, nuclear power plants, etc.

**Special Use Airspace (SUA).** Special use airspace consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both. Except for controlled firing areas, special use airspace areas are depicted on aeronautical charts. Warning areas, MOAs, alert areas, and controlled firing areas (CFAs) are nonregulatory special use airspace.

**State Implementation Plan (SIP).** The primary vehicle for states to achieve compliance with the NAAQS is a SIP, which the USEPA requires each state to prepare. A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state into compliance with federal air quality standards.

**Tactical Intercept (TI).** Involves the detection and interception of hostile aircraft. The target aircraft attempts to penetrate the area protected by the interceptor who, with the aid of radar, attempts to detect the target, maneuver to identify the target, and based on the scenario, reach a position from which the target can be destroyed.

**Title V Program.** Title V is a federal program designed to standardize air quality permits and the permitting process for major sources of emissions across the country. The name "Title V" comes from Title V of the 1990 federal Clean Air Act Amendments which requires the U.S. Environmental Protection Agency (USEPA) to establish a national, operating permit program. Accordingly,

USEPA adopted regulations (Title 40 of the Code of Federal Regulations, Chapter 1, Part 70 [Part 70]), which require states and local permitting authorities to develop and submit a federally enforceable operating permit programs for EPA approval.

**Traditional Cultural Properties (TCP):** Properties associated with cultural practices or beliefs of a living community that are rooted in the history of the community, and are important to maintaining the continuing cultural identity of the community. TCPs may be determined eligible for the NRHP and, as such, are considered under the Section 106 process. Examples of TCPs include: 1) locations where Native American or other groups traditionally gather wild foods or medicines; 2) ethnic neighborhoods whose cultural character is important to current residents; 3) rural landscapes reflecting traditional patterns of agriculture or social interaction; and 4) landforms associated with Native American traditions and religious practices.

**Visual Flight Rules (VFR).** Procedures for conducting flight under visual navigation which consider potentially restricting conditions such as weather. VFR may indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, VFR is used by pilots and controllers to indicate type of flight plan.

**Visual Flight Rules Route (VR).** Routes used by the military for low-altitude navigation and tactical training under VFR below 10,000 feet MSL at indicated airspeeds in excess of 250 knots.

**Volatile Organic Compounds (VOCs).** Organic compounds that evaporate faster than water under like environmental conditions. VOCs may exist as either gases or liquids under normal atmospheric conditions.

**Warning Area.** A warning area is airspace of defined dimensions, (extending from 3 nautical miles outward from the coast of the U.S.), designated to contain activity that may be hazardous to nonparticipating aircraft. The purpose of a warning area is to warn nonparticipating pilots of the potential danger from activities being conducted. A warning area may be located over domestic waters, international waters, or both. Warning areas may be

considered for joint use if the area can be released to the FAA during periods when it is not required for its designated purpose, and provided the warning area is located in airspace wherein the FAA exercises ATC authority under ICAO agreements. When designating a warning area for joint use, a letter of agreement must be executed between the controlling and using agencies to define the conditions and procedures under which the controlling agency may authorize nonparticipating aircraft to transit, or operate within the area.