Final
Environmental Assessment
Combat Air Forces Adversary Air
Kingsley Field Air National Guard Base, Oregon

February 2020

United States Air Force
173d Fighter Wing
114th Fighter Squadron
550th Fighter Squadron

Kingsley Field Air National Guard Base, Oregon

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PRIVACY ADVISORY

This Final Environmental Assessment (EA) is provided in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR Parts 1500-1508), and 32 CFR Part 989, Environmental Impact Analysis Process (EIAP). Private information from public commenters, such as personal home addresses and phone numbers, is not published in this document to comply with Privacy Act requirements.

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COVER SHEET

FINAL ENVIRONMENTAL ASSESSMENT (EA) FOR COMBAT AIR FORCES ADVERSARY AIR, KINGSLEY FIELD AIR NATIONAL GUARD BASE

a. *Responsible Agency*: United States Air Force (Air Force)

b. *Cooperating Agency*: None

c. *Proposals and Actions:* The environmental assessment (EA) analyzes a Proposed Action to provide dedicated contract adversary air sorties for Combat Air Forces training at Kingsley Field Air National Guard Base (ANGB). The Proposed Action would include the addition of 39 contract maintenance personnel and an estimated eight contract pilots. Approximately 2,000 additional sorties would be added to perform training activities within the Juniper/Hart Military Operations Area (MOA) Complex, Dolphin MOA, Goose MOA, and Warning Area W-93. The proposed facilities at Kingsley Field ANGB would include the required ramp space; maintenance space; operational space; petroleum, oil and lubricant storage; runway access; and associated parking to support the Proposed Action. Three Alternatives in addition to the No Action Alternative were evaluated in the EA.

d. *For Additional Information:* Captain Joseph Young, 173 CES/CEV, 211 Arnold Avenue, Suite 26, Kingsley Field, OR 97603, or by email at joseph.a.young32.mil@mail.mil

e. *Designation:* Final EA

f. *Abstract:* This EA has been prepared pursuant to provisions of the National Environmental Policy Act, Title 42 United States Code Sections 4321 to 4347, implemented by Council on Environmental Quality Regulations, Title 40, Code of Federal Regulations (CFR) Parts 1500 to 1508, and 32 CFR Part 989, *Environmental Impact Analysis Process*. Potentially affected environmental resources were identified in coordination with local, state, and federal agencies. Specific environmental resources with the potential for environmental consequences include airspace management and use; noise; safety; air quality; biological resources; land use; socioeconomics – income and employment; environmental justice and protection of children; cultural resources; hazardous materials and waste, contaminated sites, and toxic substances; and transportation.

The purpose of the Proposed Action is to provide dedicated contract adversary air (ADAIR) sorties to improve the quality of training and readiness of pilots of the 173d Fighter Wing located at Kingsley Field ANGB, Oregon. By providing a dedicated contract ADAIR capability, F-15 trainees and instructor pilots would gain more realistic air-to-air training during their training syllabus tasks. Dedicated contract ADAIR would also allow the unit to free up resources used to self-generate ADAIR and more effectively use those available flying hours. Additionally, other Air Force (4th generation) units that are tasked to provide ADAIR training support at Kingsley Field could recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

Contract ADAIR training scenarios would include the use of combat tactics and procedures that differ from Combat Air Forces tactics to simulate an opposing force. The elements affecting Kingsley Field include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. Elements affecting the airspace include airspace use and defensive countermeasures. The Proposed Action at Kingsley Field would include the establishment of an estimated 39 contracted maintainers and 8 contracted pilots who would operate an estimated six aircraft. Six aircraft types (MiG-29, F-5, Dassault Mirage, F-16, Eurofighter Typhoon, and JAS-39 Gripen) have been identified which would meet the needs of the Air Force for contract ADAIR selection at Kingsley Field based on performance capabilities of the aircraft and how those capabilities best meet mission training requirements at the installation. Contracted ADAIR service providers may ultimately choose another type of aircraft to support Air Force ADAIR needs at Kingsley Field; however, any aircraft selected would need to operate within the parameters and impact levels evaluated within this EA or supplemental National Environmental Policy Act analysis would be required. The proposed facilities at Kingsley Field are available for use and include the required ramp space; maintenance space; operational space; petroleum, oil and lubricant storage; runway access; and associated parking to support the Proposed Action.

The analysis of the affected environment and environmental consequences of implementing the Proposed Action and alternatives concluded that operational mitigation measures would need to be applied to the Proposed Action to reduce noise impacts to less than significant. With the implementation of these operational mitigation measures, in addition to the application of standing environmental protection measures and Best Management Practices, there would be no significant adverse impacts from contract ADAIR operations at Kingsley Field or in the special use airspace on the following resources: airspace management and use; noise; safety; air quality; biological resources; land use; socioeconomics – income and employment; environmental justice and protection of children; cultural resources; hazardous materials and wastes, contaminated sites, and toxic substances; and transportation. Kingsley Field is an active installation with new construction and maintenance actions currently underway; however, impacts on air quality, noise, and socioeconomics – income and employment associated with construction would be minor and short in duration; therefore, significant cumulative impacts are not anticipated from activities associated with the Proposed Action when considered with past, present, or reasonably foreseeable future actions.

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)

COMBAT AIR FORCES ADVERSARY AIR
KINGSLEY FIELD AIR NATIONAL GUARD BASE

Pursuant to provisions of the National Environmental Policy Act (NEPA), 42 United States Code (U.S.C.) §§ 4321 to 4370h; Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) Parts 1500 to 1508; and 32 CFR Part 989, *Environmental Impact Analysis Process,* the United States Air Force (Air Force) prepared the attached Final Environmental Assessment (EA) to address the potential environmental consequences associated with providing contract adversary air (ADAIR) sorties for improving training and readiness of pilots at Kingsley Field Air National Guard Base (ANGB), Oregon.

Purpose and Need

The purpose of the Proposed Action is to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of 173d Fighter Wing (173 FW) pilots located at Kingsley Field ANGB, Oregon. Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions. By providing a dedicated contract ADAIR capability, F-15 trainees and instructor pilots would gain more realistic air-to-air training during their training syllabus tasks. Dedicated contract ADAIR would also allow the unit to free up resources used to self-generate ADAIR and more effectively use those available flying hours. Additionally, other Air Force (4th generation) units that were tasked to provide ADAIR training support at Kingsley Field could recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

The need for action is to provide better and more realistic training for the F-15 flight training program at Kingsley Field ANGB. Dedicated contract ADAIR is critical to improving pilot readiness as it provides realistic training opportunities to employ Combat Air Forces (CAF) tactics and procedures that optimize the training value of every mission. Contract ADAIR can be used in basic building block syllabus sorties or the very advanced and fluid environment of multiaircraft air combat required by the training syllabus.

Description of Proposed Action and Alternatives

The Proposed Action would provide dedicated contract ADAIR sorties for CAF training at Kingsley Field, Oregon, to address shortfalls in F-15 pilot training and production capability and to provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced training missions. Training scenarios would include the use of combat tactics and procedures that differ from CAF tactics to simulate an opposing force. The elements affecting Kingsley Field include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. The elements affecting the airspace include airspace use and defensive countermeasures.

The Proposed Action at Kingsley Field ANGB would include the establishment of an estimated 39 contracted maintainers and 8 contracted pilots who would operate an estimated six aircraft. Six aircraft types (MiG-29, F-5, Dassault Mirage, F-16, Eurofighter Typhoon, and JAS-39 Gripen) have been identified as capable of providing contract ADAIR support to F-15 CAF aircrews stationed at Kingsley Field based on performance capabilities of the aircraft and how those capabilities best meet mission training requirements at the installation. One or a combination of these aircraft types may be operated by a contractor at Kingsley Field in support of ADAIR training. The proposed facilities at Kingsley Field are available for use and include the required ramp space; maintenance space; operational space; petroleum, oil and lubricant storage; runway access; and associated parking to support the Proposed Action. Approximately 1,952 sorties annually would support training activities within nearby special use airspace including the Juniper/Hart Military Operations Area (MOA) Complex, Dolphin MOA, Goose MOA, and Warning Area W-93. Contract ADAIR aircraft would employ defensive countermeasures (e.g., chaff and flares) in all the MOAs and Warning Area.

In addition to the No Action Alternative, three alternatives for the proposed contract ADAIR were identified for evaluation in the EA. These alternatives are described below and represent various options for facility use at Kingsley Field.

Alternative 1

Contract ADAIR capabilities would be established using an estimated six aircraft providing 2,000 annual sorties at Kingsley Field. Of the 2,000 annual sorties, 1,366 training sorties would occur in the Juniper/Hart MOA Complex, 186 in the Dolphin MOA, 390 in the Goose MOA, and 10 in W-93. The remaining sorties are expected for aircraft leaving for or returning from either maintenance or other deployments. Operations would be located in Building 404 and maintenance activities would be located in Building 307. Contract aircraft would be parked on Delta Row located in front of Building 307.

Alternative 2

Alternative 2 would be the same as described in Alternative 1 except operations would be located in Building 219, with maintenance activities housed in Building 307. Contract aircraft would be parked on Delta Row.

Alternative 3

Alternative 3 would be the same as described in Alternatives 1 and 2 except operations and maintenance activities would be consolidated in Building 219. Contract aircraft would be parked on Bravo Row in front of Building 219.

No Action Alternative

No action means that an action would not take place, and the resulting environmental effects from taking no action would be compared with the effects of allowing the proposed activity to go forward. No action for this EA reflects the status quo, where no contract ADAIR support at Kingsley Field ANGB would occur.

Summary of Findings

Potentially affected environmental resources were identified through communications with state and federal agencies and review of past environmental documentation. Specific environmental resources with the potential for environmental consequences include airspace management and use; noise; safety; air quality; biological resources; land use; socioeconomics – income and employment; environmental justice and protection of children; cultural resources; hazardous materials and wastes, contaminated sites, and toxic substances; and transportation.

Under the Proposed Action, the annual number of operations would increase by 3 percent but would not impact the operational capacity or necessitate changes to the locations or dimensions of the airspace around Kingsley Field. Potential impacts on the airspace around the airfield for Alternatives 1, 2, and 3 would be negligible. Likewise, the airspace proposed for use by contract ADAIR have the capacity and the dimensions necessary to support additional sorties; therefore, negligible impacts on airspace management and use are anticipated for Alternatives 1, 2, and 3.

Under the Low and Medium Noise Scenarios, long-term, negligible to minor increases in noise from the addition of contract ADAIR flight operations in the vicinity of the Kingsley Field airfield are anticipated. These impacts are primarily localized north and south of Kingsley Field. Under the High Noise Scenario, proposed contract ADAIR operations would increase noise levels resulting in major impacts for all alternatives. Mitigation measures to reduce the impacts are described in EA Section 4.2.2.2 and Appendix E. The primary changes in noise contours increased the affected area greater than the 65-A-weighted-decibel (dBA) Day-Night Sound Level (DNL) by approximately 2,742 additional acres. The increases in the DNL ranged from 0 to 4 dBA above the baseline condition at select noise sensitive receptors designated as points of interest (e.g., schools, places of worship) near the airfield. Under the High Noise Scenario, there would be moderate impacts on select points of interest with mitigation. There would be a slight increase in noise from additional contract ADAIR subsonic and/or supersonic flight operations in the Juniper/Hart MOA Complex, Dolphin MOA, Goose MOA, and W-93; however, the impact would be negligible as these MOAs are not located over highly populated areas.

Safety zones around the airfield are not expected to change. Buildings associated with contract ADAIR are located outside of identified Quantity-Distance arcs; therefore, no impacts on explosives safety are anticipated. With an established crash damaged or disabled aircraft recovery program and implementation of all applicable Air Force Office of Safety and Health and Occupational Safety and Health Administration requirements, no impacts on ground safety are expected to occur. No impacts are expected on flight safety

under the implementation of contractor flight safety rules and bird/wildlife-aircraft strike hazard (BASH) procedures.

Increased air emissions resulting from contract ADAIR operations at Kingsley Field are not considered significant under Alternatives 1, 2, and 3. The proposed project would not interfere with the region's ability to maintain compliance with National Ambient Air Quality Standards for attainment area pollutants and would not interfere with the ability to achieve compliance for pollutants that contribute to ozone nonattainment. In the airspace, none of the criteria pollutants emission rates exceeded the 100 tons per year *de minimis* threshold; therefore, no impacts on air quality are expected from contract ADAIR operations.

Noise and aircraft movement impacts from increased operations at Kingsley Field would have negligible, short- and long-term effects on wildlife. Airfield management and risk reduction implementation measures associated with the BASH program would continue to reduce BASH resulting in a minor impact on birds and other wildlife. There are no ground-disturbing activities associated with the Proposed Action at Kingsley Field. Sonic booms from supersonic flights are expected during training activities; however, potential impacts on wildlife in the airspace associated with sonic booms are not expected. No impacts on threatened and endangered species from aircraft operations are anticipated. Additionally, federally listed sea turtles and sea birds could be impacted from ingestion of residual plastic chaff and flare components. The Air Force has made a *may affect, but not likely to adversely affect* determination for all listed sea turtles as well as for the marble murrelet and short-tailed albatross. The National Marine Fisheries Service and US Fish and Wildlife Service concurred with this determination. There would be only minor impacts from increased noise during flight operations to sage-grouse and sage-grouse leks because there would be only a negligible change in noise from the contract ADAIR training and the overall noise levels from the proposed High Noise Scenario would be low; further, the risk of fire from the use of flares would be greatly minimized by only releasing flares above 5,000 feet (ft) and at times of low fire danger. The months with the highest fire risk for the Juniper MOAs are July, August, and September; the months with the highest fire risk for the Hart MOAs are July through October. Flares will not be used during these times of high fire danger. Moreover, while Air Force Instruction 11-214, *Air Operations Rules and Procedures*, limits the minimum altitude for flare use by F-15s over all federal land to 2,000 ft above ground level, in order to ensure flares are completely extinguished before reaching the ground and due to increased fire risk beneath the Juniper/Hart MOA Complex, chaff and flare are not authorized in Juniper Low MOA. As a result of this conservative approach, no flares are authorized below 5,000 ft above ground level over land.

Changes to the noise setting from increased noise as a result of the High Noise Scenario would result in potentially significant long-term impacts on land use compatibility. The increases in the DNL under the High Noise Scenario ranged from 0 to 4 dBA above the baseline condition at select noise sensitive receptors designated as points of interest (e.g., schools, places of worship) near the airfield. Mitigation measures, as described in the EA in Section 4.2.2.2, would reduce the impacts from noise to a less than significant level for land use compatibility.

No ground disturbance would take place as part of the Proposed Action at Kingsley Field; therefore, potential archaeological deposits would not be impacted. The buildings proposed for use (Buildings 219, 307, and 404) were determined to be not eligible for inclusion in the National Register of Historic Places. No traditional cultural or sacred sites are located at Kingsley Field; however, during tribal consultation, one Tribe, the Tolowa Dee-ni' Nation, identified an area that is used for ceremonial practices and traditional/subsistence fishing in the Dolphin MOA at certain times of the year. In response, the National Guard Bureau (NGB) defined an exclusion zone covering the northern California coastline and waters. The exclusion zone extends from Lake Earl north to California's border with Oregon. NGB agreed that no chaff and flare will be used within the exclusion zone for the Winter Solstice and the following 10 days or within the month of July. Also, all aircraft operations will be restricted to a floor of 11,000 ft mean sea level. NGB agreed to contact the Nation after 1 year to ensure that all their concerns have been addressed. Following completion of tribal consultation, ADAIR operations would be performed at altitudes and with restrictions that would result in no effects to historic, ceremonial, or sacred resources.

Since there is no new construction proposed at Kingsley Field ANGB, the interior upgrades to facilities for contract ADAIR operations would require only a small amount of supplies and labor and therefore would not impact the existing socioeconomic environment. The proposed personnel and pilots would represent a

small increase in the 1,040 military and civilian personnel currently employed at Kingsley Field; therefore, no adverse impact on income and employment would occur. The increased annual expenditures in the region of up to approximately $30 million for contract ADAIR support would represent a long-term, potentially major, beneficial impact.

Some noise-sensitive receptors would experience major impacts from the additional sorties under the High Noise Scenario associated with the contract ADAIR aircraft. Under the High Noise Scenario, noise impacts could cause some existing residential homes and commercial properties to decrease in value. Mitigation measures to reduce the impacts from noise are described in EA Section 4.2.2.2 and Appendix E. With the implementation of mitigation, impacts on property values would be minor. Increased annual expenditures in the region would provide long-term, moderate, beneficial impacts through increased payroll tax revenue and the purchase of equipment, materials, and fuel for aircraft operations.

There would be no disproportionate impacts on minority populations or low-income communities surrounding Kingsley Field. Under the High Noise Scenario, the 4-dBA DNL increase in noise near education facilities would result in a potentially significant impact on children, as studies have shown that increased noise impacts the ability of children to learn; however, mitigation measures would be implemented as described in EA Section 4.2.2.2 and Appendix E to reduce impacts to a less than significant level.

Hazardous wastes generated as a result of contract ADAIR operations would be stored and disposed in accordance with the 173 FW *Hazardous Waste Management Plan*; therefore, no impacts from managing hazardous waste are expected. No impacts are expected from asbestos-containing materials and lead-based paint from interior renovations of proposed facilities with implementation of requirements described in the *Asbestos Management and Operating Plan*. Lighting fixtures containing polychlorinated biphenyls would be disposed in accordance with federal, state, and local laws, which would result in a long-term, minor, beneficial impact. There is a low potential for radon to pose a health hazard at Kingsley Field. As such, no impacts from radon are anticipated. There is no environmental contamination known to occur within the project area.

Cumulative Impacts

Kingsley Field is an active military installation that experiences continuous evolution of mission and operational requirements. Routine construction and planned infrastructure improvements would continue to occur simultaneously with the Proposed Action. In addition to these routine projects, past, present, and reasonably foreseeable future Air Force and NGB projects, as well as nonfederal off-base projects, were considered in the cumulative impacts analysis for this EA. While some of these projects may overlap in construction or implementation with the Proposed Action, there is the potential for an incremental impact; however, no potentially significant cumulative impacts under the Low or Medium Noise Scenarios or with mitigation the High Noise Scenario are expected at Kingsley Field, nearby environs, or the airspace proposed for use by contract ADAIR.

Mitigation

Best Management Practices and environmental commitments are described and recommended in the EA where applicable.

The EA analysis concluded that if the Low or Medium Noise Scenario contract aircraft are selected, the Proposed Action and alternatives would not result in significant environmental impacts; however, if the Proposed Action is implemented and the High Noise Scenario contract aircraft are selected, mitigation to reduce noise impacts at points of interest (POIs) near Kingsley Field would be needed for impacts to remain less than significant. Noise analyses conducted for the Proposed Action indicate that the noise exposure at Kingsley Field may increase significantly with the proposed addition of ADAIR contractor flight training operations under the High Noise Scenario and specifically for the straight-in arrival operations by these High Noise Scenario aircraft; therefore, to reduce the potentially significant impacts from noise on POIs under the High Noise Scenario, operational noise mitigation studies were conducted with a goal of reducing noise at the POIs in the vicinity of the airfield so that no POIs experience an increase greater than the 3-dBA DNL as a result of the Proposed Action.

DNL increases of 3 to 4 dBA would be clearly noticeable and may increase human annoyance. Based on the evaluation of nine possible mitigation scenarios, Mitigation Scenario 4 is the most reasonable to implement and would cause the fewest operational concerns in conjunction with implementation of the Proposed Action. If additional approaches to mitigation for noise to the POIs both north and south of the airfield are required, then Mitigation Scenario 7 would be implemented. A Mitigation Plan has been prepared and is included in the EA as Appendix E.

The High Noise Scenario was analyzed in the EA as the "worst-case" scenario and assumes that the noisiest aircraft would be selected for use for contract ADAIR operations. Without appropriate mitigation, the High Noise Scenario could result in potentially significant impacts for all alternatives. Section 4.2.2.2 of the EA explains the various mitigation options that would, individually or in combination, be implemented. Under the High Noise Scenario, the 173 FW would implement mitigation measures, as feasible and appropriate, to reduce noise impacts near Kingsley Field to less than significant. The mitigation would only apply if aircraft similar to the High Noise Scenario are chosen as the contract ADAIR aircraft. If contract ADAIR aircraft similar to the Medium or Low Noise Scenario are chosen, no mitigation would be required. The ultimate need for mitigation would be determined by the actual aircraft used for contract ADAIR. Once the selected aircraft are known, the Air Force would analyze and document the most effective mitigation scenarios for the selected aircraft.

Conclusion

Finding of No Significant Impact. After review of the EA prepared in accordance with the requirements of NEPA; CEQ regulations; and 32 CFR Part 989, *Environmental Impact Analysis Process,* and which is hereby incorporated by reference, I have determined that the proposed activities to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of pilots of the 173 FW located at Kingsley Field ANGB, Oregon, with the implementation of operational mitigation for High Noise Scenario contract ADAIR aircraft as outlined in Section 4.2.2.2 and Appendix E (as required), would not have a significant impact on the quality of the human or natural environment. Accordingly, an Environmental Impact Statement will not be prepared.

This decision has been made after considering all submitted information, including a review of public and agency comments submitted during the 30-day public comment period, and considering a full range of practical alternatives that meet project requirements and are within the legal authority of the United States Air Force.

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DEE JAY KATZER, Colonel, Air Force
Chief, Civil Engineer Division (ACC/A4C)

12 Feb 2020
DATE

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FINAL

ENVIRONMENTAL ASSESSMENT (EA)

FOR

COMBAT AIR FORCES ADVERSARY AIR
KINGSLEY FIELD AIR NATIONAL GUARD BASE, OREGON

PREPARED FOR:

Department of the Air Force

February 2020

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	degree(s) Fahrenheit
µg/m^3	microgram(s) per cubic meter
114 FS	114th Fighter Squadron
173 FW	173d Fighter Wing
173 LRS	173d Logistics Readiness Squadron
173 MXS	173d Maintenance Squadron
550 FS	550th Fighter Squadron
ac	acre(s)
ACAM	Air Conformity Applicability Model
ACM	asbestos-containing materials
ADAIR	adversary air
ADF	Automatic Direction Finder
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AFPD	Air Force Policy Directive
AGE	Aerospace Ground Equipment
AGL	above ground level
AGRS	aggressor squadron
Air Force	United States Air Force
AMU	Aircraft Maintenance Unit
ANG	Air National Guard
ANGB	Air National Guard Base
APE	Area of Potential Effects
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
ANGRC	Air National Guard Readiness Center
AST	aboveground storage tank
ATC	Air Traffic Control
ATCAA	Air Traffic Control-Assigned Airspace
AWOIS	Automated Wreck and Obstruction Information System
BACT	Best Available Control Technologies
BASH	bird/wildlife-aircraft strike hazard
BMP	Best Management Practice
BRAC	Base Realignment and Closure
C	candidate
CAA	Clean Air Act
CAD/PAD	cartridge-actuated device/propellant-actuated device
CAF	Combat Air Forces
CAP	central accumulation point
CDDAR	Crash Damaged or Disabled Aircraft Recovery
CDFW	California Department of Fish and Wildlife
CDNL	C-weighted Day-Night Average Sound Level
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPSC	Consumer Product Safety Commission
CSAF	Chief of Staff Air Force
CSEL	C-Weighted Sound Exposure Level
CZ	Clear Zone

CZMA	Coastal Zone Management Act
dB	decibel(s)
dBA	A-weighted decibel(s)
DDT	dichlorodiphenyltrichloroethane
DLA	Defense Logistics Agencies
DNL	Day-Night Average Sound Level
DOD	Department of Defense
DPS	distinct population segment
E	endangered
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EMO	Environmental Management Office
EMS	Environmental Management System
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESOHC	Environmental Safety and Occupational Health Council
FAA	Federal Aviation Administration
FL	Flight Level
FONSI	Finding of No Significant Impact
ft	foot (feet)
ft^2	square foot (feet)
FTU	formal training unit
GHG	greenhouse gas
GWP	global warming potential
HAZMART	hazardous material pharmacy
HAZMAT	hazardous material(s)
IDP	Installation Development Plan
IFR	Instrument Flight Rules
in.	inch(es)
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
JLUS	Joint Land Use Study
lb/yr	pound(s) per year
LBP	lead-based paint
LDC	Land Development Code
L_{dn}	Day-Night Average Sound Level
L_{dnmr}	Onset-Rate Adjusted Monthly Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
LFE	large force exercise
L_{max}	Maximum Sound Level
MBTA	Migratory Bird Treaty Act
mg/m^3	milligram(s) per cubic meter
mi	mile(s)
mi^2	square mile(s)
MMPA	Marine Mammal Protection Act
MMt	million ton(s) per year
MOA	Military Operations Area
MOU	Memorandum of Understanding
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
Nation	Tolowa Dee-ni' Nation
NEPA	National Environmental Policy Act

NFA	No Further Action
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NM	nautical mile(s)
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	ozone
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OHA	Oregon Health Authority
OSHA	Occupational Safety and Health Administration
Pb	lead
PCB	polychlorinated biphenyl
pCi/L	picocurie(s) per liter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
POI	point of interest
ppb	part(s) per billion
ppm	part(s) per million
PSD	Prevention of Significant Deterioration
psf	pound(s) per square foot
PTE	potential to emit
PWS	*Performance Work Statement for the Combat Air Forces (CAF) Contracted Air Support (CAF CAS)*
Q-D	quantity-distance
R	recovery
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SAP	satellite accumulation point
SARA	Superfund Amendments and Reauthorization Act
SEL	Sound Exposure Level
SER	Significant Emission Rate
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
T	threatened
T&E	threatened and endangered
THPO	Tribal Historic Preservation Officer
tpy	ton(s) per year
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
US 90	United States Highway 90
US	United States
USACE	United States Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency

USFWS	United States Fish and Wildlife Service
UST	underground storage tank
VOC	volatile organic compound
yd^2	square yard(s)

CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Air Force (Air Force) is tasked with the defense of the United States (US) and fulfillment of its Title 10 United States Code (U.S.C.) mission. The Air Force's mission is to fly, fight, and win - in air, space, and cyberspace. In order to accomplish this mission, it is critical that combat pilots, and the Airmen supporting them, adequately train to attain proficiency on tasks they must execute during times of war and further to sustain this proficiency as they serve in the Air Force. Increasingly, fighter pilots of the Combat Air Forces (CAF) have been operating at degraded levels of proficiency and training readiness due to diminishing fiscal resources. For the purpose of this effort, the CAF includes all active duty, Air National Guard (ANG), and Air Force Reserve units in both formal training units (FTUs) and operational units.

Ideally, CAF fighter pilots would be able to maintain their proficiency by flying 200 or more hours per year, practicing training syllabus tactics, techniques, and procedures. Unfortunately, for much of the last decade, pilots of advanced weapons platforms have been falling 25 to 40 percent short of the flying hours recommended to build and sustain their proficiency on required training tasks (Venable, 2016). At the same time, increasingly complex aircraft and technologies require more time to master the full range of skills required to become proficient combat-ready pilots. Along with insufficient budgets to support the flying hours/training requirements needed by CAF pilots, they have also had to support adversary air (ADAIR) flying missions that have minimal training value to the CAF pilots themselves. ADAIR missions simulate an opposing force that provides a necessary and realistic combat environment during CAF training missions. Flying these ADAIR sorties requires the use of potential adversaries' tactics and procedures that may differ significantly from CAF tactics and procedures and therefore provides minimal CAF training while taking up valuable flying hours that could otherwise be spent on core training tasks. In many cases, minimal ADAIR missions, or none at all, have been available to support pilot training and have resulted in degraded readiness for CAF pilots who are expected to operate some of the most sophisticated weapons platforms in the world.

A SORTIE IS DEFINED AS A SINGLE MILITARY AIRCRAFT FLIGHT FROM INITIAL TAKEOFF THROUGH FINAL LANDING.

During his confirmation hearing, Chief of Staff of the Air Force (CSAF), General David Goldfein, identified a growing crisis in the readiness of CAF pilots (Venable, 2016):

> *Less than half of Air Force combat units are ready for "full-spectrum" (high threat, high intensity) combat. This lack of readiness could jeopardize the lives of aircrews and other service members who depend upon them in combat and put mission-essential tasks at great risk.*

1.1.1 Background

Air Force readiness is currently affected by several issues including training, weapon system sustainment, and facilities. While all are critical, training in particular has become an increasing concern as worldwide commitments, high operations tempo, and fiscal and manpower limitations detract from available training resources. As an example, the Budget Control Act of 2011, as implemented in 2013, reduced flying hours by 18 percent and temporarily stood down 17 of 40 combat-coded squadrons (The Heritage Foundation, 2015). The Air Force prioritized readiness in 2014, but shortfalls in readiness were not eliminated and have persisted through the present day as indicated by the CSAF's acknowledgement of the lack of readiness in more than half of the service's combat units. In the training arena, readiness issues are manifested by multiple issues such as 1) an inability to internally support ADAIR without a corresponding sacrifice in scarce flying hours and normal training objectives; 2) a lack of advanced threat aircraft to provide representative ADAIR for realistic training; 3) a fighter pilot manning crisis, necessitating increased pilot production beyond sustainable levels; and 4) granting excessive syllabus waivers to graduates of the Air Force Weapons School due to inadequate ADAIR support during final training phases.

Lack of available ADAIR is degrading levels of pilot readiness and contributing to the overall decline in availability of proficient CAF pilots. The arrangement in which CAF ADAIR sorties are currently organized is depicted on **Figure 1-1**. At present, the current approach meets less than 50 percent of the total ADAIR requirement across the Air Force.

Self-generated ADAIR can either be "in-house" supporting daily flying schedules or via a dedicated tasking to support an external unit, both referred to as "Red Air." In both the "in-house" and "dedicated" options, performing self-generated ADAIR is at the expense of the tasked units' normal Air Force training objectives. These two options still result in an ADAIR capacity of less than 50 percent of the Air Force-wide requirement and reduce the availability and proficiency of combat qualified pilots at a time when the Air Force is experiencing a shortfall of more than 750 CAF pilots (Venable, 2016). Furthermore, current dedicated ADAIR units in the Air Force consist of two F-16 aggressor squadrons (AGRSs) and two T-38 fighter training squadrons. The F-16 aircraft used for aggressor missions is an advanced weapons platform, but there are not enough to meet the ADAIR requirements to maintain proficiency of the CAF's pilots. The T-38 is used for ADAIR but is a basic platform with no advanced electronics (radar and avionics) or weapons capabilities and does not adequately replicate realistic threat capabilities. In both the F-16 AGRS and T-38 ADAIR cases, the number of available aircraft and pilots are insufficient to meet the requirement.

As depicted on **Figure 1-1**, contract ADAIR would provide a fourth avenue to fill ADAIR sorties and improve the quality of training and readiness of CAF pilots and allow the Air Force to recapitalize other valuable assets and training time.

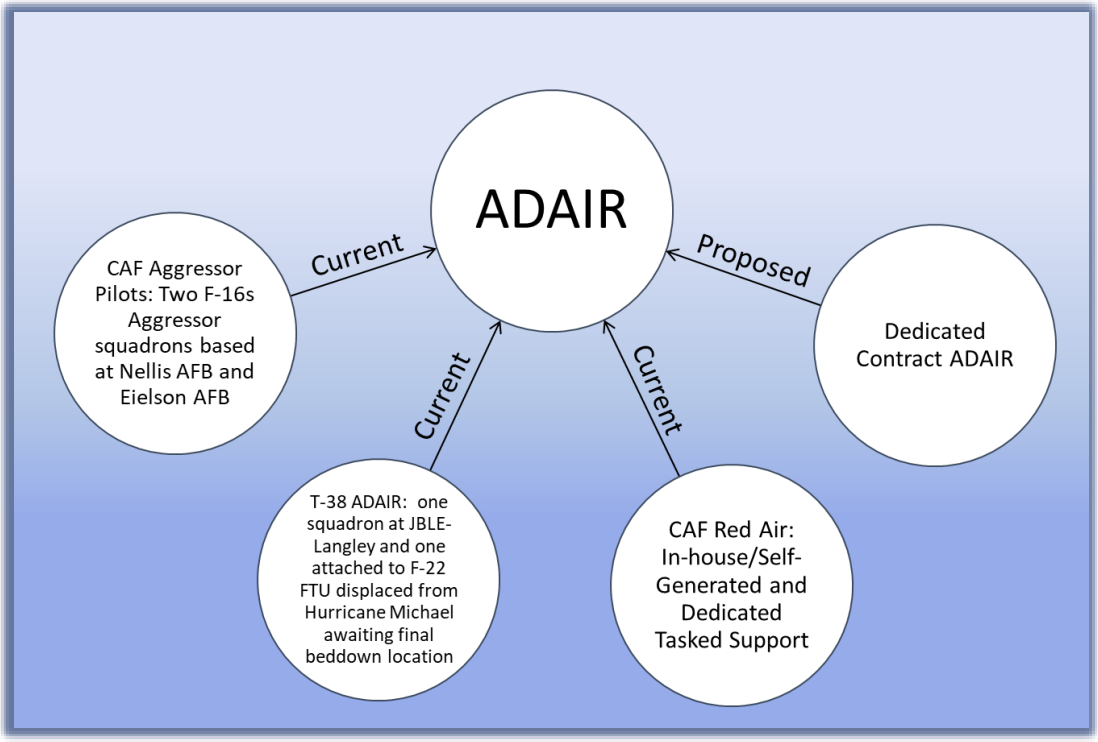


Figure 1-1. Current and Proposed Adversary Air Sortie Generation.

The contract ADAIR requirement is roughly 30,000 annual sorties. The Air Force would implement contract ADAIR in support of installations that host specific critical air-to-air training missions. Installations requiring contract ADAIR support include those bases hosting Air Force 5th generation fighter units (e.g., F-22 or F-35 aircraft), fighter FTUs, or those that support advanced fighter training. Air Force requirements for contract ADAIR exist currently at multiple installations within the continental United States and Joint Base Pearl Harbor-Hickam, Hawaii.

As discussed in **Section 1.3**, the scope of this analysis will evaluate the proposal to implement contract ADAIR at Kingsley Field Air National Guard Base (ANGB). National Environmental Policy Act (NEPA) analyses will be completed at all locations identified by the Air Force to require contract ADAIR support and that have sufficient existing facilities.

1.1.2 Location

Kingsley Field ANGB is located in southern Oregon, approximately 15 miles (mi) north of the California border (**Figure 1-2**). It is situated within the southern portion of Klamath Falls city limits in Klamath County, south of State Highway 140, and west of State Highway 39. The installation is located in a primarily rural area characterized by farmland and forests. The base is located on 254 acres (ac) of exclusive-use land at Crater Lake Regional Airport that is leased from the City of Klamath Falls (**Figure 1-3**).

Kingsley Field ANGB is the home of the 173d Fighter Wing (173 FW), 114th Fighter Squadron (114 FS), and 550th Fighter Squadron (550 FS). The 173 FW's mission is to produce the best air-to-air combat pilots, intelligence specialists, and healthcare professionals and serve the state of Oregon and the nation in times of peace and war. Kingsley Field ANGB is the only FTU for the Air Force and ANG responsible for training all CAF F-15C pilots. In 2017, the 173 FW had 26 primary F-15 aircraft authorized, with a total of 32 F-15s in inventory.

CAF training activities utilize special use airspace proximate to Kingsley Field. Special use airspace includes Military Operations Areas (MOAs), Air Traffic Control-Assigned Airspaces (ATCAAs), and Warning Areas which provide airspace for military aircraft training and serve to warn nonparticipating pilots of potential danger. The primary operational airspace that would be used by contract ADAIR aircraft is the Juniper/Hart MOA Complex located about 80 mi east of Kingsley Field (**Figure 1-4**). The Juniper/Hart MOA Complex is comprised of several MOAs and ATCAAs. Other airspace available for use by contract ADAIR missions include Dolphin MOA located about 100 mi west of Kingsley Field and Goose MOA located 25 mi east of Kingsley Field. In addition, a small portion of sorties would occur in the northern and southern portions of Warning Area W-93, located about 12 mi off the southwest coast of the state of Oregon west of Dolphin MOA.

Kingsley Field and the surrounding military airspace provide a critical venue to train F-15C pilots.

A MILITARY OPERATIONS AREA (MOA) IS DESIGNATED AIRSPACE OUTSIDE OF CLASS A AIRSPACE TO SEPARATE OR SEGREGATE CERTAIN NONHAZARDOUS MILITARY ACTIVITIES FROM INSTRUMENT FLIGHT RULES (IFR) TRAFFIC. ACTIVITIES IN MOAS INCLUDE, BUT ARE NOT LIMITED TO, AIR COMBAT MANEUVERS, AIR INTERCEPTS, AND LOW ALTITUDE TACTICS. THE DEFINED VERTICAL AND LATERAL LIMITS VARY FOR EACH MOA. WHILE MOAS GENERALLY EXTEND FROM 1,200 FEET (FT) ABOVE GROUND LEVEL (AGL) TO 18,000 FT MEAN SEA LEVEL (MSL), THE FLOOR MAY EXTEND BELOW 1,200 FT AGL IF THERE IS A MISSION REQUIREMENT AND THERE IS MINIMAL ADVERSE AERONAUTICAL EFFECT.

CLASS A AIRSPACE IS CONTROLLED AIRSPACE OF DEFINED DIMENSIONS WITHIN WHICH AIR TRAFFIC CONTROL SERVICE IS PROVIDED AND ALL OPERATIONS MUST OCCUR UNDER IFR. CLASS A AIRSPACE IS GENERALLY FROM 18,000 FT MSL UP TO AND INCLUDING 60,000 FT MSL AND INCLUDES AIRSPACE OVERLYING WATERS WITHIN 12 NAUTICAL MILES (NM) OF THE COAST OF THE 48 CONTIGUOUS UNITED STATES (US) AND ALASKA.

AIR TRAFFIC CONTROL ASSIGNED AIRSPACE (ATCAA) IS ASSIGNED TO AIR TRAFFIC CONTROL TO SEGREGATE AIR TRAFFIC BETWEEN SPECIFIED ACTIVITIES BEING CONDUCTED WITHIN THE ASSIGNED AIRSPACE AND OTHER IFR TRAFFIC. ATCAA IS THE EQUIVALENT OF A MOA AT 18,000 FT MSL AND ABOVE. THIS AIRSPACE IS NOT DEPICTED ON ANY CHART BUT IS OFTEN AN EXTENSION OF A MOA TO HIGHER ALTITUDES AND USUALLY REFERRED TO BY THE SAME NAME. THIS AIRSPACE REMAINS UNDER CONTROL OF THE FEDERAL AVIATION ADMINISTRATION (FAA) WHEN NOT IN USE TO SUPPORT GENERAL AVIATION ACTIVITIES.

A WARNING AREA IS AIRSPACE OF DEFINED DIMENSIONS THAT EXTENDS FROM 3 NM OUTWARD FROM THE COAST OF THE US AND MAY BE OVER US WATERS, INTERNATIONAL WATERS, OR BOTH. THE PURPOSE OF WARNING AREAS IS TO WARN NONPARTICIPATING PILOTS OF POTENTIALLY HAZARDOUS ACTIVITY. WARNING AREAS MAY BE USED FOR OTHER PURPOSES IF RELEASED TO THE FAA DURING PERIODS WHEN NOT REQUIRED FOR THEIR INTENDED PURPOSE AND ARE WITHIN AREAS IN WHICH THE FAA HAS AIR TRAFFIC CONTROL AUTHORITY.

1.2 PURPOSE OF THE ACTION

The purpose of the Proposed Action is to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of pilots of the 173 FW at Kingsley Field ANGB, Oregon. Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions.

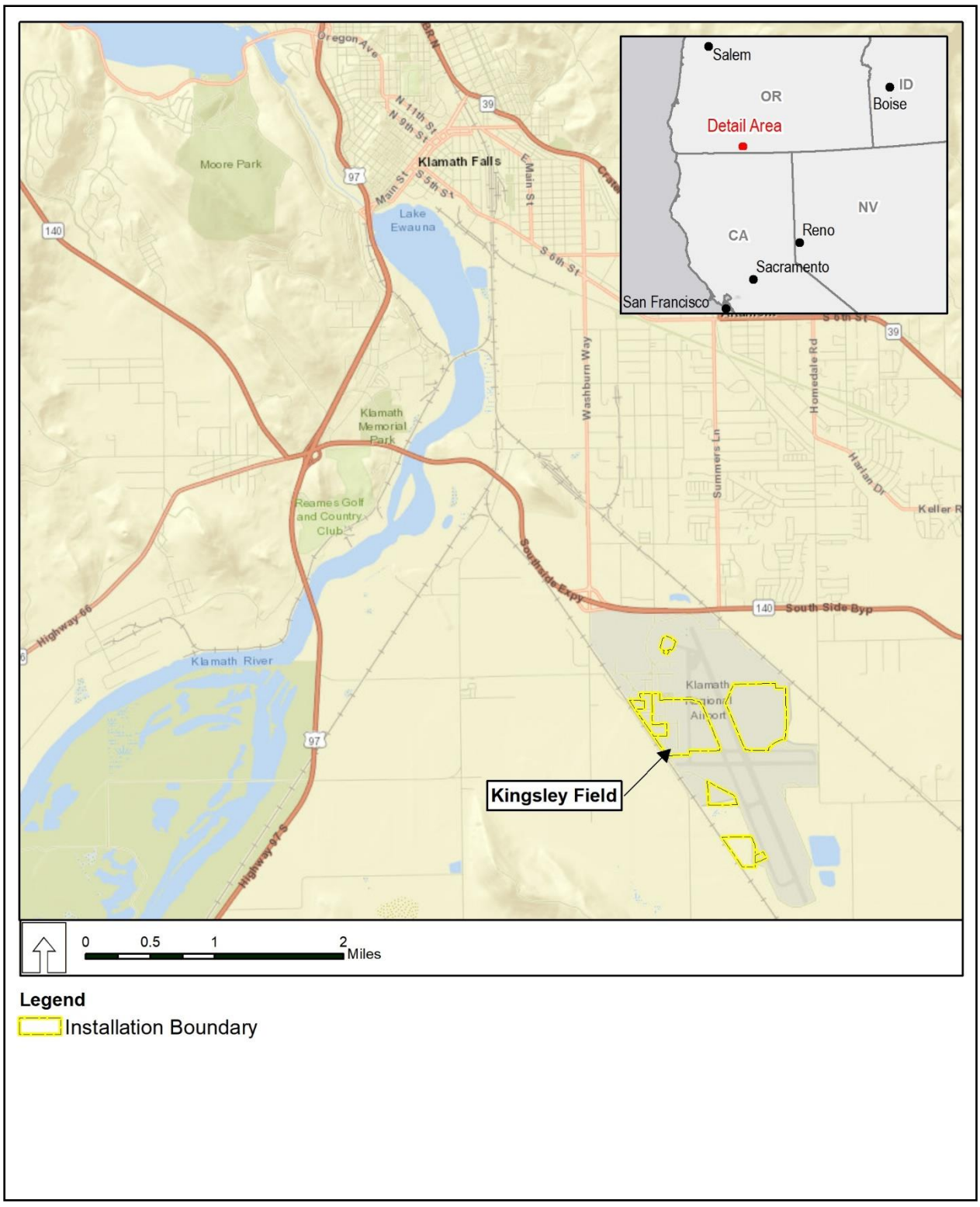


Figure 1-2. Location of Kingsley Field Air National Guard Base (Regional View).

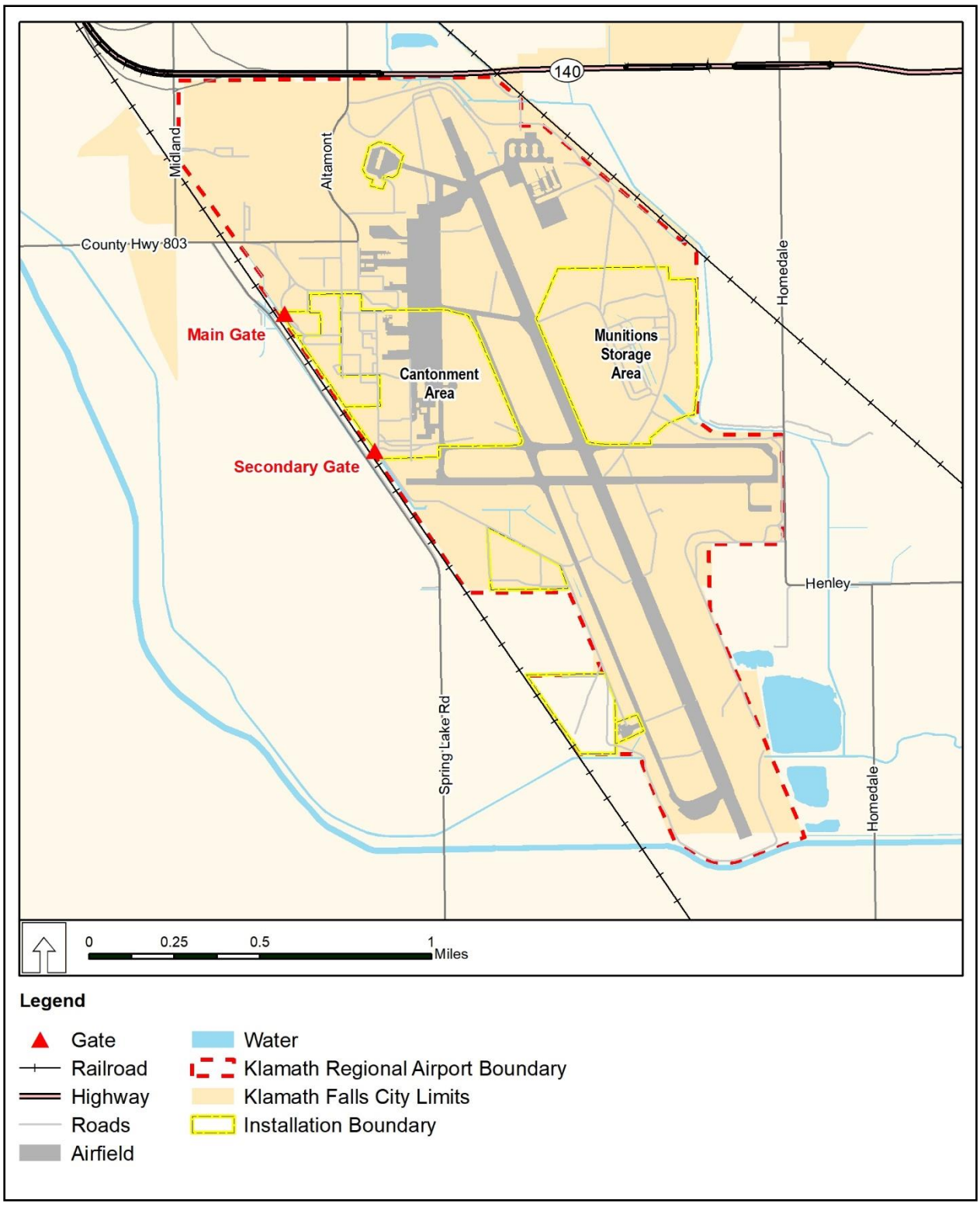


Figure 1-3. Location of Kingsley Field Air National Guard Base (Local View).

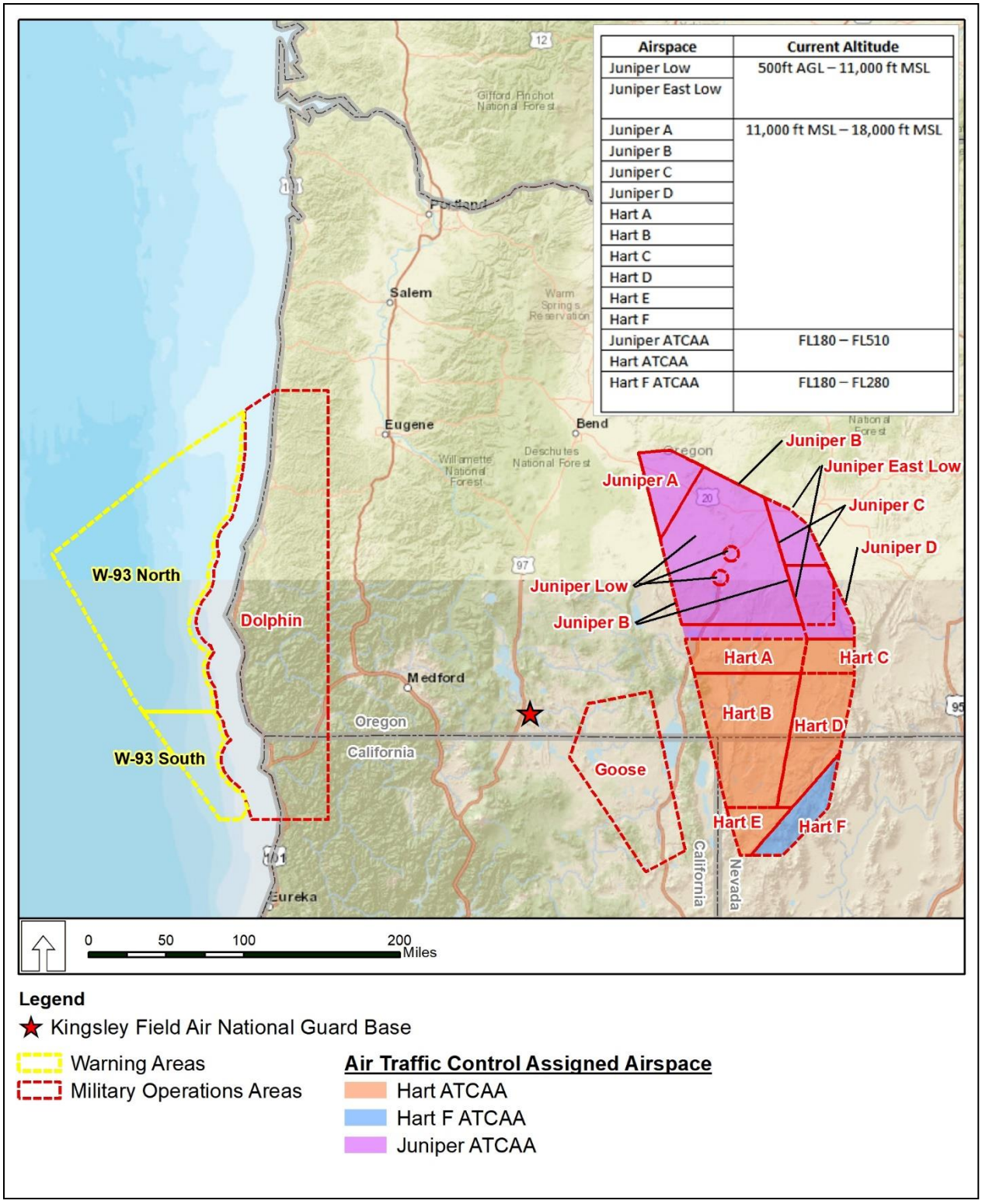


Figure 1-4. Special Use Airspace Proposed for Contract Adversary Air Sorties.

The objective of the Proposed Action at Kingsley Field is to increase the quality of training for F-15 pilots by providing dedicated, realistic adversary threat aircraft during syllabus training missions. By providing a dedicated contract ADAIR capability, F-15 trainees and instructor pilots will gain more realistic air-to-air training during their training syllabus tasks. Dedicated contract ADAIR would also allow the unit to free up resources used to self-generate ADAIR and more effectively use those available flying hours. Additionally, other Air Force (4th generation) units that may have been tasked to provide ADAIR training support at Kingsley Field may now recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

FOURTH (4TH) GENERATION AIRCRAFT IS A TERM APPLIED TO THE PREVIOUS SUITE OF FIGHTERS SUCH AS F-15, F-16, AND F/A-18. FIFTH (5TH) GENERATION ARE THE NEWEST WEAPONS SYSTEMS SUCH AS THE F-22 AND F-35 FIGHTERS THAT CONTAIN NEW AND ENHANCED LEVELS OF STEALTH PROFILES, SPEED, MANEUVERABILITY, AND ADVANCED AVIONICS AND ATTACK CAPABILITIES.

1.3 NEED FOR THE ACTION

The need for the action is to provide better and more realistic training for the F-15 flight training program at Kingsley Field. Dedicated contract ADAIR is critical to improving pilot readiness as it provides realistic training opportunities to employ CAF tactics and procedures that optimize the training value of every mission. Contract ADAIR can be used in basic building block syllabus sorties or the very advanced and fluid environment of multiaircraft air combat required by the training syllabus.

1.4 SCOPE OF THE ENVIRONMENTAL ANALYSIS

This environmental assessment (EA) analyzes the potential environmental consequences associated with establishing dedicated contract ADAIR support at Kingsley Field. Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions in order to increase the quality of training for F-15 fighter pilots.

This EA has been prepared in accordance with the NEPA (42 U.S.C. §§ 4321 to 4347), the Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] Parts 1500 to 1508), and 32 CFR Part 989, et seq., *Environmental Impact Analysis Process* (EIAP). NEPA ensures that environmental information, including the anticipated environmental consequences of a proposed action, is available to the public, federal and state agencies, and the decision-maker before decisions are made and before actions are taken.

Consistent with the CEQ regulations, the EA is organized into the following sections:

- Chapter 1, Purpose and Need for Action, includes an introduction, background description, location, purpose and need statement, scope of environmental analysis, decision to be made, interagency and intergovernmental coordination and consultations, applicable laws and environmental regulations, and a description of public and agency review of the EA.
- Chapter 2, Description of Proposed Action and Alternatives, includes a description of the Proposed Action, alternative selection standards, screening of alternatives, alternatives eliminated from further consideration, a description of the selected alternatives, summary of potential environmental consequences, and mitigation and environmental commitments.
- Chapter 3, Affected Environment, includes a description of the natural and man-made environments within and surrounding Kingsley Field and the airspace that may be affected by the Proposed Action and alternatives.
- Chapter 4, Environmental Consequences, includes definitions and discussions of direct and indirect impacts and environmental commitments.
- Chapter 5, Cumulative Effects, considers the potential cumulative impacts on the environment that may result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions.
- Chapter 6, List of Preparers, provides a list of the preparers of this EA.
- Chapter 7, References, contains references for studies, data, and other resources used in the preparation of the EA.

- Appendices, as required, provide relevant correspondence, studies, modeling results, and public review information. **Appendix A** includes all interagency and intergovernmental coordination and consultations; **Appendix B** provides noise metrics and noise models; **Appendix C** outlines methodologies, emission factors, and assumptions used for air quality emission estimates for each scenario and related activities; **Appendix D** summarizes the listed species potentially occurring in the action area; and **Appendix E** outlines the mitigation and monitoring plan.

NEPA, which is implemented through the CEQ regulations, requires federal agencies to consider alternatives to the Proposed Action and to analyze potential impacts of alternative actions. Potential impacts of the Proposed Action and alternatives described in this document will be assessed in accordance with the Air Force EIAP (32 CFR Part 989), which requires that impacts on resources be analyzed in terms of their context, duration, and intensity. To help the public and decision makers understand the implications of impacts, they will be described in the short and long term, cumulatively, and within context. Environmental resources and the Region of Influence (ROI) analyzed in the EA are summarized in **Table 1-1**. The expected geographic scope of any potential consequences is identified as the ROI. Kingsley Field ANGB and its environs, as well as the area within and under the special use airspace are considered in determining the ROI for each resource. As indicated in **Table 1-1**, Socioeconomics – Income and Employment; Environmental Justice and Protection of Children; Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites; and Transportation are not described in the airspace ROI for baseline in **Chapter 3** or considered for detailed analysis in **Chapter 4**. No construction or development is proposed under the airspace, so no impacts on these resources would occur under the airspace.

Table 1-1
Environmental Resources Analyzed in the Environmental Assessment

Resource	Region of Influence: Kingsley Field ANGB and Environs	Region of Influence: Juniper/Hart MOA Complex, Dolphin and Goose MOAs, and Warning Area W-93
Airspace Management and Use	✓	✓
Noise	✓	✓
Safety	✓	✓
Air Quality	✓	✓
Biological Resources (T&E, marine)	✓	✓
Land Use	✓	✓
Socioeconomics – Income and Employment	✓	
Environmental Justice and Protection of Children	✓	
Cultural Resources (archaeological, architectural, traditional)	✓	✓
Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites	✓	
Transportation	✓	

Notes:
ANGB = Air National Guard Base; MOA = Military Operations Area; T&E = threatened and endangered

1.4.1 Resource Areas Eliminated from Detailed Analysis

No public or agency concerns were raised as a result of Interagency and Intergovernmental Coordination for Environmental Planning, and the Proposed Action is not expected to affect the following resources; therefore, they are not carried forward for detailed analysis.

1.4.1.1 Infrastructure and Utilities

During site selection, the support for contract ADAIR operations was determined to be very good for facilities and communication infrastructure at Kingsley Field. No new construction or infrastructure changes would occur under the Proposed Action. The level of service for utilities needed to support the contract personnel is assumed to be the same under all alternatives and would be adequate to support the Proposed Action. Because there would be only be an additional 47 contract personnel working at Kingsley Field to support the contract ADAIR operations and adequate infrastructure exists on base to support these personnel and contract ADAIR aircraft operations, there would be no impacts on infrastructure at Kingsley Field; therefore, this resource is not carried forward for further detailed analysis in this EA.

1.4.1.2 Socioeconomics – Housing, Population, and Schools

The requirement for an estimated 47 contract personnel and their families supporting the contract ADAIR sorties in Klamath Falls, Oregon, would have no impact on the region's population. Assuming all 47 contract personnel relocated with family members to Klamath County, this would be a negligible increase in the County's population of nearly 67,000 people. There is adequate available housing and public schools to support the minor increase in population from the Proposed Action; therefore, there would be no impact on the region's population, housing, or schools from implementation of the Proposed, Action and these resources are not carried forward for more detailed analysis in this EA.

1.4.1.3 Soil Resources

Protection of soils was considered when evaluating potential impacts of the Proposed Action in terms of alteration of soil composition, structure, or function and any accumulation of chaff material. Effects on soils would be adverse if they alter the soil composition, structure, or function within the environment or accumulate in the soil. Under the Proposed Action, there would be no ground disturbing activities to affect soil resources. Under the airspace, the use of defensive countermeasures has been found to be nontoxic. Due to the rare and infrequent nature of fuel dumps as well as in-place safety precautions such as altitude restrictions, these emergency procedures are not likely to adversely affect soil resources; therefore, soil resources are not carried forward for detailed analysis.

1.4.1.4 Visual Resources

There would be no potential impacts on visual resources from the proposed contract ADAIR activities because no new construction would occur, and aircraft would utilize the existing airfield; therefore, contract ADAIR activities in the areas adjacent to the proposed facilities and aircraft parking ramp would not change the existing visual setting. Likewise, the Proposed Action would not affect the aesthetic qualities of the natural areas and sensitive lands beneath the proposed airspace boundaries; therefore, this resource is not carried forward for further detailed analysis in this EA.

1.4.1.5 Water Resources

Under the Proposed Action, there would be no ground disturbing activities. The proposed additional contract ADAIR aircraft and personnel and associated operational and maintenance activities would not affect water quality or quantity. No ground-disturbing activities that would cause the dredging or filling of wetlands are proposed; therefore, there would be no impacts on wetlands. Under the airspace, the nontoxic defensive countermeasures and emergency procedures stated in **Section 1.4.1.3** are not likely to adversely affect

water resources; therefore, water resources, including wetlands, are not carried forward for detailed analysis.

1.5 DECISION TO BE MADE

This EA evaluates the potential environmental consequences of implementing the proposed or alternative actions to provide dedicated contract ADAIR sorties at Kingsley Field to improve the readiness and proficiency of pilots of the 173 FW, other supported units, and the CAF at large. Based on the analysis in this EA, the Air Force/National Guard Bureau (NGB) will make one of three decisions regarding the Proposed Action: 1) choose the alternative action that best meets the purpose of and need for this project and sign a Finding of No Significant Impact (FONSI), allowing implementation of the selected alternative; 2) initiate preparation of an Environmental Impact Statement (EIS) if it is determined that significant impacts would occur through implementation of the proposed or alternative actions; or 3) select the No Action Alternative, whereby the Proposed Action would not be implemented. As required by NEPA and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project and be available to inform decision-makers of the potential environmental impacts.

1.6 INTERAGENCY AND INTERGOVERNMENTAL COORDINATION AND CONSULTATIONS

1.6.1 Interagency/Intergovernmental Coordination and Consultation

The environmental analysis process, in compliance with NEPA guidance, includes public and agency review of information pertinent to the proposed and alternative actions. Scoping is an early and open process for developing the breadth of issues to be addressed in an EA and for identifying significant concerns related to an action. Per the requirements of Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, federal, state, and local agencies with jurisdiction that could potentially be affected by the proposed and alternative actions were notified during the development of this EA. Those Interagency and Intergovernmental Coordination for Environmental Planning letters and responses are included in **Appendix A**.

1.6.2 Agency Consultations

Implementation of the Proposed Action involves coordination with several organizations and agencies. Compliance with Section 7 of the Endangered Species Act (ESA), and implementing regulations (50 CFR Part 402), requires communication with the US Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. The primary focus of this consultation is to request a determination of whether any of these species occur in the proposal area. If any of these species is present, a determination would be made of any potential adverse effects on the species. Should no species protected by the ESA be affected by the proposed or alternative actions, no additional consultation is required. Letters were sent to the appropriate USFWS and NMFS offices as well as relevant state agencies informing them of the proposal, requesting data regarding applicable protected species, and subsequently requesting concurrence with the Air Force's affect determination to federally listed species. Concurrence was received from both USFWS and NMFS and consultation is complete. In addition, the Marine Mammal Protection Act (MMPA; 16 U.S.C. § 1371 et seq.) makes it illegal for a person to take a marine mammal, which includes significantly disturbing the habitat, unless it is done in accordance with regulations or a permit. The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801) requires federal agencies to consult with the NMFS when activities may have adverse impacts on designated essential fish habitat.

Coordination with the appropriate Oregon, California, and Nevada state government agencies and planning districts will occur for review and comment. Compliance with Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations (36 CFR Part 800) was accomplished through the State Historic Preservation Officers (SHPOs).

In Oregon, the Oregon Department of Environmental Quality is included for air and water quality and the Oregon Department of Fish and Wildlife is included in this coordination on habitat and species of concern. In California, the State Clearinghouse is the single point of contact for the state for the review process of federal environmental documents. Coordination in Nevada includes the Nevada Division of Environmental Protection for air and water quality and the Nevada Department of Wildlife for habitat and species of concern. In addition, the Oregon Department of Land Conservation and Development and California Coastal Commission are included in the coordination for coastal zone consistency determinations under the states' Coastal Management Programs, if necessary.

All agency correspondence is included in **Appendix A**.

1.6.3 Government-to-Government Consultation

The NHPA and its regulations in 36 CFR Part 800 direct federal agencies to consult with federally recognized Indian tribes when a proposed or alternative action has the potential to affect tribal lands or properties of religious and cultural significance to a tribe. Consistent with the NHPA, Department of Defense (DOD) Instruction 4710.02, *Interactions with Federally-Recognized Tribes*, and Air Force Instruction (AFI) 90-2002, *Air Force Interaction with Federally-Recognized Tribes*, federally recognized tribes that are historically affiliated with lands in the vicinity of the proposed and alternative actions have been invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Kingsley Field ANGB point of contact for Native American tribes is the Base Commander. The point of contact for consultation with the Tribal Historic Preservation Officer (THPO) and the Advisory Council on Historic Preservation is the NGB Cultural Resources Program Manager. Government-to-government consultation is complete. Correspondence is included in **Appendix A.**

1.7 Applicable Laws and Environmental Regulations

Implementation of the Proposed Action would involve coordination with several organizations and agencies. Adherence to the requirements of specific laws, regulations, Best Management Practices (BMPs), and necessary permits are described in each resource section in **Chapter 3**.

1.7.1 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 NEPA (40 CFR Parts 1500 to 1508). These regulations specify that an EA be prepared to

- briefly provide sufficient analysis and evidence for determining whether to prepare an EIS or a FONSI;
- aid in an agency's compliance with NEPA when no EIS is necessary; and
- facilitate preparation of an EIS when one is necessary.

Further, to comply with other relevant environmental requirements (e.g., the ESA and NHPA) in addition to NEPA and to assess potential environmental impacts, the EIAP and decision-making process for the proposed and alternative actions involves a thorough examination of environmental issues potentially affected by government actions subject to NEPA.

1.7.2 The Environmental Impact Analysis Process

The EIAP is the process by which the Air Force facilitates compliance with environmental regulations (32 CFR Part 989), including NEPA, which is primary legislation affecting the agency's decision-making process.

1.8 PUBLIC AND AGENCY REVIEW OF ENVIRONMENTAL ASSESSMENT

A Notice of Availability (NOA) of the Draft EA and FONSI was published on 9 June 2019 in *The Herald and News, Oregonian, Siskiyou Daily News, Del Norte Triplicate,* and *Reno Gazette Journal* newspapers inviting the public to review and comment on the Draft EA. The public and agency review period ended on 9 July 2019. No public comments were received. The agency comments are addressed in the Final EA and are provided in **Appendix A**.

Copies of the Draft EA and FONSI were also made available for review online at https://www.173fw.ang.af.mil/About-Us/ and at the following libraries:

- Klamath Falls Main Public Library, 126 South 3rd Street, Klamath Falls, Oregon 97601
- Coos Bay Public Library, 525 Anderson Avenue, Coos Bay, Oregon 97420
- Cedarville Library, 460 Main Street, Cedarville, California 96104
- Del Norte County Library, 190 Price Mall, Crescent City, California 95531
- Northwest Reno Library, 2325 Robb Drive, Reno, Nevada 89523

CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Air Force is proposing to provide dedicated contract ADAIR sorties for CAF training at Kingsley Field ANGB, Oregon, to address shortfalls in F-15 pilot training and production capability and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced combat training missions. Training scenarios would include the use of combat tactics and procedures that differ from CAF tactics to simulate an opposing force. The Proposed Action includes elements affecting the base and military training airspace. The elements affecting the base include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. The elements affecting the airspace include airspace use and defensive countermeasures.

Numbers of contract ADAIR aircraft, maintenance personnel, and pilots were estimated and informed through multiple meetings with active duty and civilian Air Force functional area experts and were based on sortie requirements developed by the end user at the base. Numbers of aircraft and personnel were then used to define facility requirements, which were estimated using planning factors from Air Force Manual (AFMAN) 32-1084, *Facility Requirements*.

2.1.1 Contract Adversary Air Aircraft

Contract ADAIR would have multiple aircraft available with acceptable capabilities to support training requirements. Contract ADAIR proposed aircraft specifications are described in **Table 2-1**; all aircraft listed are capable of providing contract ADAIR support to F-15 CAF aircrews stationed at Kingsley Field. One or a combination of these aircraft types may be operated by a contractor at Kingsley Field in support of contract ADAIR training. The Proposed Action at Kingsley Field would include the establishment of an estimated 39 contracted maintainers and 8 contracted pilots who would operate an estimated six aircraft.

Table 2-1
Contract Adversary Air Potential Aircraft Specifications

Aircraft	Wingspan (feet)	Length (feet)	Height (feet)	Number of Engines
MiG-29	38	57	16	2
F-5	27	48	14	2
Dassault Mirage	27	51	15	1
F-16	33	50	17	1
Eurofighter Typhoon	35	48	13	2
JAS-39 Gripen	27	47	16	1

2.1.2 Facilities

Kingsley Field has existing facilities to support the Proposed Action. The proposed facilities are available for use and require minimal modification. They are located around the existing airfield and runway and include the necessary ramp space; maintenance space; operational space; petroleum, oil, and lubricants storage; runway access; and associated parking to support the contract ADAIR mission. In addition, the Munitions Storage Area has sufficient facilities to store the necessary increase in training countermeasure allocations (chaff/flares; discussed further in **Section 2.1.7**). A summary of estimated facilities requirements needed to satisfy the Proposed Action is provided in **Table 2-2**.

Table 2-2
Kingsley Field Air National Guard Base Facilities Requirements

Ramp Required (yd^2)	Number Maintenance Personnel*	Number Pilots[1]	Aircraft Maintenance Unit space (ft^2)	Stand-Alone Operations Space (ft^2)	Integrated Operations Space (ft^2)
4,200	39	8	2,100	1,800	1,000

Notes:

* The number of personnel is estimated, and the final number may be slightly higher or lower depending on operational needs.

ft^2 = square feet; yd^2 = square yards

Kingsley Field has three options for providing proposed contractor operations and maintenance facilities. Under Option 1, operations activities would be located in Building 404, which is approximately 2,800 feet (ft) from the aircraft parking area (**Figure 2-1**). This facility has 5,300 square feet (ft^2) of available space and has been recently renovated. Aircraft Maintenance Unit (AMU) personnel would be located in Building 307, which has over 2,100 ft^2 of available floor space.

Under Options 2 and 3, operations would be accommodated in Building 219, which is near the 114 FS and would facilitate interactions between contract ADAIR pilots and F-15 pilots (**Figure 2-1**). At least 1,800 ft^2 would be available along the west wall in Building 219. Under Option 2, maintenance would be housed in Building 307 as with Option 1. Alternatively, under the Option 3, maintenance would be consolidated with operations in Building 219, and an additional 2,100 ft^2 would be available.

THE AIRCRAFT MAINTENANCE UNIT (AMU) IS THE SUPPORT FUNCTION RESPONSIBLE FOR THE DIRECT SUPPORT AND MAINTENANCE OF AIRCRAFT TO ENSURE THEY ARE MISSION CAPABLE. AMU SPACE INCLUDES DEDICATED FACILITIES FOR CONTRACT MAINTENANCE PERSONNEL AND OFFICE AND ADMINISTRATIVE SPACE, PLUS SPECIAL USE SPACE FOR A TOOL CRIB, PARTS STORAGE, AND SECURE STORAGE. THE CONTRACT ADVERSARY AIR (ADAIR) AMU IS INTENDED, FOR ACCOUNTABILITY PURPOSES, TO REMAIN PHYSICALLY SEPARATED FROM ANY AIR NATIONAL GUARD (ANG) MAINTENANCE ORGANIZATION. CONVERSELY, CONTRACT ADAIR OPERATIONS SPACE MAY, AT THE DISCRETION OF THE HOST UNIT, BE A SEPARATE STAND-ALONE FACILITY OR BE INTEGRATED INTO AN EXISTING ANG OPERATIONS FACILITY. STAND-ALONE OPERATIONS SPACE INCLUDES OFFICE AND ADMINISTRATIVE SPACE, PLUS SPECIAL USE SPACE FOR AIRCREW FLIGHT EQUIPMENT, MISSION PLANNING, AND SECURE STORAGE. INTEGRATED OPERATIONS SPACE INCLUDES REDUCED AMOUNTS OF OFFICE, ADMINISTRATIVE, AND SPECIAL USE SPACE BECAUSE OF ANTICIPATED ECONOMIES OF SCALE REALIZED WHEN FACILITIES ARE SHARED WITH ANOTHER ORGANIZATION.

Under Options 1 and 2, Contract ADAIR aircraft would be parked on Delta Row, which is directly in front of Building 307. Covered aircraft maintenance spaces would be available in the Charlie Barns, maintenance spaces 1 and 2, which are also located immediately in front of Building 307. There is at least 4,200 square yards (yd^2) of aircraft parking space available on Delta Row, which would fulfill the parking requirement for the action. Under Option 3, aircraft would be parked on Bravo Row, in front of Building 219. Up to 4,200 yd^2 of aircraft parking space would be available at Bravo Row. Aircraft maintenance under Option 3 would be located with the AMU, inside Building 219 in maintenance spaces 1 and 6.

Following training sorties, contract ADAIR pilots would land and park their aircraft at Kingsley Field on either the Delta Row or Bravo Row. Contract ADAIR Pilots would then participate in debriefs with ANG pilots of the 173 FW, and other units as required. Debriefs would occur at facilities on Kingsley Field.

Contract ADAIR aircraft would use Defense Logistics Agency (DLA) Jet A aircraft fuel that would be delivered in fuel trucks owned and operated by the 173d Logistics Readiness Squadron (173 LRS). Contract ADAIR personnel would be responsible for all aircraft fuel and defuel operations. No additional personnel in the 173 LRS would be needed to support the additional deliveries.

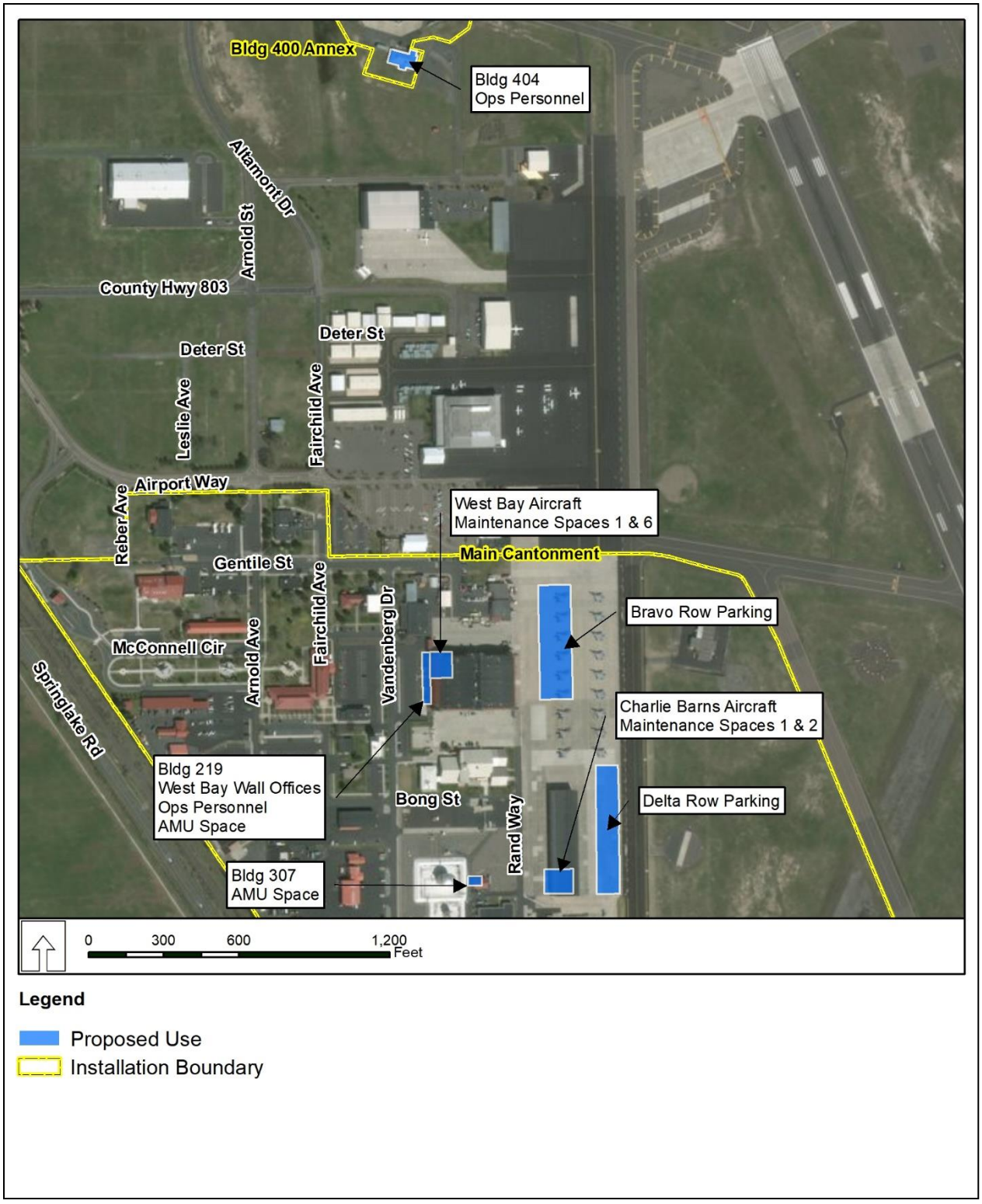


Figure 2-1. Proposed Locations for Contract Adversary Air Operations and Maintenance Facilities.

Contract ADAIR aircraft would also use Air Force chaff and flares (refer to **Section 2.1.7** for additional information on defensive countermeasures). The ADAIR contractor would receive an allocation for chaff and flares through the 173d Maintenance Squadron (173 MXS), Munitions Flight. 173 MXS munitions personnel would store, account for, inspect, maintain, assemble, and deliver chaff and flares to contract ADAIR aircraft; contract personnel would be responsible for loading and unloading chaff and flares on aircraft. In addition, some minor support for egress system munitions (i.e., cartridge- and propellant-actuated devices [CADs/PADs]) may be necessary; however, the level of support is expected to be minor and infrequent. The additional munitions functions would not require additional munitions personnel. Contractor maintenance personnel would be responsible for the inspection and maintenance of all external stores (e.g., captive air training missiles, electronic countermeasure pods, external fuel tanks). The ejector cartridges required for external stores would be considered as contractor-furnished equipment and would not require support from the base Munitions Flight. All required Aerospace Ground Equipment (AGE) would be owned and maintained by the contract ADAIR. Gas and diesel fuel for AGE would be obtained by contract ADAIR personnel from the base DLA fuel station through an account established with 173 LRS.

AEROSPACE GROUND EQUIPMENT (AGE) IS SUPPORT EQUIPMENT REQUIRED FOR AIRCRAFT MAINTENANCE AND SORTIE GENERATION AND IS COMPOSED OF EQUIPMENT SUCH AS GENERATORS, AIR COMPRESSORS, PORTABLE LIGHT SOURCES, TOW BARS, AND MOBILE LIQUID OXYGEN AND NITROGEN SOURCES.

2.1.3 Maintenance

As discussed above, under Options 1 and 2, maintenance would use hangar space in Charlie Barns and AMU facilities in Building 307 or, under Option 3, hangar space and AMU facilities in Building 219 to perform limited maintenance operations on contract ADAIR aircraft. Contract ADAIR aircraft maintenance would include routine inspections and minor unscheduled repairs on the flightline. Aircraft requiring major scheduled (depot level maintenance) or unscheduled maintenance would be expected to be flown back to the contractor's home base for repairs. For the rare occasions when an aircraft is not flyable, the contractor would dispatch a temporary field repair team to Kingsley Field to repair the aircraft. Any additional maintenance support requirements (e.g., aircraft fuel cell, defueling, aircraft structural assets, nondestructive inspection Joint Oil Analysis Program tests) would be coordinated with 173 MXS, 173d Aircraft Maintenance Squadron, and 173 LRS, as appropriate on a noninterference basis.

2.1.4 Personnel

Contract ADAIR at Kingsley Field would be staffed by an estimated 39 additional contracted maintenance personnel who would primarily operate out of either Building 307 or Building 219. Implementation of the Proposed Action would also employ an estimated eight contracted pilots to primarily operate out of Building 219. It is expected that the initial personnel would arrive about 90 days after a contractor is selected and the estimated arrival on Kingsley Field is between February 2020 and January 2021.

2.1.5 Sorties

The Proposed Action includes contracting for the support of an estimated six contractor aircraft to fly an estimated 2,000 annual sorties in support of the 173 FW at Kingsley Field. This number of sorties includes sorties expected for contractor training activities (refer to **Section 2.1.6**) and aircraft leaving for or returning from either maintenance or other deployments.

A TURN PATTERN OF 4 X 4 DOES NOT REQUIRE EIGHT AIRCRAFT TO EXECUTE BUT RATHER COULD BE FILLED WITH ONLY FOUR AIRCRAFT (NOTWITHSTANDING IMPACTS OF BROKEN AIRCRAFT AND AIRSPACE SCHEDULES). THE TURN PATTERN AND TOTAL DAILY SORTIES ARE THE SAME FOR ENVIRONMENTAL PURPOSES, BECAUSE THEY BOTH INDICATE THE NUMBER OF TAKEOFFS AND LANDINGS FOR ANY GIVEN DAY. A 4 X 4 REPRESENTS EIGHT TOTAL SORTIES FOR THE DAY EVEN THOUGH THOSE SORTIES MAY HAVE BEEN FLOWN WITH ONLY FOUR TOTAL AIRCRAFT.

Air Force convention is to describe daily flying schedules in terms of total sorties and a "flight turn pattern." A flight turn pattern allows the CAF to fly available aircraft multiple times per day to maximize available flying opportunities for assigned pilots. Flight turn patterns are designed to allow aircraft to fly, land, complete appropriate post flight inspections, refuel, and fly again. The maximum flight turn pattern that would be flown by contract ADAIR support would be a 4 x 4.

Implementation of the Proposed Action would result in an increase of 3 percent in the number of operations at Kingsley Field ANGB. Refer to **Section 2.1.6** for more information on training operations. Contract ADAIR would fly up to a projected 3 percent of the estimated 2,000 sorties during environmental night hours when the effects of aircraft noise are accentuated (10:00 pm to 7:00 am local time; refer to Air Force Handbook 32-7084, *AICUZ Program Manager's Guide*). This would increase flights at night by approximately 60 field operations per year, an increase of 14 percent of existing night sorties. Contractor night sorties would be flown during 173 FW's approved flying window.

2.1.6 Airspace Use

MEAN SEA LEVEL (MSL) IS ALTITUDE IN FEET ABOVE THE MEAN SEA LEVEL. AND ABOVE GROUND LEVEL (AGL) IS ALTITUDE EXPRESSED IN FEET MEASURED ABOVE THE SURFACE OF THE GROUND. WHEN FLYING OVER LAND, BOTH MSL AND AGL ARE USED TO DELINEATE AIRSPACE STRUCTURE. FLIGHT LEVEL IS VERTICAL ALTITUDE EXPRESSED IN HUNDREDS OF FEET.

The locations of the airspace that would be used for contract ADAIR are depicted on **Figure 1-4** (**Section 1.1.2**). Current and projected contract ADAIR training activities in the airspace are estimated to be 1,952 sorties and are summarized in **Table 2-3**. Proposed contract ADAIR sorties would generally consist of the following five steps: depart from Kingsley Field runway, transit from Kingsley Field airfield to airspace, perform ADAIR training, transit back to Kingsley Field, and land at Kingsley Field. Contract ADAIR aircraft would spend 5 to 20 minutes in transit each way between the airfield and airspace. Time spent within the airspace (Juniper/Hart MOA Complex, Dolphin and Goose MOAs, and W-93) would depend upon the specific training mission performed but would typically last 45 to 60 minutes. Supersonic operations are only allowed in the Juniper/Hart MOA Complex above 30,000 ft. Within the W-93, supersonic flights are restricted to 15 nautical miles (NM) offshore and at altitudes greater than 15,000 ft above mean sea level (MSL). Contractor operations would occur in these MOAs and W-93 concurrent to the 173 FW or other supported Air Force units. No airspace modifications would be required for contract ADAIR as part of the Proposed Action.

Table 2-3
Current and Projected Training Activities by Kingsley Field Air National Guard Base

Airspace	Current Altitude[1]	Baseline Training Sorties[2]	Projected Contract ADAIR Training Sorties[3]	Projected Total Sorties
Juniper/ Hart MOA Complex	500 ft AGL to 11,000 ft MSL for Juniper Low MOA, 11,000 ft MSL to FL510 remainder of complex	3,853	1,366	5,219
Dolphin MOA	11,000 ft MSL to FL510	503	186	689
Goose MOA	10,000 ft MSL to FL280	911	390	1,301
Warning Area W-93	Surface to FL500	23	10	33
Total Proposed Airspace Sorties		**5,290**	**1,952[4]**	**7,242**

Source: Center Scheduling Enterprise, 2016; NGB, 2017
Notes:
[1] No change to current minimum flight altitude is proposed.
[2] Based on 4,556 training sorties of 114 FS and 734 estimated sorties for the 123 FS, a unit of the Oregon Air National Guard 142d Fighter Wing located at Portland Air National Guard Base, Oregon.
[3] Distribution of the 114 FS and proposed ADAIR aircraft in the airspace is 70/9.5/20/0.5 percent.
[4] A total of 48 of the 2,000 contractor sorties would not be traveling from Kingsley Field to the MOAs – they would return to contractor's base for maintenance or pilot proficiency training.

ADAIR = adversary air; AGL = above ground level; FL = flight level (vertical altitude expressed in hundreds of feet); FS = Fighter Squadron; ft = feet; FW = Fighter Wing; MOA = Military Operations Area; MSL = mean sea level

2.1.7 Defensive Countermeasures

While contract ADAIR aircraft would not carry or employ live or inert munitions, aircraft would operate with advanced radar and electronic targeting systems during engagements. Contract ADAIR aircraft would employ chaff and flares (RR-188 chaff and M206 flares or similar) during 100 percent of their training sortie operations. Chaff and flares are the principal defensive countermeasures dispensed by military aircraft to avoid detection or attack by enemy air defense systems.

Chaff is an electronic countermeasure designed to reflect radar waves and obscure aircraft, ships, and other equipment from radar tracking sources. Chaff bundles consist of millions of nonhazardous aluminum-coated glass fibers. When ejected from the aircraft, these fibers disperse widely in the air, forming an electromagnetic screen that temporarily hides the aircraft from radar and forms a radar decoy, allowing the aircraft to defensively maneuver or leave the area. Flares are magnesium pellets ejected from military aircraft and provide high-temperature heat sources that act as decoys for heat-seeking weapons targeting the aircraft. These defensive countermeasures are utilized to keep aircraft from being successfully targeted by or escape from weapons such as surface-to-air missiles, air-to-air missiles, anti-aircraft artillery, and in the case of the Proposed Action, other aircraft.

The existing and estimated additional chaff and flare use are presented in **Table 2-4**. Frequent training in use of chaff and flares by aircrews to master the timing of deployment and the capabilities of the devices is a critical component of ADAIR training. Chaff and flares (types similar to RR-188 chaff and M206 flares) are proposed for annual use in contract ADAIR training. While 100 percent of the requirement may not be allocated or expended, this amount is carried forward to determine potential impact associated with defensive countermeasures. There are no restrictions on the use of chaff in MOAs; however, the Oregon ANG has developed safety precautions for the use of flares. Flares are not deployed in MOAs below 5,000 ft above ground level (AGL) to negate the potential for the ignition of wildland fires and minimize the impacts on public safety. 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.

Table 2-4
Existing and Proposed Defensive Countermeasure Use

Special Use Airspace	Countermeasure Type	Current Baseline Use[1]	Total Estimated Future Use[2]
Juniper/Hart MOA Complex	Chaff Bundles	43,576	53,373
	Flares	26,184	32,070
Dolphin MOA	Chaff Bundles	5,941	7,244
	Flares	3,553	4,352
Goose MOA	Chaff Bundles	12,450	15,250
	Flares	7,481	9,163
Warning Area W-93	Chaff Bundles	311	381
	Flares	187	299

Notes:
1. Baseline countermeasure use is based on the current FY18 use and includes chaff and flares used by CAF self-generated Red Air support.
2. This reflects Contract ADAIR estimated countermeasure use added to the baseline use. With the addition of Contract ADAIR, there would be an estimated 25 percent savings in the amount of chaff and flares used by the CAF due to no longer being tasked to fly CAF self-generated Red Air support.

ADAIR = adversary air; CAF = Combat Air Forces; MOA = Military Operations Area

The months of highest fire risk for the Juniper MOAs are July, August, and September; the months of highest fire risk for the Hart MOAs are July through October. Flares will not be used during these times of high fire danger. Moreover, while AFI 11-214, *Air Operations Rules and Procedures*, limits the minimum altitude for flare use by F-15s over all federal land to 2,000 ft AGL, in order to ensure flares are completely extinguished before reaching the ground and due to increased fire risk beneath the Juniper/Hart MOA Complex, chaff and flare are not authorized in Juniper Low MOA. As a result of this conservative approach, no flares are authorized below 5,000 ft AGL over land.

2.2 SELECTION STANDARDS

In order to assess viable alternatives for the contract ADAIR implementation at Kingsley Field, the following selection standards were applied:

1. Mission: In addition to supporting Air Force prioritized missions as described in **Section 1.1.1**, contract ADAIR alternatives must not displace, interfere with, detract from, or reduce other Air Force missions or combat operations worldwide.
2. Airspace Capacity: Alternatives must have the airspace capacity to support force-on-force training engagements and must be able to safely support the additional contract ADAIR sorties in the airspace. Airspace must be large enough to effectively support realistic air-to-air training. Viable alternatives should not require establishing new military airspace but should occur within existing surrounding military airspace.
3. Facilities: Alternatives must leverage existing facilities that support the contract ADAIR requirements with minimal short duration, low-cost renovations, if any are needed. Alternatives must have existing
    a. operations work/office space;
    b. aircraft parking and hangar space;
    c. maintenance work/office space;
    d. munitions storage space;
    e. fuel storage capacity and delivery capability; and
    f. a runway of sufficient length for takeoff and landing of applicable aircraft, with appropriate safety features, infrastructure, and clear zones to ensure safe operations.
4. Cost and Time: Contract ADAIR locations would need to support costs of facilities renovations from within their existing Operations and Maintenance budgets. Viable alternatives must not require major renovations or funding to implement. Furthermore, as CAF pilot readiness is currently an urgent need, viable ADAIR alternatives must be able to support ADAIR activities in the near term. Solutions that cannot be implemented within the next 2 years, therefore, do not meet the purpose and need for the initiative.

2.3 SCREENING OF ALTERNATIVES

The following potential alternatives were considered:

- Alternative 1 – Establish contract ADAIR capabilities (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field with 1,952 annual training sorties in the Juniper/Hart MOA Complex, Dolphin and Goose MOAs, and W-93. Operations would be located in Building 404 and the AMU in Building 307. Aircraft maintenance space would be in the Charlie Barns and aircraft parking would be located on Delta Row of the west ramp.
- Alternative 2 – Establish contract ADAIR capabilities (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field with 1,952 annual training sorties in the Juniper/Hart MOA Complex, Dolphin and Goose MOAs, and W-93. Operations would be located in Building 219 and the AMU in Building 307. Aircraft maintenance space would be in the Charlie Barns and aircraft parking would be located on Delta Row of the west ramp.
- Alternative 3 – Establish contract ADAIR capabilities (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field with 1,952 annual training sorties in the Juniper/Hart MOA Complex, Dolphin and Goose MOAs, and W-93. Operations and the AMU as well as aircraft maintenance activities would be in Building 219 and aircraft parking would be in Bravo Row of the west ramp.

- Alternative 4 – Establish an additional Air Force AGRS of military pilots to fly CAF ADAIR aircraft (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field in the Juniper/Hart MOA Complex, Dolphin and Goose MOAs, and W-93.
- Alternative 5 – Establish contract ADAIR capabilities (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field in the Juniper/Hart MOA Complex, Dolphin and Goose MOAs, and W-93. New hangars and operations and maintenance facilities would be constructed.
- Alternative 6 – Establish dedicated CAF ADAIR by tasking organic CAF units to provide the capability.

The selection standards described in **Section 2.2** were applied to these alternatives to determine which could support contract ADAIR requirements and fulfill the purpose and need for the Proposed Action. The six alternatives considered above are compared in **Table 2-5**, Comparison of Alternatives.

Table 2-5
Comparison of Alternatives

Alternative Actions	Selection Standard				Meets Purpose and Need
	1. Mission	2. Airspace	3. Facilities	4. Cost and Time	
Alternative 1	Yes	Yes	Yes	Yes	**YES**
Alternative 2	Yes	Yes	Yes	Yes	**YES**
Alternative 3	Yes	Yes	Yes	Yes	**YES**
Alternative 4	No	Yes	Yes	No	**NO**
Alternative 5	Yes	Yes	No	No	**NO**
Alternative 6	No	Yes	Yes	Yes	**NO**

2.4 ALTERNATIVE ACTIONS ELIMINATED FROM FURTHER CONSIDERATION

Three alternatives were considered and eliminated from further consideration because they would not meet the purpose and need for the action or the selection standards (refer to **Section 2.3**). These alternatives included the following:

- Alternative 4: Establish an additional Air Force AGRS of military pilots to fly CAF ADAIR aircraft (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field. Establishing a new Air Force AGRS of 4th generation aircraft would meet many of the selection standards; however, it would take a large amount of time to implement. It takes more than a decade to train an Air Force pilot. Establishing another organic AGRS would require intensive planning, budgeting, and training of Air Force pilots before they would be ready to execute their mission. Rapid stand-up and manning of additional AGRS squadrons would be possible, but not without reducing both manpower and combat platforms available to support combat operations. Due to the timeframe and/or reductions in combat mission capacity involved, this alternative fails to meet Selection Standards 1 and 4 and does not meet the purpose and need for the Proposed Action.
- Alternative 5: Establish contract ADAIR capabilities (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field and constructing new hangars and operations and maintenance facilities. Establishing the contract ADAIR mission with new facilities construction was considered but not carried forward, as the alternative requires the construction of new facilities and does not provide support in the timely manner needed to address the pilot readiness crisis, and as such does not meet Selection Standards 3 and 4. It would take 4 to 5 years to plan, program, budget, appropriate, design, and construct new facilities. This would not support the purpose and need for the Proposed Action.

- Alternative 6: Establish dedicated CAF ADAIR by tasking organic CAF units to provide the capability. Tasking organic 4th generation assets to provide dedicated ADAIR support to Kingsley Field would result in both a reduction of combat power applied worldwide as well as continued degradation of the unit's own readiness. The units employing 4th generation aircraft, such as the F-16, are heavily engaged in deployments and overseas missions. Under this alternative, these units would continue to struggle with providing for their own proficiency, while maintaining support for both combat operations and CAF ADAIR. Such an alternative does not meet Selection Standard 1 or the overarching purpose and need for the Proposed Action.

2.5 DETAILED DESCRIPTION OF THE SELECTED ALTERNATIVES

NEPA and the CEQ regulations mandate the consideration of reasonable alternatives to the Proposed Action. "Reasonable alternatives" are those that also could be utilized to meet the purpose of and need for the Proposed Action. The NEPA process is intended to support flexible, informed decision-making; the analysis provided by this EA and feedback from the public and other agencies will inform decisions made about whether, when, and how to execute the Proposed Action. Three alternative actions meet the purpose of and need for the action, satisfy the criteria set forth in the selection standards, and were carried forward for further detailed analysis in this EA. The No Action Alternative provides a benchmark used to compare potential impacts of the Proposed Action. Alternatives carried forward for evaluation are described in **Sections 2.5.1** through **2.5.4**.

2.5.1 Alternative 1: Contract Adversary Air Operating Out of Buildings 404 and 307

Under Alternative 1, CAF would establish contract ADAIR capabilities (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field ANGB. Operations would be located in Building 404 and the AMU in Building 307. Aircraft maintenance space would be in the Charlie Barns and aircraft parking would be located on Delta Row of the west ramp (refer to **Figure 2-1**). The contract ADAIR aircraft, maintenance, personnel, sorties, airspace use, and defensive countermeasures would be as described under Proposed Action.

2.5.2 Alternative 2: Contract Adversary Air Operating Out of Buildings 219 and 307

Under Alternative 2, CAF would establish contract ADAIR capabilities (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field ANGB. Operations would be located in Building 219 and the AMU in Building 307. Aircraft maintenance space would be in the Charlie Barns and aircraft parking would be located on Delta Row of the west ramp (refer to **Figure 2-1**). The contract ADAIR aircraft, maintenance, personnel, sorties, airspace use, and defensive countermeasures would be as described under Proposed Action.

2.5.3 Alternative 3: Contract Adversary Air Operating Out of Building 219

Under Alternative 3, CAF would establish contract ADAIR capabilities (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field. Operations and the AMU would be in Building 219, aircraft maintenance would also be in Building 219, and aircraft parking would be in Bravo Row of the west ramp (refer to **Figure 2-1**). The contract ADAIR aircraft, maintenance, personnel, sorties, airspace use, and defensive countermeasures would be as described under Proposed Action.

2.5.4 No Action Alternative

Analysis of the No Action Alternative provides a benchmark, enabling decision-makers to compare the magnitude of the potential environmental effects of the Proposed Action. NEPA requires an EA to analyze the No Action Alternative. No action means that an action would not take place at this time, and the resulting environmental effects from taking no action would be compared with the effects of allowing the proposed activity to go forward. No action for this EA reflects the status quo, where no additional contract ADAIR assets would be established at Kingsley Field. Organic Kingsley Field ADAIR support would result in further

declines in fielded pilot proficiency or combat operations. Kingsley Field self-generated ADAIR support, the status quo following calendar year 2017 pilot increases, is causing declining quality of pilot production which consequently results in unsustainable operations posing an unacceptable threat to national security. Aircraft tasked to support ADAIR missions organically from within CAF would continue to experience their own readiness and proficiency challenges due to the lost training time they are experiencing.

2.6 MITIGATION AND ENVIRONMENTAL COMMITMENTS

Agencies are required to identify and include all relevant and reasonable mitigation measures that could reduce potential significant impacts. The CEQ regulations (40 CFR § 1508.20) define mitigation as

- avoiding the impact altogether by not taking a certain action or parts of an action;
- minimizing the impact by limiting the degree or magnitude of the action and its implementation;
- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- compensating for the impact by replacing or providing substitute resources or environments.

The development of mitigation measures in support of contract ADAIR at Kingsley Field ANGB is necessary because the noise analysis in **Chapter 4** determined that implementation of the High Noise Scenario under the Proposed Action could result in potential significant impacts on the noise environment around the installation.

The type of aircraft that would be used by contract ADAIR is unknown at this time. The mitigation outlined in **Section 4.2.2.2** and **Appendix E** would only apply if aircraft similar to the High Noise Scenario comprise the contract ADAIR aircraft used at Kingsley Field. If contract ADAIR aircraft used for training at Kingsley Field are similar to the Medium or Low Noise Scenario, no mitigation would be required. The ultimate need for mitigation would be determined by the actual aircraft used for contract ADAIR.

BMPs are described, when applicable, in the environmental consequences discussion for each resource in **Chapter 4**. Kingsley Field follows applicable Air Force regulations and BMPs as well as federal, state, and local regulations and directives.

2.7 SUMMARY OF POTENTIAL ENVIRONMENTAL CONSEQUENCES

The potential impacts associated with Alternatives 1, 2, and 3 and the No Action Alternative are summarized in **Table 2-6**. The summary is based on information discussed in detail in **Chapter 4 (Environmental Consequences)** of the EA with mitigation where applicable. The table includes a concise definition of the issues addressed and the potential environmental impacts associated with each Alternative Action.

Table 2-6
Comparison of Potential Environmental Consequences of the Proposed Action with Mitigation*

Alternative	Resource										
	Airspace Management and Use	**Noise**	**Safety**	**Air Quality**	**Biological Resources**	**Land Use**	**Socioeconomics – Income and Employment**	**Environmental Justice and Protection of Children**	**Cultural Resources**	**Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances**	**Transportation**
Alternative 1: **Contract ADAIR operations with 2,000 additional sorties** **Operations activities in Building 404** **Maintenance activities in Building 307**	**Kingsley Field** Negligible impacts **MOAs/ Warning Area** Negligible impacts	**Kingsley Field** Under the Low and Medium Noise Scenarios, long-term, negligible to minor increases to noise in the vicinity of the Kingsley Field airfield. Under the High Noise Scenario, moderate impacts on select POIs with mitigation **MOAs/ Warning Area** Negligible impacts Impacts associated with sonic booms would be negligible to minor	**Kingsley Field** No impacts on ground, explosive, or flight safety **MOAs/ Warning Area** No impacts on ground, explosive, or flight safety	**Kingsley Field** Minor increase in criteria pollutant emissions No impacts on the region's ability to comply with the NAAQS for regulated pollutants Would not hamper efforts to achieve compliance with ozone NAAQS **MOAs/ Warning Area** Minor increase in criteria pollutants in the Juniper/Hart MOA Complex/ W-93 No impacts on the region's ability to meet NAAQS for all regulated pollutants	**Kingsley Field** Negligible, short- and long-term impacts on wildlife Minor impacts on birds from potential aircraft/bird collisions Minor impacts on sage-grouse No impacts on federally listed species **MOAs/ Warning Area** Minor impacts on wildlife and federally listed species from use of countermeasures or from noise, including sonic booms	**Kingsley Field** Less than significant impacts on select POIs with mitigation. **MOAs/ Warning Area** No changes to existing land use beneath the airspace	**Kingsley Field** No impacts on economic environment or employment. Potentially major beneficial impacts on economic environment Minor impacts on housing/ commercial property values with mitigation **MOAs/ Warning Area** N/A	**Kingsley Field** No disproportionate impact on minority or low-income populations No disproportionate impacts on children **MOAs/ Warning Area** N/A	**Kingsley Field** No impact to historic properties No known traditional cultural resources or sacred sites are present **MOAs/ Warning Area** No impact to historic properties, traditional cultural properties, or sacred sites with the temporal and altitudinal aircraft operations exclusion zone implementation over the northern California coast	**Kelly Field Annex** No impacts on hazardous waste management No impacts on asbestos-containing materials and lead-based paint management Long-term, minor, beneficial impact on managing and disposal of polychlorinated biphenyls No impacts from radon No environmental contamination **MOAs/ Warning Area** N/A	**Kingsley Field** Minor impacts on local traffic **MOAs/ Warning Area** N/A
Alternative 2: **Contract ADAIR operations with 2,000 additional sorties** **Operations activities in Building 219** **Maintenance activities in Building 307**	**Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	**Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	**Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	**Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	**Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	**Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	**Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** N/A	**Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** N/A	**Kelly Field Annex** Minor alteration to Hangar 1610 interior with negligible impact No impact on archaeological deposits No known traditional cultural resources or sacred sites present **MOAs/ Warning Area** Same as Alternative 1	**Kelly Field Annex** Same as Alternative 1 **MOAs/ Warning Area** N/A	**Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** N/A

Table 2-6
Comparison of Potential Environmental Consequences of the Proposed Action with Mitigation*

Alternative	Resource										
	Airspace Management and Use	**Noise**	**Safety**	**Air Quality**	**Biological Resources**	**Land Use**	**Socioeconomics – Income and Employment**	**Environmental Justice and Protection of Children**	**Cultural Resources**	**Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances**	**Transportation**
Alternative 3: **Contract ADAIR Operations with 2,000 additional sorties** **Maintenance and Operations consolidated in Building 219**	🟢 **Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	🟡 **Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	🟢 **Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	🟢 **Kingsley Field** Same as Alternative 1 **Brady High and Low MOAs/ Warning Area** Same as Alternative 1	🟢 **Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	🟡 **Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	🟢 **Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** N/A	🟢 **Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** N/A	🟢 **Kelly Field Annex** Same as Alternative 1 **MOAs/ Warning Area** Same as Alternative 1	🟢 **Kelly Field Annex** Same as Alternative 1 **MOAs/ Warning Area** N/A	🟢 **Kingsley Field** Same as Alternative 1 **MOAs/ Warning Area** N/A
No Action Alternative	🟢 No change to airspace management and use at Kingsley Field or in the MOAs/ Warning Area	🟢 No change to noise setting at Kingsley Field or in the MOAs/ Warning Area	🟢 No change to ground, flight, or explosive safety at Kingsley Field or in the MOAs/ Warning Area	🟢 No change to air quality at Kingsley Field or in the MOAs/ Warning Area	🟢 No change to biological resources at Kingsley Field or in the MOAs/ Warning Area	🟢 No change to land use resources at Kingsley Field or in the MOAs/ Warning Area	🟢 No change to socioeconomic conditions in the vicinity of Kingsley Field	🟢 No disproportionate impacts for minority, low-income, or youth populations in the community in the vicinity of Kingsley Field	🟢 No change to cultural resources at Kingsley Field or in the MOAs/ Warning Area	🟢 No change to hazardous materials and wastes, contaminated sites, and toxic substances at Kingsley Field	🟢 No change to transportation at Kingsley Field

Notes:

🟢 No, minor, or negligible impact 🟡 Moderate impact but not significant 🔴 Major, significant impact

* Where applicable, mitigation was included in the potential impacts summary.

ADAIR = adversary air; MOA = Military Operations Area; N/A = not applicable; NAAQS = National Ambient Air Quality Standards; POI = point of interest

CHAPTER 3 AFFECTED ENVIRONMENT

Existing environmental conditions could be affected by the Proposed Action and alternatives. The existing conditions for relevant resources are defined to provide a meaningful baseline from which to compare potential future effects. In this chapter, each resource is defined, the geographic scope is identified, followed by a description of the existing conditions for that resource. The expected geographic scope of potential consequences is referred to as the ROI. The ROI boundaries will vary depending on the nature of each resource. For example, the ROI for some resources, such as socioeconomics and air quality, extend over a larger jurisdiction unique to the resource. In addition, some resources discuss the available baseline data, installation (base) and airspace, in the same section and some discuss these elements separately, depending on the complexity of the ROI and the relationship of the base to the airspace.

3.1 AIRSPACE MANAGEMENT AND USE

3.1.1 Definition of the Resource

Airspace management involves the direction, control, and handling of flight operations in the airspace that overlies the borders of the United States and its territories. Under Title 49, U.S.C. § 40103, Sovereignty and Use of Airspace and Public Law No. 103-272, the US government has exclusive sovereignty over the nation's airspace. The Federal Aviation Administration (FAA) has the responsibility to plan, manage, and control the structure and use of all airspace over the United States. FAA rules govern the national airspace system, and FAA regulations establish how and where aircraft may fly. Collectively, the FAA uses these rules and regulations to make airspace use as safe, effective, and compatible as possible for all types of aircraft, from private propeller-driven planes to large, high-speed commercial and military jets.

Aircraft use different kinds of airspace according to the specific rules and procedures defined by the FAA for each type of airspace. For the Proposed Action, the airspaces used are MOAs and a Warning Area. A MOA is designated airspace outside of Class A airspace used to separate or segregate certain nonhazardous military activities from Instrument Flight Rules (IFR) traffic and to identify for Visual Flight Rules traffic where these activities are conducted (14 CFR § 1.1). Activities in MOAs include, but are not limited to, air combat maneuvers, air intercepts, and low-altitude tactics. The defined vertical and lateral limits vary for each MOA. While MOAs generally extend from 1,200 ft AGL to 18,000 ft MSL, the floor may extend below 1,200 ft AGL if there is a mission requirement and minimal adverse aeronautical effect. MOAs allow military aircraft to practice maneuvers and tactical flight training at airspeeds in excess of 250 knots indicated airspeed (approximately 285 mi per hour). The FAA requires publication of the hours of operation for any MOA so that all pilots, both military and civilian, are aware of when other aircraft could be in the airspace. A Warning Area is airspace of defined dimensions that extends from 3 NM outward from the coast of the United States and may be over US waters, international waters, or both. The purpose of Warning Areas is to warn nonparticipating pilots of potentially hazardous activity. Warning Areas may be used for other purposes if released to the FAA during periods when not required for their intended purpose and are within areas in which the FAA has Air Traffic Control (ATC) authority.

Each military organization responsible for a MOA develops a daily use schedule. Although the FAA designates MOAs for military use, other pilots may transit the airspace. To avoid conflicts, MOAs are designed to avoid entirely or have specific avoidance procedures around busy airports; these procedures also apply to small private and municipal airfields. Such avoidance procedures are maintained for each MOA, and military aircrews build them into daily flight plans.

In addition to the lower limits of charted airspace, all aircrews adhere to FAA avoidance rules. Aircraft must avoid congested areas of a city, town, settlement, or any open-air assembly of persons by 1,000 ft above the highest obstacle within a horizontal radius of 2,000 ft of the aircraft. Outside of congested areas, aircraft must avoid any person, vessel, vehicle, or structure by 500 ft. Bases may establish additional avoidance restrictions under MOAs.

The ROI for airspace use and management includes the Kingsley Field airfield and environs as well as the MOAs and Warning Area depicted on **Figure 1-4**.

3.1.2 Existing Conditions – Kingsley Field

The airfield at Kingsley Field is operated by the 173 FW supporting military operations conducted by units stationed at the base. Military training has occurred in the vicinity of Kingsley Field since 1954. The majority of operations at Kingsley Field are performed by the 173 FW ANG F-15C/D aircraft.

Air Traffic Control (ATC) for Kingsley Field is provided by Crater Lake-Klamath Regional Airport. Controlled Class D airspace, extending upward from the surface up to and including 2,500 ft AGL within a 4-NM radius of Kingsley Field, has been established around the airfield to support managing air traffic. The Class D airspace reverts to Class E airspace when the Kingsley Field ATC tower is closed.

A variety of factors can influence the annual level of operational activity at an airfield, including economics, national emergencies, and maintenance requirements. Operations consist of arrivals and departures (itinerant) by primarily military aircraft, with a smaller amount of general aviation traffic flights. Military aircraft use makes up 37 percent of the airfield use, with the remaining amount used by general aviation and transient aircraft flights (**Table 3-1**).

Table 3-1
Annual Operations at Kingsley Field

Use	Annual Operation	Percentage of Use
173 FW	18,474	37
General Aviation	29,833	60
Transient	1,630	3
Total	**49,937**	**100**

3.1.3 Existing Conditions – Airspace

The affected environment for airspace management and use includes MOAs and a Warning Area where military aircraft perform training operations. Kingsley Field F-15 aircraft routinely train in the Juniper/Hart MOA Complex, Dolphin MOA, Goose MOA, and W-93. These MOAs and Warning Area are described earlier in **Chapters 1** and **2**.

3.2 NOISE

3.2.1 Definition of the Resource

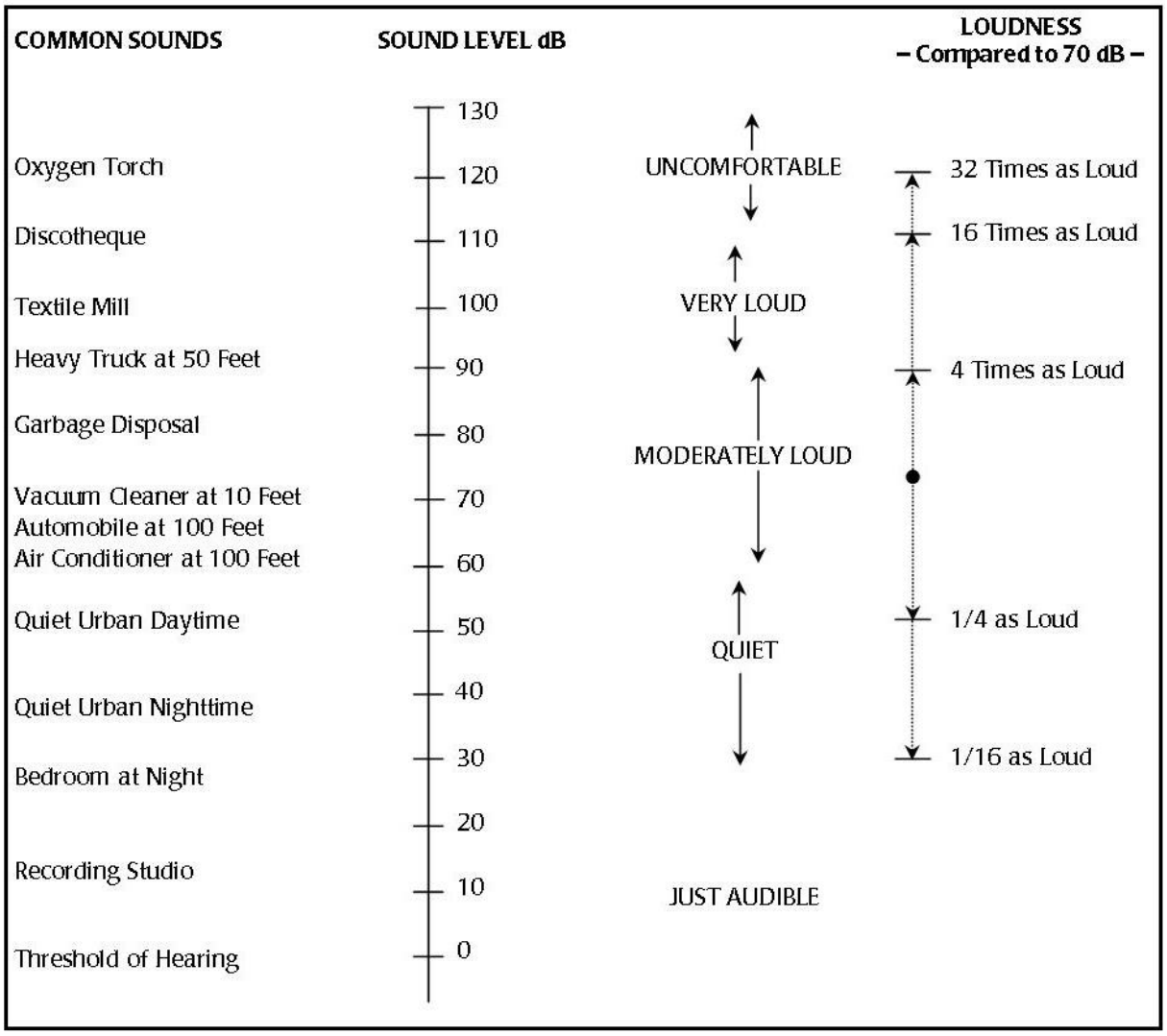
Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound becomes noise when it is unwelcome and interferes with normal activities, such as sleep or conversation. Noise is generally described as unwanted sound. Unwanted sound can be based on objective effects (such as hearing loss or damage to structures) or subjective judgments (community annoyance). The response of different individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise, its appropriateness in the setting, the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual. Noise also may affect wildlife through disruption of nesting, foraging, migration, and other life-cycle activities.

Sound is expressed in logarithmic units of decibels (dB). A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound

level of approximately 60 dB; sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 to 140 dB are felt as pain (Berglund and Lindvall, 1995). The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB.

All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second, or hertz. To mimic the human ear's nonlinear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements usually employ an "A-weighted" scale that filters out very low and very high frequencies to replicate human sensitivity. It is common to add the "A" to the measurement unit to identify that the measurement was made with this filtering process, for instance dBA. In this document, the dB unit refers to A-weighted sound levels unless otherwise noted.

A-weighted sound levels from common sources are given on **Figure 3-1**. Some sources, like the air conditioner and vacuum cleaner, are continuous sounds whose levels are constant for some time. Some sources, like the automobile and heavy truck, are the maximum sound during an intermittent event like a vehicle pass-by. Some sources like "urban daytime" and "urban nighttime" are averages over extended periods. A variety of noise metrics have been developed to describe noise over different time periods.



Source: Harris, 1979

Figure 3-1. Typical A-weighted Sound Levels of Common Sounds.

Military aircraft generate two types of sound. One is subsonic noise, which is continuous sound generated by the aircraft's engines and also by air flowing over the aircraft itself. Subsonic noise occurs at the airfields and in the airspace. The other type is supersonic noise consisting of sonic booms. Sonic booms are transient, impulsive sounds generated during supersonic flight. Supersonic flight must occur only within authorized airspace. These two types of noise differ in terms of characteristics.

Aircraft subsonic noise consists of two major types of sound events: flight events (including takeoffs, landings and flyovers) and stationary events, such as engine maintenance run-ups. Noise from aircraft overflights typically occurs beneath main approach and departure paths and in local air traffic patterns around the airfield. Noise from stationary events typically occurs in areas near aircraft parking ramps and staging areas. As aircraft climb, the noise received on the ground drops to lower levels, eventually fading into the background or ambient levels.

Aircraft in supersonic flight (i.e., exceeding the speed of sound, Mach 1) cause sonic booms. 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 very 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 (psf). The amplitude depends on the aircraft's size, weight, geometry, Mach number, and flight altitude. Altitude is usually the biggest single factor. Maneuvers (turns, dives, etc.) also affect the amplitude of particular booms.

Not all supersonic flights cause sonic booms that are heard at ground level. As altitude increases, air temperature and sound speed decrease. These sound speed changes cause booms to be turned upward as they travel toward the ground. Depending on the altitude of the aircraft and the Mach number, many sonic booms can be bent upward such that they never reach the ground. This phenomenon, referred to as "cutoff," also acts to limit the width (area covered) of the sonic booms that do reach the ground. The overpressures of booms that reach the ground are well below those that would begin to cause physical injury to humans or animals. They can, however, be annoying and can cause startle reaction in humans and animals. On occasion, sonic booms can cause physical damage (e.g., to a window) if the overpressure is of sufficient magnitude. The condition of the structure is a major factor when damage occurs, the probability of which, tends to be low. For example, the probability of a 1-psf boom (average pressure in airspace) cracking plaster or breaking a window falls in the range of 1 in 10,000 to 1 in 10 million.

3.2.1.1 Noise Metrics

Noise metrics quantify sounds so they can be compared with each other, and with their effects, in a standard way. There are a number of metrics that can be used to describe a range of situations, from a particular individual event to the cumulative effect of all noise events over a long time. This section describes the metrics relevant to environmental noise analysis. Noise metrics and noise models are described in **Appendix B**.

Single Event Metrics

Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or Maximum Sound Level and is abbreviated L_{max}. The L_{max} is depicted for a sample event in **Figure 3-2**.

L_{max} is the maximum level that occurs over a fraction of a second. For aircraft noise, the "fraction of a second" is one-eighth of a second, denoted as "fast" response on a sound level measuring meter (American National Standards Institute, Inc., 1988). Slowly varying or steady sounds are generally measured over 1 second, denoted "slow" response. L_{max} is important in judging if a noise event will interfere with conversation, TV or radio listening, or other common activities. Although it provides some measure of the event, it does not fully describe the noise, because it does not account for how long the sound is heard.

Sound Exposure Level

Sound Exposure Level (SEL) combines both the intensity of a sound and its duration. For an aircraft flyover, SEL includes the maximum and all lower noise levels produced as part of the overflight, together with how long each part lasts. It represents the total sound energy in the event. The SEL for an example event, representing it as if all the sound energy were contained within 1 second, is indicated on **Figure 3-2**.

Because aircraft noise events last more than a few seconds, the SEL value is larger than L_{max}. It does not directly represent the sound level heard at any given time, but rather the entire event. SEL provides a much better measure of aircraft flyover noise exposure than L_{max} alone.

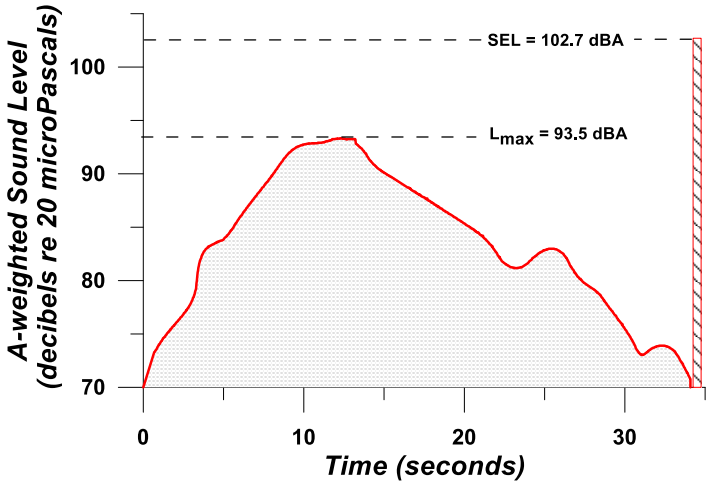


Figure 3-2. Example of Maximum Sound Level and Sound Exposure Level from an Individual Event.

Overpressure

The single event metrics commonly used to assess supersonic noise are overpressure in psf and C-Weighted Sound Exposure Level (CSEL). Overpressure is the peak pressure at any location within the sonic boom footprint.

C-Weighted Sound Exposure Level

CSEL is SEL computed with C frequency weighting, which is similar to A-Weighting (discussed in **Section 3.2.1**) except that C-weighting places more emphasis on low frequencies below 1,000 hertz.

Cumulative Metrics

Equivalent Sound Level

Equivalent Sound Level (L_{eq}) is a "cumulative" metric that combines a series of noise events over a period of time. L_{eq} is the sound level that represents the decibel average SEL of all sounds in the time period. Just as SEL has proven to be a good measure of a single event, L_{eq} has proven to be a good measure of series of events during a given time period.

The time period of an L_{eq} measurement is usually related to some activity and is given along with the value. The time period is often shown in parenthesis (e.g., $L_{eq(24)}$ for 24 hours). The L_{eq} from 7 a.m. to 3 p.m. may give exposure of noise for a school day.

An example of $L_{eq(24)}$ using notional hourly average noise levels ($L_{eq(h)}$) for each hour of the day is given on **Figure 3-3**. The $L_{eq(24)}$ for this example is 61 dBA.

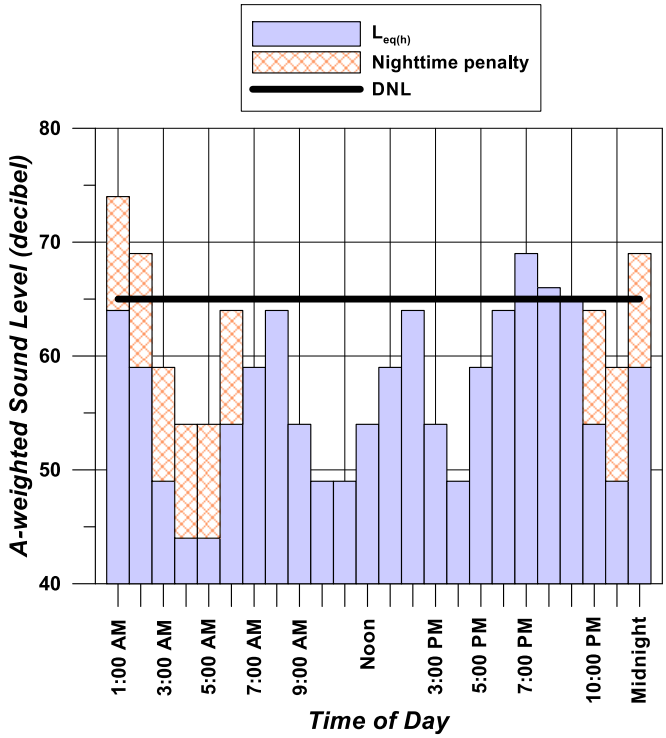


Figure 3-3. Example of Day-Night Average Sound Level Computed from Hourly Average Sound Levels.

Day-Night Average Sound Level

Day-Night Average Sound Level (DNL or L_{dn}) is a cumulative metric that accounts for all noise events in a 24-hour period; however, unlike $L_{eq(24)}$, DNL contains a nighttime noise penalty. To account for our increased sensitivity to noise at night, DNL applies a 10-dBA penalty to events during the nighttime period, defined as 10:00 p.m. to 7:00 a.m. The notations DNL and L_{dn} are both used for Day-Night Average Sound Level and are equivalent. For airports and military airfields, DNL represents the average sound level for annual average daily aircraft events.

An example of DNL using notional hourly average noise levels ($L_{eq[h]}$) for each hour of the day is given on **Figure 3-3**. Note the $L_{eq(h)}$ for the hours between 10 p.m. and 7 a.m. have a 10-dBA penalty assigned. DNL for the example noise distribution shown on **Figure 3-3** is 65 dBA.

DNL does not represent a noise level heard at any given time but represents long-term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (Schultz, 1978; US Environmental Protection Agency [USEPA], 1978).

Onset-Rate Adjusted Monthly Day-Night Average Sound Level

Military aircraft utilizing Special Use Airspace such as Military Training Routes, MOAs, and restricted areas/ranges generate a noise environment that is somewhat different from that around airfields. Rather than regularly occurring operations like at airfields, activity in Special Use Airspace is highly sporadic. It is often seasonal, ranging from 10 per hour to less than 1 per week. Individual military overflight events also

differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset, with rates of up to 150 dB per second.

The cumulative daily noise metric devised to account for the "surprise" effect of the sudden onset of aircraft noise events on humans and the sporadic nature of special use airspace activity is the Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}). Onset rates between 15 and 150 dB per second require an adjustment of 0 to 11 dB to the event's SEL, while onset rates below 15 dB per second require no adjustment to the event's SEL (Stusnick et al., 1992). The term 'monthly' in L_{dnmr} refers to the noise assessment being conducted for the month with the most operations or sorties, the busiest month.

3.2.1.2 Noise Models

This section summarizes the analysis tools used to calculate the noise levels for the EIAP.

NOISEMAP

Analyses of aircraft noise exposure and compatible land uses around DOD airfield-like facilities are normally accomplished using a group of computer-based programs, collectively called NOISEMAP (Czech and Plotkin, 1998; Wasmer and Maunsell, 2006a, 2006b). The core computational program of the NOISEMAP suite is NMAP. In this report, NMAP Version 7.3 was used to analyze aircraft operations and to generate noise contours.

MR_NMAP

When the aircraft flight tracks are not well defined and are distributed over a wide area, such as in Military Training Routes with wide corridors or MOAs, the Air Force uses the DOD-approved MR_NMAP program (Lucas and Calamia, 1996). In this report, MR_NMAP Version 3.0 was used to model subsonic aircraft noise in special use airspaces. For airspace environments where noise levels are calculated to be less than 45 dB, the noise levels are stated as "<45 dB."

PCBoom

Environmental analysis of supersonic aircraft operations requires calculation of sonic boom amplitudes. For the purposes of this study, the Air Force and DOD-approved PCBoom program was used to assess sonic boom exposure due to military aircraft operations in supersonic airspace. In this report, PCBoom Version 4 was used to calculate sonic boom ground signatures and overpressures from supersonic vehicles performing steady, level flight operations (Plotkin, 2002).

BooMap

For cumulative sonic boom exposure under supersonic air combat training arenas, the Air Force and DOD-approved BooMap program was used. In this report, BooMap96 was used to calculate cumulative C-weighted DNL (CDNL) exposure based on long-term measurements in a number of airspaces (Plotkin, 1993).

The ROI for noise includes the Kingsley Field airfield and environs as well as the MOAs and Warning Area depicted on **Figure 1-4**. Noise analysis at Kingsley Field was conducted to update the airfield noise contours and the MOAs and Warning Area, in order to reflect the most recent and accurate aircraft operations and flying conditions.

3.2.2 Existing Conditions – Kingsley Field

As is normal for military installations with a flying mission, the primary driver of noise at Kingsley Field is aircraft operations. Standard aircraft operations include take-offs, landings, closed patterns, and static run-ups.

In addition to aviation noise, some additional noise results from the day-to-day activities associated with operations, maintenance, and the industrial functions associated with the operations of the airfield. These noise sources include the operations of ground support equipment, and other transportation noise from vehicular traffic. Noise resulting from aircraft operations remains the dominant noise source.

Aircraft operations at Kingsley Field consist of based military aircraft, civilian aircraft, and a variety of transient aircraft. Existing annual aircraft operations at Kingsley Field total 49,937, as summarized in **Table 3-2**. An operation is defined as a single takeoff or landing. Closed patterns consist of two operations, one departure and one arrival (e.g., two closed-pattern circuits consist of four total operations). The table pattern numbers are operation counts, not pattern-circuit counts. Kingsley Field's Runway 14 is used for 65 percent of military aircraft operations while Runway 32 is used for the remaining 35 percent of operations. The majority of aircraft operations at Kingsley Field are performed by the based F-15C/D aircraft. Kingsley Field also hosts a biannual large force exercise (LFE), Sentry Eagle. As part of the LFE, a variety of aircraft from other locations, such as the KC-135R, F-16, F-18, and F-35, travel to Kingsley Field for approximately 4 days of training at the airfield and in nearby airspaces. A more detailed existing annual aircraft operations table can be found in **Appendix B**.

Table 3-2
Existing Annual Aircraft Operations Summary at Kingsley Field

Aircraft	Departures		Arrivals		Closed Patterns		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Total
F-15C/D	4,556	0	4,428	128	9,097	265	18,081	393	18,474
Civilians	11,221	204	11,221	204	6,983	0	29,425	408	29,833
Transients	811	0	811	0	8	0	1,630	0	1,630
Grand Total	**46,588**	**204**	**16,460**	**332**	**16,088**	**265**	**49,136**	**801**	**49,937**

The resultant 65- to 85-dBA DNL contours in 5-dBA increments for the existing daily flight events at Kingsley Field are shown on **Figure 3-4**. In accordance with Air Force Handbook 32-7084, the 65-dBA DNL is the noise level below which generally all land uses are compatible with noise from aircraft operations. It should be emphasized that these noise levels, which are often shown graphically as contours on maps, are not discrete lines that sharply divide louder areas from land largely unaffected by noise. Instead, they are part of a planning tool that depicts the general noise environment around the installation based on typical aviation activities. Areas beyond the 65-dBA DNL can also experience levels of appreciable noise depending upon training intensity or weather conditions. In addition, DNL noise contours may vary from year to year due to fluctuations in operational tempo due to unit deployments, funding levels, and other factors. Static run-up operations, such as maintenance and pre/postflight run-ups, were also modeled. A more detailed discussion of run-up operations at Kingsley Field can be found in **Appendix B**.

The prominent features from **Figure 3-4** are the extents of the DNL contours along the extended centerline of Runway 14/32. The 65-dBA DNL contour extends beyond the base boundary, approximately 2.0 mi to the north and 4.8 mi to the south from the end of the runway. The 70-dBA DNL contour extends approximately 1.4 mi to the north and 1.6 mi to the south from the end of the runway. The 75-dBA DNL contour extends approximately 0.7 mi to the north and 0.8 mi to the south from the end of the runway. The area within each DNL noise contour for the existing conditions as shown on **Figure 3-4** are shown in **Table 3-3**.

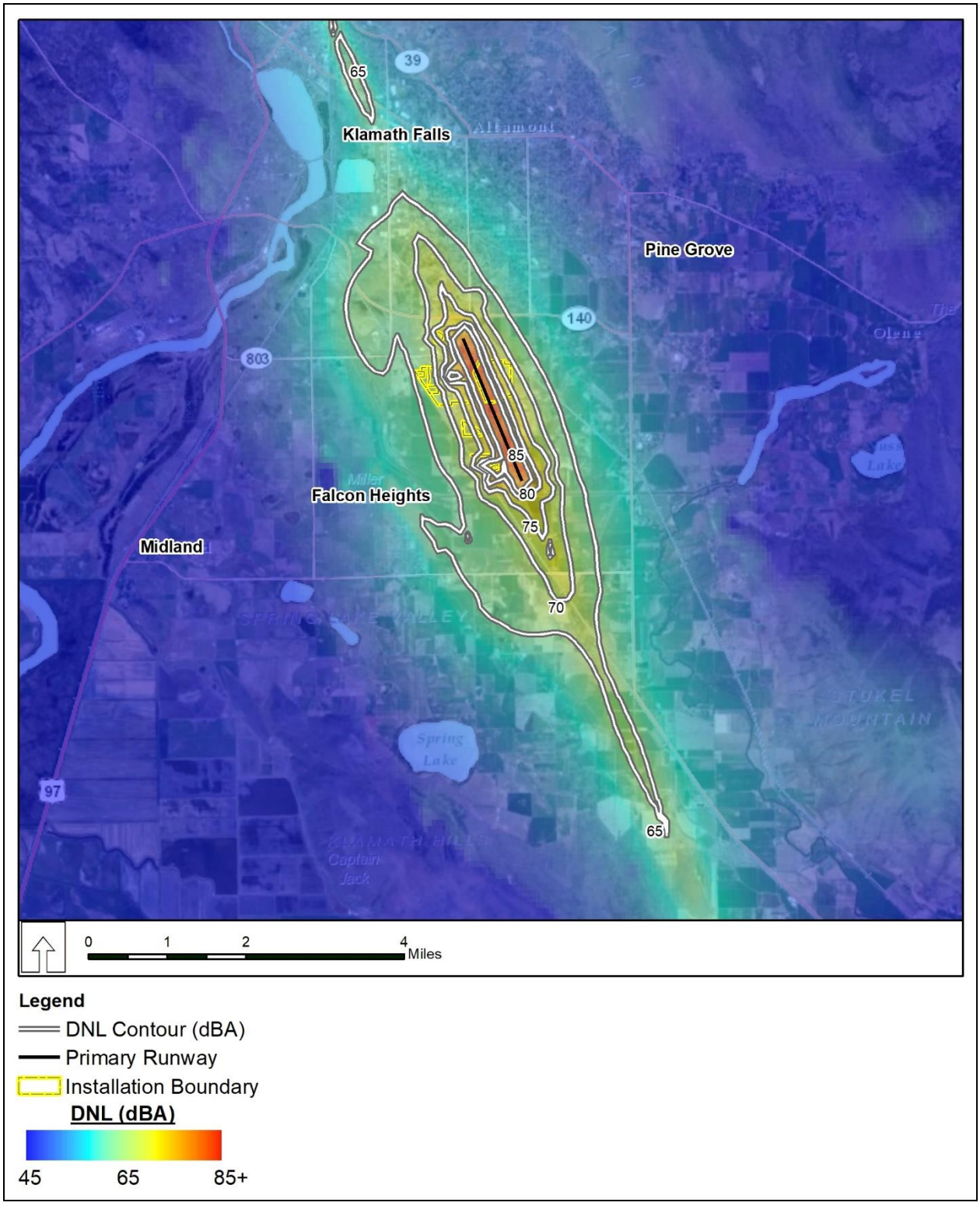


Figure 3-4. Existing Day-Night Average Sound Level Contours at Kingsley Field.

Table 3-3
Existing Day-Night Average Sound Level Acreage Affected at Kingsley Field

Noise Level (dBA DNL)	Area Within Noise Contour (acres)
>65	6,094
>70	2,293
>75	1,155
>80	625
>85	350

Notes:
[1] Area (on- and off-base) was based off NOISEMAP modeled noise contours and used to calculate the amount of land within each noise contour. The amounts shown are cumulative, i.e., the acreage within the >85-dBA contour is also within all the lower noise level contours.

dBA = A-weighted decibel; DNL = Day-Night Average Sound Level

A number of points of interest (POI) have been identified in the vicinity of Kingsley Field. These POIs are made up of noise sensitive receptors such as homes, schools, hospitals, and places of worship. **Table 3-4** shows the existing DNL as a result of aircraft operations at Kingsley Field at the 32 POIs for the existing conditions. Fourteen of the 32 POIs are exposed to DNL between 60 and 65 dBA, and four of the POIs are exposed to DNL higher than 65 dBA.

THE FIRST STEP IN IDENTIFYING NOISE SENSITIVE RECEPTORS, ALSO REFERRED TO AS POINTS OF INTEREST (POIS) AROUND MILITARY AIRFIELDS IS TO REVIEW PUBLISHED NATIONAL ENVIRONMENTAL POLICY ACT AND/OR AIR INSTALLATION COMPATIBLE USE ZONE REPORTS TO DETERMINE PREVIOUSLY IDENTIFIED POIS. THESE TYPICALLY INCLUDE SCHOOLS, PLACES OF WORSHIP, AND RESIDENTIAL AREAS AROUND THE AIRFIELD. IN ADDITION, INSTALLATION PERSONNEL WORK WITH THE COMMUNITY TO IDENTIFY AREAS AROUND THE AIRFIELD THAT SHOULD BE CONSIDERED FOR NOISE ANALYSIS.

Table 3-4
Existing Day-Night Average Sound Level at Points of Interest at Kingsley Field

POI		DNL (dBA)
ID	Description	
01	Brixner Junior High School	60
02	Apostolic Lighthouse	57
03	Baptist Church of Homedale	54
04	BBC Ministries	53
05	Calvary Chapel	56
06	Church of Christ	51
07	Fairview School	54
08	Faith Tabernacle Assembly	59
09	First Church of God	60
10	Harvest Outreach Christian Center	54
11	Hosanna Christian School	64
12	The Church of Jesus Christ of Latter-day Saints	50
13	Klamath Community College	49
14	Klamath Family Head Start	62
15	Living Faith Fellowship	60
16	Mazama High School	58
17	Mt Laki Community Church	61
18	New Horizon Christian Fellowship	52
19	Our Place to Grow LLC daycare	57
20	Peterson Elementary School	60
21	Ponderosa Middle School	55
22	St Pius X Catholic Church	61
23	Stearns Elementary School	63
24	Triad School	56

Table 3-4
Existing Day-Night Average Sound Level at Points of Interest at Kingsley Field

POI		DNL (dBA)
ID	Description	
25	Wesleyan Church	55
26	Oregon Institute of Technology	55
27	Sky Lakes Medical Center	59
28	Residences near Lombardy Lane and railroad tracks	71
29	Residences near Old Midland Road and railroad tracks	72
30	Residences near Anderson Avenue and Altamount Drive	72
31	Residences near Highland Way and Summit Street	68
32	Residences near Airway Drive and Homedale Road	63

Notes:
Affected POIs based on NOISEMAP-modeled noise contours and used to calculate the POIs within each noise contour.
dBA = A-weighted decibel; DNL = Day-Night Average Sound Level; POI = point of interest

3.2.3 Existing Conditions – Airspace

The primary special use airspaces used by Kingsley Field based aircraft are the Juniper/Hart MOA Complex, Dolphin MOA, and Goose MOA as well as W-93. The Juniper/Hart MOA Complex receives approximately 74 percent of all airspace operations originating from Kingsley Field while the Dolphin MOA receives 9 percent, the Goose MOA receives 16.5 percent, and W-93 receives 0.5 percent. Kingsley Field is home to one major LFE every year called Sentry Eagle. A summary of Kingsley Field's annual airspace operations is presented in **Table 3-5**. A summary of airspace operations from Kingsley's biannual Sentry Eagle LFE, which occurs solely in the Juniper/Hart MOA Complex, is also included in **Table 3-5**.

Table 3-5
Existing Annual Airspace Operations Summary at Kingsley Field

Aircraft	Juniper/Hart		Dolphin		Goose		W-93		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Total
F-15C/D	3,744	109	489	14	885	26	22	1	5,140	150	5,290
LFE	252	0	0	0	0	0	0	0	252	0	252
Grand Total	**3,996**	**109**	**489**	**14**	**885**	**26**	**22**	**1**	**5,392**	**150**	**5,542**

Note:
LFE = large force exercise

The existing L_{dnmr} noise levels, calculated using MR_NMAP, from the subsonic aircraft operations detailed in **Table 3-5** underneath the Juniper/Hart MOA Complex, Dolphin MOA, and Goose MOA as well as W-93 are shown on **Table 3-6**.

Supersonic operations are only allowed in the Juniper/Hart MOA Complex above 30,000 ft. For W-93, supersonic flights are restricted to 15 NM offshore and at altitudes greater than 15,000 ft MSL. Sorties require aircraft exceeding Mach 1.0 (supersonic) for brief periods of time (approximately 10 percent/ 5 minutes or less). Airspace sorties require aircraft to exceed Mach 1.0 (supersonic) for brief periods of time for approximately 10 percent of total flight time. This is equivalent to less than 5 minutes of supersonic flight activity per sortie.

The BooMap program was to compute cumulative sonic boom exposure under supersonic air combat training arenas. Under the existing conditions, the cumulative CDNL exposure in the various MOAs and W-93 used by based Kingsley Field aircraft do not exceed the 45-dB CDNL under any primary use airspace.

Table 3-6
Existing Noise Levels in the Airspace

Airspace	Noise Level (L_{dnmr} dB)
Juniper/Hart MOA Complex	50
Dolphin MOA	<45
Goose MOA	<45
Warning Area W-93	<45

Note:
dB = decibel(s); L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level; MOA = Military Operations Area

Single event sonic boom levels estimated for supersonic flights in the airspace above the Juniper/Hart MOA Complex are shown in **Table 3-7**. Overpressure (psf) and CSEL (decibels) were estimated directly under the flight path for the F-15C/D aircraft at various altitudes and Mach numbers. Overpressure levels estimated for the Juniper/Hart MOA Complex range from 2.5 to 1.3 psf depending on the flight conditions.

Table 3-7
Juniper/Hart Military Operations Area Complex: Sonic Boom Levels Undertrack for Based Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)		
	30,000	40,000	50,000
Mach 1.2			
Overpressure (pounds per square foot)			
F-15C/D	2.2	1.6	1.3
CSEL (decibels)[1]			
F-15C/D	109	106	104
Mach 1.5			
Overpressure (pounds per square foot)			
F-15C/D	2.5	1.7	1.3
CSEL (decibels)[1]			
F-15C/D	110	106	104

Note:
C-weighted Sound Exposure Level (CSEL) – SEL with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

Single event sonic boom levels estimated for supersonic flights in the airspace above W-93 are shown in **Table 3-8**. Overpressure (psf) and CSEL (decibels) were estimated directly under the flight path for the F-15C/D aircraft at various altitudes and Mach numbers. Overpressure levels estimated for the Juniper/Hart MOA Complex range from 5.2 to 1.4 psf depending on the flight conditions.

When sonic booms reach the ground, they impact an area that is referred to as a “carpet.” The size of the carpet depends on the supersonic flight path and on atmospheric conditions. The width of the boom carpet beneath the aircraft is about 1 mi for each 1,000 ft of altitude (National Aeronautics and Space Administration [NASA], 2017). Sonic booms are loudest near the center of the carpet, having a sharp “bang-bang” sound. Near the edges, they are weak and have a rumbling sounding like distant thunder. The boom levels shown in **Tables 3-7** and **3-8** are the loudest levels computed at the center of the carpet, directly under the flight path, for the constant Mach, level flight conditions indicated. The location of these booms will vary with changing flight paths and weather conditions, so it is unlikely that any given location will experience these undertrack levels more than once over multiple events. Public reaction is expected to occur with overpressures above 1 psf, and in rare instances, damage to structures have occurred at

overpressures between 2 and 5 psf (NASA, 2017). People located farther away from the supersonic flight paths, who are still within the primary boom carpet, might also be exposed to levels that may be startling or annoying, but the probability of this decreases the farther away they are from the flight path. People located beyond the edge of the boom carpet are not expected to be exposed to sonic boom although postboom rumbling sounds may be heard.

Table 3-8
Warning Area W-93: Sonic Boom Levels Undertrack for Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)			
	10,000	20,000	30,000	40,000
Mach 1.2				
Overpressure (pounds per square foot)				
F-15C/D	5.2	2.8	1.8	1.4
CSEL (decibels)[1]				
F-15C/D	116	110	107	105
Mach 1.5				
Overpressure (pounds per square foot)				
F-15C/D	6.0	3.2	2.0	1.5
CSEL (decibels)[1]				
F-15C/D	117	112	108	105

Note:
C-weighted Sound Exposure Level (CSEL) – SEL with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

3.3 SAFETY

3.3.1 Definition of the Resource

Safety concerns associated with ground, explosive, and flight activities are considered in this section. Ground safety considers issues associated with ground operations and maintenance activities that support unit operations including arresting gear capability, jet blast/maintenance testing, and safety danger. Aircraft maintenance testing occurs in designated safety zones. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace. Clear Zones (CZs) and Accident Potential Zones (APZs) around the airfield restrict the public's exposure to areas where there is a higher accident potential. Although ground and flight safety are addressed separately, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns.

Explosives safety relates to the management and safe use of ordnance and munitions. Flight safety considers aircraft flight risks such as midair collision, bird/wildlife-aircraft strike hazard (BASH), and in-flight emergency. Contractor planes would follow Air Force safety procedures and aircraft specific emergency procedures based on the aircraft design which are produced by the original equipment manufacturer of the aircraft. Basic airmanship procedures also exist for handling any deviations to ATC procedures due to an in-flight emergency; these procedures are defined in AFI 11-202 [Volume 3], *General Flight Rules*, and established aircraft flight manuals. The Flight Crew Information File is a safety resource for aircrew day-to-day operations which is composed of air and ground operation rules and procedures.

Existing conditions are organized by ground, explosive, and flight safety. The ROI includes Kingsley Field and areas immediately adjacent to the base where ground and explosive safety concerns are described, as well as the airfield and airspaces where flight safety is discussed.

3.3.2 Existing Conditions – Kingsley Field and Airspace

3.3.2.1 Ground Safety

Ground safety includes several categories including ground and industrial operations, operational activities, and motor vehicle use. Ground mishaps can occur from the use of equipment or materials and maintenance functions. Day-to-day operations and maintenance activities conducted by the 173 FW are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health requirements (AFOSH).

Emergency Response

For emergency response, the Air Force provides emergency responders (Airport Firefighter) trained on the applicable mission design series. For crash response, the DOD provides on-field aircraft Crash Damaged or Disabled Aircraft Recovery (CDDAR). For events occurring off base, civilian authorities (city, county, or state) are first on scene; once on scene, the Air Force provides an Incident Commander and command staff for site management, security and safety investigation purposes. Emergency response procedures also apply to civilian aircraft located on the greater Klamath Falls area.

Safety Zones

Safety zones around airfields that restrict incompatible land uses are designated to reduce exposure to aircraft safety hazards. These include the CZs, which are areas immediately beyond the ends of a runway, and APZ I and APZ II, which are areas beyond the CZs. The standards for CZs and APZs are established by DOD Instruction 4165.57, *Air Installations Compatible Use Zones*. Within the CZs, which covers a 3,000-by-3,000-ft area at the end of each runway, the overall accident risk is the highest. APZ I, which extends for 5,000 ft beyond the CZ, is an area of reduced accident potential. In APZ II, which is 7,000 ft long, accident potential is the lowest among the three zones.

Open space (undeveloped) and agricultural uses (excluding raising of livestock) are the only uses deemed compatible in a CZ. Land use within APZs is based on the concept of limiting density of land use, and uses such as residential development, educational facilities, and medical facilities are considered incompatible and are strongly discouraged. Within the CZs at Kingsley Field, there are approximately 205 ac of incompatible land use as well as about 289 ac of incompatible land use in APZ I and about 426 ac of incompatible land use in APZ II. The safety zones are shown on **Figure 3-5**.

Quantity-distance (Q-D) arcs are an additional safety zone, described in **Section 3.3.2.2, Explosive Safety**, and shown on **Figure 3-5**.

Arresting Gear Capability

Per AFI 32-1043, *Managing Aircraft Arresting Systems*, criteria for siting aircraft arresting systems vary according to the type of system and operational requirement. The best location for arresting systems runways used extensively during instrument meteorological conditions is 2,200 to 2,500 ft from the threshold; however, if aircraft that are not compatible with the arresting system must operate on the same runway, the installation commander may shift the installation site as close to the threshold as possible. The critical factor in this case is assurance that the runout area for an aircraft engaging the system in an aborted takeoff scenario is large enough to safely accommodate other arresting systems or equipment such as light fixtures. Kingsley Field has BAK-12/14 cable arresting systems on each end of Runway 14/32 and E-5 arresting gear strung at the end of Runway 14.

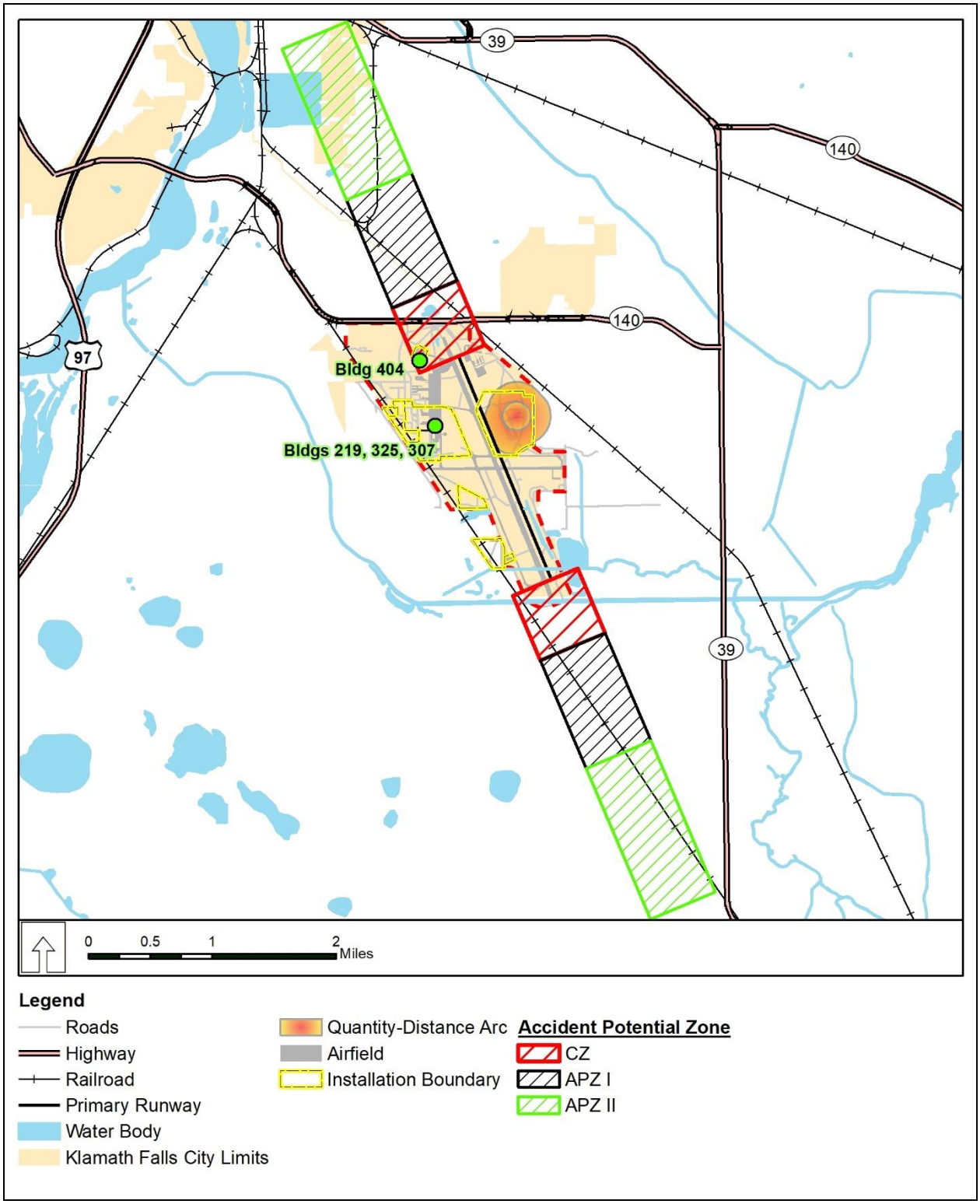


Figure 3-5. Field Clear Zones, Accident Potential Zones, and Quantity-Distance Arcs.

3.3.2.2 Explosive Safety

The 173 FW has a Munitions Flight assigned to the 173 FW/MXMW located at the airfield at Kingsley Field. Personnel assigned to the 173 FW/MXMW Munitions Flight currently support the 173 FW flying mission with munitions support, including storage, inspection, maintenance, and accountability as well as delivery and pick-up of aircraft munitions to the airfield.

Aircraft munitions include ammunition, propellants (solid and liquid), pyrotechnics, warheads, explosive devices, and chemical agent substances and associated components that present real or potential hazards to life, property, or the environment. AFMAN 91-201, *Explosives Safety Standards*, defines the guidance and procedures dealing with munition storage and handling.

During typical training operations, aircraft are not loaded with high-explosive ordnance. Training munitions usually include captive air-to-air training missiles, countermeasure chaff and flares, and cannon ammunition with inert projectiles. All munitions are stored and maintained in the munitions storage area within facilities sited for the allowable types and amounts of explosives. All storage and handling of munitions is carried out by trained and qualified munitions systems personnel and in accordance with Air Force-approved technical orders.

Defined distances are maintained between munitions storage areas and a variety of other types of facilities. These distances, called Q-D arcs, are determined by the type and quantity of explosive material to be stored. Each explosive material storage or handling facility has Q-D arcs extending outward from its sides and corners for a prescribed distance. Within these Q-D arcs, development is either restricted or prohibited altogether to ensure personnel safety and to minimize potential for damage to other facilities in the event of an accident. In accordance with AFMAN 91-201, paragraphs 12.47.2 and 12.47.3, the ramp does not need to be sited for chaff and flares and is not currently sited for Hazard Class 1.3. The Q-D arcs on Kingsley Field are shown on **Figure 3-5**.

3.3.2.3 Flight Safety

Located on Kingsley Field, Kingsley Field's air traffic control tower, manned by personnel from the 270th Air Traffic Control Squadron, supports the training and readiness for the 173 FW and other units supported by Kingsley Field including military and civilian aircraft on the joint field. The control tower manages aircraft flying within a range of 5 mi of the base. Aircraft flying beyond 5 mi are transferred to Seattle Air Route Traffic Control Center.

The potential for aircraft accidents is a primary public concern with regard to flight safety. Such accidents may occur as a result of mid-air collisions, collisions with manmade structures or terrain, mechanical failure, weather-related accidents, pilot error, BASH, or strikes from defensive countermeasures used during training.

Midair Collision

Midair collision accidents involve two or more aircraft coming in contact with each other during flight. Navigation errors, miscommunications, deviations from flight plans, and lack of collision avoidance systems all increase the potential for midair collisions. Aircraft mishaps and their prevention represent a paramount concern for the Air Force. Air Force Policy Directive (AFPD) 91-2, *Safety Programs*, defines four major categories of reportable mishaps based on total cost of property damage or the degree of injury: Class A, B, C, and D mishaps. Mishap types range from loss of life or destruction of an aircraft (Class A) to a minor, reportable injury or property damage less than $50,000 (Class D). Reporting and investigation requirements for aviation mishaps are defined in AFI 91-204, *Safety Investigation and Hazard Reporting*, and AFMAN 91-223, *Safety: Aviation Safety Investigations and Reports*.

In-Flight Emergency

Each aircraft type has different emergency procedures based on the aircraft design which are produced by the original equipment manufacturer of the aircraft. Basic airmanship procedures also exist for handling any deviations to ATC procedures due to an in-flight emergency; these procedures are defined in AFI 11-202 [Volume 3] and established aircraft flight manuals.

Bird/Wildlife-Aircraft Strike Hazards

BASH presents a safety concern for aircraft operations because of the potential for damage to aircraft or injury to aircrews or local populations if a crash should occur. Aircraft can encounter birds at nearly all altitudes up to 30,000 ft MSL; however, most birds fly close to the ground. According to the Air Force Safety Center, BASH statistics, about 52 percent of strikes occur from birds flying below 400 ft, and 88 percent occur at less than 2,000 ft AGL (Air Force Safety Center, 2018).

The Air Force BASH program was established to minimize the risk for collisions of birds/wildlife with aircraft and the subsequent loss of life and property. In accordance with AFI 91-202, *The US Air Force Mishap Prevention Program*, each flying unit in the Air Force is required to develop a BASH plan to reduce hazardous bird/wildlife activity relative to airport flight operations. The intent of each plan is to reduce BASH issues at the airfield by creating an integrated hazard abatement program through monitoring, avoidance, and actively controlling bird and animal population movements. BASH procedures at Kingsley Field conducted by the 173 FW consist of using a variety of pyrotechnics to disperse birds including a 15-millimeter Banger and Screamer, PGU-26 (M-80 shot from a M870 shotgun), paintball gun, and planned future use of propane cannons as well as participating in a program with the US Department of Agriculture (USDA) to disperse, relocate, and remove different species of birds and animals.

3.4 AIR QUALITY

3.4.1 Definition of the Resource

Under the authority of the Clean Air Act (CAA) and subsequent regulations, the USEPA has divided the country into geographical regions known as Air Quality Control Regions (AQCRs) to evaluate compliance with the National Ambient Air Quality Standards (NAAQS). Kingsley Field ANGB is located in Klamath County within the city limits of Klamath Falls, Oregon. Klamath Fall is in the Central Oregon Interstate AQCR (40 CFR § 81.219) which also includes the following Oregon counties: Crook, Deschutes, Hood River, Jefferson, Klamath, Lake, Sherman, and Wasco as well as 27 incorporated cities (Antelope, Bend, Bonanza, Cascade Locks, Chiloquin, Culver, Dufur, Grass Valley, Hood River, La Pine, Lakeview, Madras, Moro, Paisley, Prineville, Redmond, Metolius, Klamath Falls, Rufus, Maupin, Sisters, Malin, Wasco, Mosier, Merrill, Shaniko, and The Dalles). The AQCR by airspace is described in **Table 3-9**.

Table 3-9
Military Operation Areas by County and Air Quality Control Regions

Military Operations Area	State	County	Air Quality Control Region
Juniper/Hart	Oregon	Crook, Deschutes, Lake, Harney	Central and Eastern Oregon
	California	Modoc	Northeast Plateau
	Nevada	Washoe, Humboldt	Northwest Nevada
Dolphin	Oregon	Lane, Douglas, Coos, Curry, Josephine	Portland Interstate and Southwest Oregon
	California	Del Norte	North Coast
Goose	Oregon	Klamath, Lake	Central Oregon
	California	Modoc	Northeast Plateau

For air quality, there are three ROIs, one coinciding with the Central Oregon Interstate AQCR (Kingsley Field), one coinciding with the Eastern Oregon Intrastate AQCR (Juniper/Hart MOA Complex), and another coinciding with the airspace within W-93. For consideration of potential air quality impacts, it is the volume of air extending up to the mixing height (3,000 ft AGL) coinciding with the spatial distribution of the ROIs that is considered in this section. The mixing height is the altitude at which the lower atmosphere will undergo mechanical or turbulent mixing, producing a nearly uniform air mass. The height of the mixing level determines the volume of air within which pollutants can disperse. Pollutants that are released above the mixing height typically will not disperse downward and thus will have little or no effect on ground level concentrations of pollutants. Mixing heights at any one location or region can vary by the season and time of day, but for air quality applications, an average mixing height of 3,000 ft AGL is an acceptable default value (40 CFR § 93.153[c][2]).

3.4.1.1 Criteria Pollutants

In accordance with CAA requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. Measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$). Regional air quality is a result of the types and quantities of atmospheric pollutants and pollutant sources in an area as well as surface topography, the size of the "air basin," and prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards, NAAQS, for pollutants that have been determined to impact human health and the environment and established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulates equal to or less than 10 microns in diameter [PM_{10}] and particulates equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources in addition to maintaining visibility standards. The primary and secondary NAAQS are presented in **Table 3-10**.

The criteria pollutant O_3 is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants, or "O_3 precursors." These O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies limit atmospheric O3 concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO_x.

The USEPA has recognized that particulate matter emissions can have different health affects depending on particle size and, therefore, developed separate NAAQS for coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). The pollutant $PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter, typically forming nitrate and sulfate compounds. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there and thus which precursors are considered significant for $PM_{2.5}$ formation and identified for ultimate control.

The CAA and USEPA delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. When a region or area fails to meet a NAAQS for a pollutant, that region is classified as "nonattainment" for that pollutant. In such cases the affected State must develop a State Implementation Plan (SIP) that is subject to USEPA review and approval. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

Table 3-10
National Ambient Air Quality Standards

Pollutant	Standard Value[6]		Standard Type
Carbon Monoxide (CO)			
8-hour average	9 ppm	(10 mg/m^3)	Primary
1-hour average	35 ppm	(40 mg/m^3)	Primary
Nitrogen Dioxide (NO_2)			
Annual arithmetic mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
1-hour average[1]	0.100 ppm	(188 µg/m^3)	Primary
Ozone (O_3)			
8-hour average[2]	0.070 ppm	(137 µg/m^3)	Primary and Secondary
Lead (Pb)			
3-month average[3]		0.15 µg/m^3	Primary and Secondary
Particulate <10 Micrometers (PM_{10})			
24-hour average[4]		150 µg/m^3	Primary and Secondary
Particulate <2.5 Micrometers ($PM_{2.5}$)			
Annual arithmetic mean[4]		12 µg/m^3	Primary
Annual arithmetic mean[4]		15 µg/m^3	Secondary
24-hour average[4]		35 µg/m^3	Primary and Secondary
Sulfur Dioxide (SO_2)			
1-hour average[5]	0.075 ppm	(196 µg/m^3)	Primary
3-hour average[5]	0.5 ppm	(1,300 µg/m^3)	Secondary

Notes:

1 In February 2010, the USEPA established a new 1-hour standard for NO_2 at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the then-existing annual standard.

2 In October 2015, the USEPA revised the level of the 8-hour standard to 0.070 ppm, based on the annual 4th highest daily maximum concentration, averaged over 3 years; the regulation became effective on 28 December 2015. The previous (2008) standard of 0.075 ppm remains in effect for some areas including Oregon. A 1-hour standard no longer exists.

3 In November 2008, USEPA revised the primary lead standard to 0.15 µg/m^3. USEPA revised the averaging time to a rolling 3-month average.

4 In October 2006, USEPA revised the level of the 24-hour $PM_{2.5}$ standard to 35 µg/m^3 and retained the level of the annual $PM_{2.5}$ standard at 15 µg/m^3. In 2012, USEPA split standards for primary & secondary annual $PM_{2.5}$. All are averaged over 3 years, with the 24-hour average determined at the 98th percentile for the 24-hour standard. USEPA retained the 24-hour primary standard and revoked the annual primary standard for PM_{10}.

5 In 2012, the USEPA retained a secondary 3-hour standard, which is not to be exceeded more than once per year. In June 2010, USEPA established a new 1-hour SO_2 standard at a level of 75 ppb, based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.

6 Parenthetical value is an approximately equivalent concentration for NO_2, O_3, and SO_2.

µg/m^3 = microgram(s) per cubic meter; mg/m^3 = milligram(s) per cubic meter; ppb = part(s) per billion; ppm = part(s) per million; USEPA = United States Environmental Protection Agency

The CAA required that USEPA draft general conformity regulations that are applicable in nonattainment areas or in designated maintenance areas (attainment areas that were reclassified from a previous nonattainment status and are required to prepare a maintenance plan for air quality). These regulations are designed to ensure that federal actions do not impede local efforts to achieve or maintain attainment with the NAAQS. The General Conformity Rule and the promulgated regulations found in 40 CFR Part 93 exempt certain federal actions from conformity determinations (e.g., contaminated site cleanup and natural disaster response activities). Other federal actions are assumed to conform if total indirect and direct project emissions are below *de minimis* levels presented in 40 CFR § 93.153. The threshold levels (in tons of pollutant per year) depend upon the nonattainment status that USEPA has assigned to a region. Once the net change in nonattainment pollutants is calculated, the federal agency must compare them to the *de minimis* thresholds.

Title V of the CAA Amendments of 1990 requires state and local agencies to implement permitting programs for major stationary sources. A major stationary source is a facility (plant, base, activity, etc.) that has the potential to emit (PTE) more than 100 tons annually of any one criteria air pollutant, 10 tons per year (tpy)

of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants; however, lower pollutant-specific "major source" permitting thresholds apply in nonattainment areas. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if a proposed project's net emission increase meets or exceeds the rate of emissions listed in 40 CFR § 52.21(b)(23)(i); or (1) a proposed project is within 10 kilometers of any Class I area (wilderness area greater than 5,000 ac or national park greater than 6,000 ac), and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more (40 CFR § 52.21[b][23][iii]). PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III (40 CFR § 52.21[c]).

3.4.1.2 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth's temperature and are believed to contribute to global climate change. GHGs include water vapor, carbon dioxide (CO_2), methane, nitrous oxide, O_3, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The GWP of a particular gas provides a relative basis for calculating its carbon dioxide equivalent (CO_2e) or the amount of CO_2e to the emissions of that gas. CO_2 has a GWP of 1 and is, therefore, the standard by which all other GHGs are measured. Potential impacts associated with GHG emissions are discussed in **Section 4.4**.

On 13 May 2010, the USEPA issued the final GHG Tailoring Rule. This rule established thresholds for GHG emissions that define when permits under the PSD and Title V Operating Permit programs are required for new and existing industrial facilities. The Rule was implemented using a phased-in approach, effective January 2011. The salient features of the Rule are as follows (USEPA, 2011):

- The Tailoring Rule generally defines a major source of GHGs as one that has PTE GHG emissions equal to or greater than 100,000 tpy CO_2e. An installation that is a major source and has not already applied for a Title V permit had to apply for a Title V permit by 1 July 2012, or within 1 year after having a PTE of at least 100,000 tpy or more of GHGs as CO_2e.
- An installation has to obtain a PSD permit and apply Best Available Control Technologies (BACT) for GHGs if the PTE is 100,000 tpy or more of CO_2e for a new source (and for a modification, if the modification also results in a 75,000 tpy increase or more in CO_2e). A PSD permit and BACT for GHGs also applies if an installation is already subject to PSD for non-GHG pollutants and has a PTE of 75,000 tpy or more of CO_2e (new sources) or an increase of 75,000 tpy or more of CO_2e for modifications.
- PSD and BACT requirements apply if a source is an existing minor source for PSD, and the modification alone has actual or PTE GHG emissions equal to or greater than 100,000 tpy CO_2e.
- The USEPA had planned to propose rules for smaller sources of GHG (i.e., with less than 50,000 tpy of GHG on a CO_2e basis) by 30 April 2016. At the time of the preparation of this EA, no such rules have been promulgated or proposed. If and until such time as rules have been proposed, the USEPA cannot take action to make such sources subject to GHG regulation.

On 19 August 2015, the USEPA published regulations that removed several provisions pertaining to Step 2 of the PSD Tailoring Rule. Effectively, GHGs are no longer treated as an air pollutant for the specific purpose of determining whether a source (or modification) is required to obtain a PSD or Title V permit. In other words, a stationary source would not need to obtain a PSD or Title V permit solely because the source emits or has the PTE GHGs above the applicable major source thresholds (Federal Register, 19 August 2015).

On 26 August 2016, the USEPA proposed regulations that revise provisions to determine whether a source must obtain a permit. In addition, the USEPA proposed a 75,000-tpy CO_2e Significant Emission Rate (SER) for GHGs. The SER establishes a *de minimis* level below which BACT is not required for this pollutant (81 Federal Register 81711). The final rule has not been promulgated.

In addition to the GHG Tailoring Rule in 2009, the USEPA promulgated a rule requiring sources to report their GHG emissions if they emit more than 25,000 metric tons or more of CO_2e per year (40 CFR § 98.2[a][2]).

3.4.2 Existing Conditions – Kingsley Field

3.4.2.1 Regional Climate

The regional climate of southcentral Oregon, where Kingsley Field ANGB is located, is classified as a high desert prairie which is characterized by mild warm summers and cold wet winters. The warmest month in the region is July, with average high and low temperatures of 86 degrees Fahrenheit (°F) and 52°F, respectively. December and January are the coldest months with an average high temperature of 40°F and an average low temperature of 22°F. The wettest month is January with an average of 2.05 inches (in.) of precipitation. The driest month is July with an average of 0.35 in. of precipitation (US Climate Data, 2018). Summers are characterized as dry conditions and winters are impacted by occasional snowfall.

3.4.2.2 Baseline Air Emissions

The USEPA has delegated enforcement of the PSD and Title V programs to the Oregon Department of Environmental Quality (ODEQ). The ODEQ has adopted the NAAQS, thereby requiring the use of the standards within the State of Oregon (Oregon Administrative Rules [OAR] 340-200-0020).

Kingsley Field ANGB is in the Central Oregon Intrastate AQCR. Each AQCR has regulatory areas that are designated as an attainment area or nonattainment area for each of the criteria pollutants depending on whether it meets or fails to meet the NAAQS for the pollutant. Currently the Central Oregon Intrastate AQCR is designated as an unclassifiable/attainment area for all criteria pollutants except for $PM_{2.5}$ (40 CFR § 81.338). Klamath County is the only county in the region that is classified as nonattainment for the 24-hour $PM_{2.5}$ NAAQS established in 2006. In addition, ODEQ has submitted the Klamath Falls attainment plan to the USEPA and is awaiting approval. Unclassifiable areas are those areas that have not had ambient air monitoring and are assumed to be in attainment with NAAQS.

Generally, ODEQ monitoring data show criteria pollutant emission concentrations of PM_{10}, CO, and SO_2 have been decreasing since 2006 (ODEQ, 2012). The monitoring data show that O_3, $PM_{2.5}$, and NO_x have neither increased nor decreased but rather remained constant (ODEQ, 2012). The reductions are believed to be the result of emission control measures that have been implemented over the past two decades. These measures targeted inefficient wood stoves, forest fire prevention, outdoor burning, motor vehicle engines, gas stations, factories, and construction sites.

Kingsley Field ANGB is not classified as major source for PSD nor located within 10 kilometers of any of the 156 USEPA-designated Class I areas protected by the Regional Haze Rule. Kingsley Field ANGB operates under a Simple Air Contaminant Discharge Permit which limits emissions of criteria pollutants to less than 100 tpy. As shown in **Table 3-11**, Kingsley Field ANGB actual stationary emissions are far less than the OAR permit threshold.

Stationary emissions sources at Kingsley Field ANGB include natural gas and oil-fired boilers and heaters; jet engine test cells; paint spray booths; refueling operations; and emergency power generators. Mobile sources, such as vehicle and aircraft emissions, are generally not regulated and are not covered under existing stationary source permitting requirements. Previous mobile source inventory data for Kingsley Field ANGB covering aircraft ground equipment, aircraft operations, jet engine testing, fuel loading, nonroad

equipment and vehicle emissions indicated the following emissions: CO = 99.88 tpy, NO_x = 89.07 tpy, $PM_{2.5}$ = 12.57 tpy, PM_{10} = 13.92, SO_x = 7.34, and VOC = 35.19 tpy.

An Air Conformity Applicability Analysis is discussed in **Section 4.4**. **Appendix C** provides an overview of the CAA and the State of Oregon air quality regulations as well as assumptions used for the air quality analysis. Since Kingsley Field ANGB is in a nonattainment area for $PM_{2.5}$, a General Conformity assessment is required to determine if a Conformity determination is triggered.

Table 3-11
Kingsley Field Air National Guard Base Stationary Source Emission Summary

	CO	NO_X	PM_{10}	VOC	SO_2
Kingsley Field ANGB Actual* (tpy)	1.73	2.70	0.24	1.59	0.18
Kingsley Field ANGB PTE* (tpy)	6.33	9.33	2.32	5.84	0.40
OAR 340-216-0020 Permit Threshold* (tpy)	10	10	5	10	5
Title V Threshold* (tpy)	100	100	100	100	100
Percent of Permit Threshold	17	27	5	16	4
Percent of Title V Threshold	2	3	0.24	2	0.18

Notes:
* NGB, 2016

ANGB = Air National Guard Base; CO = carbon monoxide; NOx = nitrogen oxides; OAR = Oregon Administrative Rules; PM_{10} = particulate matter less than 10 microns; PTE = Potential to Emit; SO_2 = sulfur dioxide; tpy = ton(s) per year; VOC = volatile organic compound

3.4.3 Existing Conditions – Airspace

3.4.3.1 Regional Climate

The regional climate encompasses eastern Oregon and the Oregon Coast. Eastern Oregon is a high desert region of the state. The summers are short, hot, dry, and mostly clear and the winters are very cold, windy, and partly cloudy. Over the course of the year, the temperature typically varies from 28°F to 90°F and is rarely below 15°F or above 99°F. Because of the influence of the Pacific Ocean, there is an abundant amount of moisture in the air on the Oregon Coast that is responsible for some of the heaviest rainfall in the country. Hurricane force winds originating from the Pacific Ocean can occur along the Oregon Coast. Many of the same weather features that affect the land areas impact the airspace, including hurricane force winds on the coast, heavy snowfall in the mountains and in eastern Oregon, and infrequent hailstorms.

3.4.3.2 Baseline Emissions

In the Central Oregon AQCR, the emissions are so insignificant that the General Conformity Rule is not applicable in these areas. There are no Class 1 areas within 10 mi of the airspace. There are no known sources of emissions that exist in W-93. State jurisdiction with respect to meeting NAAQS extends to the state seaward boundary (3 mi). Thus, W-93 almost entirely falls outside state jurisdiction, and therefore NAAQS does not apply.

Under 40 CFR Part 55, permitting and other air quality requirements apply to facilities beyond state seaward boundaries. Within 25 NM of the state seaward boundary, facilities must comply with the air quality regulations of the nearest onshore area. Beyond 25 mi from the state seaward boundary, facilities are subject to federal requirements including the PSD preconstruction permit program and the Title V operating permit program; however, these programs apply only to stationary sources and thus would not be applicable to the proposed ADAIR operations in the Warning Area. The same is true of the Portland Interstate and Southwest Oregon, North Coast, and Northeast Plateau AQCRs. The emissions from current aircraft activity in these AQCRs are very low. Moreover, all these AQCRs encompass counties that are in attainment for all pollutants.

3.5 BIOLOGICAL RESOURCES

3.5.1 Definition of the Resource

Biological resources include native or invasive plants and animals; sensitive and protected floral and faunal species; and the habitats, such as forests and grasslands, in which they exist. Habitat can be defined as the resources and conditions in an area that support a defined suite of organisms. The following is a description of the primary federal statutes that form the regulatory framework for the evaluation of biological resources.

The ROI for biological resources on the installation includes the land surrounding the facilities proposed for use, the land within the airfield noise contours and safety zones (see **Figures 3-4** and **3-5**), and the land beneath the Juniper/Hart MOA Complex, Goose and Dolphin MOAs, and W-93 proposed for contract ADAIR training (see **Figure 1-4**).

3.5.1.1 Endangered Species Act

The ESA of 1973 (16 U.S.C. § 1531, et seq.) established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend. Sensitive and protected biological resources include plant and animal species listed as threatened, endangered, or special status by the USFWS and NMFS. Under the ESA (16 U.S.C. § 1536), an “endangered species” is defined as any species in danger of extinction throughout all, or a large portion, of its range. A “threatened species” is defined as any species likely to become an endangered species in the foreseeable future. The USFWS maintains a list of species considered to be candidates for possible listing under the ESA. The ESA also allows the designation of geographic areas as critical habitat for threatened or endangered species. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and may warrant protection under the ESA. Section 9 of the ESA prohibits the take of federally listed species. “Take” as defined under the ESA means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”

3.5.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations. Per the MBTA, “take” is defined as “pursue, hunt, shoot, wound, kill, trap, capture, or collect” (50 CFR § 10.12). Migratory birds include nearly all species in the United States, with the exception of some upland game birds and nonnative species.

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

The National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314, 116 Stat. 2458) provided the Secretary of the Interior the authority to prescribe regulations to exempt the armed forces from the incidental take of migratory birds during authorized military readiness activities. Congress defined military readiness activities as all training and operations of the US armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use.

In December 2017, the US Department of the Interior issued M-Opinion 37050 which concluded that the take of migratory birds from an activity is not prohibited by the MBTA when the underlying purpose of that

activity is not the take of a migratory bird. The USFWS interprets the M-Opinion to mean that the MBTA's prohibition on take does not apply when the take of birds, eggs, or nests occurs as a result of an activity, the purpose of which is not to take birds, eggs or nests.

3.5.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. §§ 668 to 668c) prohibits the "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle (*Haliaeetus leucocephalus*) or any golden eagle (*Aquila chrysaetos*), alive or dead, or any part, nest, or egg thereof." "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," and "disturb" is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle, a decrease in productivity by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior, or nest abandonment by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior." The Bald and Golden Eagle Protection Act also prohibits activities around an active or inactive nest site that could result in an adverse impact on the eagle.

3.5.1.4 Marine Mammal Protection Act

The MMPA of 1972 (16 U.S.C. § 31) protects all marine mammals: dugongs (*Dugong dugon*) and manatees (*Trichechus* spp.), cetaceans (dolphins, porpoises, and whales), pinnipeds (seals, sea lions, and walruses), polar bears (*Ursus maritimus*), marine otters (*Lutra felina*), and sea otters (*Enhydra lutris*). The MMPA prohibits the "take" of marine mammals in US waters and by US citizens on the high seas, as well as the importation of marine mammals and marine mammal products into the United States. "Take" is defined under the MMPA as "to hunt, harass, capture, or kill" any marine mammal or attempt to do so. NMFS administers the MMPA in protecting dolphins, porpoises, seals, sea lions, and whales. USFWS administers the MMPA for the protection of dugongs, manatees, walruses, otters, and polar bears. Military readiness activities are not subject to the MMPA provisions of harassment. The "specified geographic area" requirement and the small numbers provision do not apply to military readiness activities or scientific research activities conducted by or on behalf of the federal government.

3.5.1.5 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act of 1976 (16 U.S.C. § 1801, et seq.) and amended by the Sustainable Fisheries Act in 1996, requires the identification and conservation of Essential Fish Habitat. Essential Fish Habitat includes those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. This can include areas that were historically used by fish. Federal agencies are required to consult with NMFS and prepare an Essential Fish Habitat Assessment if potential adverse effects on Essential Fish Habitat are anticipated from the Proposed Action.

3.5.2 Existing Conditions

The information presented in this section was primarily gathered from the Kingsley Field ANGB Integrated Natural Resources Management Plan (INRMP; ORANG, 2017b) and Environmental Impact Statement for Proposed Establishment and Modification of Oregon Military Training Airspace (ORANG, 2017a). Data were also gathered from the USFWS, USEPA, Oregon Department of Fish and Wildlife (ODFW), California Department of Fish and Wildlife (CDFW), and Nevada Department of Conservation and Natural Resources (CDFW, 2018; ODFW, 2018; Nevada Department of Conservation and Natural Resources, 2018).

3.5.2.1 Kingsley Field

Vegetation and Wildlife

The city of Klamath Falls and surrounding areas are within the high desert region of southern Oregon. Vegetation is characterized by plant communities that include western juniper (*Juniperus occidentalis*)

woodland, ponderosa pine (*Pinus ponderosa*), antelope bitterbrush (*Purshia tridentata*), and big sagebrush (*Artemisia tridentata*). Most habitat near the city of Klamath Falls has been converted to agriculture uses or modified to facilitate urban development. Native vegetation communities at Kingsley Field ANGB have been disturbed by past and ongoing construction, maintenance, and operational activities. Most vegetated areas are currently mowed and actively landscaped, and little natural vegetation or natural habitat remains. Small areas of the facility possess mixtures of antelope bitterbrush, big sagebrush, and other plants commonly found in the Oregon high desert (ORANG, 2017b).

The airfield is predominantly mowed grassland, while surrounding areas are largely agricultural characterized by row crops such as potatoes, and cover crops such as alfalfa and wheat. Ornamental and landscape plantings are typically nonnative species. Drainage ditches at Kingsley Field ANGB and the surrounding Crater Lake Airport support aquatic and wetland vegetation, such as cattails (*Typha* spp.), and rushes (*Juncus* spp.). The development and maintenance of runways and other facilities in support of the military mission requires consistent mowing of vegetation. The vegetation communities found at Kingsley Field are shrub-steppe, agriculture, grassland, aquatic habitat, and developed land (ORANG, 2017b).

Kingsley Field is composed of open mowed grassland habitat and drainage ditches that provide habitat for animal species, including migratory songbirds which use these areas as spring and fall stopover points. Wildlife at Kingsley Field ANGB is limited to species that have adapted to high levels of human activity and disturbance (ORANG, 2017b). Birds most commonly observed at Kingsley Field include ring-necked pheasant (*Phasianus colchicus*), California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), and barn owl (*Tyto alba*). Lakes, rivers, canals, ditches, and ponds on and adjacent to the airfield also attract large numbers of waterfowl (ORANG, 2017b). Mammals common to habitats occurring at Kingsley Field include mountain cottontail (*Sylvilagus nuttallii*), black-tailed jack rabbit (*Lupus californicus*), northern pocket gopher (*Thomamys talpoides*), Belding's ground squirrel (*Spermophilus beldingi*), ermine (*Mustela erminea*), and deer mouse (*Peromyscus maniculatus*). Other mammals that occur in the vicinity of the installation include mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), badger (*Taxidea taxus*), feral dog (*Canis domesticus*), California ground squirrel (*Spermophilus beecheyi*), Merrima's groundsquirrel (*Spermophilus canus*), yellow-bellied marmot (*Marmota flaviventris*), voles (*Microtus* spp.), and mice (*Peromyscus* sp.) (ORANG, 2017b). Reptiles that are commonly found on and near Kingsley Field include the gopher snake (*Pituophis melanoleucces*), desert shorthorned lizard (*Phrynosoma douglasii*), and western fence lizard (*Sceloporus occidentalis*). Amphibians commonly found along the drainage and irrigation ditches include the long-toed salamander (*Ambystoma macrodactylum*) and the Pacific tree frog (*Hyla regilla*) (ORANG, 2017b).

Aquatic habitats on and in the vicinity of Kingsley Field ANGB consist of the Lost River Diversion Canal and shallow, narrow drainage ditches and irrigation ditches. Small nongame fish species, such as dace (*Rhinichthys* spp.) and chub (*Gila* spp.), are expected to occur in the Lost River Diversion Canal; however, larger game fish are prevented from entering the canal by diversion structures. Drainage ditches at Kingsley Field were surveyed in 2011 as part of a fish survey assessing the potential presence of two listed species on the installation. Fish of several species were abundant in two of the three ditches on the installation. Species collected during the surveys included fathead minnows (*Pimephales promelas*), tui chub (*Gila bicolor*), pumpkinseed sunfish (*Lepomis gibbosus*), speckled dace (*Rhinichthys osculus*), and yellow perch (*Perca flavescens*) (ORANG, 2017b).

3.5.2.2 Special Use Airspace

Ecoregion Description

The Juniper/Hart MOA Complex, Goose MOA, and Dolphin MOA are located within six Level III Ecoregions (**Figure 3-6**). Ecoregions are used to describe areas of similar type, quality, and quantity of environmental resources (USEPA, 2018). Ecoregions are assigned hierarchical levels to delineate ecosystems spatially based on different levels of planning and reporting needs. Level I is the broadest ecoregion level, dividing North America into 15 ecological regions. Level II includes 50 ecoregions, and Level III divides the continental United States into 105 ecoregions. Level IV further subdivides the Level III ecoregions (USEPA, 2018).

To describe the ecosystems within the MOAs, Level III Ecoregions are used. Level III ecoregion descriptions provide a regional perspective and are more specifically oriented for environmental monitoring, assessment and reporting, and decision-making (Commission for Environmental Cooperation, 1997). The vegetation and wildlife common within the ecoregions are described below. The following are the Level III ecoregions associated with each MOA.

Juniper/Hart MOA Complex
- Central Basin and Range
- Northern Basin and Range
- Blue Mountains
- Eastern Cascades Slopes and Foothills

Goose MOA
- Eastern Cascades Slopes and Foothills

Dolphin MOA
- Coast Range
- Klamath Mountains/California High North Coast Range

Vegetation and Wildlife

Central Basin and Range. The Central Basin and Range ecoregion has a dry, mid-latitude desert climate, with hot summers and mild winters. It has a hotter and drier climate than the Snake River Plain ecoregion and Northern Basin and Range ecoregion, both located north of the Central Basin and Range ecoregion; however, the Central Basin and Range ecoregion is not as hot as the Mojave Basin and Range and Sonoran Desert ecoregions to the south. Lower elevations are dominated by big sagebrush or saltbush-greasewood (*Sarcobatus vermiculatus*) vegetation with shadscale (*Atriplex confertifolia*), winterfat (*Krascheninnikovia lanata*), black sagebrush (*Artemisia nova*), Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*), ephedra (*Ephedra* spp.), rabbitbrush (*Ericameria nauseosa*), Indian ricegrass (*Oryzopsis hymenoides*), and squirreltail (*Elymus elymoides*) also commonly occurring. In more areas with more saline soil conditions, greasewood, Nuttall saltbush (*Atriplex nuttallii*), seepweed (*Suaeda* spp), and alkali sacaton (*Sporobolus airoides*) are common. The lower elevations of mountains in this ecoregion are dominated by singleleaf pinyon (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), sagebrush, bitterbrush, serviceberry (*Amelanchier* spp.), snowberry (*Symphoricarpos* spp.), and bluebunch wheatgrass (*Pseudoroegneria spicata*). High elevation areas of mountains in this ecoregion support Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), limber pine (*Pinus flexilis*), whitebark pine (*Pinus albicaulis*), or aspen (*Populus tremuloides*) (USEPA, 2010).

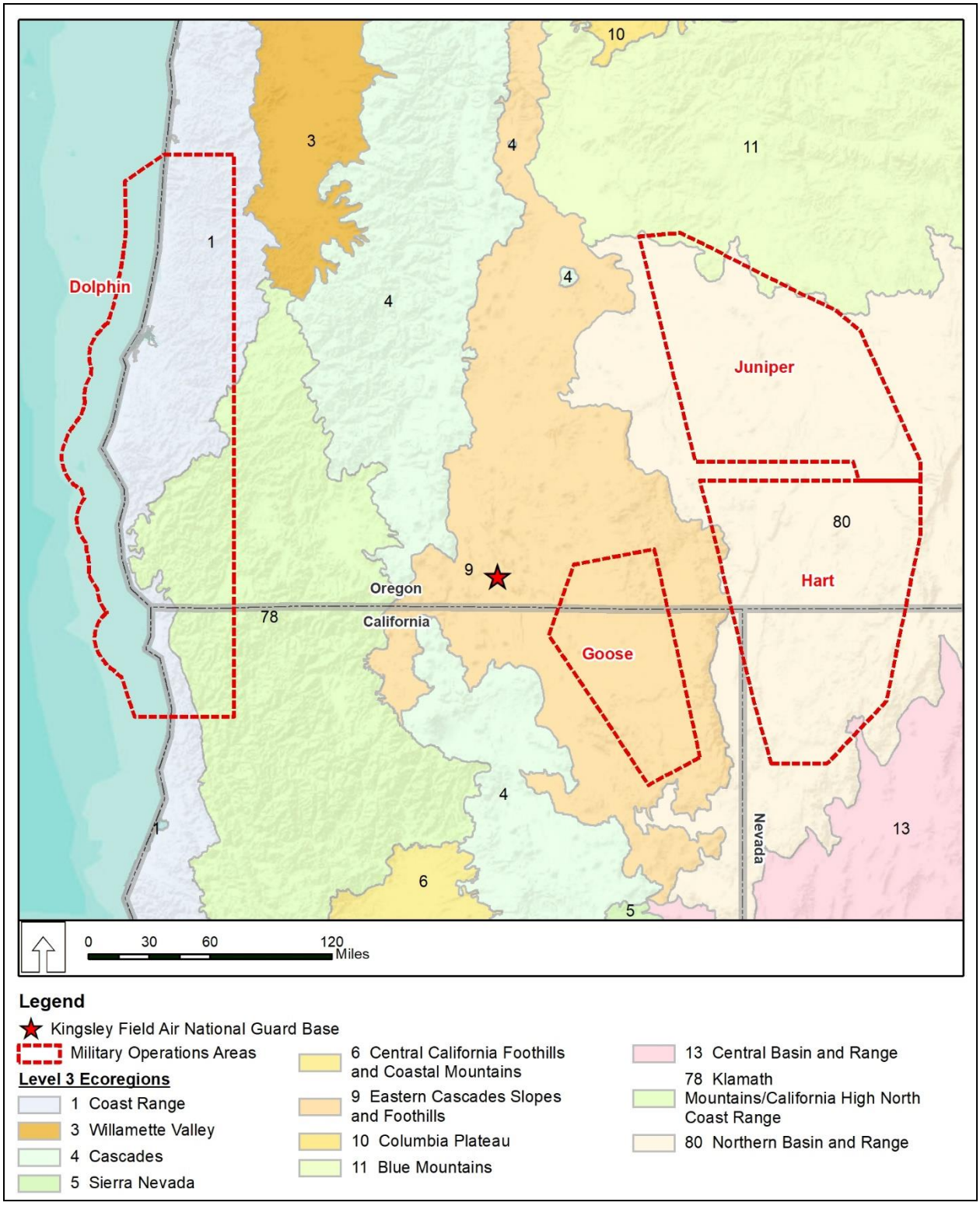


Figure 3-6. Ecoregions in the Special Use Airspace.

In this ecoregion, mammals commonly found include mule deer, pronghorn (*Antilocapra americana*), bighorn sheep (*Ovis canadensis*), coyote, bobcat (*Lynx rufus*), and black-tail jackrabbit (*Lepus californicus*). Birds typically seen in this ecoregion include prairie falcon (*Falco mexicanus*), common raven (*Corvus corax*), sage thrasher (*Oreoscoptes montanus*), mountain chickadee (*Poecile gambeli*), and mountain bluebird (*Sialia currucoides*). Endemic desert fish species such as Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*), White River springfish (*Crenichthys baileyi*), Pahranagat roundtail chub (*Gila robusta*), speckled dace, and Independence Valley tui chub (*Gila bicolor isolata*) are present in the Central Basin and Range ecoregion. Reptiles observed in this ecoregion are western rattlesnake (*Crotalus viridis*), desert horned lizard (*Phrynosoma platyrhinos*), and western fence lizard (USEPA, 2010).

The greater sage-grouse (*Centrocercus urophasianus*) is highly dependent on available sage-brush habitat and occurs in this ecoregion. Disturbance and conversion of this habitat has threatened the species and reduced the reproduction success and survival rate of existing populations. The greater sage-grouse was proposed to be listed as threatened under the ESA on 28 October 2013, but the proposed listing was withdrawn in 2015, and numerous conservation and protective programs were put in place through various state and federal agencies including the USFWS, Bureau of Land Management, and the ODFW. Federal protections implemented included 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 1 hour after sunset to 2 hours after sunrise, and restricting off-highway-vehicle use to areas more than 2 mi from nesting areas during breading season as well as other measures intended to mitigate potential disturbance (ODFW, 2011). Based on lawsuits challenging the withdrawal of the proposed threatened rules and a court-issued decision, the USFWS reopened the 60-day comment period on 12 April 2019 on the proposed threatened listing for the bistate Distinct Population Segment (DPS) of the greater sage-grouse as well as the proposed designated critical habitat. The bistate greater sage-grouse does not occur in the ROI and its distribution is limited to the California-Nevada border primarily south of Lake Tahoe in sage brush habitats associated with the Sierra Nevada and White Mountains.

Bald and golden eagles are also resident species in this ecoregion. Bald eagles were delisted under the federal ESA in 2007. The USFWS is currently working with the ODFW to monitor bald eagle populations and ensure that relisting is not necessary. Monitoring activities for bald eagles are based on the Bald Eagle Monitoring Plan, released in June 2010; however, additional legal protections for bald eagles as well as golden eagles include the Bald and Golden Eagle Protection Act, MBTA, and the Lacey Act (which prohibits trade in wildlife, fish, and plants that have been illegally taken, possessed, transported, or sold). Each of these protections restricts activities that could have a detrimental effect on bald and golden eagle populations.

Blue Mountains. The Blue Mountains ecoregion has a severe mid-latitude climate, with both continental and Mediterranean influences. At lower elevations, grasslands of bluebunch wheatgrass, Idaho fescue (*Festuca idahoensis*), basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), and juniper (*Juniperus* spp.) woodlands. In forested areas, ponderosa pine is the dominant tree species, with some Douglas-fir and grand fir (*Abies grandis*) in the forest community. At higher elevations, subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*), whitebark pine, and lodgepole pine (*Pinus contorta*), with forests of stunted timber growth and alpine meadows in the alpine zone (USEPA, 2010).

Mammals found in the Blue Mountains ecoregion include Rocky Mountain elk (*Cervus canadensis nelsoni*), mule deer, black-tailed deer (*Odocoileus columbianus*), black bear (*Ursus americanus*), bighorn sheep, cougar (*Puma concolor*), bobcat, coyote, beaver (*Castor canadensis*), and raccoon (*Procyon lotor*). Birds that are common in the Blue Mountains ecoregion include golden eagle, chukar (*Alectoris chukar*), sage thrasher, pileated woodpecker (*Dryocopus pileatus*), nuthatches, chickadees, and bluebirds. Fish in rivers and streams of the ecoregion include chinook salmon (*Oncorhynchus tshawytscha*), coho salmon *Oncorhynchus kisutch)*, rainbow trout (*Oncorhynchus mykiss*), bull trout (*Salvelinus confluentus*), and brook trout (*Salvelinus fontinalis*) (USEPA, 2010).

Northern Basin and Range. The Northern Basin and Range ecoregion is arid, with mid-latitude steppe and mid-latitude desert climates. This ecoregion is marked by hot summers and cold winters. Nonmountainous areas are dominated by sagebrush steppe vegetation and some cool season grasses such as mountain big sagebrush, Wyoming big sagebrush, low sagebrush (*Artemisia arbuscula*), bluebunch wheatgrass, rabbitbrush, Idaho fescue, and Thurber needlegrass (*Achnatherum thurberianum*), with scattered western juniper. Ranges are generally covered in mountain sagebrush, mountain mahogany (*Cerocarpus* spp.), western juniper, and Idaho fescue at the lower and mid-elevations and Douglas-fir and aspen are common at higher elevations. Higher elevations in Nevada also include scattered limber pine and whitebark pine (USEPA, 2010).

Wildlife commonly observed in the Northern Basin and Range ecoregion are similar to those observed in the Central Basin and Range ecoregion. Mammals include mule deer, pronghorn, and coyote. This ecoregion is crossed by a waterfowl migration route and birds found in this ecoregion include the tundra swan (*Cygnus columbianus*), lesser snow goose (*Chen caerulescens*), American widgeon (*Anas americana*), northern pintail (*Anas acuta*), canvasback (*Aythya valisineria*), ruddy duck (*Oxyura jamaicensis*), sandhill crane (*Grus canadensis)*, white pelican (*Pelecanus erythrorhynchos*), golden eagle, gray flycatcher (*Empidonax wrightii*), greater sage-grouse, and sagebrush sparrow (*Artemisiospiza nevadensis*). Endemic desert fish species such as chubs and daces are in basin lakes and springs.

Eastern Cascades Slopes and Foothills. The Eastern Cascades Slopes and Foothills ecoregion has a more continental climate than the ecoregions to its west. This ecoregion experiences greater temperature extremes and less precipitation than those that occur at higher elevations or closer to the Pacific Ocean. Open forests of ponderosa pine and some lodgepole pine distinguish this region from the higher elevation ecoregions to the west, where fir and hemlock forests are common, and from the lower dryer regions to the east where shrubs and grasslands are predominant. The vegetation is adapted to the prevailing dry continental climate and is highly susceptible to wildfire. Higher elevations have Douglas-fir and other fir species such as grand fir (*Abies grandis*) and white fir. Lowest elevations grade to sagebrush (*Artemisia* spp.) steppe-dominated vegetation (USEPA, 2010).

Common mammals in the Eastern Cascades Slopes and Foothills ecoregion include black bear, black-tailed deer, mule deer, cougar, wolverine (*Gulo gulo*), coyote, and yellow-bellied marmot. Common raptors observed in the Eastern Cascades Slopes and Foothills ecoregion are bald eagle, golden eagle, mountain quail (*Oreortyx pictus*), pileated woodpecker, northern goshawk (*Accipiter gentilis*), mountain chickadee, Cooper's hawk (*Accipiter cooperii*), and osprey (*Pandion haliaetus*). Fish include coho salmon, chinook salmon, chum salmon (*Oncorhynchus keta*), pink salmon (*Oncorhynchus gorbuscha*), rainbow trout, and bull trout. Common amphibians in the ecoregion include western toad (*Bufo boreas*) and Cascades frog (*Rana cascadae*) and common reptiles in the ecoregion are California mountain kingsnake (*Lampropeltis zonata*), western terrestrial garter snake (*Thamnophis elegans vagrans*) (USEPA, 2010).

Coast Range. The Coast Range ecoregion has marine west coast and Mediterranean-type climates, with warm, relatively dry summers and mild, but very wet winters. The vegetation is dominated by coniferous forests. Historically, in the southern portion of the coast range, Sitka spruce (*Picea sitchensis*) and coastal redwood (*Sequoia sempervirens*) communities dominated coastal areas, and western red cedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), and Douglas-fir communities dominated inland areas. Today Douglas-fir plantations are the dominant plant community on the intensively logged and managed landscape. Other species common to the coast range include red alder (*Alnus rubra*), big leaf maple (*Acer macrophyllum*), vine maple (*Acer circinatum*), rhododendron (*Rhododendron* spp.), salal (*Gaultheria shallon*), salmonberry (*Rubus spectabilis*), and Oregon grape (*Mahonia aquifolium*) (USEPA, 2010).

The most commonly observed mammals in the Coast Range ecoregion include black-tailed deer, Roosevelt elk (*Cervus canadensis roosevelti*), black bear, cougar, coyote, bobcat, beaver, and Townsend's mole (*Scapanus townsendii*). Commonly seen birds include western tanager (*Piranga ludoviciana*), rufous hummingbird (*Selasphorus rufus*), willow flycatcher (*Empidonax traillii*), Wilson's warbler (*Cardellina pusilla*), red-breasted sapsucker (*Sphyrapicus ruber*), Stellar's jay (*Cyanocitta stelleri*), chestnut-backed chickadee (*Poecile rufescens*), and evening grosbeak (*Coccothraustes vespertinus*). The Coast Range ecoregion supports the federally listed northern spotted owl (*Strix occidentalis caurina*) and marbled

murrelet (*Brachyramphus marmoratus*), Shorebirds and waterfowl are also common in nearshore and aquatic habitats. Fish in the rivers and streams of the ecoregion include chinook and coho salmon, and steelhead (*Oncorhynchus mykiss*) (USEPA, 2010).

Klamath Mountains/California High North Coast Range. The Klamath Mountains ecoregion has a mild, mid-latitude Mediterranean climate, with warm summers including a lengthy summer drought period, and mild winters. The dominant vegetation includes a mix of conifers and hardwoods commonly occurring in northern Californian as well as the Pacific Northwest. Mixed conifer forests are dominated by Douglas-fir, white fir, incense cedar (*Calocedrus decurrens*), tanoak (*Notholithocarpus densiflorus*), Jeffrey pine (*Pinus jeffreyi*), Shasta red fir (*Abies magnifica*), sugar pine (*Pinus lambertiana*), ponderosa pine, chinkapin (*Castanopsis chrysophylla*), and canyon live oak (*Quercus chrysolepis*). In some lower elevation areas, chaparral and western juniper-dominated communities are present. Hardwood-dominated plant communities in this ecoregion are primarily Oregon oak woodlands dominated by Oregon white oak (*Quercus garryana*), madrone (*Arbutus menziesii*), California black oak (*Quercus kelloggii)*, and ponderosa pine. Grasslands are also common (USEPA, 2010).

Mammals commonly found in the Klamath Mountains ecoregion include black bear, Roosevelt elk, black-tailed deer, cougar, bobcat, coyote, river otter (*Lontra canadensis*), beaver, and California ground squirrel (*Otospermophilus beecheyi*). Common bird species in this ecoregion include peregrine falcon (*Falco peregrinus*), osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), northern spotted owl, and California quail (*Callipepla californica*). Bald eagles breed throughout the ecoregion and also occur during the nonbreeding season. Salmonids such as steelhead, chinook salmon, and coho salmon are present in the rivers and streams of this ecoregion. Numerous reptiles, salamanders, and amphibians are common and the variation in species distribution often occurs with elevation (USEPA, 2010).

Marine Environment

W-93 and the Dolphin MOA include offshore waters off the coasts of Oregon and northern California. The bathymetry of the offshore area includes the continental shelf, a continental slope, a rise, and a deep seafloor. The Juan de Fuca Ridge is located on the western side of the ocean floor in the Dolphin MOA and W-93 and is where the Pacific Ocean is spreading apart and new ocean crust is forming. The Cascadia abyssal plain is a flat area of deep ocean floor between the end of the continental slope and the Juan de Fuca Ridge, and has depths between 7,300 and 18,150 ft (US Navy, 2015). The continental shelf and Cascadia abyssal plain are areas inhabited by soft-sediment communities containing mobile invertebrates that feed on benthic algae production, chemosynthetic microorganisms, and detritus in the water column (US Navy, 2015).

Marine Mammals. Five pinniped species protected by the MMPA may occur along the Oregon and California coasts. These are California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), northern fur seal (*Callorhinus ursinus*), Pacific harbor seal (*Phoca vitulina*), and northern elephant seal (*Mirounga angustirostris*). The northern fur seal occurs primarily on the northern coast of Oregon. California sea lion occurrences are primarily seasonal. The northern elephant seal are typically in the Dolphin MOA only along the coast when on a rookery during the breeding season as well as for approximately one month when they undergo a molt (ODFW, 2018).

Eight species of cetaceans may occur in the study area and all eight are protected under the MMPA. These cetaceans are the gray whale (*Eschrichtius robustus*), blue whale (*Balaenoptera musculus*), minke whale (*Balaenoptera acutorostrata*), humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter catodon*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), bottlenose dolphin (*Tursiops truncatus*), Dall's porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), and killer whale (*Orcinus orca*). The blue whale, humpback whale, sperm whale, and the Eastern North Pacific southern resident population of killer whales are also listed under the ESA and described in greater detail in **Section 3.5.2.3**. The most common whale off the coast in W-93 is the gray whale and includes both resident gray whales and migrants during the winter and spring. Minke whales typically occur near the coast and are present in W-93 year-round. The Pacific white-sided dolphin occur in W-93 in deep off-shore waters only in the summer as they move north from winter feeding areas. The bottlenose dolphin is the most common of

the marine dolphins and can be found year-round in the Dolphin MOA and W-93. Dall's porpoise also occurs year-round. The southern resident killer whale DPS is federally listed and the southern resident killer whales are described further in **Section 3.5.2.3**. Killer whales of transient and offshore populations also occur in the Dolphin MOA and W-93. They are most often spotted off the coast of Oregon in mid-April but have been known to remain along the coast into July if adequate prey is present. Harbor porpoises are typically found in shallower waters such as river estuaries and bays in the Dolphin MOA and are present year-round (ODFW, 2018).

Sea Turtles. The description for sea turtles is provided **Section 3.5.2.3**, as all sea turtles are listed under the ESA.

Fish. Fish species vary greatly with depth of water, salinity, distance from shore, clarity of the water, availability of structure, and availability of prey. Although the Dolphin MOA includes coastal and nearshore aquatic habitats, the majority of the Dolphin MOA and W-93 are primarily a deep water offshore environment. Fish species of greatest interest in this area includes salmonid species, with adult salmonids remaining over the continental shelf; rockfish, found in rocky substrates and shallower water offshore environments; sharks, rays, and skates (i.e., cartilaginous fish); eels; sturgeon; roundfish (e.g., cod, hake); flatfish (e.g., sole, flounder); tunas, jacks and mackerels; and billfish and swordfish (US Navy, 2015).

3.5.2.3 Threatened and Endangered Species and/or Species of Concern

A list of species that could potentially be found in the action area was obtained from the USFWS Information for Planning and Consultation website, NMFS Listed Species Lists, ODFW, CDFW, and Nevada Natural Heritage Program, and are provided in **Appendix D**.

The threatened and endangered species with the potential to be affected by contract ADAIR operations are listed in **Table 3-12**. Of these species, three are known to occur at Kingsley Field ANGB (one plant and two fish species): Applegate's milk-vetch (*Astragalus appelgatei*), shortnose sucker (*Chasmistes brevirostris*), and Lost River sucker (*Deltsistes luxatus*). In 2011, an endangered species survey was completed at Kingsley Field to determine the presence/absence of these species and their habitats on the installation (ORANG, 2017b); however, as there would be no construction or ground-disturbing activities at Kingsley Field ANGB and plant and fish species would not be affected by changes in air operations from increased sorties at Kingsley Field ANGB, there would be no adverse effects on the three sensitive species listed above and will not be discussed further.

Because there would be no ground activities from the ADAIR Proposed Action in the Juniper/Hart MOA Complex, Goose MOA, Dolphin MOA, or W-93, and proposed activities are limited to aircraft overflights in the airspace where noise and visual cues could cause behavioral changes in birds, mammals, and sea turtles, there would be no impacts on listed plants, aquatic species (i.e., fish), reptiles (other than sea turtles) and amphibians, invertebrates, or crustaceans; therefore, of the listed species potentially occurring in the project area, one state listed and seven federally listed birds (for a total of eight unique species); one state listed, nine federally listed, one proposed Threatened, and one candidate mammal species (for a total of 12 unique species); and four federally listed sea turtle species could be impacted by the Proposed Action in the airspace.

There is designated critical habitat in the Juniper/Hart MOA Complex for two listed fish species: the desert dace (*Eremichthys acros*) and the warner sucker (*Catostomus warnerensis*). No impacts on the designated critical habitat in the MOA would occur from aircraft overflight activity and contract ADAIR training with Air Force pilots, and as such, this critical habitat is not described further.

Table 3-12
Federally and State Listed Species with the Potential to be Affected by Air Operations at Kingsley Field Air National Guard Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Kingsley Field ANGB	Special Use Airspace			
				Juniper/Hart MOA Complex	Goose MOA	Dolphin MOA	Warning Area W-93
Birds							
Short-tailed albatross (*Phoebastria* [=*Diomedea*] *albatrus*)	E	E (OR only)				X	X
Marbled murrelet (*Brachyramphus marmoratus*)	T	T (OR), E (CA)				X	
Streaked horned lark (*Eremophila alpestris strigata*)	T	-				X	
Ridgway's rail (*Rallus longirostris obsoletus*)	E	E (CA only)				X	
Brown pelican (*Pelecanus occidentalis*)	R	FP (CA), E (OR)				X	
Western snowy plover (*Charadrius nivosus*)	T	T (OR only)	X		X	X	
Yellow-billed cuckoo (*Bartramia longicauda*)	T	-	X	X	X	X	
Northern spotted owl (*Strix occidentalis caurina*)	T	T (CA and OR)	X	X	X	X	
Reptiles							
Leatherback turtle (*Dermochelys coriacea*)	E	-				X	X
Green turtle (*Chelonia mydas*)	T (East Pacific DPS)	-				X	X
Loggerhead turtle (*Caretta caretta*)	E	-				X	X
Olive ridley turtle (*Lepidochelys olivacea*)	T	-				X	X

Table 3-12
Federally and State Listed Species with the Potential to be Affected by Air Operations at Kingsley Field Air National Guard Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Kingsley Field ANGB	Special Use Airspace			
				Juniper/Hart MOA Complex	Goose MOA	Dolphin MOA	Warning Area W-93
Mammals							
Steller sea lion (*Eumetopias jubatus*)	E (in one DPS)	-				X	X
Sperm whale (*Physeter macrocephalus*)	E	-				X	X
Blue whale (*Balaenoptera musculus*)	E	-				X	X
Killer whale – Southern Resident DPS (*Orcinus orca*)	E	-				X	X
Humpback whale – Central America DPS (*Megaptera novaengliae*)	E	-				X	X
Humpback whale – Mexico DPS (*Megaptera novaengliae*)	T	-				X	X
Gray wolf (*Canis lupus*)	E	-	X	X	X	X	
Red tree vole – Northern Oregon Coast DPS (*Arborimus longicaudus*)	C	-				X	
Columbian white-tailed deer – Columbia River DPS (*Odocoileus virginianus leucurus*)	T	-				X	
Wolverine (*Gulo gulo*)	PT	T (CA and OR)	X	X	X	X	
Canada lynx (*Lynx canadensis*)	T	-	X	X	X		
Kit fox (*Vulpes macrotis*)	-	T (OR only)	X		X		

Source:
[1] USFWS, 2019b
[2] ODFW, 2018; CDFW, 2018; Nevada Department of Conservation and Natural Resources, 2018

ANGB = Air National Guard Base; C = Candidate; DPS = distinct population segment; E = Endangered; FP= Fully Protected; MOA = Military Operations Area; P = Protected; PT = Proposed Threatened; R = Recovery; T = Threatened

Designated critical habitat for the Lost River sucker and shortnose sucker is present within the Goose MOA. There would be no impacts on designated critical habitat for these two listed fish species from aircraft overflights associated with contract ADAIR training activities, therefore, the designated critical habitat for these two fish species is not discussed further.

Designated critical habitat for seven listed species occurs in the Dolphin MOA. Critical habitat for the marbled murrelet, northern spotted owl, and western snowy plover (*Charadrius nivosus*) is discussed in greater detail below and are shown on **Figure 3-7**. Designated critical habitat for Cook's lomatium (*Lomatium cookii*), tidewater goby (*Eucyclogobius newberryi*), Oregon silverspot butterfly (*Speyeria zerene hippolyta*), and coho salmon are not discussed further as aircraft overflights from contract ADAIR training activities would not impact plants, fish, or insects, or their designated critical habitat.

Federally Listed Species Descriptions

Western Snowy Plover. The western snowy plover is a small shorebird with a thin, dark bill. They occur on beaches, offshore islands, and peninsulas where they feed in tidal waters adjacent to the Pacific Ocean. Some plovers use dry salt ponds and river gravel bars for nesting and migrate to the coast during the winter months. Their diet consists of insects, marine worms, invertebrates, crustaceans, and mollusks. The western snowy plover was listed as federally threatened in 1993 and state threatened in Oregon in 1975. 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 (USFWS, 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. Western snowy plovers are found year-round in the action area and are known to breed and forage within the Dolphin MOA (USFWS, 2019k).

Marbled Murrelet. The marbled murrelet is a small seabird that is dark-brown to blackish with a white belly and throat during the breeding season and is gray with dark marks on the sides of their breast and a white ring around their eye during the winter. They are associated with old growth forests where they nest, and are found in coastal Washington, Oregon, and northern California. They have a diet consisting of small fish and invertebrates. In 1992, Washington, Oregon, and California, marbled murrelet populations were federally listed as threatened, state listed as endangered in California, and state listed as threatened in Oregon. 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 3 million ac of federal lands and almost 1 million ac of state, county, city, and private lands (USFWS, 2019g). Marbled murrelet is a coastal bird species and occurs year-round in old growth forests under the Dolphin MOA. There is designated critical habitat for the marbled murrelet in the Dolphin MOA.

Yellow-Billed Cuckoo. The yellow-billed cuckoo (*Bartramia longicauda*) is found in deciduous woodlands, low scrubby vegetation, abandoned farmland, and dense riparian thickets. In the western United States, it 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 western United States is attributed to agriculture, dams, and river flow management, overgrazing and competition from exotic plants such as tamarisk (*Tamarisk* spp.). According to the USFWS, there have been very few recorded observations of this species in the action area (USFWS, 2019l); however, there is suitable habitat for the yellow-billed cuckoo in all of the MOAs.

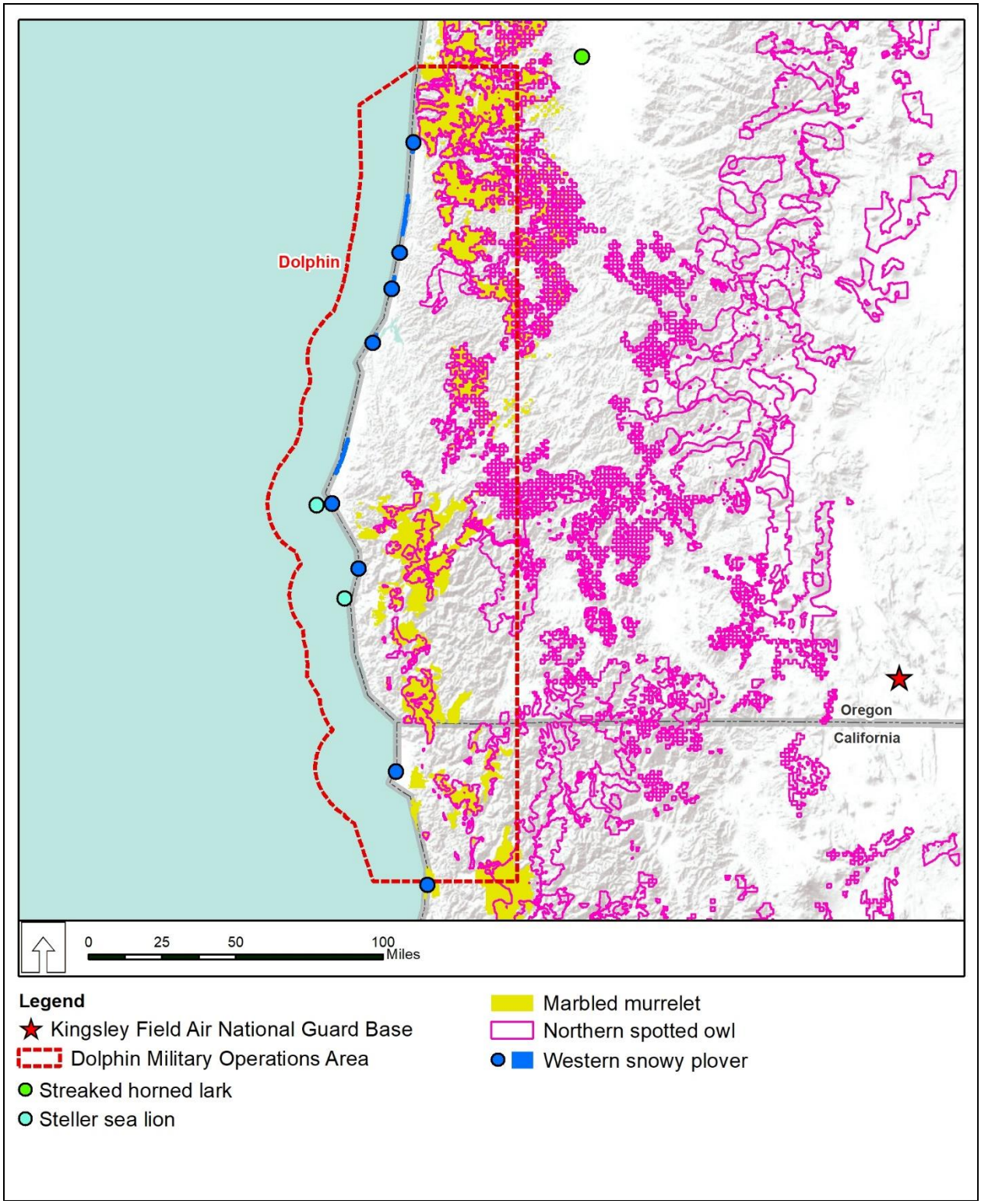


Figure 3-7. Designated Critical Habitat in the Dolphin Military Operations Area.

Northern Spotted Owl. The northern spotted owl is found in old growth forests from British Columbia south to Northern California. It is a medium-sized bird that primarily feeds on small rodents, insects, reptiles, and birds. The USFWS listed the northern spotted owl as threatened under the ESA 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, where it is listed as a state-threatened species. 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 and includes areas beneath the Dolphin MOA. 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 (USFWS, 2019h). The two main threats to the spotted owl's continued survival are habitat loss and competition from the barred owl (*Strix varia*), a species common to eastern North America and with occurrences in the northwestern United States (ORANG, 2017b). The northern spotted owl is known to occur in the Dolphin MOA.

Streaked Horned Lark. The streaked horned lark (*Eremophila alpestris strigata*) is a small, ground-dwelling bird with a dark-brown back, yellow underparts, and a yellow eyebrow stripe and throat. It is found in open areas with few trees or shrubs and its distribution is limited to Oregon and Washington. It can be found in native prairies, coastal dunes, agricultural fields, mudflats, grazed pastures, and mowed fields. Streaked horned larks nest on the ground and eat a wide variety of seeds and insects. The streaked horned lark was listed as a threatened species under the ESA in October 2013. Much of the cause for the streaked horned lark's population decline is due to habitat changes associated with loss of natural disturbances such as fire and flooding that reduced the encroachment of woody vegetation as well as the introduction of nonnative invasive plant species (USFWS, 2019m). Relative to the action area, the streaked horned lark only occurs in the Willamette Valley and lower Columbia River islands in Oregon (ODFW, 2019). Designated critical habitat for the streaked horned lark is located approximately 20 mi northeast of the Dolphin MOA. The Dolphin MOA does not extend into the Willamette Valley, and there is no suitable habitat for the streaked horned lark in the Dolphin MOA.

Short-Tailed Albatross. The short-tailed albatross (*Phoebastria* [=*Diomedea*] *albatrus*) is a large, white seabird with a 7-ft wingspan, black and white wings, and a large pink bill. It forages across the entire North Pacific, but its nesting habitat is isolated to islands in Japan. Its diet consists of squid, fish, and shrimp. The short-tailed albatross was federally listed as endangered throughout its range in July 2000 and is state listed as threatened in Oregon. 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 United States coast (USFWS, 2019j). The short-tailed albatross is known to travel and forage in W-93 and the Dolphin MOA.

Ridgway's Rail. Previously called the California clapper rail, the Ridgway's rail (*Rallus longirostris obsoletus*) is a large rail, between 13 and 19 in. in length, with olive-brown upper parts, a cinnamon-buff breast, and dark flanks crossed by white bars. Ridgway's rails are a wading bird occurring only in salt and brackish marshes, with the largest populations of Ridgway's rails in the San Francisco Bay area; however, this species is known from coastal marshes throughout California. Their diet consists of mussels, crabs, and clams. Its decline has occurred primarily due to the loss of habitat. The Ridgway's rail was listed as Endangered in October 1970 (USFWS, 2019d). There is suitable habitat for Ridgway's rail in coastal salt marshes of northern California under the Dolphin MOA.

Gray Wolf. The gray wolf's (*Canis lupus*) historic range included much of the United States; however, its current distribution includes Alaska, Canada, Idaho, Oregon, Wyoming, and Montana as well as Michigan, Minnesota, and Wisconsin. The gray wolf has a coat that is gray, black, or white and is a large canid. The gray wolf is federally and state listed as an 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 determent 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 (USFWS, 2019f). Although there

is suitable habitat for the gray wolf under the Dolphin, Goose, Juniper, and Hart MOAs, no known wolf use areas are present under these MOAs (ODFW, 2017).

Canada Lynx. The Canada lynx (*Lynx canadensis*) is a forest-dwelling cat, weighing between 14 and 31 pounds, with large paws, long ear tufts, and a short tail. The Canada lynx is found in areas with high densities of snowshoe hare (*Lepus americanus*), which is typically moist, cool, boreal spruce-fir forests. Snowshoe hares form the majority of the Canada lynx's diet. The Canada lynx primarily inhabits the boreal forests of Alaska and Canada. Its southern range extends from northern Maine to Washington in the contiguous United States. Canada lynx have been observed in the North Cascade Mountains and have the potential to occur in Oregon. Canada lynx in the contiguous United States were designated a DPS and listed as threatened under the ESA in 2000 (USFWS, 2019a). There is very limited suitable habitat for the Canada lynx under the Goose MOA.

Columbian White-Tailed Deer. The Columbian white-tailed deer's (*Odocoileus virginianus leucurus*) distribution is limited to the Columbia River basin in Washington and Oregon and Douglas County, Oregon, in tidal spruce, forested swamps, riparian habitats, and oak-savannah uplands. It has a reddish-brown spring and summer coat and a gray-brown fall and winter coat. The Columbian white-tailed deer has a distinguishing white underside on its tail. The Columbia River DPS of the Columbian white-tailed deer is federally listed as a threatened species. It 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 (USFWS, 2019e). The Columbian white-tailed deer is known to occur under a portion of the Dolphin MOA; however, the Douglas County DPS under the Dolphin MOA has been delisted due to recovery (USFWS, 2019e).

Red Tree Vole. The red tree vole (*Arborimus longicaudus*) is a small, furry rodent with a long, fur-covered tail and reddish-brown to orange fur. It occurs throughout the Cascade Mountains in Oregon and Northern California in late-successional forests. Its diet consists of conifer needles. The Northern Oregon Coast population of the red tree vole is identified as a Candidate for listing under the federal ESA. 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 (USFWS, 2019i). The red tree vole is known to occur in portions of the Dolphin MOA.

Humpback Whale. The humpback whale (*Megaptera novaengliae*) is a baleen whale and characterized by extraordinarily long flippers and a more robust body. The whales are dark on the back with areas of white on the flippers, sides, and ventral surface of the body and flukes. Humpback whales occur globally and migrate between warmer waters in the winter to cooler, temperate and subArctic waters in the summer. They typically occur in shallow coast waters with migrations occurring in deep offshore waters. Both the federally listed Threatened Mexico DPS and the federally listed Endangered Central America DPS feed and migrate along the Pacific Coast of California and Oregon. Humpback whales occur off the coast of Oregon during the summer months (US Navy, 2015; ODFW, 2018). The humpback whale has the potential to occur in waters below W-93.

Killer Whale. The killer whale (*Orcinus orca*) has a distinctive black and white color pattern with black dorsal and white ventral portions and a white patch above and behind the eye. They are globally distributed and likely the most widely distributed mammal species. Three groups of killer whales occur along the Pacific Coast of the United States, the Eastern North Pacific southern resident killer whales, the Eastern North Pacific offshore killer whales, and the Eastern North Pacific transient killer whales. Only the Southern Resident DPS killer whales are listed as endangered under the ESA. They are primarily residents of the inland waters of Washington State and Vancouver Island; however, individuals pass through action area as they move to coastal California in Monterey Bay, Point Reyes, and the Farallon Islands (US Navy, 2015; ODFW, 2018). The killer whale is known to occur in waters below W-93 and the Dolphin MOA.

Blue Whale. The blue whale (*Balaenoptera musculus*) is a baleen whale that occurs globally and the largest animal to have ever lived on Earth. Females are slightly larger than males. Blue whales are listed as a federally endangered species. Blue whales migrate to the waters offshore of Oregon and northern California to forage and are associated with deep offshore waters and typically in the action area during the summer months (US Navy, 2015). The blue whale is known to occur during migration in the waters below W-93.

Sperm Whale. The sperm whale (*Physeter macrocephalus*) is the largest of the toothed whales and distinguished by an extremely large head and a single blowhole located on the left side of its head (asymmetrical) near the tip. The sperm whale is mostly dark gray with some sperm whales having white patches on the belly. Sperm whales are globally distributed and occur in deep offshore waters. Sperm whales are listed as federally endangered. They occur in offshore waters of Oregon and California during most of the year but do migrate to equatorial waters in the winter (US Navy, 2015; ODFW, 2018). The sperm whale is known to occur in the waters below W-93.

Steller Sea Lion. The Steller sea lion (*Eumetopias jubatus*) is the largest of the eared seals, which includes sea lions and fur seals. Steller sea lions are distributed throughout the subarctic waters of the North Pacific Ocean and occur from northern Japan to California. Haul-out locations include beaches, shoreline ledges, and rocky reefs. Steller sea lions inhabiting US waters are divided into a Western DPS (currently listed as federally endangered) and an Eastern DPS (listed as federally threatened). The Western DPS includes Steller sea lions born west of Cape Suckling (144 degrees west longitude) and the Eastern DPS includes Steller sea lions born east of Cape Suckling (National Oceanic and Atmospheric Administration [NOAA] Fisheries, 2018). Critical habitat for the Steller sea lion has been designated in the Dolphin MOA and the stellar sea lion is known to occur in W-93 and the Dolphin MOA.

Loggerhead Turtle. Loggerhead turtles (*Caretta caretta*) are the most abundant species of sea turtle found in US coastal waters. Loggerhead turtles have a top shell that is slightly heart-shaped and reddish-brown in color with a pale, yellowish bottom shell. Their diet primarily consists of whelks and conch. Loggerhead turtles are protected by various international treaties and agreements as well as federal laws. The loggerhead 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 turtle protection (NOAA Fisheries, 2019c). The loggerhead turtle is known to occur in waters below W-93 and the Dolphin MOA.

Green Turtle. The green turtle (*Chelonia mydas*) has a smooth black, gray-green, brown, and yellow top shell and a yellowish-white bottom shell. Their diet consists mostly of seagrasses and algae. The green turtle was listed under the federal ESA in July 1978. There are 11 DPSs of green turtles, all of which are listed as either federally endangered or threatened under the ESA (NOAA Fisheries, 2019a). Similar to the loggerhead turtle, the green turtle is globally distributed and international cooperation has led to various treaties and agreements for green turtle protection (ORANG, 2017b; NOAA Fisheries, 2019a). The green turtle is known to occur in waters below W-93 and the Dolphin MOA.

Leatherback Turtle. The leatherback turtle (*Dermochelys coriacea*) has a black top shell and a pinkish-white bottom shell. They are globally distributed. They primarily feed on soft-bodied animals such as jellyfish and salps. The leatherback turtle was listed as endangered in 1970. Leatherback 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 (NOAA Fisheries, 2019b). The leatherback turtle is known to occur in waters below W-93 and the Dolphin MOA.

Olive Ridley Turtle. The olive ridley turtle (*Lepidochelys olivacea*) has a heart-shaped, grayish-green top shell and has a broad diet consisting of shrimp, fish, lobster, crabs, tunicates, mollusks, and algae. They are globally distributed. The olive ridley turtle was listed as threatened under the ESA in July 1978. 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 (NOAA Fisheries, 2019d). The olive ridley turtle is known to occur in waters below W-93 and the Dolphin MOA.

State Listed Species Descriptions

Brown Pelican. The brown pelican (*Pelecanus occidentalis*) is a coastal pelican with an approximately 6.5-ft wingspan, a huge bill, a large brown body, a white neck and belly, and short legs. Its distribution is limited to coastal environments, islands, and the open sea. It is found on all coasts of the United States. In the Pacific Northwest, its diet consists primarily of anchovy, sardine, and mackerel. In 1970, under a law that preceded the ESA, 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 ESA list; however, this species is still protected under the MBTA and currently listed as fully protected in California and state listed as endangered in Oregon. The decline of the brown pelican has been attributed to organophosphate pesticide (e.g., dichlorodiphenyltrichloroethane [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 United States. 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 (ORANG, 2017b). The brown pelican is known to occur in the Dolphin MOA.

Kit Fox. The kit fox (*Vulpes macrotis*) is a small fox with a black-tipped tail, brownish-gray fur, white chest, large ears, slim body, and long legs. Kit foxes inhabit mixed-grass shrublands, grasslands, and margins of pinyon-juniper woodlands over much of the Southwest. Its diet includes primarily rodents and rabbits. The kit fox is not federally listed; however, it is listed as threatened by the State of Oregon. Range reductions have been attributed to habitat loss, degradation, and fragmentation resulting from agricultural, industrial, and urban development (ORANG, 2017b). The kit fox is known to occur below the Goose MOA and Juniper/Hart MOA Complex.

Wolverine. The wolverine (*Gulo gulo luscus*) is the largest terrestrial member of the weasel family and has the appearance of a small bear with a bushy tail. They have short, rounded ears, small eyes, and five toes on each foot with curved claws. Males weigh between 25 and 40 pounds. Wolverines primarily scavenge carrion but will also feed on small mammals, birds, and reptiles, as well as fruits, berries and insects. The wolverine is a federally proposed threatened species wherever it is found, which includes California, Nevada, Oregon, Washington, Utah, Colorado, New Mexico, Idaho, Montana, and Wyoming (USFWS, 2019c). The wolverine is currently state listed as threatened in California and Oregon. There is suitable habitat for the wolverine under the Dolphin MOA.

3.5.2.4 Invasive Species

No formal vegetation surveys have been completed at Kingsley Field ANGB. Although some of the most prevalent invasive terrestrial plant species apparently are numerous in the general region of Kingsley Field, no installation-specific surveys for invasive and nonnative plant species are available (ORANG, 2017b).

Overflight activities from contract ADAIR training in the Juniper/Hart MOA Complex, Goose MOA, and Dolphin MOA would have no impacts on invasive species; therefore, invasive species in the MOAs are not described further.

3.6 LAND USE

3.6.1 Definition of the Resource

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws; however, no nationally recognized convention or uniform terminology has been adopted for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary

among jurisdictions. This EA addresses potential land impacts from implementation of the Proposed Action on Kingsley Field and discusses land use categories identified on the base (**Figure 3-8**). The categories identified are

- Command and Support;
- Airfield Operations;
- Airfield Pavements;
- Airfield Operations;
- Maintenance;
- Industrial;
- Open Space; and
- Special Use.

The Installation Development Plan (IDP; NGB, 2015) is the base's planning tool to guide future development on Kingsley Field ANGB to be aligned to current and programmed mission requirements and was prepared in response to AFI 32-7062, *Comprehensive Planning*. Goals and objectives of land use planning are to maintain mission readiness; achieve and maintain compliance with operational, safety, environmental, energy, and security regulations and requirements; maximize functional capabilities through the utilization and adaption of existing areas; incorporate Leadership in Energy and Environmental Design guidelines; achieve environmental compliance through reduction of the installation environmental footprint; and foster awareness of the installation by community stakeholders.

To address land use with respect to noise, the *Kingsley Field Joint Land Use Study* (JLUS) (City of Klamath Falls, 2016) identified several areas of potential concern and include future development within noise contours, impacts on modular homes that may have lower noise insulation, the impact of concentrated air operations, summer night training, and dairy farms located near the field. Additionally, the JLUS identifies those areas in which development should be more restrictive of use and concentrations of people, including aircraft APZs, weapons firing range safety zones, and explosive safety Q-D arcs. **Section 3.2** provides a detailed description of existing noise environment, and **Section 3.3** provides a description of the safety zones associated with Kingsley Field ANGB.

The location(s) and extent of the Proposed Action needs to be evaluated for their potential effects on the proposed sites and land uses adjacent to project areas on Kingsley Field and beneath airspace that would be used for ADAIR training. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include existing land use at the project site, the types of land use on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its "permanence." The ROI for this resource includes the land surrounding the facilities proposed for use and the land within the airfield noise contours and safety zones (**Figure 3-8**). Additionally, the land and waters beneath the airspace also fall within the land use ROI (**Figure 3-9**). The population centers that are beneath the airspace are identified in **Table 3-13**.

In addition to the land use categories identified above, sensitive lands are considered in the evaluation as well. Sensitive lands include those intended to preserve natural or cultural resources, contain recreational opportunities and public access, or provide for the management of public lands. Natural areas include uses such as forestry and agriculture, as well as conservation areas, wildlands, and parks. The ROI of off-base sensitive lands includes the land within the boundaries of the airspace proposed for use (**Figure 3-10**). There would be no impact on land use for operations within W-93 as it is entirely over the Pacific Ocean, and as such, this area will not be discussed.

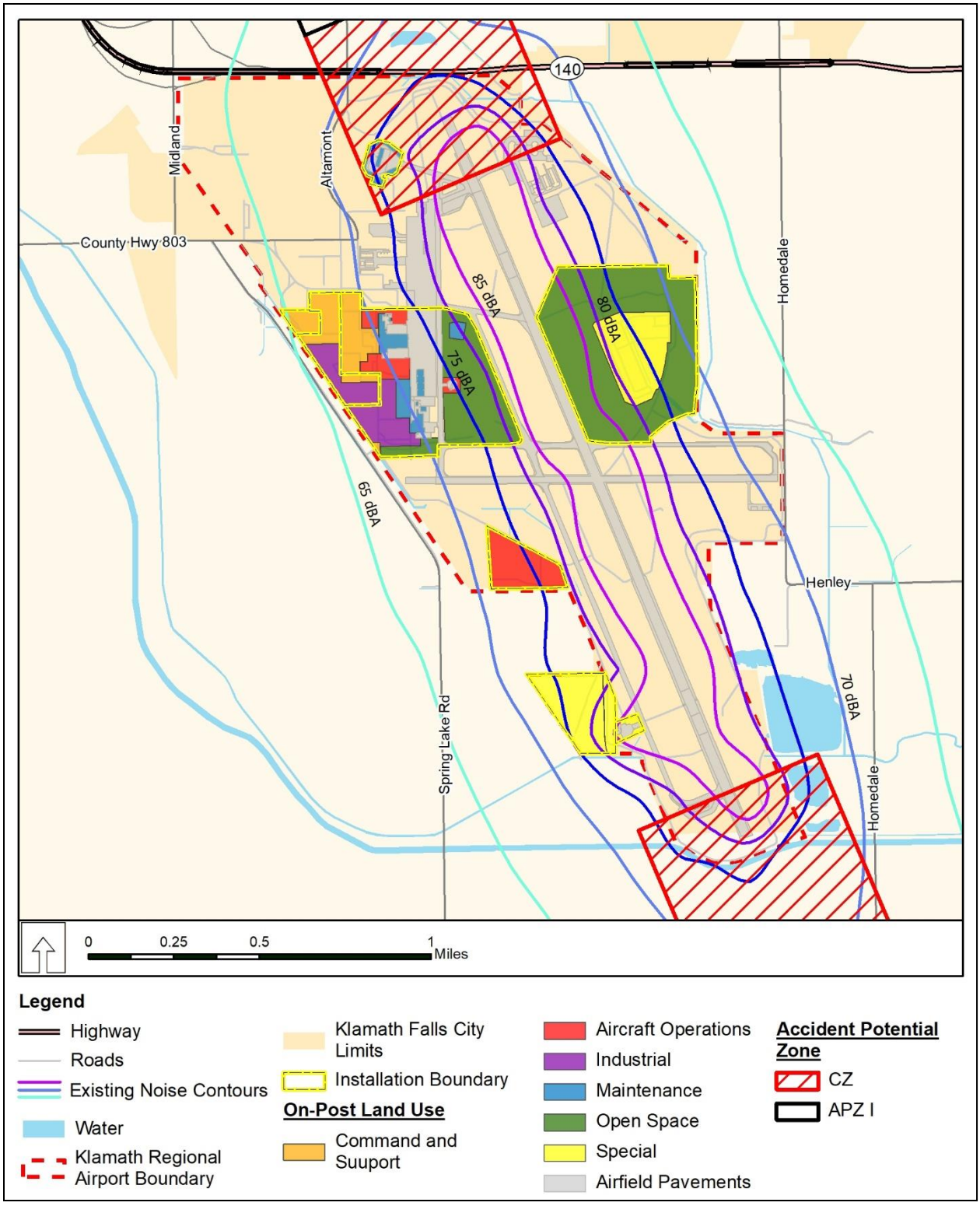
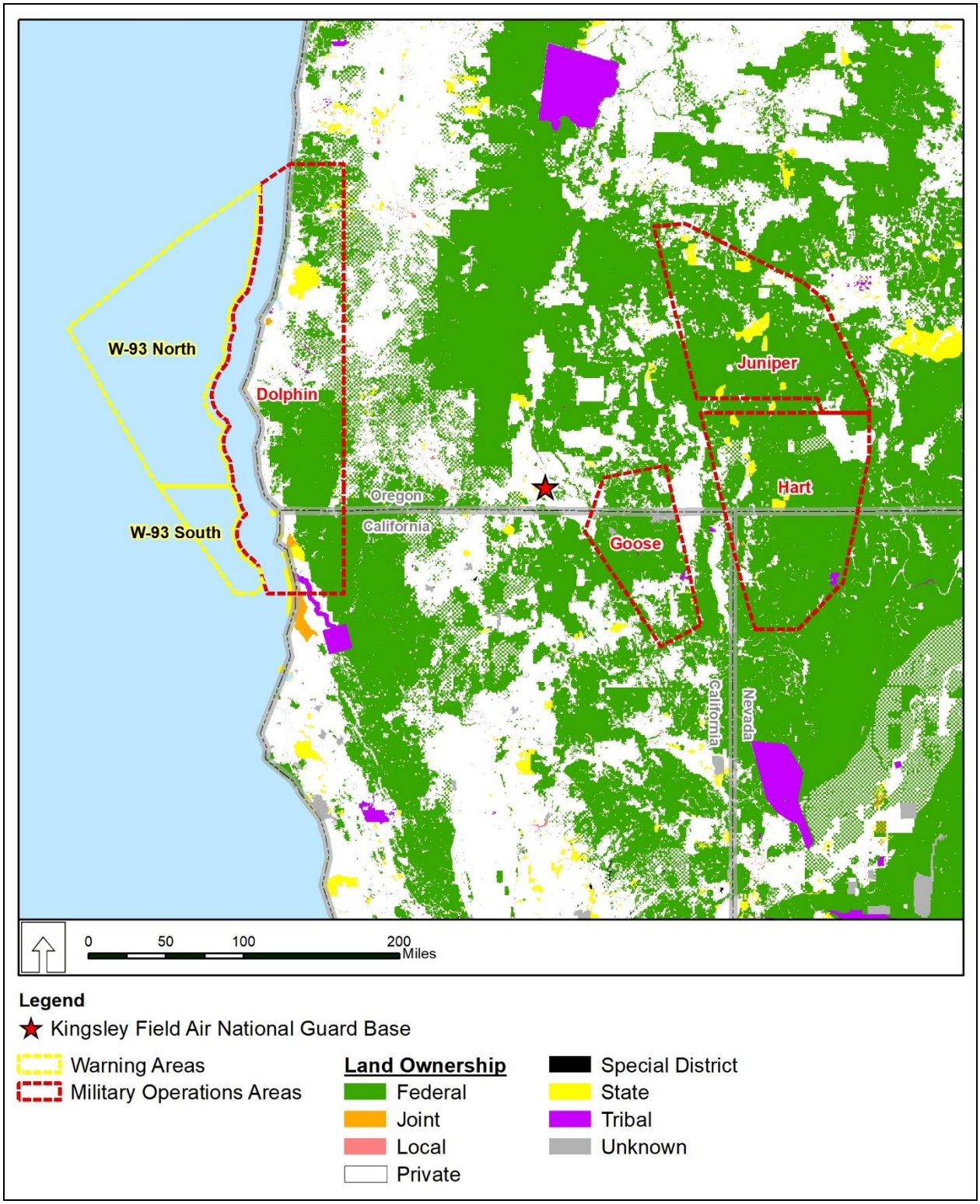


Figure 3-8. Generalized Existing Land Use Categories, Noise Contours, and Safety Zones on Kingsley Field Air National Guard Base.



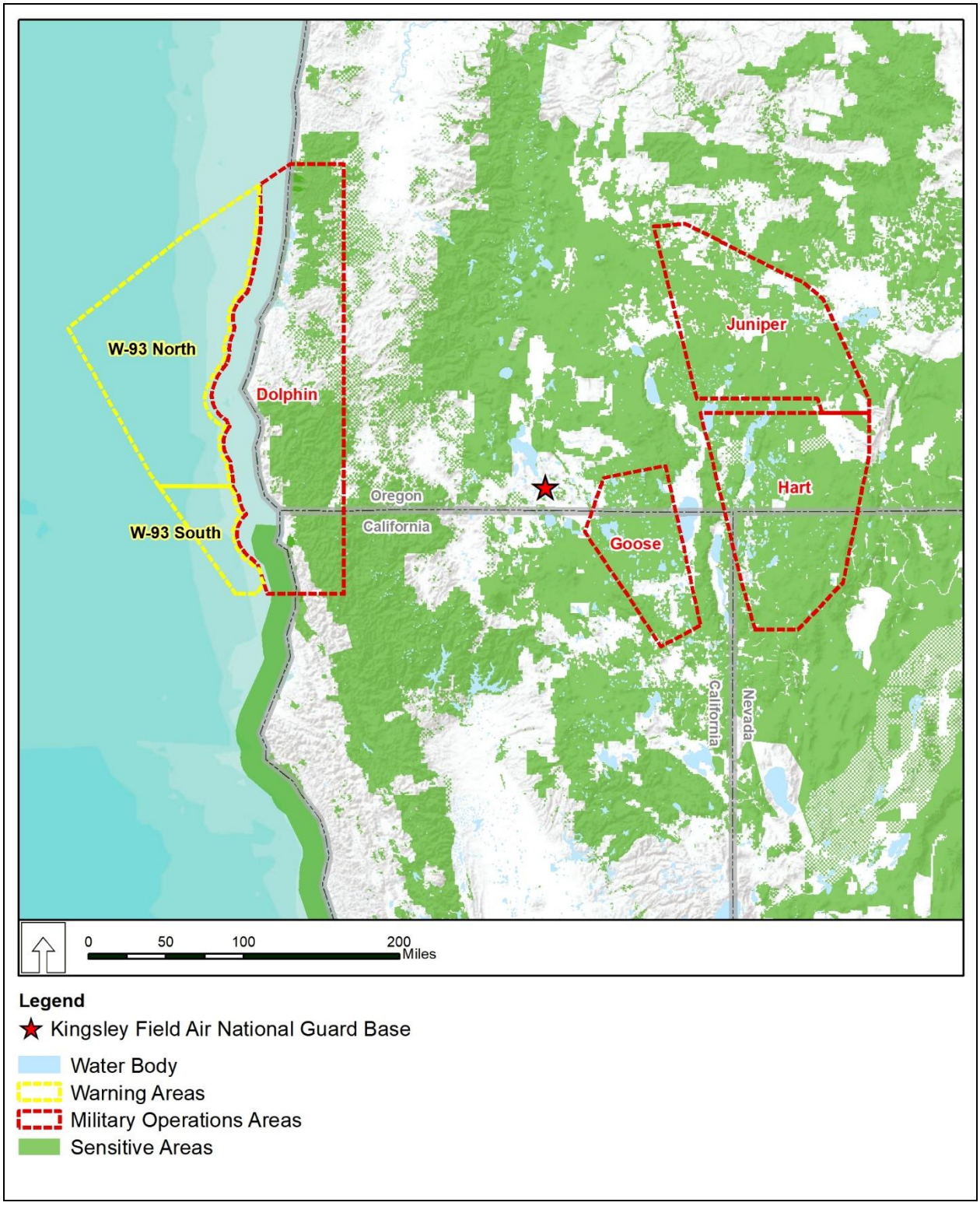
Source: US Geological Survey, 2016

Figure 3-9. Land Ownership Beneath the Airspace Proposed for Contract Adversary Air.

Table 3-13
Population Centers Beneath the Airspace Proposed for Contract Adversary Air

State	Incorporated Cities		Unincorporated Communities	
Dolphin Military Operations Area				
California	**Del Norte County**			
	Klamath	Gasquet	Requa	
	Crescent City	Smith River	Fort Dick	
	Hiouchi			
Oregon	**Coos County**			
	Powers	Bunker Hill	Broadbent	Fairview
	Myrtle Point	Coos Bay	Bridge	Charleston
	Bandon	North Bend	Norway	Allegany
	Coquille	Glasgow	Dora	Hauser
	Barview	Lakeside	Riverton	
	Curry County			
	Brookings	Nesika Beach	Carpenterville	
	Harbor	Port Orford	Agness	
	Pistol River	Langlois	Ophir	
	Gold Beach		Sixes	
	Douglas County			
	Winchester Bay	Gardiner	Camas Valley	
	Reedsport		Scottsburg	
	Josephine County			
	Takilma	Cave Junction	-	
	O'Brien	Kerby		
	Lane County			
	Dunes City		Siltcoos	Mapleton
	Florence		Cushman	Swisshome
	Lincoln County			
	Yachats		-	
Goose Military Operations Area				
California	**Modoc County**			
	Likely	Canby	-	
	California Pines	Alturas		
Hart Military Operations Area				
Nevada	**Washoe County**			
	-		Vya	
Oregon	**Lake County**			
	Plush		Adel	
Juniper Military Operations Area				
Oregon	**Deschutes County**			
	-		Hampton	Brothers
	Harney County			
	-		Frenchglen	Riley
			Wagontire	

Source: US Geological Survey, 2017



Source: US Geological Survey, 2016

Figure 3-10. Sensitive Areas Beneath Special Use Airspace Proposed for Contract Adversary Air.

Coastal Zone Management Act

The coastal zone refers to coastal waters and the adjacent shorelines, including islands, transition and intertidal areas, salt marshes, wetlands, and beaches, extending to the outer limit of State title and ownership under the Submerged Lands Act (i.e., 3 NM). The NOAA oversees the Coastal Zone Management Program for the federal government. Coastal areas in the United States receive special land use protections through the federal Coastal Zone Management Program. Authorized by the Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. § 1451, et seq., as amended), this federal program addresses the coastal issues of the United States through a voluntary partnership among the federal government and the coastal and Great Lakes states and territories. The program's purpose is to protect, restore, and responsibly develop the nation's diverse coastal communities and resources.

Section 307 of the CZMA provides states with the authority to offer input in federal agency decision-making for activities potentially affecting coastal uses or resources. This federal consistency provision provides authority to the states that would not otherwise be authorized through other federal programs. Section 307 of the CZMA requires that federal actions that have reasonably foreseeable effects on any coastal use or natural resources of the coastal zone be consistent with the enforceable policies of a state's approved coastal management program. Federal agency activities must be consistent with the state's coastal management program to the maximum extent practicable. The Oregon Coastal Management Program was approved by NOAA in 1977 and is managed by the Oregon Department of Land Conservation and Development. The California Coastal Management Program, approved in 1978, is administered by: the California Coastal Commission, the San Francisco Bay Conservation and Development Commission, and the California Coastal Conservancy.

3.6.2 Existing Conditions – Kingsley Field

Kingsley Field ANGB is within Klamath Falls City limits, located on 254 ac of land leased from the City, within Klamath County, Oregon (see **Figure 1-3**). Kingsley Field ANGB is collocated with the Crater Lake – Klamath Regional Airport.

The 2015 Kingsley Field IDP is the planning, programming, and development strategy used to address current and future mission planning. The IDP is the guide for the development of properly configured facilities and infrastructure aligned to current and programmed mission requirements. The Klamath County Land Development Code (LDC) coordinates Klamath County regulations governing the use and development of land (Klamath County, 2017). The LDC identifies land uses appropriate within Kingsley Field safety zones and noise contours and specifies standards to ensure public health and safety. The Klamath County Comprehensive Plan was developed and adopted in compliance with Oregon Revised Statutes (§§ I97.705 through I97.795). The Comprehensive Plan was prepared and is implemented by the Land Conservation and Development Commission to characterize land use, existing urban growth, and community boundaries of the county as well as achieve its goals and objectives.

On Kingsley Field ANGB, eight land use categories have been identified. A summary of land uses on the main base is provided in **Table 3-14**. Building 404 is in northern land parcel at the north end of the airfield within a maintenance land use designation (see **Figure 2-1**). Buildings 307 and 219 are in the main cantonment area and within a maintenance land use and air operations land use designation, respectively. Building 404 is within the 80- to 85-dBA DNL noise contour and Buildings 307 and 219 are within the 75- to 80-dBA DNL noise contours.

Most of land surrounding Kingsley Field ANGB and the Crater Lake – Klamath Regional Airport is chiefly composed of agricultural and light industrial land uses (NGB, 2017). The base and surrounding cities and counties have maintained a strong working relationship. As described in **Section 3.6.1**, Kingsley Field ANGB and the City of Klamath Falls collaborate on land use issues that may impact the important missions on base through the development and implementation of JLUS. In addition, the JLUS specifies specific guidelines the City would adopt for development within the base's noise contours. Kingsley Field ANGB has established runway protection zones for protecting people and property from incompatible activities so that these areas remain clear of intense or dense and noise sensitive land uses. (City of Klamath Falls, 2016). About 27 ac of runway protection zones extend off-base onto compatible Exclusive Farm Use land.

Table 3-14
Land Use Summary of Kingsley Field Air National Guard Base

Land Use Category	Acres
Command and support	26.3
Airfield operations	28.7
Airfield pavements	178.3
Maintenance	22.6
Industrial	24.0
Open space	138.8
Special use	57.1

A total of 2,833.3 ac of off-base land falls within existing noise contours (**Table 3-15**). Most of the land use within noise contours on the eastern, southern, and western sides, over 48 percent, is zoned as Exclusive Farm Use. The land north of the base includes public use, industrial, and commercial, of which public use designation makes up the largest amount of land use within noise contours. Additional information on noise conditions is included in **Section 3.2**.

Table 3-15
Off-base Land Use within Kingsley Field Air National Guard Base Noise Contours

Zone Description	Area within Noise Contours (acres)					
	65-dBA DNL	70-dBA DNL	75-dBA DNL	80-dBA DNL	85-dBA DNL	Total
Exclusive Farm Use	1,000.4	290.2	75.2	6.6		1,372.4
General Commercial	22.2	2.1				24.3
Heavy Industrial	10.2					10.2
Industrial	80.1	10.0				90.1
Light Industrial	87.6	16.2				103.8
Medium Density Residential	56.6	1.9				58.5
Neighborhood Commercial	0.8					0.8
Planned Unit Development	24.8	0.6				25.4
Public Facility	57.3	154.1	142.3	169.7	269.1	792.5
Single Family Residential	15.6	2.5				18.1
Suburban Residential	296.0	16.6				312.6
Transportation Commercial	2.2	22.6				24.8
Total	1,653.8	516.8	217.5	176.3	269.1	2,833.5

Source: Jeff Hansen, City of Klamath Falls, Oregon, personal communication, 16 May 2018; City of Klamath Falls, 2016

Notes:
dBA = A-weighted decibels; DNL= Day-Night Average Sound Level

There is currently approximately 1,814 ac of off-base land within CZs and APZs. Of these, 894 ac are zoned as Exclusive Farm Use. Lands zoned as Residential make up about 302 ac of off-base land use within these safety zones. Additional information regarding safety zones can be found in **Section 3.3**.

3.6.3 Existing Conditions – Airspace

Land uses beneath the proposed overland airspace vary and include urbanized regions, agricultural land, timberlands, and natural areas that provide recreational uses and protection for wildlife. Lands are managed by federal, state, local, Tribal, and nongovernmental organizations. There are approximately 10.25 million ac of these managed lands beneath the airspace (**Table 3-16**). For additional information on Native American population metrics, see Environmental Justice (**Section 3.8.1**), and for a discussion of specific tribes associated with the airspace ROI, see Cultural Resources (**Section 3.9**). In addition to overland uses, approximately 5,457 square miles (mi^2) of coastal waters beneath the Dolphin MOA along the Oregon and California coastlines fall under the jurisdiction of state coastal management programs: Oregon Coastal Management Program and California Coastal Management Program, respectively (West Coast Ocean Data Portal, 2013).

Table 3-16
Land Ownership Beneath Proposed Military Operations Areas

Owner[1]	State Located	Area Beneath Airspace (acres)				
		Dolphin	Goose	Hart	Juniper	Total
Federal	CA	472,333.3	1,011,875.1	11,609.3	-	1,495,817.7
	NV	-	-	1,590,706.2	-	1,590,706.2
	OR	1,897,707.7	270,704.5	1,674,238.1	2,758,101.9	6,600,752.2
Total		**2,370,041.0**	**1,282,579.6**	**3,276,553.6**	**2,758,101.9**	**9,687,276.1**
State	CA	105,612.7	8,087.9	501.6	-	114,202.3
	NV	-	-	1,508.7	-	1,508.7
	OR	137,809.4	149.7	62,505.1	152,251.5	352,715.6
Total		**243,422.1**	**8,237.6**	**64,515.4**	**152,251.5**	**468,426.6**
Joint[2]	CA	34,634.3	-	-	-	34,634.3
	OR	4,777.6	-	-	-	4,777.6
Total		**39,411.9**	**-**	**-**	**-**	**39,411.9**
Local Government[3]	CA	32.9	123.7	-	-	156.5
	NV	-	-	39.0	-	39.0
	OR	906.9	-	-	-	906.9
Total		**939.8**	**123.7**	**39.0**	**-**	**1,102.5**
Nongovernmental Organization	OR	2,017.3	-	626.4	-	2,643.6
Total		**2,017.3**	**-**	**626.4**	**-**	**2,643.6**
Tribal	CA	22,886.1	10,299.8			33,185.9
	NV			12,637.9		12,637.9
	OR	6,663.5				6,663.5
Total		**29,549.6**	**10,299.8**	**12,637.9**		**52,487.3**
Grand Total		**2,685,381.7**	**1,301,240.7**	**3,354,372.3**	**2,910,353.4**	**10,251,348.0**

Source: US Geological Survey, 2016

Notes:
[1] Primary landownership under the special use airspace; private ownership is not included
[2] Joint federal and state ownership
[3] County and municipality

3.7 SOCIOECONOMICS – INCOME AND EMPLOYMENT

3.7.1 Definition of the Resource

Socioeconomics is the relationship between economics and social elements, such as population levels and economic activity. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region. Socioeconomic data are typically presented at county, state, and US levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends.

The ROI for this resource at Kingsley Field is Klamath County, Oregon (which includes the city of Klamath Falls).

3.7.2 Existing Conditions – Kingsley Field

The unemployment rate for Klamath County was 5.9 percent in 2017 (Bureau of Labor Statistics, 2018). This was higher than the 2017 unemployment rate for Oregon (4.1 percent) and the United States (3.9 percent) (Bureau of Labor Statistics, 2018). The median household income in 2016 was $41,951 for Klamath County and $36,977 for the city of Klamath Falls, which was substantially lower in 2016 than that for Oregon ($53,270) and the United States ($55,322).

In Fiscal Year 2016, approximately 1,040 people were employed by or associated with Kingsley Field ANGB, including 383 Drill-Status National Guardsmen (part-time), 215 Active National Guard Reserves, 8 federal civilians, and 66 state employees (ORANG, 2015). The annual payroll generated by Kingsley Field in Fiscal Year 2016 was $55.5 million. A total of $12.3 million was spent at Kingsley Field for operations and maintenance activities in Fiscal Year 2016. It was estimated that the Kingsley Field created $11.6 million in indirect jobs for the local economy in Fiscal Year 2016 (ORANG, 2015).

3.8 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

3.8.1 Definition of the Resource

EOs direct federal agencies to address disproportionate environmental and human health effects in minority and low-income communities and to identify and assess environmental health and safety risks to children.

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, pertains to environmental justice issues and relates to various socioeconomic groups and disproportionate impacts that could be imposed on them. This EO requires that federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. EO 12898 was enacted to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action.

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

For the purposes of this analysis, minority populations are defined as Alaska Natives and American Indians, Asians, Blacks or African-Americans, Native Hawaiians, and Pacific Islanders or persons of Hispanic origin (of any race); low-income populations include persons living below the poverty threshold as determined by the US Census Bureau; and youth populations are children under the age of 18 years.

Minority, low-income, and youth populations that could be disproportionately impacted by the project are addressed for Klamath County and are compared to those populations in the state of Oregon and the United States. For further discussion of Tribal Lands and their locations relative to the MOAs, see Land Use (**Section 3.6.3**), and for further discussion of the specific Native American tribes associated with the region, see Cultural Resources (**Section 3.9**).

3.8.2 Existing Conditions – Kingsley Field

An evaluation of minority and low-income populations in Klamath County forms a baseline for the evaluation of the potential for disproportionate impacts on these populations from the Proposed Action. In 2016, the State of Oregon and Klamath County had a lower percentage of minorities in the population compared to the United States (US Census Bureau, 2018). The same trend occurred for the percent of the population that is Hispanic or Latino (**Table 3-17**); however, the State of Oregon and Klamath County had a higher percentage of American Indian or Alaska Native population (1.8 percent and 4.9 percent, respectively) and a substantially lower percentage of the population that is Black or African American (2.1 percent and 0.9 percent, respectively) than the United States (1.3 percent American Indian or Alaskan Native and 13.3 percent Black or African American).

Klamath County had a higher rate of poverty than Oregon and the United States (**Table 3-17**); however, the percentage of children was similar to the percentage of children in Oregon and the United States as a whole (**Table 3-17**) (US Census Bureau, 2018).

Table 3-17
Total Population and Populations of Concern

	Total Population	Percent Minority	Percent Hispanic or Latino	Percent Below Poverty	Percent Youth
Klamath County	66,935	21.7	12.5	19.0	21.7
State of Oregon	4,093,465	23.6	12.8	13.3	21.2
United States	323,127,513	38.7	17.8	12.7	22.8

Source: US Census Bureau, 2018

Note: Hispanic and Latino denote a place of origin and percent youth are all persons under the age of 18.

3.9 CULTURAL RESOURCES

3.9.1 Definition of the Resource

Cultural resources include archaeological, architectural, and traditional sites that represent past human use or occupation of an area.

Cultural Resources include the following subcategories:

- Archaeological (i.e., prehistoric or historic sites where human activity has left physical evidence of that activity);
- Architectural (i.e., buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance); and
- Traditional Cultural Properties (resources of traditional, religious, or cultural significance to Native American tribes and other communities).

Significant cultural resources are called historic properties and are listed in the National Register of Historic Places (NRHP) or have been determined to be eligible for listing. These resources are protected under the NHPA as well as other legislation and Executive Orders. Properties that have not yet been evaluated for NRHP eligibility are afforded the same protection under the law as those that have been determined eligible.

To be eligible for listing in the NRHP, properties typically must be 50 years old; possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance; and meet at least one of the following criteria:

- Associated with events that have made a significant contribution to the broad patterns of our history (Criterion A)
- Associated with the lives of persons significant in our past (Criterion B)
- Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C)
- Have yielded or be likely to yield information important to our understanding of national, regional, or local prehistory or history (Criterion D)

Properties that are less than 50 years old can be considered eligible for listing in the NRHP under Criterion Consideration G if they possess exceptional historical importance. Those properties must also retain the seven aspects of integrity and meet at least one of the four NRHP Criteria for Evaluation (Criterion A, B, C, or D).

Federal laws protecting historic properties include the Archaeological and Historic Preservation Act of 1974 as amended, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and the NHPA, as amended through 2016, and associated regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings to historic properties. Federal agencies fulfill this requirement by completing the Section 106 consultation process, as set forth in 36 CFR Part 800. Section 106 of the NHPA also requires agencies to consult with federally recognized Indian tribes with a vested interest in the undertaking.

Section 106 of the NHPA requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects to historic properties (36 CFR § 800.1[a]). For cultural resource analysis, the Area of Potential Effects (APE) is used as the ROI. APE is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist," (36 CFR § 800.16[d]) and thereby diminish their historic integrity. There are two APEs including 1) the area of proposed use at Kingsley Field and 2) the airspace that lies off the coast and overlies the Pacific Ocean, specifically the Juniper/Hart MOA Complex located about 80 mi east of Kingsley Field, the Dolphin MOA located about 100 mi west of Kingsley Field, Goose MOA located 25 mi east of Kingsley Field, and W-93 located about 12 mi off the southwest coast of the states of Oregon and California.

3.9.2 Existing Conditions – Kingsley Field

3.9.2.1 Environmental Setting

The APE for Kingsley Field includes portions of the Main Cantonment immediately associated with Buildings 219 and 307 proposed for ADAIR use and Building 404, contained within the Building 400 Annex. Kingsley Field is located within the city limits of Klamath Falls within an area that is part of the Klamath Project a federally sponsored irrigation and drainage system. Undertaken by the Bureau of Reclamation with construction starting in 1906, this project drained and reclaimed large portions of the Klamath Basin to produce arable lands for agriculture and has dramatically altered the natural environment of the area (which was originally quite marshy). This process created the Lost River Diversion Channel (completed by 1912), which diverts water between the Klamath River and the Lost River just outside of the boundaries of Kingsley Field (US Department of the Interior, n.d.; Engineering-Environmental Management, Inc. [e^2M], 2002).

3.9.2.2 Archaeological and Traditional Cultural Properties

One cultural resources investigation has been conducted at Kingsley Field (ORANG, 2012b). A total of 103.79 ac (approximately 9.7 percent of total installation acreage) was surveyed for archaeological resources. As a result, one archaeological site was recorded, outside of the APE at Kingsley Field. Site 35KL2893, a historic surface scatter dating from the late 1930s through 1940s, was described as a low-density, one-time domestic dump. The ANGB determined the site not eligible for listing in the NRHP, and the Oregon SHPO concurred with the determination (e^2M, 2002). Generally, the entire installation is considered to have a low potential for archaeological resources, though some deeply buried soils retain potential for archaeological resources dating to the Paleoindian period. No ground-disturbing activities are proposed to support contract ADAIR, so NGB determined no further work necessary to evaluate the potential for buried sites within this portion of the APE.

Traditional cultural properties and sacred sites are a special class of cultural resources that require specialized expertise in their identification and assessment. The base is not in possession of prehistoric human remains, funerary objects, sacred objects, or objects of cultural patrimony, and no known traditional cultural resources or sacred sites have been formally identified at Kingsley Field.

The federally recognized Klamath Tribes (Klamath, Modoc, and Yahooskin Peoples) are closest to Kingsley Field. In addition to the Klamath Tribes, there are nine federally recognized tribes recorded in Oregon including Burns Paiute Tribe, Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians of Oregon, Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Reservation, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation of Oregon, Coquille Indian Tribe, Cow Creek Band of Umpqua Tribe of Indians, and McDermitt Paiute and Shoshone Tribes of the Fort McDermitt Indian Reservation (Nevada and Oregon). Tribes in Nevada and California have historic ties to Oregon. Specifically, six tribes in Nevada: the Paiute-Shoshone Tribe of the Fallon Reservation and Colony, Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation, Reno-Sparks Indian Colony, Shoshone-Paiute Tribes of the Duck Valley Reservation, Shoshone-Paiute Tribes of the Duck Valley Reservation, and Yerington Paiute Tribe of the Yerington Colony and Campbell Ranch; and two tribes in California: Elk Valley Rancheria and the Tolowa Dee-ni' Nation. Additional tribes in Nevada and California are associated with portions of the airspace that cross into these states (US Department of Housing and Urban Development, 2019). For a complete list of tribes consulted as part of this EA, see **Appendix A-1**.

The THPO representing the Tolowa Dee-ni' Nation (Nation) expressed concern (refer to **Appendix A**) that properties of religious and cultural significance to the Nation are present under the existing airspace. As such, the Nation requested that the Air Force refrain from flying over, or training in, the Dolphin MOA and Warning Area (W-93) during the first day of Winter Solstice and the 10 days following as this is a "highly significant and cultural time of the year for the Tolowa people."[1] The Nation further requested that these areas not be used during June, July, and August as this is "also an important time of year for the Tolowa people to camp on the coastline of northern California and southern Oregon for the purpose of harvesting ocean resources with tradition methods."

As noted in **Section 1.6.3**, the point of contact for consultation with the THPO and the Advisory Council on Historic Preservation is the NGB Cultural Resources Program Manager. After discussions between the NGB, THPO, and the Nation's Cultural Committee, an exclusion zone was defined covering the northern California coastline and waters. The exclusion zone extends from Lake Earl north to California's border with Oregon. NGB agreed that no chaff and flare will be used within the exclusion zone for the Winter Solstice and the following 10 days or within the month of July. Also, all aircraft operations will be restricted to a floor of 11,000 ft MSL. NGB also agreed to contact the Nation after 1 year to ensure that all their concerns have been addressed.

[1] Amanda O'Connell, Tribal Historic Preservation Officer, Tolowa Dee-ni' Nation, Smith River, California, letter to Jennifer Harty, Cultural Resources Program Manager, Air National Guard Readiness Center, Joint Base Andrews, Maryland, 2 July 2019.

3.9.2.3 Architectural Properties

Kingsley Field Air Base was activated in 1954 to house a fighter interceptor squadron and an aircraft warning and control squadron for air defense purposes. The ORANG has determined that there are no historic districts at Kingsley Field, and the Oregon SHPO has concurred with this determination (Johnson, 2011). To date, Kingsley Field has one building—Hangar 400—that is potentially eligible for inclusion in the NRHP. It was the only building to be identified as such, following a 2000 inventory of 71 structures constructed between 1940 and 1999 (e^2M, 2002). Building 404 is located just northwest of, and perpendicular to, Hangar 400. Constructed in 1992, the Readiness Facility was determined not eligible for inclusion in the NRHP under Criteria Consideration G in 2002. It will not be subject to reevaluation until 2042.

Building 219, a Hangar/Maintenance Shop dating to 1959, is located along the flight line. Building 219 was determined not eligible for inclusion in the NRHP by the ORANG in 2011, and the Oregon SHPO concurred with this determination.

Building 307, an Avionics Shop constructed in 1957, is also located along the flight line. It was determined not eligible for NRHP inclusion under Criterion Consideration G (e^2M, 2002). It was formally recommended by the Oregon SHPO that Building 307 be reassessed for NRHP significance should any future action potentially impacting the building be found to be an undertaking under Section 106 of the NHPA, as amended. Under this proposed undertaking, the ORANG has determined that Building 307 is not eligible for listing in the NRHP. Building 307, as a support facility, lacks architectural significance and its integrity has been compromised by exterior changes.

3.9.3 Existing Conditions – Airspace

3.9.3.1 Environmental Setting

The airspace APE includes the airspace as described in **Section 2.1.6**. Based on the nature of the Proposed Action, archaeological and architectural resources under the airspace are not described in this EA. No know traditional cultural properties have been identified in the APE. Significant cultural resources under the airspace are described below.

3.9.3.2 National Register of Historic Places Listed Resources

There are 83 historic resources associated with the airspace APE listed in the NRHP. Of these, 1 is under the Juniper/Hart MOA Complex, 78 under the Dolphin MOA, and 4 under the Goose MOA. Resource types include 24 structures (e.g., bridges, light houses, infrastructure features), 6 archaeological sites (e.g., townsites cemeteries, mining-related sites), and 53 buildings (e.g., homes, government buildings, churches, theaters) (**Table 3-18**) (NPS, n.d.).

3.9.3.3 Tribal Lands

There are currently ten federally recognized Native American tribes in Oregon. The airspace APE is directly associated with the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians, the Coquille Indian Tribe, and the Summit Lake Paiute Tribe (Nevada).

Table 3-18
National Register of Historic Places Listed Resources Under the Airspace*

Military Operations Area	Resource	Type	Reference No.	State
Dolphin	Sandy Creek Bridge	Structure	79002051	Oregon
Dolphin	Lake Creek Bridge	Structure	79002091	Oregon
Dolphin	Deadwood Creek Bridge	Structure	79002099	Oregon
Dolphin	North Fork of the Yachats Bridge	Structure	79002108	Oregon
Dolphin	Fisher School Bridge	Structure	79002105	Oregon
Dolphin	Umpaqua River Light House	Structure	77001100	Oregon
Dolphin	Wildcat Creek Bridge	Structure	79002089	Oregon
Dolphin	Hume, Mary D.	Structure	79002052	Oregon
Dolphin	St. George Reef Light Station	Structure	93001373	California
Dolphin	Osgood Ditch	Structure	01001151	Oregon
Dolphin	Osgood Ditch	Structure	01001151	Oregon
Dolphin	Logan Wash Ditch	Structure	01001153	Oregon
Dolphin	Logan Wash Ditch	Structure	01001153	Oregon
Dolphin	Logan Cut	Structure	01001154	Oregon
Dolphin	Logan Cut	Structure	01001154	Oregon
Dolphin	Logan Drain Ditches	Structure	01001155	Oregon
Dolphin	Logan Drain Ditches	Structure	01001155	Oregon
Dolphin	Rogue River Bridge No. 01172	Structure	05000814	Oregon
Dolphin	Umpqua River Bridge No. 01822	Structure	05000815	Oregon
Dolphin	Siuslaw River Bridge No. 01821	Structure	05000816	Oregon
Dolphin	Coos Bay Bridge No. 01823	Structure	05000817	Oregon
Dolphin	Ten Mile Creek Bridge No. 01181	Structure	05000818	Oregon
Dolphin	Big Creek Bridge No. 01180	Structure	05000819	Oregon
Dolphin	Cape Creek Bridge No. 01113	Structure	05000820	Oregon
Dolphin	Allen Gulch Townsite	Site	01001136	Oregon
Dolphin	Allen Gulch Townsite	Site	01001136	Oregon
Dolphin	St. Patrick's Roman Catholic Cemetery	Site	01001137	Oregon
Dolphin	Cameron Mine	Site	01001144	Oregon
Dolphin	Wheeler Ridge Japanese Bombing Site	Site	06000589	Oregon
Dolphin	Brother Jonathan (Shipwreck Site)	Site	02000535	California
Dolphin	Marshfield Elks Temple	Building	83002146	Oregon
Dolphin	Paulson, John E. and Christina, House	Building	83002147	Oregon
Dolphin	Coquille River Life Boat Station	Building	84002969	Oregon
Dolphin	Tower-Flanagan House	Building	84002976	Oregon
Dolphin	Coos Bay Carnegie Library	Building	86000297	Oregon
Dolphin	Chandler Hotel and Annex	Building	84002966	Oregon
Dolphin	Myrtle Arms Apartment Building	Building	85003478	Oregon
Dolphin	Store Gulch Guard Station No. 1020	Building	86000838	Oregon
Dolphin	Whisky Creek Cabin	Building	75001584	Oregon

Table 3-18
National Register of Historic Places Listed Resources Under the Airspace*

Military Operations Area	Resource	Type	Reference No.	State
Dolphin	Coquille River Light	Building	74001682	Oregon
Dolphin	Heceta Head Lighthouse and Keepers Quarters	Building	78002296	Oregon
Dolphin	Kyle, William, and Sons, Building	Building	81000499	Oregon
Dolphin	Central Building	Building	80003309	Oregon
Dolphin	Marshfield Sun Printing Plant	Building	73001574	Oregon
Dolphin	Reorganized Church of Latter-day Saints	Building	79002050	Oregon
Dolphin	Hughes, Patrick, House	Building	80003310	Oregon
Dolphin	Brown, Henry, House	Building	79002057	Oregon
Dolphin	Benedict, Edwin E., House	Building	79002090	Oregon
Dolphin	Olsson, Captain Bror W., House	Building	86002905	Oregon
Dolphin	Nasburg--Lockhart House	Building	85003038	Oregon
Dolphin	Abernethy, Edwin and Ethel, House	Building	88001532	Oregon
Dolphin	Gold Beach Ranger Station	Building	86000818	Oregon
Dolphin	Tower, Maj. Morton, House	Building	85003453	Oregon
Dolphin	Tribal Hall of the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians	Building	89000202	Oregon
Dolphin	Coos Bay National Bank Building	Building	89001868	Oregon
Dolphin	Coke, J. S., Building	Building	91000048	Oregon
Dolphin	Black, A. H. and Company, Building	Building	90001586	Oregon
Dolphin	United States Coast Guard Station--Umpqua River, Administration and Equipment Buildings	Building	92000662	Oregon
Dolphin	Hub Department Store Building	Building	92001307	Oregon
Dolphin	Breuer Building	Building	92001308	Oregon
Dolphin	Sherwood, A. J., House	Building	92001314	Oregon
Dolphin	Harlocker, Judge Lintner, House	Building	92001315	Oregon
Dolphin	St. James Episcopal Church	Building	92001316	Oregon
Dolphin	Cary, Leo J., House	Building	92001317	Oregon
Dolphin	Coquille City Hall	Building	92001318	Oregon
Dolphin	Sixes Hotel	Building	92001325	Oregon
Dolphin	Nerdrum, Hjalte, House	Building	93000435	Oregon
Dolphin	Cape Blanco Lighthouse	Building	73002339	Oregon
Dolphin	Cape Arago Lighthouse	Building	73002338	Oregon
Dolphin	Seelig--Byler House	Building	93001510	Oregon
Dolphin	Marshfield Hotel	Building	84002971	Oregon
Dolphin	Koski Building	Building	93001509	Oregon
Dolphin	Marshfield City Hall	Building	97000125	Oregon
Dolphin	Cresent City Lighthouse	Building	83001177	California
Dolphin	Nauke, William and Nannie, House	Building	99000946	Oregon
Dolphin	Nerdrum--Conrad House	Building	04000616	Oregon
Dolphin	Hotel North Bend	Building	05000932	Oregon

Table 3-18
National Register of Historic Places Listed Resources Under the Airspace*

Military Operations Area	Resource	Type	Reference No.	State
Dolphin	Egyptian Theatre	Building	10000281	Oregon
Goose	Sacred Heart Catholic Church	Building	83001209	California
Goose	NCO Railway Depot	Building	85000357	California
Goose	Nevada-California-Oregon Railway Co. General Office Building	Building	74000529	California
Goose	Nevada-California-Oregon Railway Co. General Office Building	Building	74000529	California
Juniper	Frenchglen Hotel	Building	84000469	Oregon

Note: * The condition is defined as “likely but not guaranteed to be extant” (or not guaranteed to be standing).

3.9.3.4 Cultural Resources in the Marine Environment

The western seaboard of the United States is rich in maritime tradition. It includes thousands of miles of coastline as well as numerous tributaries, inlets, and bays that provided avenues for transportation, trade, and a way of life to various groups from prehistoric times through the present. As such, the potential for submerged, underwater archaeological resources is equally rich and varied. The offshore APE includes portions of the coastlines and waters of the continental shelf of southern Oregon and northern California. Neither the Oregon nor California SHPO offices have specific programs dedicated to underwater resources.

Though the location, number, and type of underwater archaeological resources has not been as formally documented through time as terrestrial resources have, underwater resources have gained scientific and public prominence in the past two decades and are currently being tracked through several industry and government-run vehicles. NOAA maintains a Wrecks and Obstructions Database, the Automated Wreck and Obstruction Information System (AWOIS), which contains information on over 10,000 submerged wrecks and obstructions in the coastal waters of the United States (NOAA, n.d.). This AWOIS indicated there are as many as 25 uncharted wrecks and 4 visible wrecks within the offshore APE. The Maritime Archaeological Society, headquartered in Astoria, Oregon, was created to help state archaeologists document the thousands of shipwrecks and other submerged archaeological sites in the Pacific Northwest and beyond. They do not currently maintain an independent database; however, their Coastal Survey Project seeks to acquire a better understanding of the maritime heritage, currently focusing on the northern Oregon Coast by examining and recording wrecks as well as abandoned vessels. Wreck types can range from what may be first European contact around 1693 to nineteenth century luxury steamships and early twentieth-century boats used in local commerce. While shipwrecks have understandably been the primary subject of underwater archaeology, it is important to note that the potential for submerged prehistoric sites is equally great (Maritime Archaeological Society, n.d.).

3.10 HAZARDOUS MATERIALS AND WASTES, CONTAMINATED SITES, AND TOXIC SUBSTANCES

3.10.1 Definition of the Resource

The Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act (SARA) and the Toxic Substances Control Act (TSCA), defines hazardous materials (HAZMAT). HAZMAT is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The Occupational Safety and Health Administration (OSHA) is responsible for enforcement

and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also includes the regulation of HAZMAT in the workplace and ensures appropriate training in their handling.

The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. Hazardous waste is defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

AFPD 32-70, *Environmental Considerations in Air Force Programs and Activities*, establishes the policy that the Air Force is committed to

- cleaning up environmental damage resulting from its past activities;
- meeting all environmental standards applicable to its present operations;
- planning its future activities to minimize environmental impacts;
- responsibly managing the irreplaceable natural and cultural resources it holds in public trust; and
- eliminating pollution from its activities wherever possible.

AFI 32-7044, *Storage Tank Compliance*, implements AFPD 32-70 and identifies compliance requirements for underground storage tanks (USTs), aboveground storage tanks (ASTs), and associated piping that store petroleum products and hazardous substances. Evaluation of HAZMAT and hazardous wastes focuses on USTs and ASTs as well as the storage, transport, and use of pesticides, fuels, oils, and lubricants. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a Proposed Action. In addition to being a threat to humans, the improper release of HAZMAT and hazardous wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of HAZMAT or hazardous wastes, the extent of contamination varies based on type of soil, topography, weather conditions, and water resources.

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of HAZMAT throughout the Air Force. It applies to all Air Force personnel who authorize, procure, issue, use, or dispose of HAZMAT, and to those who manage, monitor, or track any of those activities.

Through the Environmental Restoration Program (ERP) initiated in 1980 (formerly the Installation Restoration Program [IRP]), a subcomponent of the Defense ERP that became law under SARA, each DOD installation is required to identify, investigate, and clean up hazardous waste disposal or release sites. Remedial activities for ERP sites follow the Hazardous and Solid Waste Amendment of 1984 under the RCRA Corrective Action Program. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants, minimize potential hazards to human health and the environment, and clean up contamination through a series of stages until it is decided that no further remedial action is warranted.

Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

Toxic substances might pose a risk to human health but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACM), lead-based paint (LBP), radon, and polychlorinated biphenyls (PCBs). The presence of special hazards or controls over them might affect, or be affected by, a Proposed Action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a Proposed Action.

Asbestos. AFI 32-1052, *Facility Asbestos Management*, provides the direction for asbestos management at Air Force installations. This instruction incorporates by reference applicable requirements of 29 CFR Part 669 et seq., 29 CFR § 1910.1025, 29 CFR § 1926.58, 40 CFR § 61.3.80, Section 112 of the CAA, and other applicable AFIs and DOD Directives. AFI 32-1052 requires bases to develop an asbestos management plan to maintain a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by the USEPA with the authority promulgated under OSHA, 29 U.S.C. § 669, et seq. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

Lead-based Paint. Human exposure to lead has been determined an adverse health risk by agencies such as OSHA and the USEPA. Sources of exposure to lead are dust, soils, and paint. In 1973, the Consumer Product Safety Commission (CPSC) established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the Consumer Product Safety Act (Public Law 101-608, as implemented by 16 CFR Part 1303), the CPSC lowered the allowable lead level in paint to 0.06 percent (600 ppm). The Act also restricted the use of LBP in nonindustrial facilities. DOD implemented a ban of LBP use in 1978; therefore, it is possible that facilities constructed prior to or during 1978 may contain LBP.

Radon. The US Surgeon General defines radon as an invisible, odorless, and tasteless gas, with no immediate health symptoms, that comes from the breakdown of naturally occurring uranium inside the earth (US Surgeon General, 2005). Radon that is present in soil can enter a building through small spaces and openings, accumulating in enclosed areas such as basements. No federal or state standards are in place to regulate residential radon exposure at the present time, but guidelines were developed. Although 4.0 picocuries per liter (pCi/L) is considered an “action” limit, any reading over 2 pCi/L qualifies as a “consider action” limit. The USEPA and the US Surgeon General have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low).

Polychlorinated Biphenyls. PCBs are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the United States until they were banned in 1979. The disposal of PCBs is regulated under the federal TSCA (15 U.S.C. § 2601, et seq., as implemented by 40 CFR Part 761), which banned the manufacture and distribution of PCBs, with the exception of PCBs used in enclosed systems. Per Air Force policy, all installations should have been PCB-free as of 21 December 1998. In accordance with 40 CFR Part 761 and Air Force policy, both of which regulate all PCB articles, which are regulated as follows:

- Less than 50 ppm—non-PCB (or PCB-free)
- 50 ppm to 499 ppm—PCB-contaminated
- 500 ppm and greater—PCB equipment (USEPA, 2008)

The TSCA regulates and the USEPA enforces the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment.

The ROI for hazardous materials and wastes, the installation ERP, and toxic materials includes Buildings 219, 307, and 404 at Kingsley Field ANGB. Radon is described for Klamath County, Oregon.

3.10.2 Existing Conditions – Kingsley Field

3.10.2.1 Hazardous Materials and Wastes

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of HAZMAT throughout the Air Force. It applies to all Air Force personnel who authorize,

procure, issue, use, or dispose of HAZMAT, and to those who manage, monitor, or track any of those activities.

Hazardous and toxic material procurements at Kingsley Field ANGB are approved and tracked by the Bioenvironmental Engineering Office. The Installation Environmental Management Office (EMO) supports and monitors environmental permits, HAZMAT and hazardous waste storage, spill prevention and response, and participation on the Environmental Safety and Occupational Health Council (ESOHC) (ORANG, 2014). The Environmental Protection Committee is the Environmental Management System (EMS) steering group. The Environmental Protection Committee consists of senior base leadership as described in AFI 32-7005, *Environmental Protection Committees*. The Environmental Protection Committee oversees compliance with AFPD 90-8 *Environmental, Safety and Occupational Health*, and in accordance with AFPD 32-70 which establishes the objectives and targets of the EMS and evaluates the performance of the EMS against established objectives and goals and makes changes to accommodate new or modified activities, procedures, or services. The ESOHC is a network of safety, environmental, and logistics experts who work with HAZMAT Managers, Unit Environmental Coordinators, and other HAZMAT users to ensure safe and compliant HAZMAT management throughout the base**.** A privately contracted hazardous material pharmacy (HAZMART) ensures that only the smallest quantities of HAZMAT necessary to accomplish the mission are purchased and used.

The 173 FW maintains a *Hazardous Waste Management Plan* (ORANG, 2014) as directed by AFI 32-7042. This plan prescribes the roles and responsibilities of all members of Kingsley Field ANGB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable federal, state, and local standards for solid waste and hazardous waste management.

The 173 FW is regulated as a small quantity generator of hazardous waste and maintains USEPA Hazardous Waste Identification Number OR3572800040. The 173 FW is a small quantity handler of universal waste, a subdivision of hazardous waste that does not need to be managed as hazardous waste as long as the provisions of universal waste management established in OAR Chapter 340, Divisions 109 and 113 (40 CFR Part 273) are followed. Wastes generated at Kingsley Field ANGB include waste flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, mixed-solid waste, and other miscellaneous wastes. Certain types of hazardous waste are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called “Universal Wastes,” and their associated regulatory requirements are specified in 40 CFR Part 273. Types of waste currently covered under the universal waste regulations include fluorescent light tubes, hazardous waste batteries, hazardous waste thermostats, and hazardous waste lamps.

By regulation, satellite accumulation points (SAP) have been established at specific facilities to handle locally accumulated wastes prior to transport to a central accumulation point (CAP) where wastes are packaged and prepared for subsequent disposal. The CAP is located at Vandenberg Drive and Harper Row where the EMO is located. No hazardous waste is stored within Building 404. Small quantities of hazardous waste or petroleum products may be generated in Buildings 219 and 307, which are identified as SAPs.

3.10.2.2 Environmental Restoration Program Sites

Kingsley Field began its IRP in 1981 with the investigation of possible locations of hazardous waste contamination. The result of investigations conducted under the ERP was the identification of 14 sites of concern. Due to geographical location and property ownership, six of these sites (Sites 2, 3, 4, 7, 8, and 12) were transferred to the US Army Corps of Engineers (USACE) to be addressed as formerly used defense sites. The remaining eight sites (Sites 1, 5, 6, 9, 10, 11, 13, and 14) are the responsibility of the ORANG. The eight ORANG cleanup sites have each received approved No Further Action (NFA) findings from the ODEQ. Most recently in 2014, Site 10 (PL016) received an NFA finding for which implementation of a Contaminated Material Management Plan was required as condition to the NFA (ODEQ, 2014).

Building 219 was identified as an area of concern, specifically the former wash rack/sump system, where soil contaminants were identified. Site investigations were conducted between November 2012 and December 2013, with an NFA issued by ODEQ in March 2014.

3.10.2.3 Asbestos and Lead-Based Paint

The 173 FW has developed an *Asbestos Management and Operating Plan* for Kingsley Field, which includes program administration, organizational roles and responsibilities, standard work practices, and documentation. Appendix E of the Plan includes the 2006 asbestos survey report for the facility (ORANG, 2012a).

The asbestos survey report indicates that of the three buildings identified in the Proposed Action (Buildings 219, 307, and 404) only Building 219 contained ACM. Building 219 was inspected for ACM in March 2006, with transite fire breaks being identified as ACM in the main bay area. At the time, this ACM was in good condition, appeared to pose no threat of asbestos exposure, and required no immediate action. The report did recommend that the material be inspected at six-month intervals, and if deterioration had occurred, repair or removal take place as applicable (ANG, 2006).

Buildings 307 and 404 were visually inspected in 2006, with no suspect ACM identified.

Comprehensive information or records on the presence or absence of LBP in Buildings 219 and 307 is available. Based on their construction date prior to 1978 (1959 and 1957, respectively), LBP may be present. Building 404 was constructed in 1992 and is less likely to contain LBP.

3.10.2.4 Radon

The Oregon Health Authority (OHA) has evaluated radon levels throughout Oregon and summarized the data in an online interactive ArcGIS data set (OHA, 2018). OHA classifies radon risk in Klamath County and the greater Klamath Falls area as Low, with average radon levels of 1.5 pCi/L.

USEPA and the US Surgeon General have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low). The USEPA radon zone for Klamath County, Oregon, is Zone 2 (Moderate Potential, predicted indoor average level between 2.0 and 4.0 pCi/L); however, radon potential throughout the county can vary (USEPA, 2013, 2016). Each zone designation reflects the average short-term radon measurement that can be expected in a building without the implementation of radon control methods.

3.10.2.5 Polychlorinated Biphenyls

All known high-voltage equipment containing 50 ppm or more of PCBs has been removed from Kingsley Field ANGB (ORANG, 2014). The facility's *Hazardous Waste Management Plan* indicates that there are no known PCB-containing materials at Kingsley Field ANGB but notes that ballasts and starters from light fixtures could be PCB-containing material. The disposal of these materials is regulated. If the ballasts are not plainly marked as "Non-PCB", the material must be treated as PCB-containing (or be tested and proven to be non-PCB containing). No PCB spills have been identified at Kingsley Field.

3.11 TRANSPORTATION

3.11.1 Definition of the Resource

Transportation is defined as the system of roadways, highways, and transit services that are in the vicinity of the installation, which could be potentially affected by the Proposed Action.

The ROI for this resource is Kingsley Field ANGB.

3.11.2 Existing Conditions – Kingsley Field

The 173 FW occupies 254 ac of exclusive use land at Crater Lake-Klamath Regional Airport through a lease with the City of Klamath Falls that expires in 2045 and an Airport Joint Use Agreement that expires in 2023. The main cantonment area is situated at west side of the airfield and is approximately 135 ac. There are four annexes occupied by the ANG: 1) the Munitions Storage Area annex, located east of the airfield, 2) the 270 ATCS annex south of the main cantonment area, 3) the Combat Arms Training and Maintenance/Rifle Range annex and the hush house on the south end of the primary runway, and 4) the Building 400 annex on the north end of the primary runway. The 173 FW maintains and operates 61 buildings at Kingsley Field ANGB (NGB, 2015).

Kingsley Field ANGB is located approximately 5 mi south of downtown Klamath Falls. US Highway 97 is the primary access road to Klamath Falls. US Highway 97 intersects Interstate 5 to the south in northern California and provides access to the north to Bend, Oregon, and the northern Willamette Valley via State Route 58. Regional access to Klamath Falls from the east and west is provided by State Route 140, connecting Klamath Falls to Medford and Ashland, Oregon.

Kingsley Field is accessed via the Main Gate located on Airport Way (**Figure 3-11**), just south of Joe Wright Road (County Highway 803). Joe Wright Road directly connects to US Highway 97 to the west as well as State Highway 140 via Washburn Way. Washburn Way is major north-south road that also provides access from Klamath Falls to Kingsley Field. A secondary gate to Kingsley Field is located on County Highway 876/Spring Lake Road (**Figure 3-11**); however, this gate is only used for special needs and construction traffic access and remains closed on most weekdays.

Traffic conditions for the weekday afternoon peak hour at key intersections along State Highway 140 proximate to Kingsley Field were studied for the *Klamath Falls Urban Area Transportation System Plan* (City of Klamath Falls, 2012). The study assigned levels of service for these key intersections. Levels of service range from A to F, with A indicating a free-flow of traffic and Level F indicating stop-and-go waves with traffic exceeding the amount that can be served. The Washburn Way/State Highway 140 intersection consists of ramps connecting the two roads via the Washburn Way overpass; the level of service at weekday afternoon peak hour conditions is C (indicating stable but restricted flow with significant interactions with others in the traffic stream) for the westbound ramps and F for the eastbound ramps. The intersection of US Highway 197 and Joe Wright Road was not studied (City of Klamath Falls, 2012).

The road network at Kingsley Field is a series of streets in a grid pattern (**Figure 3-11**). The primary entry through the Main Gate accesses Kingsley Way/Fighter Alley which directs vehicles to the McConnell Circle entrance to the base. Vandenberg Drive and Arnold Avenue are the primary north-south streets through the base and Gentile Street and Bong Street are the primary east-west streets at Kingsley Field. Traffic control at intersections is signed and no signalized intersections are located at Kingsley Field.

Parking is available at 12 parking lots providing space for 721 vehicles at Kingsley Field. No specific overflow parking is designated at the base. The 173 FW has utilized a privately owned field west of Kingsley Field across Spring Lake Road for overflow parking with permission from the landowner (ORANG, 2011).

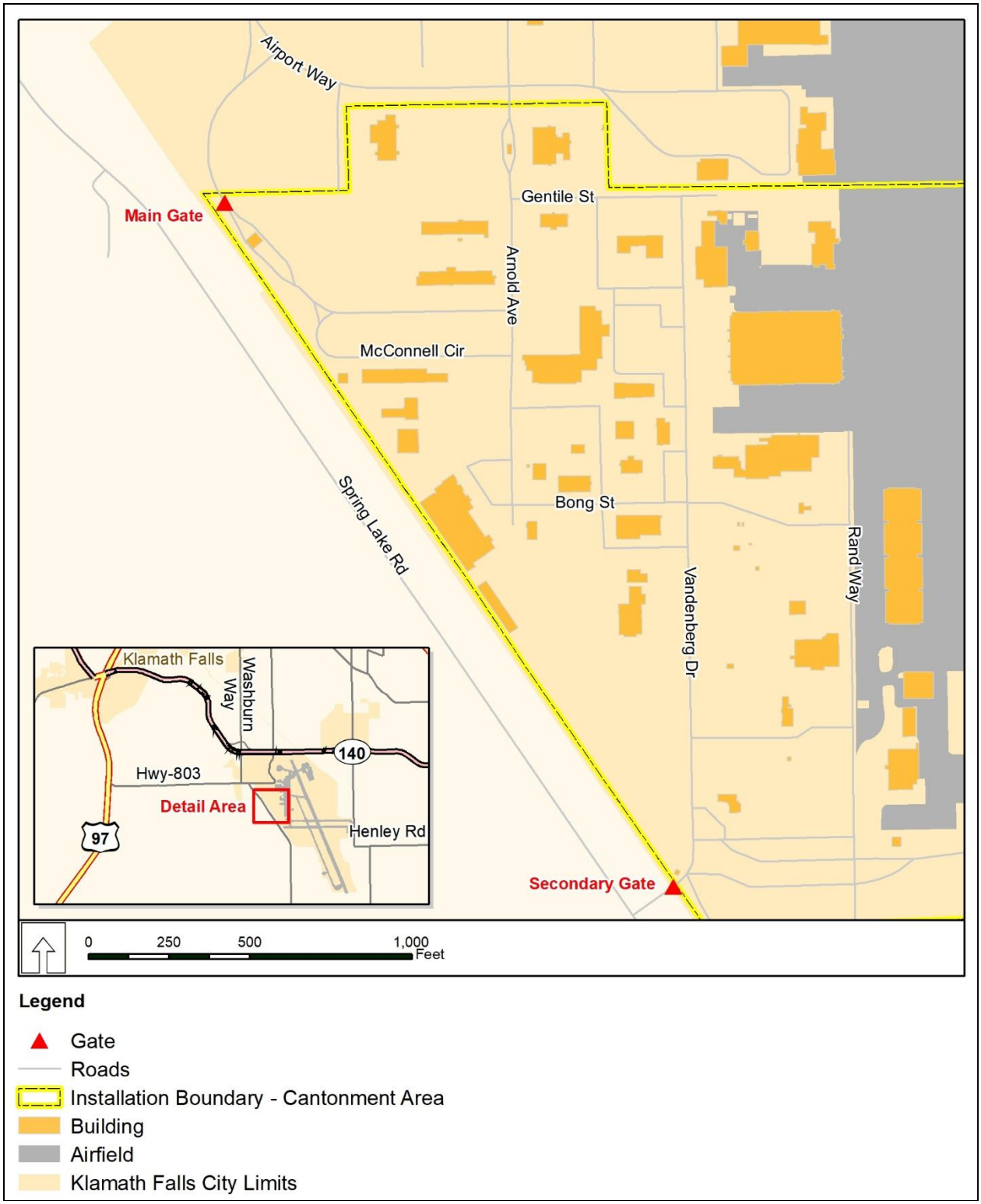


Figure 3-11. Transportation Network for Kingsley Field Air National Guard Base.

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CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter presents a detailed analysis of the potential environmental impacts associated with the Proposed Action, Alternatives, and No Action Alternative as described in **Chapter 2**. Impacts are described for each ROI previously described in **Chapter 3**. The specific criteria for evaluating impacts and assumptions for the analyses are presented under each resource area. Evaluation criteria for most potential impacts were obtained from standard criteria; federal, state, or local agency guidelines and requirements; and/or legislative criteria. Proposed environmental commitments and BMPs to reduce potential impacts are included for each resource area, as appropriate.

Impacts are defined in general terms and are qualified as adverse or beneficial, and as short- or long-term. For the purposes of this EA, short-term impacts are generally considered those impacts that would have temporary effects. Long-term impacts are generally considered those impacts that would result in permanent effects.

Impacts may be direct or indirect and are described in terms of type, context, duration, and intensity, which is consistent with the CEQ regulations. “Direct effects” are caused by an action and occur at the same time and place as the action. “Indirect effects” are caused by the action and occur later in time or are farther removed from the place of impact but are reasonably foreseeable.
Impacts are defined as

- negligible, the impact is localized and not measurable or at the lowest level of detection;
- minor, the impact is localized and slight but detectable;
- moderate, the impact is readily apparent and appreciable; or
- major, the impact is severely adverse or highly noticeable and considered to be significant.

Major impacts are considered significant and receive the greatest attention in the decision-making process. The significance of an impact is assessed based on the relationship between context and intensity. Major impacts require application of a mitigation measure to achieve a less than significant impact. Moderate impacts may not meet the criteria to be classified as significant, but the degree of change is noticeable and has the potential to become significant if not effectively mitigated. Minor impacts have little to no effect on the environment and are not easily detected; impacts defined as negligible are the lowest level of detection and generally not measurable. Beneficial impacts provide desirable situations or outcomes.

Direct and indirect effects and their significance, as well as the means (e.g., BMPs or environmental commitments) for reducing adverse environmental impacts are also discussed for each resource. As described in **Section 2.6**, for the High Noise Scenario Proposed Action, mitigation measures are required to reduce impacts. These measures are described in **Section 4.2.2.2** and **Appendix E**. The potential impacts on each resource from the proposed mitigation was evaluated and described in each **Chapter 4** resource section.

4.1 AIRSPACE MANAGEMENT

4.1.1 Evaluation Criteria

Adverse impacts on airspace might include modifications to special use airspaces or significantly increasing flight operations within airspaces as a result of the Proposed Action and alternatives. For the purposes of this EA, an impact is considered significant if it modifies airspace location, dimensions, or aircraft operational capacity.

4.1.2 Proposed Action

Under the Proposed Action, an estimated six contract ADAIR aircraft would provide training sorties at Kingsley Field and airspaces as described in **Chapter 2**. An estimated additional 2,000 sorties would be added to the current number of sorties flown at Kingsley Field. This number includes training sorties and a smaller number of sorties for aircraft leaving and returning from either maintenance or other deployments.

The number of sorties within MOAs and W-93 would increase by an estimated 1,952 sorties. Sorties in MOAs and W-93 would include both subsonic and supersonic flight operation.

4.1.2.1 Alternatives 1, 2, and 3

Implementation of alternatives differs only in the facilities chosen for operations, maintenance, and aircrew briefings. Because the number and type of aircraft, using the same flight profiles and airspace are the same under all alternatives, potential impacts on airspace management and use are the same for all action alternatives.

The addition of an estimated 2,000 sorties in the airspace around Kingsley Field is negligible, increasing the annual number of sorties by 3 percent. This change is not expected to impact the operational capacity or necessitate changes to airspace locations or dimensions around Kingsley Field. Potential impacts on the airspace around the airfield are expected to be negligible and long term.

There would be an increase of 1,952 sorties in the airspace resulting in an overall increase of aircraft operations in the Juniper/Hart MOA Complex, Dolphin MOA, Goose MOA, and W-93. Additionally, Air Force training flights at night would increase by approximately 60 airspace operations per year, an increase of 14 percent of existing nighttime airspace sorties. Contractor night sorties would be flown during the 173 FW's approved flying window and concurrent to the 173 FW's operations in the airspace.

The airspace proposed for use has the capacity and is in locations with the dimensions necessary to support the additional sorties proposed; therefore, negligible impacts on airspace are expected from the implementation of Alternative 1, 2, or 3.

4.1.2.2 Mitigation

The mitigation measures developed to reduce impacts from noise associated under the High Noise Scenario (described in **Section 4.2.2**) would not affect airspace and, therefore, have no impact on airspace management and use from implementation.

4.1.3 No Action Alternative

Under the No Action Alternative, contract ADAIR would not perform sorties at Kingsley Field and nearby airspaces; therefore, under the No Action Alternative, there would be no change to airspace use and management.

4.2 NOISE

4.2.1 Evaluation Criteria

Noise impact analysis typically evaluates potential changes to existing noise environments that would result from implementation of the Proposed Action and alternatives. At the installation, the 65-dBA DNL is the noise level below which generally all land uses are compatible with noise from aircraft operations. Areas beyond the 65-dBA DNL can also experience levels of appreciable noise depending upon training intensity or weather conditions. In addition, DNL noise contours may vary from year to year due to fluctuations in operational tempo due to unit deployments, funding levels, and other factors. In the airspace, supersonic flight operations in the overland MOAs have the potential to generate loud sonic booms.

Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise impacts were evaluated for the Proposed Action and alternatives.

4.2.2 Proposed Action

The Proposed Action includes contracting for the support of an estimated six contractor aircraft to fly an estimated 2,000 annual sorties in support of the 173 FW at Kingsley Field. This number of sorties includes those expected for training activities and aircraft leaving for or returning from either maintenance or other deployments. Of the estimated 2,000 sorties, about 1,952 of those are the training sorties that would occur within MOAs or W-93.

Because it is not known at this time what type of aircraft would be used by contract ADAIR, three aircraft scenarios were evaluated, High, Medium, and Low, to represent the range of aircraft types that could be selected. These scenarios are discussed further below. Depending on the specific type of contract ADAIR aircraft, impacts on the noise environment are expected to range from negligible to major and would be long term.

No significant impacts are anticipated from the Medium Noise or Low Noise Scenarios. Significant impacts on the noise environment could occur from the High Noise Scenario. Impacts from each alternative are summarized in **Table 4-1,** with details regarding impacts specific to the alternatives described in **Sections 4.2.2.1** through **4.2.2.3**.

Table 4-1
Summary of Potential Noise Impacts

Alternative	Change in Noise
Alternatives 1, 2, and 3	High Noise Scenario – Long-term, minor noise increases (0- to 2-dBA DNL) for some POIs as well as long-term, major noise increases (3- to 4-dBA DNL) for a number of POIs resulting in potential significant impacts from addition of contract ADAIR flight operations in the vicinity of the Kingsley Field airfield. Impacts are primarily localized north, west, and south of Kingsley Field. Negligible to minor increase in noise from additional contract ADAIR subsonic and/or supersonic flight operation in the Juniper/Hart MOA Complex, Dolphin MOA, Goose MOA, and Warning Area W-93.
	Medium Noise Scenario – Long-term, negligible to minor increases in noise from addition of contract ADAIR flight operations in the vicinity of the Kingsley Field airfield. Impacts are primarily localized north and south of Kingsley Field. Negligible increase in noise from additional contract ADAIR subsonic and/or supersonic flight operation in the Juniper/Hart MOA Complex, Dolphin MOA, Goose MOA, and Warning Area W-93.
	Low Noise Scenario – Long-term, negligible to minor increases in noise from addition of contract ADAIR flight operations in the vicinity of the Kingsley Field airfield. Impacts are primarily localized north and south of Kingsley Field. Negligible increase in noise from additional contract ADAIR subsonic and/or supersonic flight operation in the Juniper/Hart MOA Complex, Dolphin MOA, Goose MOA, and Warning Area W-93.
No Action Alternative	None

Notes:
ADAIR = adversary air; MOA = Military Operations Area; POI = point of interest

4.2.2.1 Alternatives 1, 2, and 3

Implementation of the Proposed Action would establish contract ADAIR capabilities (an estimated six aircraft) providing 2,000 annual training sorties at Kingsley Field in the Juniper/Hart MOA Complex, Dolphin MOA, Goose MOA, and W-93.

Since the exact types of aircraft that ADAIR contractors would operate at Kingsley Field is unknown, three scenarios were designed to provide a bounded analysis of potential impacts on the noise environment. The aircraft proposed for use by contract ADAIR and the surrogate aircraft modeled for the High, Medium, and Low Noise Scenarios are summarized in **Table 4-2**.

Table 4-2
Adversary Air Noise Scenarios

Scenario	Adversary Air Aircraft	Surrogate Aircraft
High Noise Scenario	Eurofighter Typhoon	F-18E/F
Medium Noise Scenario	Dassault Mirage	F-16C
Low Noise Scenario	JAS 39 Gripen	F-16A

To model changes in noise relative to the baseline conditions, all modeled contract ADAIR flight and engine run-up operations are set to the ADAIR aircraft listed in **Table 4-2** for the appropriate scenario. For example, when evaluating the High Noise Scenario, all contract ADAIR operations are modeled as Eurofighter Typhoon operations; however, the NOISEMAP database does not contain noise data for the Eurofighter Typhoon, so an appropriate noise modeling surrogate was selected, the F-18E/F in this case. The noise modeling surrogates for various aircraft presented in **Table 4-2** have been approved for use by the Air Force. Flight profiles for contract ADAIR (i.e., schedules of altitude, power setting, and airspeed along each flight track) were reviewed and approved by the Air Force. The representative flight profiles for the various contract ADAIR scenarios are provided in **Appendix B**. All contract ADAIR departure profiles were modeled using afterburner or the maximum possible power on all take-offs.

High Noise Scenario

Under the High Noise Scenario, all contract ADAIR operations are assumed to be performed by Eurofighter Typhoon aircraft. Since noise data for the Eurofighter Typhoon are not available in NOISEMAP, the F-18E/F was used as a modeling surrogate. Proposed contract ADAIR flight operations at Kingsley Field and associated airspaces would be identical to existing conditions except for the additional contract ADAIR sorties. Noise analysis of the High Noise Scenario was conducted to analyze changes to the airfield noise contours and the proposed airspaces.

Kingsley Field Noise Environment

Implementation of the Proposed Action would result in a 3 percent increase in the number of operations at Kingsley Field. Contract ADAIR would fly up to a projected 3 percent of the estimated total 2,000 additional sorties during environmental night hours when the effects of aircraft noise are accentuated (10:00 pm to 7:00 am local time). This equates to an increase of approximately 60 sorties per year, a 14 percent increase above all existing night sorties. Runway utilization, flight tracks, and flight track utilization for contract ADAIR aircraft would be similar to the existing F-15C/D operations. Proposed annual departure, arrival, and closed pattern aircraft operations at Kingsley Field with the addition of contract ADAIR are summarized in **Table 4-3**. Contract ADAIR would also perform static run-up operations, such as pre- and postflight run-ups.

Table 4-3
Proposed Annual Aircraft Operations Summary at Kingsley Field Air National Guard Base

Aircraft	Departures		Arrivals		Closed Patterns		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Total
F-15C/D	4,556	-	4,428	128	9,097	265	18,081	393	18,474
Contract ADAIR	2,000	-	1,944	56	583	-	4,526	56	4,582
Civilian	11,221	204	11,221	204	6,983	-	29,425	408	29,833
Transients	811	-	811	-	8	-	1,630	-	1,630
Grand Total	**18,588**	**204**	**18,404**	**388**	**16,671**	**265**	**53,662**	**857**	**54,519**

Notes:
* See **Sections 2.1.5**, **2.1.6**, and **3.2.2** for an explanation of closed patterns, sorties, and operations.
ADAIR = adversary air

As described in **Section 3.2.1.2**, NOISEMAP was used to model military aircraft noise. The resultant 65- to 85-dBA DNL contours in 5-dBA increments for the daily flight events at Kingsley Field under the proposed High Noise Scenario are summarized on **Figure 4-1**. The 65-dBA DNL is the noise level below which generally all land uses are compatible with noise from aircraft operations.

The primary changes in noise contour features between the High Noise Scenario and the existing conditions is the elongation of the DNL contours along the extended centerline of Runway 14/32 and the expansion perpendicular to the runway. This overall increase in noise level is a result of contract ADAIR departures, straight-in arrivals, and closed pattern flight operations. A comparison of the DNL noise contours of the High Noise Scenario and the existing conditions is shown on **Figure 4-2**, and the change in area within noise contours as a result of the High Noise Scenario is shown in **Table 4-4**.

As a result of the implementation of the High Noise Scenario, noise levels at representative POIs described in **Section 3.2.2** would increase (**Table 4-5**).

At the representative noise-sensitive locations modeled, the DNL would increase by an amount ranging from 0 to 4 dBA under the High Noise Scenario. DNL increases of 3 to 4 dBA would be clearly noticeable and may increase human annoyance. If unmitigated, impacts within this range would be major and could be potentially be significant. All other POIs examined would experience negligible to minor DNL increases of 0 to 2 dBA. The increased DNL at these POIs and the surrounding areas would be long term, barely noticeable, and not significant under Alternatives 1, 2, and 3.

Airspace Noise Environment

Under the High Noise Scenario, contract ADAIR would perform an estimated 1,952 annual airspace operations in the various MOAs and W-93. Contract ADAIR would only operate in the same MOAs and the Warning Area already used by based Kingsley Field aircraft. The Juniper/Hart MOA Complex would receive approximately 73 percent of sorties originating from Kingsley Field while the Dolphin MOA would receive approximately 9 percent, the Goose MOA about 17.5 percent, and W-93 about 0.5 percent. A summary of estimated annual airspace operations is presented in **Table 4-6**.

Using the methods described in **Section 3.2.1.2** for MR_NMAP, the L_{dnmr} noise levels from the proposed High Noise Scenario were calculated from the subsonic aircraft operations underneath the Juniper/Hart MOA Complex, Dolphin MOA, Goose MOA, and W-93. Subsonic noise levels modeled for Kingsley Field-based aircraft and contract ADAIR aircraft under the High Noise Scenario using MR_NMAP differ negligibly from the levels reported in **Table 3-5**. Due to the negligible change and the overall low L_{dnmr} noise levels from the proposed High Noise Scenario, there are no significant impacts expected to the noise environments of any of the listed airspaces.

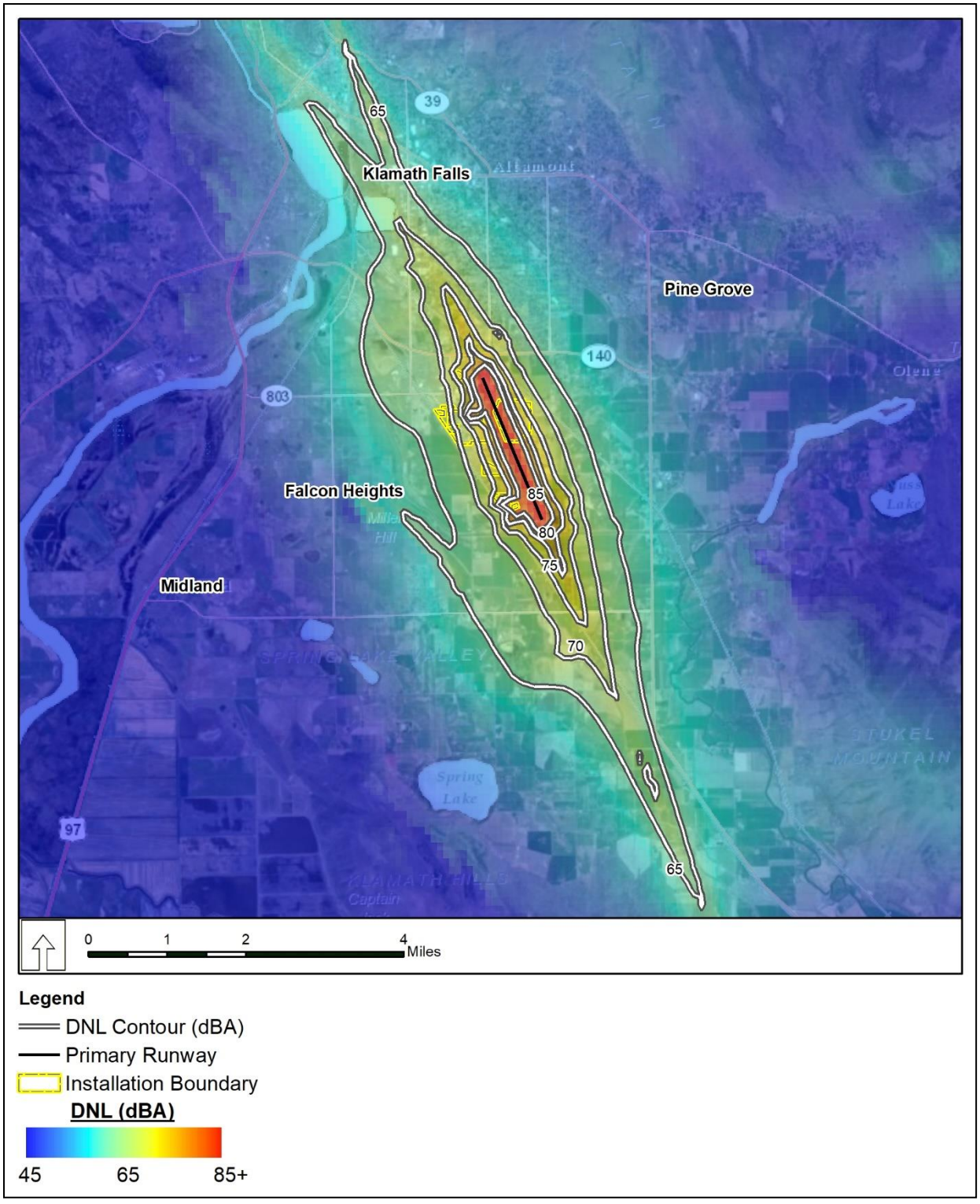

Figure 4-1. High Noise Scenario Day-Night Average Sound Level Contours at Kingsley Field Air National Guard Base.

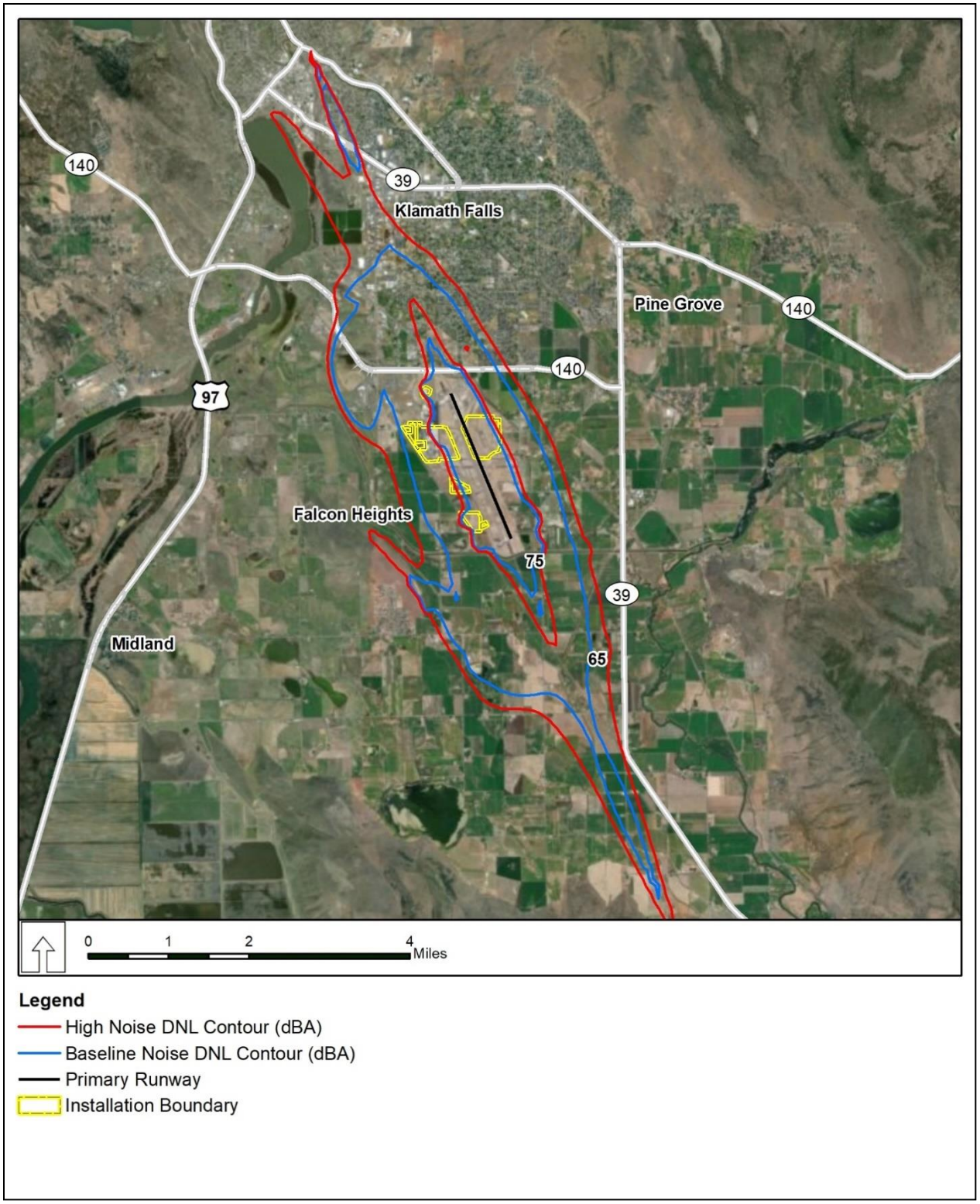

Figure 4-2. Comparison of High Noise Scenario and Existing Day-Night Average Sound Level Contours at Kingsley Field Air National Guard Base.

Table 4-4
Proposed High Noise Scenario Day-Night Average Sound Level Area Affected on and Surrounding Kingsley Field Air National Guard Base

Noise Level (dBA DNL)	Area Within Noise Contour (acres)		
	Existing	High Noise Scenario	Increase
>65	6,094	8,836	2,742
>70	2,293	3,238	945
>75	1,155	1,554	399
>80	625	800	175
>85	350	433	83

Notes:
dBA = A-weighted decibel(s); DNL = day-night average sound level

Table 4-5
Proposed High Noise Scenario Day-Night Average Sound Level at Representative Points of Interest on and near Kingsley Field Air National Guard Base

POI		DNL (dBA)		
ID	Description	Existing	High Noise Scenario	Increase in DNL
01	Brixner Junior High School	60	61	1
02	Apostolic Lighthouse	57	59	2
03	Baptist Church of Homedale	54	56	2
04	BBC Ministries	53	55	2
05	Calvary Chapel	56	59	3
06	Church of Christ	51	53	2
07	Fairview School	54	58	4
08	Faith Tabernacle Assembly	59	61	2
09	First Church of God	60	63	3
10	Harvest Outreach Christian Center	54	57	3
11	Hosanna Christian School	64	66	2
12	The Church of Jesus Christ of Latter-day Saints	50	52	2
13	Klamath Community College	49	51	2
14	Klamath Family Head Start	62	64	2
15	Living Faith Fellowship	60	61	1
16	Mazama High School	58	60	2
17	Mt Laki Community Church	61	64	3
18	New Horizon Christian Fellowship	52	54	2
19	Our Place to Grow LLC daycare	57	60	3
20	Peterson Elementary School	60	61	1
21	Ponderosa Middle School	55	57	2
22	St Pius X Catholic Church	61	62	1
23	Stearns Elementary School	63	65	2
24	Triad School	56	59	3
25	Wesleyan Church	55	57	2
26	Orego Institute of Technology	55	55	0
27	Sky Lakes Medical Center	59	59	0
28	Residences Near Lombardy Lane and railroad tracks	71	74	3
29	Residences Near Old Midland Road and railroad tracks	72	75	3
30	Residences Near Anderson Avenue and Altamount Drive	72	76	4
31	Residences Near Highland Way and Summit Street	68	70	2
32	Residences Near Airway Drive and Homedale Road	63	65	2

Notes:
Affected POIs based off NOISEMAP modeled noise contours and used to calculate the POIs within each noise contour.
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

Table 4-6
Proposed Annual Airspace Operations Summary from Kingsley Field

Aircraft	Juniper/ Hart MOA Complex		Dolphin MOA		Goose MOA		W-93		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Total
F-15C/D	3,744	109	489	14	885	26	22	1	5,140	150	5,290
Contract ADAIR	1,328	39	180	5	379	11	9	-	1,896	55	1,951
LFE	252	-	-	-	-	-	-	-	252	-	252
Grand Total	**5,324**	**148**	**669**	**19**	**1,264**	**37**	**31**	**1**	**7,288**	**205**	**7,493**

Notes:
ADAIR =adversary air; LFE = large force exercise; MOA = Military Operations Area

Supersonic flight operations are only allowed in the Juniper/Hart MOA Complex above 30,000 ft. For W-93, supersonic flights are restricted to 15 NM offshore and at altitudes greater than 15,000 ft MSL. Airspace sorties require aircraft to exceed Mach 1.0 (supersonic) for brief periods of time for approximately 10 percent of total flight time. This is equivalent to less than 5 minutes of supersonic flight activity per sortie. That percentage of supersonic flight is in not expected to change with the addition of contract ADAIR aircraft.

For cumulative sonic boom exposure under supersonic air combat training arenas, the BooMap program as described in **Section 3.2.1.2** was used to model the cumulative CDNL exposure in the MOAs proposed for use under the Proposed Action. The sonic boom noise levels modeled for the High Noise Scenario are unlikely exceed the 45-dB CDNL under any primary use airspace unit.

Single event sonic boom levels were estimated, using the PCBoom program also described in **Section 3.2.1.2**, directly undertrack for the F-15C/D, and the surrogates modelled for the Eurofighter Typhoon, Dassault Mirage, and JAS 39 Gripen aircraft at various altitudes and Mach numbers. The single event levels reported include Overpressure (psf) and CSEL in decibels. Sonic boom levels estimated for contract ADAIR supersonic flights in the airspace above the Juniper/Hart MOA Complex and W-93 are shown on **Tables 4-7** and **4-8**, respectively. For ease of comparison sonic boom levels for the High, Medium, and Low Noise Scenarios are included.

The sonic boom levels shown on **Tables 4-7** and **4-8** are the loudest levels computed at the center of the footprint for the constant Mach, level flight conditions indicated. Supersonic flights above the Juniper/Hart MOA Complex and W-93 occur at high altitudes but would still generate booms that are certain to be noticed. The location of these booms would vary with changing flight paths and weather conditions, so it is unlikely that any given location would experience these undertrack levels more than once over multiple events. Overpressure levels, directly under the flight path, estimated for the Juniper/Hart MOA Complex would range from 1.0 to 2.5 psf depending on the flight conditions. Likewise, overpressure levels, directly under the flight path, for W-93 would range from 1.1 to 6.0 psf although supersonic flights in W-93 are expected to occur more than 15 nm from the coast. Public reaction may occur with overpressures above 1 psf, and in rare instances, damage to structures have occurred at overpressures between 2 and 5 psf (NASA, 2017). People located farther away from the supersonic flight paths, who are still within the primary boom carpet, might also be exposed to levels that may be startling or annoying, but the probability of this decreases the farther away they are from the flight path. People located beyond the edge of the boom carpet are not expected to be exposed to sonic boom although postboom rumbling sounds may be heard. The addition of contractor aircraft operating at supersonic speeds means that the number of sonic booms heard would likely increase; however, potential impacts associated with sonic booms are still expected to be negligible under Alternatives 1, 2, and 3.

Table 4-7
Above Juniper/Hart Military Operations Area Complex: Sonic Boom Levels Undertrack for Adversary Air Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (Feet)		
	30,000	40,000	50,000
Mach 1.2			
Overpressure (psf)			
F-15C/D	2.2	1.6	1.3
Eurofighter Typhoon[1]	2.2	1.6	1.3
Dassault Mirage[2]	1.8	1.3	1.0
JAS 39 Gripen[3]	1.8	1.3	1.0
CSEL (dB)[1]			
F-15C/D	109	106	104
Eurofighter Typhoon[1]	108	106	104
Dassault Mirage[2]	107	104	101
JAS 39 Gripen[3]	107	104	101
Mach 1.5			
Overpressure (psf)			
F-15EC/D	2.5	1.7	1.3
Eurofighter Typhoon[1]	2.4	1.7	1.4
Dassault Mirage[2]	2.0	1.4	1.0
JAS 39 Gripen[3]	2.0	1.4	1.0
CSEL (dB)[1]			
F-15C/D	110	106	104
Eurofighter Typhoon[1]	109	106	104
Dassault Mirage[2]	108	104	102
JAS 39 Gripen[3]	108	104	102

Notes:
[1] As modelled with the surrogate F-18E/F
[2] As modelled with the surrogate F-16C
[3] As modelled with the surrogate F-16A
C-weighted Sound Exposure Level (CSEL) – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz
dB = decibel(s); psf = pound(s) per square foot

Table 4-8
Above Warning Area W-93: Sonic Boom Levels Undertrack for Adversary Air Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (Feet)			
	10,000	20,000	30,000	40,000
Mach 1.2				
Overpressure (psf)				
F-15C/D	5.2	2.8	1.8	1.4
Eurofighter Typhoon[1]	5.1	2.7	1.8	1.4
Dassault Mirage[2]	4.2	2.2	1.5	1.1
JAS 39 Gripen[3]	4.2	2.2	1.5	1.1
CSEL (dB)[1]				
F-15C/D	116	110	107	105
Eurofighter Typhoon[1]	116	110	107	105
Dassault Mirage[2]	114	109	105	103
JAS 39 Gripen[3]	114	109	105	103
Mach 1.5				
Overpressure (psf)				
F-15C/D	6.0	3.2	2.0	1.5
Eurofighter Typhoon[1]	5.9	3.1	2.0	1.5
Dassault Mirage[2]	4.9	2.5	1.6	1.2
JAS 39 Gripen[3]	4.9	2.5	1.6	1.2
CSEL (dB)[1]				
F-15C/D	117	112	108	105
Eurofighter Typhoon[1]	117	111	108	105
Dassault Mirage[2]	115	110	106	103
JAS 39 Gripen[3]	115	110	106	103

Notes:
[1] As modelled with the surrogate F-18E/F
[2] As modelled with the surrogate F-16C
[3] As modelled with the surrogate F-16A
C-weighted Sound Exposure Level (CSEL) – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz
dB = decibel(s); psf = pound(s) per square foot

Medium Noise Scenario

Under the Medium Noise Scenario, all contract ADAIR operations are assumed to be performed by Dassault Mirage aircraft. Since noise data for the Dassault Mirage are not available in NOISEMAP, the F-16C was used as a modeling surrogate. Proposed flight operations at Kingsley Field and associated MOAs would be identical to existing conditions except for the additional contract ADAIR sorties. Noise

analysis of the Medium Noise Scenario was conducted to analyze changes to the airfield noise contours and assess noise changes in the proposed airspaces.

Kingsley Field Noise Environment

Under the Medium Noise Scenario, contract ADAIR would perform the same operations as outlined under the High Noise Scenario in **Section 4.2.2.1** (see **Table 4-4**). As such, the increase in the total number of operations and increase in night sorties, runway utilization, flight tracks, and flight track utilization would also be the same as described in the High Noise Scenario.

NOISEMAP was used to model military aircraft noise. The resultant 65- to 85-dBA DNL contours in 5-dBA increments for the existing daily flight events at Kingsley Field are shown on **Figure 4-3**. The primary changes in noise contour features between the Medium Noise Scenario and the existing conditions would be the elongation of the DNL contours along the extended centerline of Runway 14/32 and a slight expansion perpendicular to the runway. This overall increase in noise level would be a result of contract ADAIR departures, straight-in arrivals, and closed pattern flight operations. A comparison of the DNL noise contours of the Medium Noise Scenario and the existing conditions is shown on **Figure 4-4**.

Under the Medium Noise Scenario, the amount of area within noise contours would increase (**Table 4-9**). These increases would not lead to significant impacts in these areas.

As a result of the implementation of the Medium Noise Scenario, noise levels at representative POIs described in **Section 3.2.3** would increase (**Table 4-10**). At the representative noise-sensitive locations modeled, the DNL would increase by an amount ranging from 0 to 2 dBA under the Medium Noise Scenario. As such, all representative POIs examined would experience negligible to minor impacts from DNL increases of 0 to 2 dBA. The negligible to minor impacts on these POIs and the surrounding areas would be long term, barely noticeable, and not significant under Alternatives 1, 2, and 3.

Airspace Noise Environment

Under the Medium Noise Scenario, the subsonic and/or supersonic airspace noise environment would be practically identical to the subsonic and/or supersonic airspace noise environment under the High Noise Scenario described in **Section 4.2.2.1**. The aircraft proposed in the Medium Noise Scenario are slightly quieter than those used in the High Noise Scenario, which was determined to have no significant impacts; as such, there would be no significant impacts under the quieter Medium Noise Scenario (see **Tables 4-7** and **4-8**) under Alternatives 1, 2, and 3.

Low Noise Scenario

Under the Low Noise Scenario, all contract ADAIR operations would be performed by JAS 39 Gripen aircraft. Since noise data for the JAS 39 Gripen are not available in NOISEMAP, the F-16A was used as a modeling surrogate. Proposed contract ADAIR flight operations at Kingsley Field and associated airspaces would be identical to existing conditions except for the additional contract ADAIR sorties. Noise analysis of the Low Noise Scenario was conducted to analyze changes to the airfield noise contours and the proposed airspaces.

Kingsley Field Noise Environment

Under the Low Noise Scenario, contract ADAIR would perform the same operations as outlined under the High Noise Scenario in **Section 4.2.2.1** (see **Table 4-4**). As such, the increase in the total number of operations and increase in night sorties, runway utilization, flight tracks, and flight track utilization would also be the same as described in the High Noise Scenario.

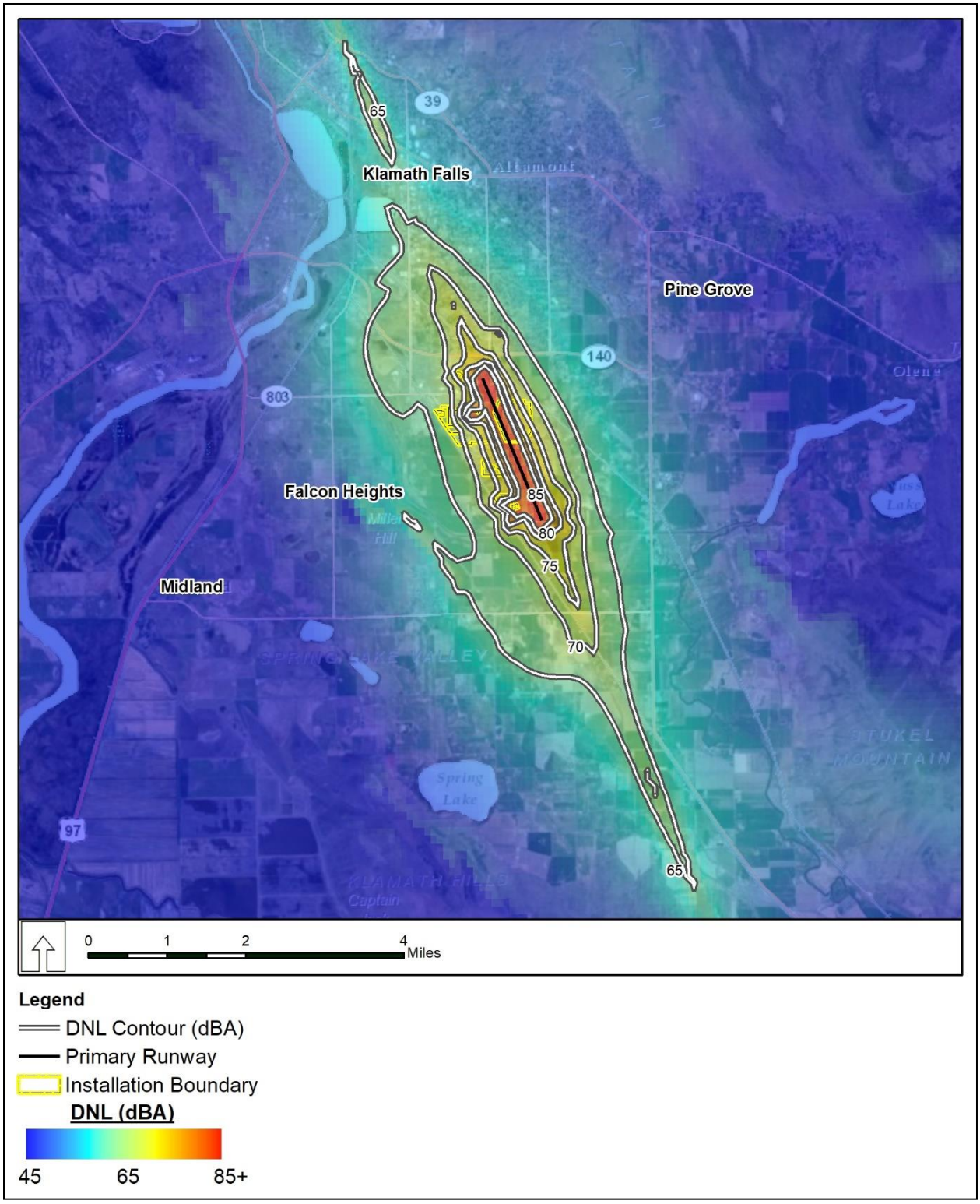

Figure 4-3. Medium Noise Scenario Day-Night Average Sound Level Contours at Kingsley Field Air National Guard Base.

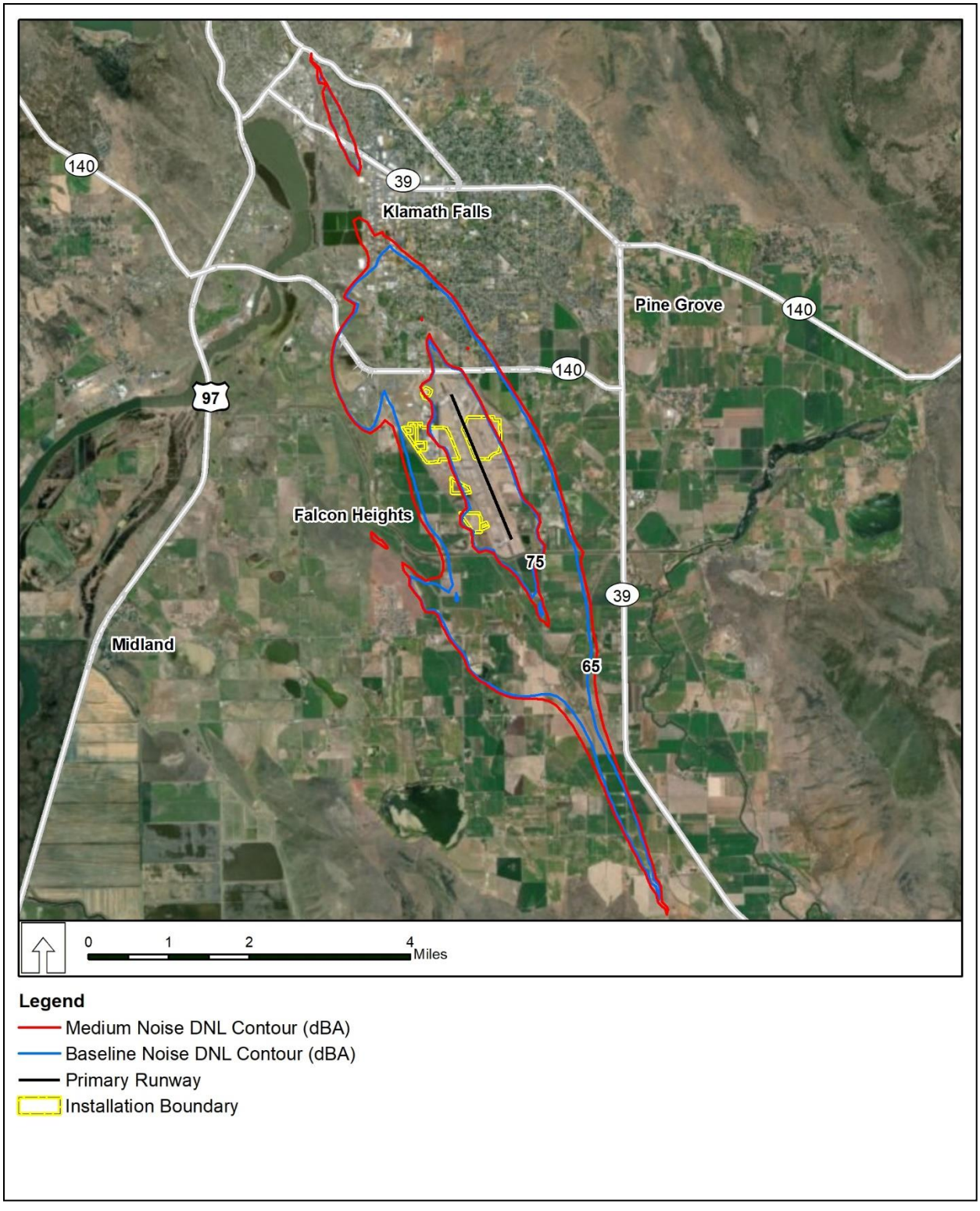

Figure 4-4. Comparison of Medium Noise Scenario and Existing Day-Night Average Sound Level Contours at Kingsley Field Air National Guard Base.

Table 4-9
Proposed Medium Noise Scenario Day-Night Average Sound Level Area affected on and surrounding Kingsley Field Air National Guard Base

Noise Level (dBA DNL)	Area Within Noise Contour (acres)		
	Existing	Medium Noise Scenario	Increase
>65	6,094	6,836	742
>70	2,293	2,539	246
>75	1,155	1,278	123
>80	625	692	67
>85	350	410	60

Notes:
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level

Table 4-10
Proposed Medium Noise Scenario Day-Night Average Sound Level at Representative Points of Interest on and near Kingsley Field Air National Guard Base

POI		DNL (dBA)		
ID	Description	Existing	Medium Noise Scenario	Increase in DNL
01	Brixner Junior High School	60	61	1
02	Apostolic Lighthouse	57	58	2
03	Baptist Church of Homedale	54	55	1
04	BBC Ministries	53	54	1
05	Calvary Chapel	56	57	1
06	Church of Christ	51	52	1
07	Fairview School	54	55	1
08	Faith Tabernacle Assembly	59	60	1
09	First Church of God	60	61	1
10	Harvest Outreach Christian Center	54	55	1
11	Hosanna Christian School	64	65	1
12	The Church of Jesus Christ of Latter-day Saints	50	51	1
13	Klamath Community College	49	50	1
14	Klamath Family Head Start	62	62	0
15	Living Faith Fellowship	60	60	0
16	Mazama High School	58	58	0
17	Mt Laki Community Church	61	62	1
18	New Horizon Christian Fellowship	52	53	1
19	Our Place to Grow LLC daycare	57	58	1
20	Peterson Elementary School	60	61	1
21	Ponderosa Middle School	55	56	1
22	St Pius X Catholic Church	61	61	0
23	Stearns Elementary School	63	63	0
24	Triad School	56	57	1
25	Wesleyan Church	55	56	1
26	Orego Institute of Technology	55	55	0
27	Sky Lakes Medical Center	59	59	0
28	Residences Near Lombardy Lane and railroad tracks	71	72	1
29	Residences Near Old Midland Road and railroad tracks	72	72	0
30	Residences Near Anderson Avenue and Altamount Drive	72	73	1
31	Residences Near Highland Way and Summit Street	68	69	1
32	Residences Near Airway Drive and Homedale Road	63	64	1

Notes:
Affected POIs based off NOISEMAP modeled noise contours and used to calculate the POIs within each noise contour.
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

NOISEMAP was used to model military aircraft noise. The resultant 65- to 85-dBA DNL contours in 5-dBA increments for the existing daily flight events at Kingsley Field are shown on **Figure 4-5**. The primary changes in noise contour features between the Low Noise Scenario and the existing conditions would be the elongation of the DNL contours along the extended centerline of Runway 14/32 and the slight expansion perpendicular to the runway. This overall increase in noise level would be a result of contract ADAIR departures, straight-in arrivals, and closed pattern flight operations. A comparison of the DNL noise contours of the Low Noise Scenario and the existing conditions is shown on **Figure 4-6**.

The area within each DNL noise contour band for both the existing conditions and the Low Noise Scenario is shown in **Table 4-11**. These increases are not expected to lead to significant impacts in these areas.

As a result of the implementation of the Low Noise Scenario, noise levels at representative POIs identified in **Section 3.2.2** would increase (**Table 4-12**). At the representative noise-sensitive locations studied, the DNL would increase by an amount ranging from 0 to 1 dBA under the Low Noise Scenario. All POIs examined would experience negligible to minor impacts due to DNL increases of 0 to 1 dBA. The negligible to minor impacts on these POIs, and the areas surrounding them would be long term, barely noticeable, and less than significant under Alternatives 1, 2, and 3.

Airspace Noise Environment

Under the Low Noise Scenario, the subsonic and/or supersonic airspace noise environment would be practically identical to the subsonic and/or supersonic airspace noise environment under the High Noise Scenario described in **Section 4.2.2.1**. The aircraft proposed under the Low Noise Scenario are slightly quieter than those proposed for the High Noise Scenario. Since there was a determination of no significant impacts under the High Noise Scenario with appropriate mitigations, there would be no significant impacts under the quieter Low Noise Scenario (see **Tables 4-7** and **4-8**) under Alternatives 1, 2, and 3.

4.2.2.2 Mitigation

Noise analyses conducted for the Proposed Action (**Section 4.2.2**) indicate that the noise exposure at Kingsley Field may increase significantly with the proposed addition of ADAIR contractor flight training operations under the High Noise Scenario and specifically for the straight-in arrival operations by these High Noise Scenario aircraft; therefore, to reduce the potentially significant impacts from noise on POIs under the High Noise Scenario, operational noise mitigation studies were conducted with a goal of reducing noise at the POIs in the vicinity of the airfield so that no POIs experience an increase greater than 3 dBA as a result of the Proposed Action. While a change of 3 dBA would be clearly noticeable by the average human ear (Federal Interagency Committee on Noise, 1992), this change can be equivalent to a doubling of flight operations for people near and around the airfield. DNL increases of 3 to 4 dBA would be perceptible and may increase human annoyance. A 3-dBA increase was used as a threshold in this EA as point where further consideration may be warranted. If unmitigated, impacts within this range would be major and could potentially be significant. Because the specific mix of aircraft to be used by contract ADAIR is unknown, the range of potential impacts was bounded by the scenarios chosen for analysis (High, Medium, and Low). The ultimate need for mitigation will be determined by the actual aircraft used for contract ADAIR if the High Noise Scenario is implemented. This section describes the noise mitigation studies conducted for Kingsley Field, including the mitigation scenarios that were successful in achieving the desired noise reduction that could be applied in practice. The recommended mitigation option is then described based on these analyses. A mitigation and monitoring plan is included as **Appendix E.**

A STRAIGHT-IN ARRIVAL IS DESCRIBED AS THE AIRCRAFT'S FINAL APPROACH TO THE RUNWAY WHICH IS ACCOMPLISHED AT A NEAR CONSTANT SLOPE AND CONSTANT SPEED ALONG THE EXTENDED RUNWAY CENTERLINE.

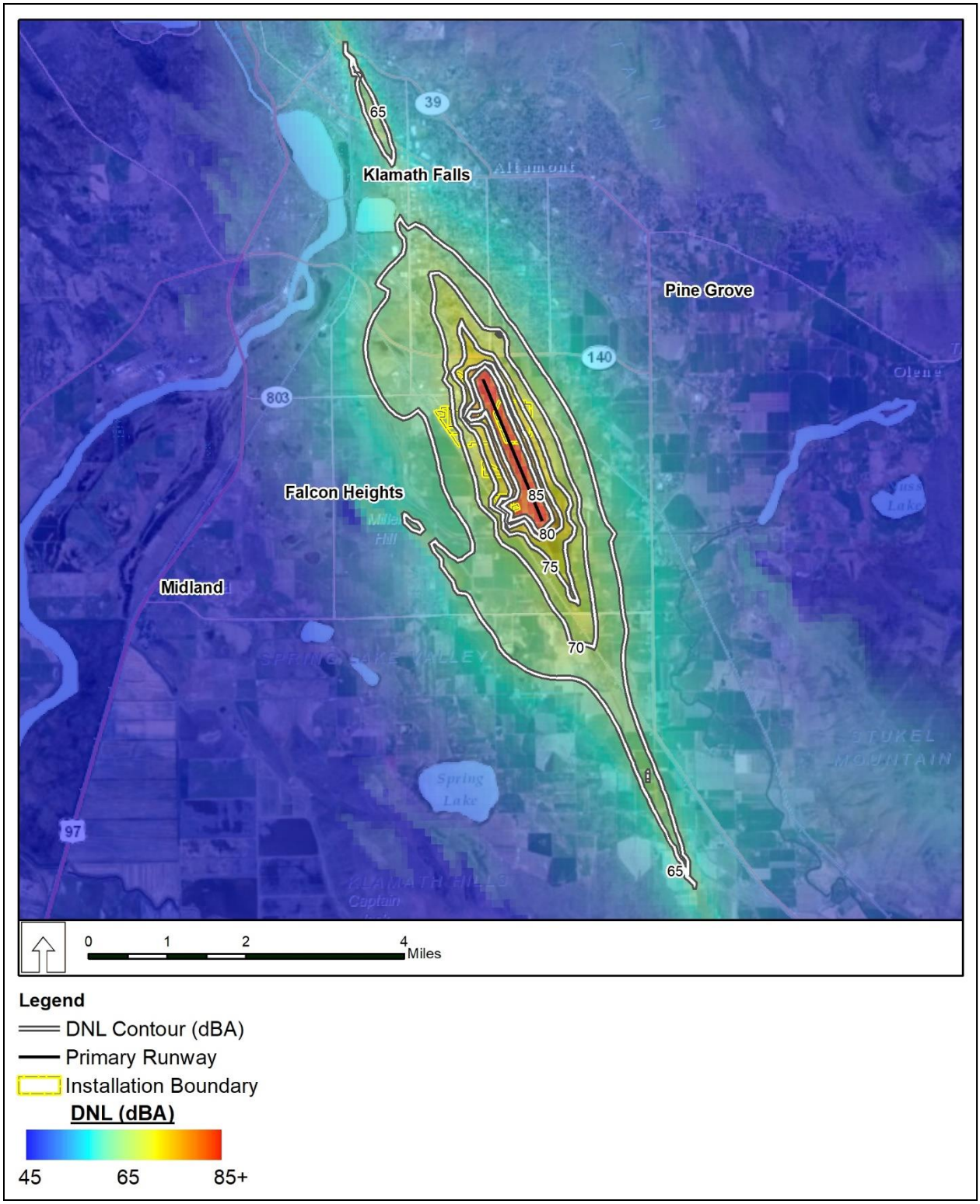

Figure 4-5. Low Noise Scenario Day-Night Average Sound Level Contours at Kingsley Field Air National Guard Base.

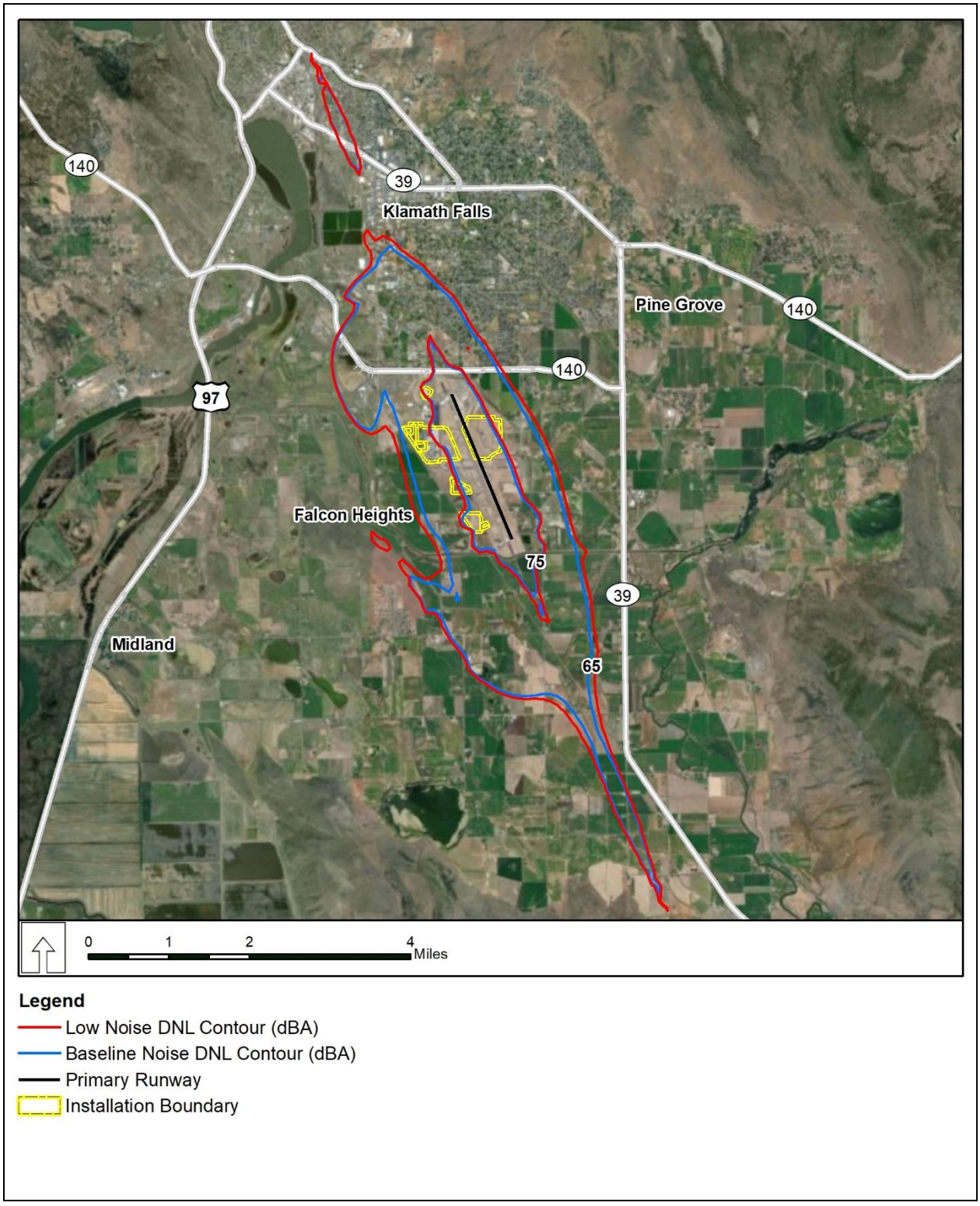

Figure 4-6. Comparison of Low Noise Scenario and Existing Day-Night Average Sound Level Contours at Kingsley Field Air National Guard Base.

Table 4-11
Proposed Low Noise Scenario Day-Night Average Sound Level area affected on and surrounding Kingsley Field Air National Guard Base

Noise Level (dBA DNL)	Area Within Noise Contour (acres)		
	Existing	Low Noise Scenario	Increase
>65	6,094	6,797	703
>70	2,293	2,511	218
>75	1,155	1,262	107
>80	625	675	50
>85	350	396	46

Notes:
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level

Table 4-12
Proposed Low Noise Scenario Day-Night Average Sound Level at Points of Interest at Kingsley Field Air National Guard Base

POI		DNL (dBA)		
ID	Description	Existing	Low Noise Scenario	Increase in DNL
01	Brixner Junior High School	60	60	0
02	Apostolic Lighthouse	57	57	0
03	Baptist Church of Homedale	54	55	1
04	BBC Ministries	53	54	1
05	Calvary Chapel	56	57	1
06	Church of Christ	51	51	0
07	Fairview School	54	55	1
08	Faith Tabernacle Assembly	59	60	1
09	First Church of God	60	61	1
10	Harvest Outreach Christian Center	54	55	1
11	Hosanna Christian School	64	64	0
12	The Church of Jesus Christ of Latter-day Saints	50	51	1
13	Klamath Community College	49	49	0
14	Klamath Family Head Start	62	62	0
15	Living Faith Fellowship	60	60	0
16	Mazama High School	58	58	0
17	Mt Laki Community Church	61	62	1
18	New Horizon Christian Fellowship	52	52	0
19	Our Place to Grow LLC daycare	57	58	1
20	Peterson Elementary School	60	60	0
21	Ponderosa Middle School	55	55	0
22	St Pius X Catholic Church	61	61	0
23	Stearns Elementary School	63	63	0
24	Triad School	56	57	1
25	Wesleyan Church	55	55	0
26	Orego Institute of Technology	55	55	0
27	Sky Lakes Medical Center	59	59	0
28	Residences Near Lombardy Lane and railroad tracks	71	72	1
29	Residences Near Old Midland Road and railroad tracks	72	73	1
30	Residences Near Anderson Avenue and Altamount Drive	72	73	1
31	Residences Near Highland Way and Summit Street	68	69	1
32	Residences Near Airway Drive and Homedale Road	63	64	1

Notes:
Affected POIs based off NOISEMAP modeled noise contours and used to calculate the POIs within each noise contour.
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

After a review of potential mitigation measures for Kingsley Field, the Air Force selected four options that are viable for safety, training goals, and being practical to implement. These four noise mitigation measure options are described in **Table 4-13**. It was noted that the noise increase due to the proposed contract ADAIR High Noise aircraft is primarily due to the straight-in arrival operations; therefore, the noise mitigation options in **Table 4-13** focus mainly on reducing these straight-in arrivals and increasing overhead break arrivals to redistribute noise around the airfield to achieve successful noise mitigation. Noise mitigation options 2, 3, and 4 include changes to arrival flight paths only whereas option 1 includes changes to arrival flight paths during environmental night (10:00 p.m. to 7:00 a.m.). Noise mitigation options 1, 2, 3, and 4 can be exercised individually or in combination if additional noise reduction is required. Neither options 2 and 3 nor options 3 and 4 can occur concurrently. From the combination of these four mitigation measures, nine different scenarios, shown in **Table 4-14**, were tested that involve either an individual measure or a combination of measures. Operational leadership will consider implementing these mitigation measures in a manner consistent with safety of flight and mission necessity.

AN OVERHEAD BREAK ARRIVAL, ALSO CALLED A PITCH ARRIVAL, IS WHEN THE AIRCRAFT APPROACHES THE RUNWAY, ALONG THE EXTENDED RUNWAY CENTERLINE, AT A SET ALTITUDE (~1,800 FT AGL FOR KINGSLEY FIELD). THE AIRCRAFT FLIES OVER THE LENGTH OF THE RUNWAY AT THE SET HEIGHT, THEN BANKS SHARPLY (180 DEGREES) DECREASING BOTH ALTITUDE AND AIRSPEED, FLIES PARALLEL TO THE RUNWAY IN THE OPPOSITE DIRECTION, THEN BANKS SHARPLY ONCE AGAIN (180 DEGREES) TO SHED THE REMAINDER OF ITS ALTITUDE AND SPEED. THE AIRCRAFT IS NOW AT THE RUNWAY THRESHOLD, NEAR GROUND LEVEL, AND PERFORMS ITS LANDING.

As noted before, reducing straight-in arrivals and/or straight-in arrivals that occur during environmental night comprise all of the scenarios tested. All scenarios were tested by making the noted change to the Proposed Action noise model and evaluating the resulting DNL at each POI. Of the nine scenarios tested, four scenarios (4, 7, 8, and 9) were successful in achieving noise reduction around the airfield such that noise increases were limited to 3 dBA or less at all representative POIs. This means that each of these four scenarios were successful in mitigating noise at Kingsley Field for the proposed High Noise, ADAIR contractor aircraft operations. The noise mitigation results for each of these scenarios are described in the following sections. Note that the results for all scenarios, **Tables 4-15** through **4-18**, show an increase in DNL of 3 dBA or less at all POIs. Though they are all successful candidate scenarios that could be implemented at Kingsley Field, these four mitigation scenarios require different operational procedures to implement that vary in complexity and practicality. In general, the most practical scenarios to implement would not involve combinations of options. The recommended noise mitigation solution for Kingsley Field is discussed last and based on Mitigation Scenario 4, which achieves the necessary noise reduction around the airfield while also being the most practical of the four candidate scenarios to implement.

Table 4-13
Noise Mitigation Options Tested at Points of Interest at Kingsley Field

Option	Description	Detailed Option Change
1	Reduce percent of straight-in arrivals that occur during environmental night (10:00 p.m. to 7:00 a.m.)	Currently, 9% of straight-in arrivals occur during 10:00 p.m. to 7:00 a.m. Change this to 1% during environmental night (10:00 p.m. to 7:00 a.m.) and 99% during environmental day (7:00 a.m. to 10:00 p.m.)
2	Increase straight-in arrivals on Runway 32, reduce straight-in arrivals on Runway 14	Currently, straight-in arrivals are 35% on Runway 14 and 65% on Runway 32. Change this to 20% on Runway 14 and 80% on Runway 32.
3	Launch on Runway 14 and land on Runway 32 exclusively (no flights to the north)	Change ADAIR departures to 100% on Runway 14 and change arrivals to 100% on Runway 32 (to all arrival types)
4	Reduce straight-in arrivals on Runways 14 and 32 and increase overhead break arrivals on Runways 14 and 32	Current arrival type utilization: 32.5% straight-in, 16.9% overhead break, 50.6% TAC 90. Change utilization to 10% straight-in, 30% overhead break, and 60% TAC 90.

Table 4-14
Nine Noise Mitigation Scenarios Tested as a Result of Combining the Four Noise Mitigation Options

Scenario	Combination of Options	Description of Scenario
1	Option 1 Only	Reduce environmental night straight-in arrivals
2	Option 2 Only	Reduce straight-in arrivals on Runway 14 by increasing straight-in arrivals on Runway 32
3	Option 3 Only	Launch on Runway 14 and recover on Runway 32
4	Option 4 Only	Reduce straight-in arrivals on Runways 14 and 32 by increasing overhead breaks and TAC 90 on Runways 14 and 32
5	Options 1 and 2	Reduce environmental night straight-in arrivals; reduce straight-in arrivals on Runway 14 by increasing straight-in arrivals on Runway 32
6	Options 1 and 3	Reduce environmental night straight-in arrivals; launch on Runway 14 and recover on Runway 32
7	Options 1 and 4	Reduce environmental night straight-in arrivals; reduce straight-in arrivals on Runways 14 and 32 by increasing overhead breaks and TAC 90 on Runways 14 and 32
8	Options 2 and 4	Reduce straight-in arrivals on Runways 14 and 32 by both increasing straight-in arrivals on Runway 32 and by increasing overhead break and TAC 90 on Runways 14 and 32
9	Options 1, 2, and 4	Reduce environmental night straight-in arrivals; Reduce straight-in arrivals on Runways 14 and 32 by both increasing straight-in arrivals on Runway 32 and by increasing overhead break and TAC 90 on Runways 14 and 32

Mitigation Scenario 4

The modeled action for Noise Mitigation Scenario 4 was to reduce straight-in arrivals to Runways 14 and 32 by increasing overhead break arrivals and TAC 90 arrivals on Runways 14 and 32. **Table 4-15** shows the Noise Mitigation Scenario 4 DNL results and the increase above the baseline DNL. Under Noise Mitigation Scenario 4, the DNL increase at each POI would be limited to 3 dBA or less.

Mitigation Scenario 7

The modeled action for Noise Mitigation Scenario 7 was to reduce environmental night straight-in arrivals; reduce straight-in arrivals to Runways 14 and 32 by increasing overhead break and TAC 90 arrivals on Runways 14 and 32. **Table 4-16** shows the Noise Mitigation Scenario 7 DNL results and the increase above the baseline DNL. Under Noise Mitigation Scenario 7, the DNL increase at each POI would be limited to 3 dBA or less.

Mitigation Scenario 8

The modeled action for Noise Mitigation Scenario 8 was to reduce straight-in arrivals on Runways 14 and 32 by both increasing straight-in arrivals on Runway 32 and by increasing overhead break and TAC 90 arrivals on Runways 14 and 32. **Table 4-17** shows the Noise Mitigation Scenario 8 DNL results and the increase above the baseline DNL. Under Noise Mitigation Scenario 8, the DNL increase at each POI would be limited to 3 dBA or less.

Table 4-15
Noise Mitigation Scenario 4 Day-Night Average Sound Level at Representative Points of Interest on and near Kingsley Field

POI		DNL (dBA)		
ID	Description	Existing	Mitigation Scenario 4	Increase in DNL
01	Brixner Junior High School	60	61	1
02	Apostolic Lighthouse	57	59	2
03	Baptist Church of Homedale	54	56	2
04	BBC Ministries	53	55	2
05	Calvary Chapel	56	58	2
06	Church of Christ	51	53	2
07	Fairview School	54	56	2
08	Faith Tabernacle Assembly	59	61	2
09	First Church of God	60	62	2
10	Harvest Outreach Christian Center	54	57	3
11	Hosanna Christian School	64	66	2
12	The Church of Jesus Christ of Latter-day Saints	50	52	2
13	Klamath Community College	49	51	2
14	Klamath Family Head Start	62	63	1
15	Living Faith Fellowship	60	61	1
16	Mazama High School	58	60	2
17	Mt Laki Community Church	61	64	3
18	New Horizon Christian Fellowship	52	54	2
19	Our Place to Grow LLC daycare	57	60	3
20	Peterson Elementary School	60	61	1
21	Ponderosa Middle School	55	57	2
22	St Pius X Catholic Church	61	62	1
23	Stearns Elementary School	63	65	2
24	Triad School	56	59	3
25	Wesleyan Church	55	57	2
26	Orego Institute of Technology	55	55	0
27	Sky Lakes Medical Center	59	59	0
28	Residences Near Lombardy Lane and railroad tracks	71	74	3
29	Residences Near Old Midland Road and railroad tracks	72	72	0
30	Residences Near Anderson Avenue and Altamount Drive	72	73	1
31	Residences Near Highland Way and Summit Street	68	69	1
32	Residences Near Airway Drive and Homedale Road	63	64	1

Notes:
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

Mitigation Scenario 9

The modeled action for Noise Mitigation Scenario 9 was to reduce environmental night straight-in arrivals; reduce straight-in arrivals on Runways 14 and 32 by both increasing straight-in arrivals on Runway 32 and by increasing overhead break and TAC 90 arrivals on Runways 14 and 32. **Table 4-18** shows the Noise Mitigation Scenario 9 DNL results and the increase above the baseline DNL. Under Noise Mitigation Scenario 9, the DNL increase at each POI would be limited to 3 dBA or less.

Selected Approach to Noise Mitigation

Regardless of which Alternative is chosen, if the Proposed Action is implemented and the High Noise Scenario contract aircraft are selected, the 173 FW will apply mitigation to reduce noise impacts at POIs near Kingsley Field.

Table 4-16
Noise Mitigation Scenario 7 Day-Night Average Sound Level at Representative Points of Interest on and near Kingsley Field

POI		DNL (dBA)		
ID	Description	Existing	Mitigation Scenario 7	Increase in DNL
01	Brixner Junior High School	60	61	1
02	Apostolic Lighthouse	57	59	2
03	Baptist Church of Homedale	54	56	2
04	BBC Ministries	53	55	2
05	Calvary Chapel	56	58	2
06	Church of Christ	51	53	2
07	Fairview School	54	56	2
08	Faith Tabernacle Assembly	59	61	2
09	First Church of God	60	62	2
10	Harvest Outreach Christian Center	54	57	3
11	Hosanna Christian School	64	66	2
12	The Church of Jesus Christ of Latter-day Saints	50	52	2
13	Klamath Community College	49	51	2
14	Klamath Family Head Start	62	63	1
15	Living Faith Fellowship	60	61	1
16	Mazama High School	58	60	2
17	Mt Laki Community Church	61	63	2
18	New Horizon Christian Fellowship	52	54	2
19	Our Place to Grow LLC daycare	57	60	3
20	Peterson Elementary School	60	61	1
21	Ponderosa Middle School	55	57	2
22	St Pius X Catholic Church	61	62	1
23	Stearns Elementary School	63	65	2
24	Triad School	56	59	3
25	Wesleyan Church	55	57	2
26	Orego Institute of Technology	55	55	0
27	Sky Lakes Medical Center	59	59	0
28	Residences Near Lombardy Lane and railroad tracks	71	74	3
29	Residences Near Old Midland Road and railroad tracks	72	75	3
30	Residences Near Anderson Avenue and Altamount Drive	72	75	3
31	Residences Near Highland Way and Summit Street	68	70	2
32	Residences Near Airway Drive and Homedale Road	63	65	2

Notes:
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

Table 4-17
Noise Mitigation Scenario 8 Day-Night Average Sound Level at Representative Points of Interest on and near Kingsley Field

POI		DNL (dBA)		
ID	Description	Existing	Mitigation Scenario 8	Increase in DNL
01	Brixner Junior High School	60	61	1
02	Apostolic Lighthouse	57	59	2
03	Baptist Church of Homedale	54	56	2
04	BBC Ministries	53	55	2
05	Calvary Chapel	56	58	2
06	Church of Christ	51	53	2
07	Fairview School	54	56	2
08	Faith Tabernacle Assembly	59	61	2
09	First Church of God	60	62	2
10	Harvest Outreach Christian Center	54	57	3
11	Hosanna Christian School	64	66	2
12	The Church of Jesus Christ of Latter-day Saints	50	52	2
13	Klamath Community College	49	51	2
14	Klamath Family Head Start	62	63	1
15	Living Faith Fellowship	60	61	1
16	Mazama High School	58	60	2
17	Mt Laki Community Church	61	64	3
18	New Horizon Christian Fellowship	52	54	2
19	Our Place to Grow LLC daycare	57	60	3
20	Peterson Elementary School	60	61	1
21	Ponderosa Middle School	55	57	2
22	St Pius X Catholic Church	61	62	1
23	Stearns Elementary School	63	65	2
24	Triad School	56	59	3
25	Wesleyan Church	55	57	2
26	Orego Institute of Technology	55	55	0
27	Sky Lakes Medical Center	59	59	0
28	Residences Near Lombardy Lane and railroad tracks	71	74	3
29	Residences Near Old Midland Road and railroad tracks	72	75	3
30	Residences Near Anderson Avenue and Altamount Drive	72	75	3
31	Residences Near Highland Way and Summit Street	68	70	2
32	Residences Near Airway Drive and Homedale Road	63	65	2

Notes:
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

Table 4-18
Noise Mitigation Scenario 9 Day-Night Average Sound Level at Representative Points of Interest on and near Kingsley Field

POI		DNL (dBA)		
ID	Description	Existing	Mitigation Scenario 9	Increase in DNL
01	Brixner Junior High School	60	61	1
02	Apostolic Lighthouse	57	59	2
03	Baptist Church of Homedale	54	56	2
04	BBC Ministries	53	55	2
05	Calvary Chapel	56	58	2
06	Church of Christ	51	53	2
07	Fairview School	54	55	1
08	Faith Tabernacle Assembly	59	61	2
09	First Church of God	60	62	2
10	Harvest Outreach Christian Center	54	57	3
11	Hosanna Christian School	64	66	2
12	The Church of Jesus Christ of Latter-day Saints	50	52	2
13	Klamath Community College	49	51	2
14	Klamath Family Head Start	62	63	1
15	Living Faith Fellowship	60	61	1
16	Mazama High School	58	60	2
17	Mt Laki Community Church	61	63	2
18	New Horizon Christian Fellowship	52	54	2
19	Our Place to Grow LLC daycare	57	60	3
20	Peterson Elementary School	60	61	1
21	Ponderosa Middle School	55	57	2
22	St Pius X Catholic Church	61	62	1
23	Stearns Elementary School	63	65	2
24	Triad School	56	59	3
25	Wesleyan Church	55	57	2
26	Orego Institute of Technology	55	55	0
27	Sky Lakes Medical Center	59	59	0
28	Residences Near Lombardy Lane and railroad tracks	71	74	3
29	Residences Near Old Midland Road and railroad tracks	72	75	3
30	Residences Near Anderson Avenue and Altamount Drive	72	75	3
31	Residences Near Highland Way and Summit Street	68	70	2
32	Residences Near Airway Drive and Homedale Road	63	65	2

Notes:
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

Based on the evaluation of the mitigation scenarios that achieve the goal of having an increase in DNL of 3 dBA or less at all POIs, mitigation scenario 4 is the most reasonable to implement and would cause the fewest operational concerns in conjunction with implementation of the Proposed Action. If additional approaches to mitigation to the POIs both north and south of the airfield are required, then Mitigation Scenario 7 would be implemented. The methods for implementation of the mitigation are summarized in **Appendix E**.

As noted previously, the type of aircraft that would be used by contract ADAIR is unknown at this time. The mitigation would only apply if aircraft similar to the High Noise Scenario comprise the contract ADAIR aircraft. If contract ADAIR aircraft are similar to the Medium or Low Noise Scenario, no mitigation would be required; therefore, the ultimate need for mitigation would be determined by the actual aircraft used for contract ADAIR.

The potential impacts associated with the mitigated Proposed Action are summarized in **Table 2-6** and are described in more detail throughout **Chapter 4**.

4.2.3 No Action Alternative

Under the No Action Alternative, contract ADAIR would not perform sorties at Kingsley Field and nearby airspaces. Under the No Action Alternative, there would be no change to the noise environment.

4.3 SAFETY

4.3.1 Evaluation Criteria

Impacts from implementation of the Proposed Action are assessed according to the potential to increase or decrease safety risks to personnel, the public, property, or the environment. Adverse impacts on safety might include implementing contractor flight procedures that result in greater safety risk or constructing new buildings within established Q-D safety arcs. For the purposes of this EA, an impact is considered significant if the proposed safety measures are not consistent with AFOSH and OSHA standards resulting in unacceptable safety risks.

Safety concerns associated with ground, explosive, and flight activities are considered in this section. Ground safety considers issues associated with ground operations and maintenance activities that support operations including arresting gear capability, jet blast/maintenance testing, and safety danger zones. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace.

CZs and APZs around the airfield restrict the public's exposure to areas where there is a higher accident potential. Although ground and flight safety are addressed separately, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns. Explosives safety relates to the management and safe use of ordnance and munitions. Flight safety considers aircraft flight risks such as midair collision, BASH, and in-flight emergency requirements. Contractor planes will follow Air Force safety procedures and aircraft specific emergency procedures based on the aircraft design. Basic airmanship procedures also exist for handling any deviations to ATC procedures due to an in-flight emergency; these procedures are defined in AFI 11-202 (Volume 3) and established aircraft flight manuals. The Flight Crew Information File is a safety resource for aircrew day-to-day operations which is composed of air and ground operation rules and procedures.

4.3.2 Proposed Action

Ground, explosive, and flight safety associated with implementation of the Proposed Action are described in the following sections. Contract ADAIR safety procedures described in this section are mandated by the *Performance Work Statement for the Combat Air Forces (CAF) Contracted Air Support (CAF CAS)* (PWS) (Air Force, 2018).

4.3.2.1 Alternatives 1, 2, and 3

Ground Safety

Under the Proposed Action, limited contractor aircraft maintenance and testing would occur on the aircraft parking ramp or in the hangar and would be consistent with current aircraft maintenance activities on Kingsley Field. No unique maintenance activities would be associated with the contract ADAIR aircraft. All scheduled depot-level or other heavy maintenance requirements would occur at off-base contractor facilities.

Emergency Response

For initial emergency response involving a contract ADAIR aircraft, the Air Force would provide emergency responders (Airport Firefighter) trained on the applicable mission design series they are providing. For crash response, the DOD would provide on-field aircraft CDDAR. For events occurring off base, civilian authorities

(city, county, or state) would be first on scene. After the initial response, the Contractor would be required to facilitate crash site security and clean-up. The Contractor is responsible to cooperate with the Air Force or the National Transportation Safety Board investigation, depending upon circumstances of the incident.

The contractor emergency response would include the following:

- Establish a CDDAR program that is fully integrated into the host operating location's CDDAR program. The Contractor would provide technical expertise and facilitate the host operating location's response and recovery capability of Contractor-owned aircraft, consistent with the following considerations: (1) urgency to open the runway for operational use; (2) prevention of secondary damage to the aircraft; and (3) preservation of evidence for mishap or accident investigations in accordance with AFI 91-202 and AFI 91-204; National Transportation Safety Board guidelines; and any local operating location guidance, as applicable. The Contractor would ensure the host operating location's CDDAR personnel receive familiarization training on Contractor aircraft and procedures prior to commencing local flying operations, at permanent and temporary duty operating locations.
- The Contractor would develop an egress/cockpit familiarization training program to ensure all host operating location's nonegress personnel (e.g., emergency response personnel, fire department, CDDAR) who may access Contractor aircraft cockpits, equipped with egress systems, receive initial and annual refresher training.

Safety Zones

Under the Proposed Action, safety zones around the airfield would not change.

Arresting Gear Capability

Contract ADAIR aircraft would be compatible with the arresting systems on the airfield; or able to operate on the airfield without interference to the existing arresting system. There would be no need to change or modify the existing arresting gear. There would be no impacts on arresting gear capability for the implementation of the Proposed Action under Alternative 1, 2, or 3.

No significant impacts on ground safety are anticipated to occur under Alternative 1, 2, or 3 provided the contractor establishes a CDDAR program and all applicable AFOSH and OSHA requirements are implemented.

Explosives Safety

Under the Proposed Action, the 173FW/MXMW would support contract ADAIR daily training operations with the maintenance and delivery of countermeasure chaff and flares. This support would be provided by trained and certified personnel following Air Force safety guidance and technical orders. Trained and certified contract ADAIR personnel would be responsible for the loading and unloading of countermeasures on contract ADAIR aircraft and would follow approved safety measures outlined in the PWS. Contract ADAIR personnel would also be responsible for the maintenance of captive air training missiles and any ejector cartridges as contractor-provided equipment.

There may be rare occasions in which egress CADs /PADs may need to be removed from the aircraft for maintenance. In accordance with AFMAN 91-201, 11.15, when necessary, units may license a limited quantity of in-use egress explosive components of any Hazard Division explosive in the egress shop after removal from aircraft undergoing maintenance. This limit would not exceed the total number of complete sets for the number of aircraft in maintenance and the net explosive weight is limited. Contract ADAIR would work with the Wing Safety Office to obtain a license, if needed, to store egress CADs/PADs. Short-term storage could be provided at either the 173FW/MXMW Munitions Storage Area provided a courtesy storage agreement is created and space is available. Short-term storage would be limited and only needed in the event of an emergency or unforeseen occurrence such as the issuance of a suspension or restriction egress equipment or munitions. All scheduled maintenance would occur at the Contractor's off-base Central Repair Facility. CAD/PAD items are typically replaced just prior to expiration of the service life, which is typically

part of aircraft scheduled maintenance. If temporary storage of contract ADAIR CAD/PAD items within the Wing munitions storage area is needed, they would be stored in facilities sited in the Explosive Safety plan for the type and amount of explosives to be stored.

The loading and unloading of countermeasure chaff and flares would occur on the aircraft parking ramp. The proposed ramp area for contract ADAIR aircraft is not currently sited for Hazard Class 1.3 and does not need to be sited for chaff or flares in accordance with AFMAN 91-201 para 12.47.2 and 12.47.3.

No significant impacts on explosive safety are anticipated to occur under Alternative 1, 2, or 3 provided contract ADAIR personnel are trained and all applicable safety guidelines are implemented. Q-D arcs would not change.

Flight Safety

The potential for aircraft accidents is a primary public concern with regard to flight safety. Such accidents may occur as a result of mid-air collisions, collisions with manmade structures or terrain, mechanical failure, weather-related accidents, pilot error, BASH, or strikes from defensive countermeasures used during training. Under the Proposed Action, contract ADAIR would be required to strictly conform to the flight safety rules directed by the Operations Group Commander. In addition, the PWS stipulates the following requirements for contract ADAIR:

- Contractor Flight Operations would respond to and follow ATC vectors from approved facilities per FAA and AFI guidelines.
- Contract ADAIR would be conducted under positive tactical control. Pilots would be responsible to respond to tactical vectors and instructions by the applicable controlling authority (Ground Controller Intercept, Baron Controllers, Range Control Officer, Joint Terminal Attack Controller, etc.). If positive control is unavailable, mission flights would remain autonomous and adhere to the briefed presentations and Special Instructions.
- Contract ADAIR aircraft would
    - be equipped with applicable communication and navigation capability to operate in the National Airspace Structure under FAA IFR and aircraft operating limitations (if applicable) and International Civil Aviation Organization equipment prerequisites;
    - have at least one type of FAA-approved Navigation System such as a Tactical Air Navigation, Automatic Direction Finder (ADF) Receiver System, with ADF indicator; Very High Frequency Omni Directional Range; Global Positioning System/Long Range Navigation;
    - have sufficient precision approach instrumentation (compatible with standard Air Force instrument landing systems) to permit operations down to 300-ft ceilings and 1-statute-mile visibility; and
    - have at least two functional voice radios operating in either the very high frequency/ ultra-high frequency bands, and one must be ultra-high frequency.

Bird/Wildlife-Aircraft Strike Hazards

Contractor operations would not follow government BASH procedures; they follow the PWS-directed Flight Operations Procedures and Quality Management System per the references above. In this case, the contractor's BASH plan would be part of the Quality Management System and be integrated with the host Wing's plan. It is expected the contract ADAIR BASH plan would very closely mirror and, in fact, may be an exact copy of the Wing's BASH plan. While, it is not required to be so, the contract ADAIR BASH plan would comply with the FAA Wildlife Hazard Mitigation Program.

No significant impacts on airspace/flight safety are anticipated to occur under Alternative 1, 2, or 3 provided that contractor flight safety rules are followed and all applicable AFOSH and OSHA requirements are implemented.

4.3.2.2 Mitigation

No impacts on safety are anticipated to occur under the mitigated Proposed Action provided that contractor flight safety rules are followed and all applicable AFOSH and OSHA requirements are implemented.

4.3.3 No Action Alternative

Under the No Action Alternative, contract ADAIR would not perform sorties at Kingsley Field and nearby airspaces. Under the No Action Alternative, there would be no change to safety.

4.4 AIR QUALITY

4.4.1 Evaluation Criteria

The CAA Section 176(c), *General Conformity*, requires federal agencies to demonstrate that their proposed activities would conform to the applicable SIPs for attainment of the NAAQS. General conformity applies to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases.

This section discusses the potential effects of the Proposed Action and alternatives on air quality within the ROIs. The overland project area (Central Oregon Intrastate AQCR) is a nonattainment for the 24-hour $PM_{2.5}$ NAAQS established in 2006. Because of the nonattainment status a general conformity analysis is required. Emissions of $PM_{2.5}$, SO_2, NO_x, and VOC are assessed against conformity standards *de minimis* thresholds of 100 tpy, as stipulated by 40 CFR § 93.153(b)(1). In addition, operations in the Warning Area would occur outside any ACCR. W-93 extends 3 NM from the coastline (State jurisdictional boundary) out past the 12-NM Territorial Sea boundary and the 24-NM Contiguous Zone boundary. Thus, compliance with the NAAQS would not apply in the Warning Area and general conformity would not apply.

Potential impacts on air quality are evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The CEQ defines significance in terms of context and intensity in 40 CFR § 1508.27. This requires that the significance of the action must be analyzed with respect to the setting of the Proposed Action and based relative to the severity of the impact. The CEQ NEPA Regulations (40 CFR § 1508.27[b]) provide 10 key factors to consider in determining an impact's intensity.

$PM_{2.5}$, SO_2, NO_x, and VOC must first be compared against the *de minimis* thresholds of 100 tpy each. If these thresholds are exceeded, additional impact analyses are required. Impacts are considered significant if the proposed alternative would increase ambient air pollution concentrations above any NAAQS or emissions exceed ten percent of the AQCR emissions.

The Air Conformity Applicability Model (ACAM) (version 5.0.10) was used to provide emissions estimates for contract ADAIR airfield operations, maintenance activities, worker commutes, and flight operations in the airspaces. ACAM was developed by the Air Force (Air Force, 2017b); it provides estimated air emissions from proposed Federal actions for each specific criteria and precursor pollutant as defined in the NAAQS. Assumptions of the model are discussed in **Appendix C**. ACAM uses the procedures established by the Air Force as provided in *Air Emissions Guide for Air Force Mobile Sources* (Air Force, 2017a). For aircraft, operational modes, including taxi/idle (in and out), take off, climb out, approach, and pattern flight that includes touch and go operations, are used as the basis of the emission estimates. Furthermore, only emissions in the lower atmosphere's mixing level have a significant impact on ground-level pollutant concentrations. The mixing layer extends from ground level up to the point at which the vertical mixing of pollutants decreases significantly. The USEPA recommends that a default mixing layer of 3,000 ft be used in aircraft emission calculations (40 CFR § 93.153[c][2]). Based on this, aircraft emissions released above 3,000 ft were not included in analysis for the ROIs.

In nonattainment and maintenance areas emissions at or above 100 tpy are considered significant, particularly as this threshold triggers full conformity analysis. Emissions below 100 tpy are considered moderate or, if very low, minor. The air quality analysis focused on emissions associated with the airfield operations and with sorties in the airspaces. As such emissions from ACAM were determined separately for the airfield ROI and the airspace ROI. In addition, emissions associated with the use flares within the airspaces were estimated, using draft emission factors found in AP-42.

4.4.2 Proposed Action

Under the Proposed Action the three Alternatives are identical in terms of potential air emissions. As described in **Chapter 2** the only substantive difference between the three alternatives is the location of the contract ADAIR facilities on Kingsley Field ANGB (operations and maintenance personnel in different buildings). The number of contract ADAIR sorties, use of associated support equipment, the number of affected personnel, etc. are the identical under each alternative. No construction emissions are associated with any of the alternatives. For these reasons the emissions are calculated for a single alternative in each ROI. Only those emissions associated with the addition of contract ADAIR operations were evaluated as no substantive changes to current operations of the 173 FW are expected to change as a result of the action.

For Alternatives 1, 2, and 3, analyses were performed for three different emission scenarios to evaluate the risk for different adversarial aircraft that may be utilized by the ADAIR contractor. The three different emission scenarios (identified as High, Medium, and Low) are listed below with the engine type used for the basis for the emission calculations.

- High, MiG-29, Engine: F-100-PW-100*
- Medium, Mirage, Engine: F110-GE-100*
- Low, F-5, Engine: J85-GE-13

  * Surrogate engine type, reliable criteria emission factors not available for foreign engine types.

4.4.2.1 Alternatives 1, 2, and 3

The emissions were estimated for each year of the Proposed Action beginning in July 2019 and ending in June 2029. Total increases in annual operational emissions under Alternatives 1, 2, and 3 for the ROI in the vicinity of the airfield are presented in **Table 4-19**. The methodologies, emission factors, and assumptions used for the emission estimates for each of the scenarios and related activities are outlined in **Appendix C**.

Potential emissions increases would be less than the 100-tpy NAAQS threshold for all the criteria pollutants and 100,000 tpy for CO_2e and are shown in **Table 4-19**; therefore, the annual increases in criteria pollutant and CO_2e emissions are not considered significant under Alternatives 1, 2, and 3. Increased emissions from contract ADAIR activities would not impede maintenance of the NAAQS.

The region is in a nonattainment for 24-hour $PM_{2.5}$ NAAQS established in 2006, because of this designation the pollutants of concern are $PM_{2.5}$, SO_2, NO_x, and VOC. Each of these pollutants remain below the *de minimis* threshold; however, CO emissions did exceed 100 tpy (*de minimis* threshold) for the Low Emission Scenario. This is not of significant concern; CO is not a precursor to $PM_{2.5}$ or Ozone (O_3), and the emissions are well below the PSD threshold of 250 tpy. Due to the emission history of Kingsley Field ANGB, the emissions are low enough that the addition of the equipment and personnel would not put Kingsley Field in significant emission levels.

The emissions associated with contract ADAIR sorties proposed for the Juniper/Hart MOA Complex and W-93 were evaluated using ACAM for the High, Medium, and Low scenarios described previously. Consistent with the USEPA recommendation regarding mixing height only those emissions that would occur with the mixing layer (lowest 3,000 ft) were analyzed. Out of the annual sorties proposed, 1,366 are expected to include some operations between 500 and 3,000 ft AGL in the Juniper/Hart MOA Complex. In W-93, ten sorties annually are expected to occur in the same altitude range. The flight time in the mixing layer for Juniper/Hart MOA Complex and W-93 is estimated to be 11.4 minutes per sortie.

Table 4-19
Contractor Adversary Air Emissions – Airfield Operations

Scenario	Contract Year(s)	Emissions (tpy) [1,2]								
		VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2e	Pb	NH_3
High	2019 (July – Dec)	4.61	23.70	47.77	1.85	3.37	3.07	4,392.8	0	0.003
	2020 through 2028	9.23	47.41	95.54	3.71	6.75	6.15	8,785.6	0	0.007
	2029 (January - June)	4.61	23.70	47.77	1.85	3.37	3.07	4,392.8	0	0.003
Medium	2019 (July - Dec)	2.43	13.88	29.00	1.29	1.95	1.30	3,179	0	0.003
	2020 through 2028	4.87	27.76	58.00	2.59	3.90	2.60	6,358	0	0.007
	2029 (January - June)	2.43	13.88	29.00	1.29	1.95	1.30	3,179	0	0.003
Low	2019 (July - Dec)	12.82	6.17	78.10	0.92	0.62	0.60	2,013.3	0	0.003
	2020 through 2028	25.65	12.35	156.20	1.85	1.25	1.20	4,026.5	0	0.007
	2029 (January - June)	12.82	6.17	78.10	0.92	0.62	0.60	2,013.3	0	0.003

Source: Air Conformity Applicability Model output

Notes:
[1] Represents total per year emissions for: 1) flight operations (includes trim tests and auxiliary power unit use), 2) Aerospace Ground Equipment, 3) aircraft maintenance (parts cleaning), and 5) JET-A storage (fuel for contract ADAIR operation only).
[2] Based on 2,000 Landing & Takeoff Cycles and 270 Touch & Gos per year.

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NH_3 = nitrate; NO_x = nitrogen oxides; Pb = lead; PM_{10} = particulate matter less than 10 microns; $PM_{2.5}$ = particulate matter less than 2.5 microns; SO_x = sulfur oxides; VOC = volatile organic compounds; tpy = ton(s) per year

One hundred percent of sorties are expected to use chaff and flares. Chaff and flares can be dispensed in the offshore Warning Area without altitude restrictions (Air Force, 1997). The Air Quality impacts of chaff were studied by the Air Force and reported in *Environmental Effects of Self-Protection Chaff and Flares* (Air Force, 1997). That study determined that chaff material maintains its integrity after ejection and that the use of explosive charge in impulse cartridges results in minimal PM_{10}. As a result, it was concluded that the deployment of chaff will not contribute to an exceedance of the NAAQS; therefore, chaff deployment was not included in the air quality assessment. Emission from M206 Countermeasure Flares were estimated using Emission Factors for AP-42 Section 18.8 (USEPA, 2009). Only flares deployed at or below 3,000 ft were included in the analysis. Because flares are altitude restricted to above 5,000 ft in the overland airspace, flares were only considered in W-93. The quantity deployed (baseline use minus estimated future use) was proportioned based on the percent of total time spent in the 500 to 3,000 ft altitude range per sortie.

The emissions estimated for the MOAs and W-93 that would be the result of contract ADAIR sorties and the deployment of countermeasure flares (W-93 only) are shown in **Table 4-20**. Emissions are estimated for the proposed 10-year period beginning in July 2019 and ending in June 2029. Overall, the use of flares would have a negligible contribution to the emissions for the High and Medium emission scenarios. Maximum emission rates associated with flare use would be for $PM_{2.5}$ 106 pounds per year (lb/yr) (0.053 tpy) and CO_2 188 lb/yr (0.094 tpy). For the Low emission scenario, PM_{10} emissions from flare use would be greater than aircraft PM_{10} emissions. The methodologies, emission factors, and assumptions used for the emission estimates for each of the scenarios and related activities are outlined in **Appendix C**.

The offshore Warning Area is not in a regulatory control area and is beyond state jurisdictional boundaries. As such the general conformity rule does not apply; however, the 100 tpy *de minimis* threshold for the General Conformity Rule was applied as significance indicator. The criteria pollutants and CO_2e would be below 100 tpy and thus would not be expected to impact air quality in W-93.

Table 4-20
Contractor Adversary Air Emissions – Airspace Operations

Airspace	Scenario	Contract Years	Emissions (tpy)[1]								
			VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2e	Pb	NH_3
Juniper/ Hart MOA Complex[2]	High	2019 (July - Dec)	0.14	27.68	0.73	1.08	0.73	0.66	3,305.5	0	0
		2020 through 2028	0.29	55.37	1.47	2.16	1.47	1.32	6,611	0	0
		2029 (January - June)	0.14	27.68	0.73	1.08	0.73	0.66	3,305.5	0	0
	Med	2019 (July - Dec)	0.02	8.68	3.01	0.62	0.33	0.22	1,895.6	0	0
		2020 through 2028	0.39	17.35	6.03	1.24	0.70	0.47	3,791.08	0	0
		2029 (January - June)	0.02	8.68	3.01	0.62	0.33	0.22	1,895.6	0	0
	Low	2019 (July - Dec)	1.18	0.68	12.70	0.31	0.003	0.003	955.7	0	0
		2020 through 2028	2.37	1.35	25.41	0.62	0.007	0.006	1,911.5	0	0
		2029 (January - June)	1.18	0.68	12.70	0.31	0.003	0.003	955.7	0	0
Warning Area W-93[3]	High	2019 (July - Dec)	0.001	0.2	0.01	0.01	0.01	0.01	23.60	0	0
		2020 through 2028	0.01	0.4	0.02	0.02	0.06	0.06	47.28	0	0
		2029 (January - June)	0.001	0.20	0.01	0.01	0.01	0.01	23.60	0	0
	Med	2019 (July - Dec)	0.001	0.06	0.02	0.00	0.00	0.00	13.5	0	0
		2020 through 2028	0.01	0.13	0.05	0.01	0.05	0.05	27.18	0	0
		2029 (January - June)	0.001	0.06	0.02	0.00	0.00	0.00	13.5	0	0
	Low	2019 (July - Dec)	0.008	0.005	0.09	0.002	0.00	0.00	6.8	0	0
		2020 through 2028	0.01	0.01	0.18	0.004	0.00	0.00	13.7	0	0
		2029 (January - June)	0.008	0.005	0.09	0.002	0.00	0.00	6.8	0	0

Source: Air Conformity Applicability Model output

Notes:
[1] Represents total per year emissions.
[2] 1,400 sorties (70 percent of total sorties)
[3] 10 sorties (0.5 percent of total sorties)

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MOA = Military Operations Area; NH_3 = nitrate; NO_x = nitrogen oxides; Pb = lead; PM_{10} = particulate matter less than 10 microns; $PM_{2.5}$ = particulate matter less than 2.5 microns; SO_x = sulfur oxides; VOC = volatile organic compounds; tpy = ton(s) per year

4.4.2.2 Mitigation

The proposed mitigation to reduce noise under the High Noise Scenario would affect air quality; however, the change in emissions would not be substantial enough to impact the air quality at Kingsley Field. Noise mitigation measures would have little to no impact on current Air Operating Permit emission estimates as they would not substantially increase the time spent within the mixing layer (below 3,000 ft) or result in long period changes in power mode.

4.4.3 No Action Alternative

The No Action Alternative would not generate any new emissions and would not change emissions from current baseline levels presented in **Section 3.4**. As a result, no impacts would occur to regional air quality under the No Action Alternative.

4.4.4 Climate Change Considerations

The Pacific Northwest, in particular central Oregon is vulnerable to the effects of global warming. Rising temperatures caused by the burning of fossil fuel to heat homes and power factories seem to be responsible for declining snowpack, earlier snowmelt, and greater summer water demand that may increase summer water scarcity and an increase in wildfire activity. An additional rise in average temperature (2°F to 7°F) is predicted over the next 40 years. These effects will damage the ecosystems and agriculture. The warming streams partially caused by the declining snowpack will limit ranges for salmon and diminish their returns. With less snow falling and replaced with rain, flood risks are expected to increase during the fall and winter months in most basins (Oregon Climate Change Research Institute, 2017).

Annual GHG emissions from the Proposed Action are relatively low. Although Title V and PSD are not applicable to this action the applicability thresholds for these permitting requirements were compared against projected CO_2e emission levels as an indicator of significance. In addition, projected CO_2e emissions were compared against State and regional (Pacific Northwest) GHG emission estimates and projections to further assess the significance of proposed contract ADAIR-generated GHG emissions. **Table 4-21** below shows this analysis. CO_2e emissions for all three scenarios would fall well below the permitting thresholds and would account for less than 0.02 percent of State CO_2e emissions. This demonstrates that in isolation, additional CO_2e emissions expected as a result of contract ADAIR would have a negligible impact. The relative quantity of GHG emissions from the Proposed Action would be expected to be so low that it would be cost-prohibitive to consider mitigation measures.

Table 4-21
Indicators for Carbon Dioxide Emission Impacts

Emission Scenario	ADAIR Projected CO_2e Emissions (tpy)[1]	CO_2 Permit Applicability Thresholds (tpy)		Inventory Data (MMt CO_2e/yr)	
		Title V	PSD New / Modified Source	2015 Oregon Energy Sector[2]	Regional 2015 Energy Sector[2, 3]
High	30,850	100,000	100,000 / 75,000	38	131.5
Medium	19,068				
Low	11,903				

Notes:
[1] Sum of emissions from airfield operations and airspace sorties.
[2] Source: US Energy Information Administration, 2018
[3] Combined emissions for the States of Oregon, Washington and Idaho

CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent from Air Conformity Applicability Model; MMt = million tons per year (to convert from MMt to tpy multiply by 1.1E6); PSD = Prevention of Significant Deterioration; tpy = ton(s) per year

4.5 BIOLOGICAL RESOURCES

4.5.1 Evaluation Criteria

The level of impact on biological resources is based on the

- importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- proportion of the resource that would be affected relative to its occurrence in the region;
- sensitivity of the resource to the proposed activities; and
- duration of potential ecological ramifications.

The impacts on biological resources are adverse if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all federal agencies avoid "taking" federally threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS and NMFS that ends with USFWS and NMFS concurrence or a determination of the risk of jeopardy from a federal agency project.

4.5.2 Proposed Action

Under the Proposed Action, there would be no ground disturbing activities and all potential impacts on biological resources would be associated with aircraft operations at Kingsley Field ANGB and in the MOAs and W-93. The aircraft operations associated with the Proposed Action could have impacts on biological resources from aircraft movement, noise impacts, or BASH. Because the number and type of aircraft as well as flight profiles and airspace are the same under all alternatives, potential impacts on biological resources are the same for all action alternatives.

Chaff and flares (types similar to RR-188 chaff and M206 flares) are proposed for annual use during the training sortie operations. Potential direct impacts on resources from training activities include the deposition of residual materials, such as plastic, from chaff and flare use, its accumulation in sensitive and protected areas, and the ultimate breakdown of these materials into substrate mediums. Indirect impacts include fire risk, transportation of these materials to other areas by environmental elements, and the potential for ingestion by sensitive species within the ROI and beyond. 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 0.25 mi to over 100 mi (Air Force, 1997). The most confined distribution would be from a low-altitude release in calm conditions (Air Force, 1997).

Chaff chemical composition, rate of decomposition, and tendency to leach toxic chemicals under various situations paired with baseline substrate chemistry and conditions are factors that could potentially alter substrate chemistry. A change in chemistry could potentially affect fauna, flora, vegetative cover, substrate stability, the type and quality of habitat, and leaching and runoff potential. Silica (silicon dioxide), aluminum, and stearic acid are major components of chaff with minor quantities of copper, manganese, titanium, vanadium, and zinc in the aluminum chaff coating. All are generally prevalent in the environment, and all but titanium are either found in plants and animals and/or necessary essentials for their growth. Silica does not present a concern to chemistry as it is found in silicate minerals, the most common mineral group on Earth. Silica is more stable in acidic environments than alkaline. Aluminum is also very abundant in the earth's crust, forming common minerals like feldspars, micas, and clays. While acidic and extremely alkaline substrates increase the solubility of aluminum, what is left eventually oxidizes to aluminum oxide which is insoluble. Stearic acid is used in conjunction with palmitic acid to produce an anti-clumping compound for chaff fibers and both degrade when exposed to light and air (Air Force, 1997).

The primary material in flares is magnesium, which is not highly toxic, and it is highly unlikely organisms would ingest flare materials; however, plastic caps are released with the deployment of both chaff and flares. Some flares utilize impulse cartridges and initiates which contain chromium and sometimes lead. Even though these are hazardous air pollutants under the CAA and have been known to cause health risk in certain avian species, significant effects on biological resources are not expected because previous studies have indicated that there are no health risks from flare components (Air Force, 1997), the amount of lead is expected to be very small and dispersed over great distances, and the use of BMPs would avoid the selection of flares containing lead. More significantly, flares have a potential to start fires that can spread, adversely and indirectly affecting many resources. Flare-induced fires depend on the probabilities of flare materials reaching the ground, igniting vegetation, and causing significant damage if fire spreads (Air Force, 1997); however, all use of flares in the MOAs would occur above 5,000 ft (and not all flares would be used in the Juniper Low MOA), would typically burn out in less than 10 seconds, and would only be used during times of low fire risk, greatly reducing the risk of wildland fires as a result of flare use.

The following BMPs would be implemented as appropriate:

- Comply with Air Force and local procedures.
- Establish a capability to analyze fire risks on a site-specific basis. The methodologies presented in this report provide a mechanism for accomplishing this.
- Replace impulse cartridges and initiators in future procurements of flares with models that do not contain toxic air pollutants such as chromium and lead.
- Consider a public information program in areas where flares are used over non-DOD land to educate the public about the hazards of dud flares and proper procedures to follow if a dud flare is found.

4.5.2.1 Alternatives 1, 2, and 3

Vegetation

Under the Proposed Action, there would be no ground disturbing activities and as such no potential to disturb vegetation or habitats on Kingsley Field ANGB; therefore, there would be no impacts on vegetation under Alternative 1, 2, or 3.

Flights within MOAs would not have impacts on vegetation communities or habitat under Alternative 1, 2, or 3. Potential impacts on vegetation from countermeasure chaff and flare constituents may include toxicity or accumulation of chemical compounds. Studies have determined that chaff deposition onto soils does not lead to significant increase of concentrations of chaff or flare chemical constituents in soil and have not been found to be toxic to plants or soil fauna (Air Force, 1997).

Wildlife

There is limited suitable habitat for wildlife on Kingsley Field ANGB and in developed areas adjacent to the base; however, undeveloped areas near Kingsley Field ANGB support relatively common wildlife species. Wildlife, and especially avian species, utilizing these undeveloped areas for foraging and breeding would normally be sensitive to increased noise impacts from military aircraft. Although there is variability in responses across species, many birds and wildlife have the ability to habituate to noise and movement from military aircraft (Grubb et al., 2010) and military aircraft operations have been ongoing at Kingsley Field ANGB for decades. As such, the noise and movement from increased aircraft operations is anticipated to have negligible, short- and long-term impacts on wildlife, including birds breeding and foraging in nearby relatively undisturbed habitats, under Alternative 1, 2, or 3.

Aircraft operations always have the potential for bird and other wildlife strikes. This can occur during takeoff and landing on and near active runways, as well as during flight at altitude. With an increase in air operations associated with contract ADAIR aircraft at Kingsley Field ANGB, there is an increased risk of BASH; however, Kingsley Field ANGB maintains a BASH prevention program specifically to manage BASH risk and implement measures to greatly reduce the likelihood for BASH incidents. The outcome of the BASH program is both increased safety for pilots and military aircraft as well as less incidents of injury or death to birds and other wildlife. As such, with the continued airfield management and risk reduction implementation measures associated with the BASH program discussed in **Section 4.3.2.1**, the impacts on birds and other wildlife from contract ADAIR aircraft strikes during air operations at Kingsley Field ANGB would be minor.

Contract ADAIR aircraft training operations would occur at altitudes above where most bird species would be migrating or foraging. As such, it is highly unlikely that aircraft movement would adversely impact foraging birds or have a risk of BASH under Alternative 1, 2, or 3. Migrating birds could have a greater potential of encountering contract ADAIR aircraft during training operations, especially those that migrate at altitudes above 2,000 ft; however, given the large area and high altitude where training would occur, that most contract ADAIR training would during daytime hours while most songbirds migrate at night, and that most migratory birds migrate at altitudes less than 2,000 ft, the likelihood for birds to encounter aircraft during training operations is low; therefore, adverse impacts on birds from aircraft movement is negligible

under Alternative 1, 2, or 3. Further, given the altitudes that training occurs, aircraft movement in the MOAs would have no impacts on terrestrial or marine mammals under Alternative 1, 2, or 3.

Noise modeling for the contract ADAIR aircraft training operations (see **Section 4.2.2**) indicates that there would be no substantial increase in noise impacts within the MOAs and W-93, and that subsonic and/or supersonic noise levels in the airspace would not change substantially from the baseline conditions; therefore, the negligible change in noise levels as a result of contract ADAIR training would have no impact on breeding, foraging, or nesting birds (including bald and golden eagles), terrestrial mammals, marine mammals, or sea turtles in the MOAs and W-93 under Alternative 1, 2, or 3.

Sonic booms from supersonic flights within the MOAs and W-93 could cause startle effects on avian and mammal species on or near the ground and sea level; however, the sonic boom and postboom rumbling sounds that would be experienced by wildlife do not differ substantially from thunder. Further, the sonic boom events would be highly isolated and rare occurrences in the Juniper/Hart MOA Complex and W-93 and occur in areas where supersonic flights currently occur with military training activities. As such, sonic booms from supersonic flights would have no impact on wildlife, including marine mammals and sea turtles in W-93 and birds breeding and foraging in the MOAs under Alternative 1, 2, or 3.

Noise generated from low-flying aircraft may impact greater sage-grouse during its breeding season. A conservation plan (ODFW, 2011) to maintain and enhance populations of the greater sage-grouse focuses on the conservation and protection of critical habitat or designated “core areas.” Core areas consist of sagebrush habitat which is found throughout the eastern Oregon, including beneath the Juniper Low MOA, the only special use airspace over land where low altitude contract ADAIR flights would occur; however, the ORANG 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 on underlying species, including the greater sage-grouse. The noise analysis for the contract ADAIR sorties in the Juniper/Hart MOA Complex determined that there would be no substantial increase in noise from the addition of ADAIR aircraft and the overall noise levels from the proposed High Noise Scenario would be low. Further, it is estimated that only 27 percent of flight time for ADAIR training would be flown below 1,000 ft AGL in the Juniper Low MOA (ORANG, 2017a). Consequently, maximum noise events resulting from direct aircraft overflights would be infrequent and of short duration. Additionally, in order to avoid impacts on the greater sage-grouse leks (i.e., aggregations of breeding males), the ORANG 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, Alternative 1, 2, or 3 would have minor adverse impacts on the greater sage-grouse.

Under the Proposed Action, the use of chaff and flares would increase by 39 percent within the MOAs and W-93. Impacts on terrestrial wildlife from the use of chaff and flares would be limited to a startle effect from chaff and flare deployment and inhalation of chaff fibers or flare combustion products. The potential of being struck by debris or a dud flare, given the small amount, is remote. Startle effects from the release of chaff and flares would be minimal relative to the noise of the aircraft. The potential for wildlife to be startled from flare deployment at night when flares would be most visible would be minimal due to the short burn time of the flare. It is highly unlikely that during active military training with contract ADAIR aircraft that birds would remain in the area where training is occurring to be adversely impacted by chaff and flares deployment. Further, chaff and flares are so small in size, that it is highly unlikely that small amount of light-weight material ejected during their deployment would have an adverse impact on birds or that the material would reach the ground level and have an impact on mammals. Lastly, an 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 and that chaff material is made of silicon and aluminum that has been shown to have low toxicity (Air Force, 1997); therefore, the use of chaff and flares during contract ADAIR training would have no impact on terrestrial wildlife under Alternative 1, 2, or 3. Sea birds, marine mammals, and sea turtles could ingest the remaining plastic components of chaff and flares if these components remain on the ocean surface. The effect of chaff and flare components on sea birds, marine mammals, and sea turtles is discussed under the threatened and endangered species section below.

Fish

Increased aircraft operations in the MOAs and W-93 would have no impact on freshwater or marine fish. The increased use of chaff and flares does increase the potential for plastics associated with chaff and flares to end up in aquatic ecosystems and in the ocean; however, the amount of plastic material expended in the use of chaff and flares is small, the size of the plastic material is also very small, and most of the material would remain in terrestrial environments; however, the use of chaff and flares under Alternative 1, 2, or 3 would have a minor adverse impact on fish species that are large enough to ingest plastic pieces even though the likelihood of any large fish species encountering plastic caps from chaff and flares is extremely low. The additional contract ADAIR sorties in the special use airspace, including the use of defensive countermeasures, would have no impact on Essential Fish Habitat.

Invasive Species

There are no activities associated with the Proposed Action that have the potential to affect invasive species. There would be no ground disturbing activities that have the potential to spread or remove invasive plants. Similarly, aircraft operations on the airfield or in the MOAs would have no impact on invasive plants or wildlife under Alternative 1, 2, or 3.

Threatened and Endangered Species

Under the Proposed Action, there would be no ground-disturbing activities and all potential impacts on biological resources would be associated with aircraft operations in the project area. Because there would be no ground-disturbing activities, there would be no impacts on federally or state listed plant species, reptiles, amphibians, fish, or invertebrates.

Effects on other listed species could occur from flight operations associated with contracted ADAIR training. These aircraft operations could affect biological resources from aircraft movement, noise, bird and animal aircraft strikes and use of defensive countermeasures. For listed bird species, given the large area and high altitude where training would occur, and that most ADAIR training would occur during daytime hours while most songbirds migrate at night, the likelihood for birds to encounter aircraft during training operations is low. Contract ADAIR would fly up to a projected 3 percent of the estimated 1,952 annual sorties in the special use airspace during environmental night hours when the effects of aircraft noise are accentuated (10:00 pm to 7:00 am local time). These night flights have the potential to affect migratory bird species; however, there are no listed avian species that would migrate at high altitudes at night that occur in the Juniper/Hart MOA Complex, Dolphin MOA, Goose MOA, the Kingsley Field ANGB, or W-93.

There would be no effect on the western snowy plover from contract ADAIR aircraft movement during training. When this bird species is in the Dolphin MOA, it would primarily be foraging, or nesting on the ground. As such, this species would not be startled or at risk from aircraft strikes from aircraft flying at altitudes of 11,000 ft MSL and higher. Similarly, the yellow-billed cuckoo and northern spotted owl could potentially occur throughout the action area but would both primarily be foraging and/or nesting in forested areas within tree canopy cover and would not be affected by aircraft movement at higher altitudes. Additionally, there would be no effect on the short-tailed albatross which could potentially occur in W-93, far off the coast. This species is unlikely to be startled, or at risk from aircraft strikes from contract ADAIR aircraft as only 10 additional annual contract ADAIR sorties are proposed across the 7,645 mi^2 area of W-93; therefore, even though some of the contract ADAIR sorties in W-93 may occur at low altitudes, the risk of a short-tailed albatross encountering one of the 10 additional contract ADAIR aircraft annually in W-93 is highly unlikely. The streaked horned lark and Ridgway's rail are unlikely to occur in the action area. The Ridgway's rail's distribution is limited to coastal salt marshes, is a wading bird, and would never be present at altitudes higher than 11,000 ft MSL. The streaked horned lark breeds and forages in short grasslands of Oregon's Willamette Valley east of the Dolphin MOA where contract ADAIR training sorties would occur above 11,000 ft MSL.

It is highly unlikely that either aircraft movement or noise emissions, especially at higher altitudes, would elicit a response from terrestrial and marine mammals or sea turtles. Noise from contract ADAIR aircraft

would not substantially increase in the Dolphin MOA, Juniper/Hart MOA Complex, Goose MOA, and W-93, from the additional contract ADAIR sorties and would therefore have no effect on the listed terrestrial and marine mammal species and sea turtles (refer to **Table 3-12** for federally and state listed species). Sonic booms from supersonic aircraft movement could cause a startle response by the listed species; however, sonic booms would be relatively rare events during ADAIR training in the action area, and the sonic boom and postboom rumbling would be similar to what mammal species and sea turtles experience during a thunderstorm; therefore, sonic booms from supersonic aircraft movement would have no effect on listed species.

There is the potential for components of chaff and flares that remain after use to make their way to the surface of the Pacific Ocean where they could be ingested by marine mammals. Chaff cartridges, chaff canisters, chaff components, and chaff and flare end caps and pistons would be released into the marine environment, where they would persist for long periods and could be ingested by marine mammals and sea turtles while initially floating on the surface and sinking through the water column. Chaff and flare end caps and pistons would eventually sink to the seafloor (Department of the Navy, 2011), which would reduce the likelihood of ingestion by marine mammals at the surface or in the water column but could still be ingested by some sea turtles such as green turtles and loggerhead turtles that forage on the ocean floor; however, with the relatively small amount of additional chaff and flare use over the very large areas of the Pacific Ocean in the Dolphin MOA and W-93, there is an extremely low chance that marine mammals and sea turtles would encounter these small plastic chaff and flare components. It is estimated that in the Dolphin MOA, chaff and flares use would be equivalent to approximately one chaff per 3.48 mi^2 of ocean and one flare per 5.80 mi^2 of ocean, and in W-93, the annual use would be equivalent to one chaff per 51.68 mi^2 of ocean and one flare per 85.90 mi^2 of ocean. As most of the chaff and flare end caps and pistons would sink to the seafloor in the saltwater environment, it is highly unlikely that marine mammals would ever encounter these small plastic components; therefore, there would be no effect on marine mammals from the use of countermeasures under Alternative 1, 2, or 3. Further, it is also unlikely that a sea turtle would encounter chaff and flare components on the ocean surface or in the water column, but some sea turtles do forage on the sea floor where these chaff and flare components would persist, increasing the possibility over time that these small plastic components could be ingested by sea turtles; therefore, the use of chaff and flares over the Pacific Ocean as a result of the ADAIR training may affect but is not likely to adversely affect sea turtles under Alternative 1, 2, or 3.

Some species of seabirds are known to ingest plastic when it is mistaken for prey (Auman et al., 1997; Yamashita et al., 2011; Provencher et al., 2014). The ingestion of plastic such as chaff and flare compression pads or pistons by birds could cause gastrointestinal obstructions or hormonal changes leading to reproductive issues (Provencher et al., 2014). Unless consumed plastic pieces were regurgitated, the chaff and flare compression pads or pistons could cause digestive tract blockages and eventual starvation and be lethal to seabirds such as the short-tailed albatross and marbled murrelet; however, based on the available information, it is not possible to accurately estimate actual ingestion rates or responses of individual bird species (Moser and Lee, 1992); for example, it is possible that seabirds such as the short-tailed albatross and brown pelican do not mistake these plastic components for prey and mistakenly consume them. Regardless, the majority of these chaff and flare plastic components would fall through the water column to the sea floor (Department of the Navy, 2011) and would not remain on the surface of the Pacific Ocean where a seabird would encounter and consume the plastic pieces. Further, given the small number of chaff and flares that would be used over the large expanses of the Pacific Ocean in the Dolphin MOA and W-93, it is highly unlikely that seabirds such as the short-tailed albatross, marbled murrelet, and brown pelican would ever encounter chaff and flare components while they were floating on the ocean surface. The use of chaff and flares over the Pacific Ocean as a result of the ADAIR training may therefore affect but is not likely to adversely affect the marbled murrelet and short-tailed albatross as a result of Alternative 1, 2, or 3.

As previously mentioned, ADAIR training would have no effect on federally or state listed reptiles (with the exception of marine turtles), amphibians, invertebrates, mollusks, and fish as all ADAIR training activities in the action area would be limited to aircraft movement and the use of countermeasures in the MOAs. It has been determined that the proposed project would have no effect on the state listed species: kit fox or wolverine.

The Air Force has made a no effect determination on all federally listed species in the action area (see **Table 3-12**) except for the marbled murrelet, short-tailed albatross, and sea turtles. The Air Force has made a may affect, but not likely to adversely affect determination for all listed sea birds and sea turtles. The USFWS and NMFS have concurred with the Air Force's effects determinations (**Appendix A**).

4.5.2.2 Mitigation

The proposed mitigation to reduce noise under the High Noise Scenario would have minor, long-term, beneficial impacts on wildlife at and near Kingsley Field ANGB. The proposed mitigation would reduce the land area within noise contours greater than the 65-dBA DNL; this would reduce noise-induced stress to wildlife, especially avian and mammal species that breed and forage in the vicinity of Kingsley Field.

4.5.3 No Action Alternative

Under the No Action Alternative, the contract ADAIR operations would not occur at Kingsley Field ANGB, and there would be no training operations in the MOAs and W-93. As such, there would be no change to biological resources.

4.6 LAND USE

4.6.1 Evaluation Criteria

Potential impacts on land use are based on the level of land use sensitivity in areas potentially affected by the Proposed Action and alternatives as well as compatibility of those actions with existing conditions. In general, a land use impact would be adverse if it met one of the following criteria:

- inconsistency or noncompliance with existing land use plans or policies
- precluded the viability of existing land use
- precluded continued use or occupation of an area
- incompatibility with adjacent land use to the extent that public health or safety is threatened
- conflict with planning criteria established to ensure the safety and protection of human life and property

4.6.2 Proposed Action

Under the Proposed Action, contract ADAIR would augment current ADAIR sorties flown by the 173 FW at Kingsley Field ANGB. Contract ADAIR personnel would use existing facilities at Kingsley Field for operations, maintenance, and administrative activities, as well as for equipment and tool storage. In addition, existing ramp and hangar space would be used for parking and maintenance of aircraft. Contract ADAIR proposes to use existing airspace (Juniper/Hart MOA Complex, Dolphin and Goose MOAs, and W-93) for training. The Proposed Action would be compatible with the IDP for Kingsley Field ANGB (NGB, 2015), and the Kingsley Field JLUS (City of Klamath Falls, 2016). The Proposed Action also would use existing facilities that are available for use at the Kingsley Field ANGB. Three options for Operations and Maintenance facilities and ADAIR aircraft parking are proposed. Land use under the airspace would not be impacted by the Proposed Action.

Implementation of alternatives differs only in the facilities chosen for operations, maintenance, and aircraft parking. Because the number and type of aircraft, using the same flight profiles and airspace are the same under all alternatives, potential impacts associated with land use are the same for all alternatives.

4.6.2.1 Alternatives 1, 2, and 3

Changes in the noise setting can affect land use compatibility from increased noise exposure to existing POIs. Noise increases of a 3-dBA DNL and greater near sensitive receptors can alter the noise setting, resulting in incompatibility with the surrounding land uses. As indicated in **Section 4.2**, under the High

Noise Scenario, the DNL would increase 0 to 4 dBA at POIs, extending the affected area approximately 2,742 ac in the greater than the 65-dBA DNL contour and 945 ac in the greater than the 70-dBA DNL contour. The greater affected area (see **Figure 4-1**) would result in noticeable effects on noise-sensitive POIs, which include schools and places of worship. This change in the noise setting would be potentially significant, long term, and incompatible with many surrounding land uses under Alternative 1, 2, or 3.

Under Alternatives 1, 2, and 3, there would be no impacts on land use on the installation. All proposed buildings are located on land designated as Aircraft Operations or Maintenance; as such, there would be no long-term changes to the existing land use.

Contract ADAIR aircraft flights above 11,000 ft MSL in the Oregon and California coastal zone would not trigger CZMA compliance or the need for a consistency determination as no coastal resources protected under the CZMA and the states' coastal management programs would be impacted.

No impacts on land use beneath the airspace proposed for contract ADAIR are expected.

4.6.2.2 Mitigation

Implementation of noise mitigation measures if the High Noise Scenario aircraft were selected would reduce the size of the 65-dBA DNL contour and reduce the number of POIs potentially impacted by a greater than 3-dBA noise level increase at Kingsley Field and environs. Under the recommended mitigation options discussed in **Section 4.2.2.2**, High Noise Scenario DNL increases would range from 0 to 3 dBA. Some POIs would still increase by a 3-dBA DNL under mitigation; however, overall, implementation of the noise mitigation measures would reduce changes to the noise setting and, therefore, lessened the potential severity of impacts associated with incompatible land use.

4.6.3 No Action Alternative

Under the No Action Alternative, there would be no addition of contract ADAIR personnel or aircraft stationed at Kingsley Field ANGB. ADAIR Operations and Maintenance facilities would not change from their current use; therefore, no changes would occur to the existing land use.

4.7 SOCIOECONOMICS – INCOME AND EMPLOYMENT

4.7.1 Evaluation Criteria

Consequences to socioeconomic resources were assessed in terms of the potential impacts on the local economy from proposed contract ADAIR. The level of impacts associated with the contract ADAIR expenditure is assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., employment). The magnitude of potential impacts can vary greatly, depending on the location of an action. For example, implementation of an action that creates 10 employment positions might be unnoticed in an urban area but might have significant impacts in a rural region. In addition, if potential socioeconomic changes resulting from other factors were to result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, they may be considered adverse.

4.7.2 Proposed Action

Under the Proposed Action, the Air Force would contract an estimated 2,000 sorties annually at Kingsley Field ANGB, which would require an estimated 6 aircraft and 47 contract personnel. As such, there is no substantive difference in where the aircraft and personnel are located at Kingsley Field ANGB as it pertains to impacts on socioeconomics. There would be no socioeconomic impacts in the special use airspace as contract ADAIR training in the Juniper/Hart MOA Complex, Goose MOA, Dolphin MOA, and W-93 would not alter the income and employment in these areas.

Implementation of alternatives differs only in the facilities chosen for operations, maintenance, and aircrew briefings. Because the number and type of aircraft, using the same flight profiles and airspace are the same under all alternatives, potential impacts associated socioeconomics resources are the same for all alternatives.

4.7.2.1 Alternatives 1, 2, and 3

Minor interior renovations to facilities and associated communication infrastructure needed for aircrew flight equipment or secured storage space would be a minor requirement for materials and labor and would have no impacts on the socioeconomic condition on the region under Alternative 1, 2, or 3. The 47 contracted ADAIR maintenance personnel and pilots would represent a small increase in the total persons permanently assigned to and working at Kingsley Field ANGB, where currently over 1,040 military and civilian personnel are employed. No adverse impacts on income and employment would occur from the addition of contract ADAIR personnel at Kingsley Field ANGB under Alternative 1, 2, or 3.

As described in **Section 4.2**, increased noise at sensitive receptors would occur in the Klamath Falls area near the airfield. Some POIs would experience a potentially significant increase in noise from the additional sorties associated with the contract ADAIR aircraft. As such, noise increases greater than a 3-dBA DNL at existing residential homes and commercial properties near these sensitive receptors in the Klamath Falls area could cause a loss of value of these residential and commercial properties as the desirability to live and work in these areas would decrease with the increased aircraft noise; therefore, noise from the contract ADAIR aircraft would have a potentially significant adverse impact on property values under Alternative 1, 2, or 3.

It is estimated that the maximum contracted value for ADAIR training would be $30,000 per flight hour (Headquarters Air Combat Command Acquisition Management and Integration Center, 2018), though most likely between $8,500 and $15,000 based on technical solution sought; therefore, there would be increased annual expenditures in the region of up to approximately $30 million to support the seven contracted fighter aircraft flying 2,000 annual sorties from Kingsley Field ANGB. These expenditures would be in the form of purchasing fuel, equipment, and materials to support the contract ADAIR sorties as well as the employment of 47 highly skilled contracted personnel (maintainers and pilots). These increased expenditures would provide a long-term, potentially major, beneficial impact on the ROI through increased payroll tax revenue and the purchase of additional equipment, materials, and fuel needed for aircraft operations and maintenance under Alternative 1, 2, or 3.

4.7.2.2 Mitigation

The implementation of the noise mitigation measures under the High Noise Scenario that would reduce the noise levels from contract ADAIR aircraft at POIs near the airfield would be needed to reduce the potentially significant impact of the loss of value of residential homes and commercial properties near the airfield. With the implementation of the proposed mitigation measures under the High Noise Scenario, minor impacts on the residential and commercial property values in the vicinity of the airfield would occur.

4.7.3 No Action Alternative

Under the No Action Alternative, the contract ADAIR operations would not occur at Kingsley Field ANGB, and no expenditures would occur locally or regionally to support contracted aircraft or sorties. As a result, there would be no change in socioeconomics.

4.8 ENVIRONMENTAL JUSTICE

4.8.1 Evaluation Criteria

Environmental justice analysis applies to potential disproportionate effects on minority, low-income, and youth populations. Environmental justice issues could occur if an adverse environmental or socioeconomic

consequence to the human population fell disproportionately upon minority, low-income, or youth populations. Ethnicity and poverty status were examined and compared to state and national data to determine if these populations could be disproportionately affected by the Proposed Action.

4.8.2 Proposed Action

Under the Proposed Action, the Air Force would contract an estimated 2,000 ADAIR sorties annually at Kingsley Field ANGB. The addition of an estimated 6 aircraft and 47 contract personnel and their families to Kingsley Field ANGB, and the associated noise from those aircraft have the potential to cause disproportionate impacts on minorities and children in the community, regardless of the alternative location at Kingsley Field for contract ADAIR operations and maintenance.

Implementation of alternatives differs only in the facilities chosen for operations, maintenance, and aircrew briefings; therefore, potential impacts on environmental justice populations and children are the same for all alternatives.

4.8.2.1 Alternatives 1, 2, and 3

Under the Proposed Action, the increase in the number of personnel at Kingsley Field ANGB supporting the contracted ADAIR sorties would not result in a disproportionate impact on minorities, low-income populations, and protection of children, because there is adequate housing, community resources, and community services in the region to support the increase in personnel. The 47 additional personnel and their families supporting the contract ADAIR requirement would not disproportionately affect the availability of these resources to minorities, low-income populations, or children under Alternative 1, 2, or 3.

The DNL increase under the High Noise Scenario was modeled to be at or greater than the 3-dBA DNL at selected POIs and would impact neighborhoods proximate to Kingsley Field ANGB. Because the percentages of the population that identify as minorities and low income in the Klamath Falls area proximate to the airfield are similar to those throughout Klamath County, in the state of Oregon, and the United States, there would be no disproportionate impacts from the increase in noise impacts on minority populations or low-income communities under Alternative 1, 2, or 3.

Although aircraft noise in the community from contract ADAIR aircraft operations would adversely impact select schools and daycare centers in the ROI, posing a special risk to children, the percentage of the population that is under the age of 18 in communities near Kingsley Field is similar to the Klamath County, the State of Oregon, and the United States. Changes in the DNL at nearby schools under the High Noise Scenario range were modeled to be at or greater than 3 dBA. This is a substantial noise increase and would have potentially significant impacts on educational facilities where the DNL increases as increased noise levels have been shown to have serious adverse impacts on the ability of children to learn (**Appendix B**); therefore, although those noise impacts would not be disproportionate under Alternative 1, 2, or 3, the increased noise from contract ADAIR aircraft would have less than significant impacts on children utilizing childcare facilities and schools under the Low and Medium Noise Scenarios and potentially significant impacts on children under the High Noise Scenario without mitigation (see **Section 4.2.2**).

As noise levels in the MOAs proposed for contract ADAIR training would not increase substantially, there would be no impacts on minority or low-income communities or children as a result of Alternative 1, 2, or 3.

4.8.2.2 Mitigation

The proposed mitigation to reduce noise under the High Noise Scenario would reduce the potential noise level at nearby childcare facilities and schools under all three alternatives, and no POIs would have a noise increase greater than a 3-dBA DNL; therefore, the Proposed Action with mitigation would have minor impacts on children in nearby childcare facilities and schools under Alternative 1, 2, or 3.

4.8.3 No Action Alternative

Contract ADAIR operations would not occur at Kingsley Field ANGB under the No Action Alternative; therefore, there would be no disproportionate impacts on minority or low-income communities or children from regional expenditures to support contracted aircraft or from the increased training sorties.

4.9 CULTURAL RESOURCES

4.9.1 Evaluation Criteria

Adverse effects to cultural resources might include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the resource that make it eligible for listing in the NRHP. Those effects can include introducing visual or audible elements that are out of character with the property or its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property's historic significance. For the purposes of this EA, an effect is considered adverse if it alters the integrity of a NRHP-listed or eligible resource or if it has the potential to adversely affect Traditional Cultural Properties and the practices associated with the property.

4.9.2 Proposed Action

The Proposed Action includes elements affecting the base and military training airspace. As described in **Chapter 2**, the elements affecting the base would include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. The elements affecting the airspace would include airspace use and defensive countermeasures. Impact results from each alternative related to cultural resources are described below.

4.9.2.1 Alternative 1

Constructed in 1992, Building 404 was determined not eligible for inclusion in the NRHP under Criterion Consideration G in 2002, and the Oregon SHPO concurred with this determination. Building 404 will not be subject to reevaluation until it reaches 50 years of age in 2042.

Constructed in 1957, Building 307 was determined not eligible for inclusion in the NRHP under Criterion Consideration G in 2002. Under this proposed undertaking, the ORANG has determined that Building 307, although more than 50 years of age, is not eligible for listing in the NRHP. Building 307, as a support facility, lacks architectural significance and its integrity has been compromised by exterior changes.

The ORANG initiated tribal consultation in 2012 when pursuing the establishment and modification of Oregon Military Training Airspace (ORANG, 2017a). Federally recognized Native American tribes located beneath or in the vicinity of the Oregon Military Training Airspace Project were contacted in an effort to determine if sacred sites or places of importance to these tribes were located within the APE for the Proposed Action. No traditional cultural resources or sacred sites were formally identified at Kingsley Field as a result of this effort nor have any been identified as part of ongoing consultation on the Proposed Action; however, as part of the consultation process, the Tolowa Dee-ni' Nation expressed concern that properties of religious and cultural significance to the Nation are present under the existing airspace, specifically along the northern California coastline, and requested that the Air Force refrain from flying over or training in existing airspace during culturally significant times of the year. After negotiations among the NGB, THPO, and the Nation's cultural committee, the Air National Guard Readiness Center (ANGRC) agreed to an exclusion zone along the northern California coastline and waters, extending from Lake Earl north to California's border with Oregon. No chaff and flare will be used within the exclusion zone for the Winter Solstice and 10 days thereafter, and no chaff and flare will be used within the exclusion zone during the month of July. All aircraft operations will be restricted to a floor of 11,000 ft MSL. NGB also agreed to contact the Nation after 1 year to ensure that all their concerns have been addressed.

No ground disturbance would take place as part of the Proposed Action; therefore, no archaeological resources (surface or subsurface) would be disturbed or otherwise affected.

There are 83 historic properties listed in the NRHP that are located within the APE. Resource types include 24 structures (e.g., bridges, lighthouses, infrastructure features), six archaeological sites (e.g., townsites cemeteries, mining-related sites), and 53 buildings (e.g., homes, government buildings, churches, theaters) (see **Table 3-18**) (NPS, n.d.). Current data indicate no known traditional cultural properties are located under the 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. The only cultural resources with the potential to be impacted by increased training in the overland portions of the MOAs would be historic structures, which could be damaged during aircraft overflights at altitudes low enough to generate significant noise vibrations or from sonic booms. All military flight activity in the special use airspace would be located at or above an altitude of 11,000 ft MSL, however, and would not generate a maximum sound level equal to or greater than 130 dB (only sound lasting more than one second above a sound level of 130 dB is potentially damaging to structural components) (Wyle Laboratories, Inc., 2008). The addition of contractor aircraft operating at supersonic speeds means that the number of sonic booms heard would likely increase; however, potential impacts associated with sonic booms are still expected to be negligible. Alternative 1 would therefore have no effect, and consequently no impact, to historic properties.

4.9.2.2 Alternative 2

Building 219 was determined not eligible for inclusion in the NRHP by the ORANG in 2011, and the Oregon SHPO concurred with this determination.

Building 307 was determined not eligible for inclusion in the NRHP by the ORANG in 2002. At that time, the SHPO recommended it be reassessed at 50 years of age. Under this proposed undertaking, the ORANG has determined that Building 307, although more than 50 years of age, is not eligible for listing in the NRHP. Building 307, as a support facility, lacks architectural significance and its integrity has been compromised by exterior changes.

No traditional cultural resources or sacred sites have been formally identified at Kingsley Field; however, as part of the consultation process, the Tolowa Dee-ni' Nation expressed concern that properties of religious and cultural significance to the Nation are present under the existing airspace, specifically along the northern California coastline, and requested that the Air Force refrain from flying over or training in existing airspace during culturally significant times of the year. After negotiations among the NGB, THPO, and the Nation's cultural committee, the ANGRC agreed to an exclusion zone along the northern California coastline and waters, extending from Lake Earl north to California's border with Oregon. No chaff and flare will be used within the exclusion zone for the Winter Solstice and 10 days thereafter, and no chaff and flare will be used within the exclusion zone during the month of July. All aircraft operations will be restricted to a floor of 11,000 ft MSL. NGB also agreed to contact the Nation after 1 year to ensure that all their concerns have been addressed.

No ground disturbance would take place as part of the Proposed Action; therefore, potential archaeological deposits would not be impacted. Potential effects to historic properties under the airspace are the same as described in Alternative 1.

4.9.2.3 Alternative 3

Under this alternative, Contract ADAIR operations and AMU activities would both be housed in Building 219. Building 219 was determined not eligible for inclusion in the NRHP by the ORANG in 2011, and the Oregon SHPO concurred with this determination.

No traditional cultural resources or sacred sites have been formally identified at Kingsley Field; however, as part of the consultation process, the Tolowa Dee-ni' Nation expressed concern that properties of religious and cultural significance to the Nation are present under the existing airspace, specifically along the northern California coastline, and requested that the Air Force refrain from flying over or training in existing airspace during culturally significant times of the year. After negotiations among the NGB, THPO, and the Nation's cultural committee, the ANGRC agreed to an exclusion zone along the northern California coastline and waters, extending from Lake Earl north to California's border with Oregon. No chaff and flare will be used within the exclusion zone for the Winter Solstice and 10 days thereafter, and no chaff and flare will be used within the exclusion zone during the month of July. All aircraft operations will be restricted to a floor of 11,000 ft MSL. NGB has also agreed to contact the Nation after 1 year to ensure that all their concerns have been addressed.

No ground disturbance would take place as part of the Proposed Action; therefore, potential archaeological deposits would not be impacted. Potential effects to historic properties under the airspace are the same as described in Alternative 1.

4.9.2.4 Mitigation

The mitigation measures developed to reduce impacts from noise under the High Noise Scenario (described in **Section 4.2.2**) would not affect cultural resources at Kingsley Field and therefore, have no impact on cultural resources from implementation.

4.9.3 No Action Alternative

This alternative provides a benchmark for assessment, preserving the status quo. Under this alternative, no contract ADAIR would be established at Kingsley.

4.10 HAZARDOUS MATERIALS AND WASTES, CONTAMINATED SITES, AND TOXIC SUBSTANCES

4.10.1 Evaluation Criteria

Impacts on HAZMAT management would be considered adverse if the federal action resulted in noncompliance with applicable federal and state regulations, or increased the amounts generated or procured beyond current Kingsley Field's waste management procedures and capacities. Impacts on the ERP would be considered adverse if the federal action disturbed (or created) contaminated sites resulting in negative effects on human health or the environment.

4.10.2 Proposed Action

Under the Proposed Action, maintenance and operations of six contracted ADAIR aircraft could contribute to the volume of HAZMAT stored and used at Kingsley Field ANGB and the amount of hazardous wastes generated.

4.10.2.1 Alternative 1

Hazardous Materials and Wastes

The quantity of HAZMAT such as oil, Jet-A fuel, hydrazine, hydraulic fluid, solvents, sealants, and antifreeze would increase with the operations and maintenance of contract ADAIR aircraft at Kingsley Field ANGB. HAZMAT required for the contract ADAIR aircraft and used by contract personnel would be procured, controlled, and tracked through the Bioenvironmental Engineering Office and provided through the HAZMART, following established Kingsley Field procedures. This would ensure that only HAZMAT needed for operations and maintenance at the smallest quantities would be used and that all of the HAZMAT used

for contract ADAIR at Kingsley Field would be properly tracked and remain compliant at the base; therefore, there would be a minor impact from the increased HAZMAT use to support the contract ADAIR sorties at Kingsley Field.

The quantity of hazardous wastes generated (e.g., used petroleum products) would increase as a result of the contract ADAIR operations at Kingsley Field ANGB; however, all hazardous waste generated as a result of contract ADAIR aircraft operations and maintenance would be properly handled, stored, and disposed of following the 173 FW *Hazardous Waste Management Plan* (ORANG, 2014). Further, the 173 FW's *Oil and Hazardous Substances Spill Prevention and Response Plan* (ORANG, 2016) would reduce the likelihood of spills and provide rapid response to any discharges of oil or hazardous substances. These procedures ensure that hazardous waste is managed according to all federal, state, and local laws and regulations. As such, there would be no impact from the storage and disposal of hazardous waste in support of the contract ADAIR sorties at Kingsley Field ANGB.

Environmental Restoration Program

All eight ERP sites on Kingsley Field ANGB that are the responsibility of the ORANG have received approved NFA findings, indicating that all response actions are complete for these restoration sites. Further, no ERP sites are located proximate to Buildings 404 and 307; therefore, no environmental contamination is known to occur within the project area and no impact would occur from the use of Buildings 404 and 307 for contracted ADAIR operations and maintenance.

Asbestos-Containing Materials and Lead-Based Paint

Buildings 404 and 307 were visually inspected for ACM in 2006, and no suspect ACM were identified; therefore, interior renovations are not anticipated to disturb any ACM; however, due to the age of the buildings, ACM could be present and renovations would follow the requirements of the *Asbestos Management and Operating Plan* for Kingsley Field.

LBP could be present in Buildings 404 and 307, with the date of construction of Building 307 indicating that the presence of LBP is likely. If interior renovations are needed in Buildings 404 or 307 to support the contracted ADAIR personnel, materials that would be altered would be tested for LBP, and any LBP found would be properly handled by a certified contractor, and disposed of in accordance with federal, state, and local laws.

With the implementation of the requirements described by the *Asbestos Management and Operations Plan* and appropriate testing and handling of any possible LBP, there would be no impact from potential ACM or LBP disturbed by interior renovations of Buildings 404 and 307, if renovations are deemed necessary to support the contract ADAIR personnel.

Radon

There is a low potential for radon to pose a health hazard at Kingsley Field. Buildings 404 and 307 have adequate ventilation systems. Further, no new construction is proposed. As such, no impact from radon is anticipated.

Polychlorinated Biphenyls

Removal of any light fixtures has the potential to disturb PCBs. If renovations of the interior of Buildings 404 and 307 require the removal of fluorescent lighting fixtures that could contain PCBs, the lighting fixtures would be disposed of according to federal, state and local laws. The removal and proper disposal of light fixtures containing PCBs would be a long-term, minor, beneficial impact.

4.10.2.2 Alternatives 2 and 3

Hazardous Materials and Wastes

Impacts from increased quantities of HAZMAT and hazardous waste are the same as described for Alternative 1.

Environmental Restoration Program

Building 219 was identified as an area of concern with an NFA issued by the ODEQ in 2014, and no environmental contamination is known to occur in the project area. No ERP sites are located near Building 307. As such, there would be no impacts from environmental contamination from the implementation of the Proposed Action.

Asbestos-Containing Materials and Lead-Based Paint

The impacts of ACM and LBP at Building 307 are the same as described for Alternative 1. ACM has been identified in Building 219; the ACM present in Building 219 does not pose a threat of asbestos exposure; however, any renovations to the interior of Building 219 would require further inspection by a qualified contractor. If ACM are determined to be present in areas where interior renovation is needed to support contract ADAIR personnel, ACM would be properly removed and disposed of according to the *Asbestos Management Plan* following all federal, state, and local regulations (ANG, 2006).

LBP could be present in Building 219 as the building has never been tested for LBP. If interior renovations are needed in Building 219 to support the contracted ADAIR personnel, materials would be tested for LBP, and any potential LBP discovered would be properly handled by a certified contractor, and disposed in accordance with federal, state, and local regulations.

With the implementation of the requirements described by the *Asbestos Management Plan* and proper testing and disposal of LBP (if present), there would be no impact from potential ACM or LBP with interior renovations of Building 219, if determined to be necessary to support the contract ADAIR personnel.

Radon

The impact from radon is the same as described for Alternative 1.

Polychlorinated Biphenyls

The impact from potential PCBs in light fixtures that could be removed during interior renovations is the same as described for Alternative 1.

4.10.2.3 Mitigation

The mitigation measures developed to reduce impacts from under the High Noise Scenario (described in **Section 4.2.2**) would not affect hazardous materials, hazardous wastes, contaminated sites or toxic substances and therefore, have no impact on hazardous materials, hazardous wastes, contaminated sites or toxic substances from implementation.

4.10.3 No Action Alternative

Under the No Action Alternative, the contract ADAIR operations would not occur at Kingsley Field. As such, no increased quantity of HAZMAT would be used and no increased quantity of hazardous wastes would be generated. No interior renovations of buildings to support contract ADAIR personnel would be required; therefore, there would be no potential disturbance of ACM, LBP, or PCBs in Kingsley Field ANGB buildings.

As a result, there would be no direct or indirect impact on any HAZMAT or hazardous or special wastes under the No Action Alternative.

4.11 TRANSPORTATION

4.11.1 Evaluation Criteria

The Proposed Action would result in transportation impacts if it resulted in a substantial increase in traffic generation that would cause a decrease in the level of service, a substantial increase in the use of the connecting street systems or mass transit, or if on-site parking demand would not be met by projected supply.

4.11.2 Proposed Action

Under the Proposed Action, no new construction or transportation changes are proposed. The level of service for transportation needed to support the contract personnel is assumed to be the same under all of the alternatives.

4.11.2.1 Alternative 1

The additional 47 contracted personnel (39 maintainers and 8 pilots) would utilize Kinsley Field's on-base transportation network as well as the Klamath Regional Airport road network to travel to and between Buildings 404 and 307. Travel between the two buildings would require passing through the Main Gate of the Cantonment Area at Kingsley Field ANGB. It is anticipated that under typical contract ADAIR mission-support situations, the 39 contracted maintenance personnel could be working at Building 307 at the same time; therefore, up to 39 additional privately owned vehicles would enter and exit through the Main Gate during peak hours; however, there is adequate capacity at the Main Gate to handle the additional privately owned vehicles commuting to the Building 307. Regional roads leading to the Main Gate as well as to Building 404 have varying levels of traffic congestion during peak morning and afternoon travel times (City of Klamath Falls, 2012), including a level of service of F for eastbound ramps at the Washburn Way/State Highway 140 intersection; however, the number of additional vehicles associated with the Proposed Action commuting to Kingsley Field daily is very low (up to 47 personally owned vehicles), the level of service at all other intersections studied that are proximate to Kingsley Field are at C or above, and it is anticipated that some of the contract personnel would arrive and depart at nonpeak hours to support after-hours maintenance requirements and nighttime sorties, and would not necessarily utilize local roadways and the Main Gate for ingress and egress during peak hours every day. As such, the direct, long-term, adverse impact on the Kingsley Field transportation network from the additional contract ADAIR personnel associated with the Proposed Action would be minor.

4.11.2.2 Alternatives 2 and 3

The additional 47 contracted personnel would utilize Kingsley Field ANGB's on-base transportation network and the Main Gate to travel to and from Buildings 219 and 307, and the impacts on the Kingsley Field and local transportation network would be the same as described for Alternative 1.

4.11.2.3 Mitigation

The mitigation measures developed to reduce impacts from noise under the High Noise Scenario (described in **Section 4.2.2**) would not affect transportation.

4.11.3 No Action Alternative

Under the No Action Alternative, the contract ADAIR operations would not occur at Kingsley Field ANGB and no facilities would be used to support contracted aircraft or sorties. As a result, there would be no direct or indirect impacts on transportation, under the No Action Alternative.

CHAPTER 5 CUMULATIVE IMPACTS AND OTHER ENVIRONMENTAL CONSIDERATIONS

This section includes an analysis of the potential cumulative impacts by considering past, present, and reasonably foreseeable future actions; potential unavoidable adverse impacts; the relationship between short-term uses of resources and long-term productivity; and irreversible and irretrievable commitment of resources.

5.1 CUMULATIVE EFFECTS

The CEQ regulations stipulate that the cumulative effects analysis considers the potential environmental consequences resulting from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR § 1508.7). In addition, CEQ published guidance for addressing and analyzing cumulative impacts under NEPA. CEQ's publication, *Considering Cumulative Effects Under the National Environmental Policy Act* (January 1997), provides additional guidance for conducting an effective and informative cumulative impacts analysis.

This section identifies and evaluates past, present, and reasonably foreseeable future projects that could cumulatively affect environmental resources in conjunction with the Proposed Action. The ROI for the cumulative effects analysis is the same as defined for each resource in **Chapter 3**. Actions identified in **Tables 5-1** and **5-2** would not interact with all resources; therefore, resources that potentially could result in a cumulative effect with the addition of the Proposed Action and alternatives are noted in these tables.

Assessing cumulative effects begins with defining the scope of other actions and their potential interrelationship with the proposed or alternative actions. Other activities or projects that coincide with the location and timetable of the Proposed Action and other actions are evaluated. Actions not identified in **Chapter 2** as part of the proposed or alternative actions, but that could be considered as actions connected in time or space (40 CFR § 1508.25) may include projects that affect areas on or near Kingsley Field ANGB.

An effort has been made to identify actions that are being considered or are in the planning phase at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action or alternatives, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available in order that they can evaluate the potential environmental consequences of the Proposed Action.

5.2 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Past, present, and reasonably foreseeable actions by the Air Force on Kingsley Field as well as in the region were considered. A review of the available information from the federal land management agencies managing lands in the Juniper/Hart MOA Complex, Dolphin MOA, and Goose MOA indicated that there were no major projects with the potential to create cumulative impacts when combined with the proposed project and other reasonably foreseeable future projects.

5.2.1 Air National Guard Actions

Recent past and ongoing military actions at Kingsley Field were considered as part of the baseline or existing condition in the appropriate ROI. Each project summarized in this section was reviewed to consider the implication of each action with the proposed or alternative actions. Potential overlap in affected area and project timing were considered.

Kingsley Field is an active military installation that experiences continuous evolution of mission and operational requirements. All construction projects must comply with land use controls, which include safety and environmental constraints outlined in the IDP (2015) and the EA for the IDP (2017). Kingsley Field, like other major military installations, requires new construction and infrastructure improvements. These routine projects are environmentally cleared using NEPA's Categorical Exclusion process and would continue to

occur in conjunction with the Proposed Action. In addition to these routine projects, **Table 5-1** lists the past, present, and reasonably foreseeable future major Air Force projects anticipated to occur on the base. Anticipated future nonfederal, off-base projects that may overlap in the potentially affected area or project timing with the Proposed Action were also considered and are discussed in **Sections 5.2.2** and **5.2.3** below.

Table 5-1
Past, Present, and Reasonably Foreseeable Projects at Kingsley Field

Scheduled Project	Project Summary	Implementation Date	Relevance to Proposed Action	Resource Potentially Affected
Past Actions				
F-15 Flight Hour Robust and Short-term Construction Project at the 173rd Fighter Wing Oregon Air National Guard Kingsley Field	Project proposed to increase F-15 flight hours and to construct short-term facilities to support 173 FW activities and demolition of buildings to enhance operational efficiency and establish Anti-terrorism/Force Protection standards.	EA FONSI, August 2011	Increase in sorties in the same airspace proposed for ADAIR.	Airspace Management, Noise, Air Quality, Safety, Socioeconomics – Income and Employment
Operational Range Assessment Plan, Phase I Qualitative Assessment Report EA	Small arms assessment located at Kingsley Field. Report assessed the migration of munitions constituents off-site, identified any potential threats of releases, and response to threats of human health and the environment.	June 2009	Located on Kingsley Field.	Air Quality, Safety, Biological Resources
Present Actions				
Air National Guard Installation Development Plan at the 173 Fighter Wing, Kingsley Field EA	Over a 5-year period, provide the 173 FW with the properly sized and configured facilities, infrastructure, and services outlined in the Installation Development Plan.	EA, September 2017	Infrastructure enhancement could affect installation facilities proposed for ADAIR use.	Noise, Air Quality, Socioeconomics – Income and Employment, Transportation
Design Submittal to Provide Energy Resilience	Provide energy resilience to Emergency Operations Center – Building 211 and the Network Control Center – Building 210 to allow the 173 FW the ability to assume command and control of the Oregon National Guard in the event of a major catastrophe.	Project conceptual design completed November 2017	Project would be located in Buildings 211 and 210 at Kingsley Field.	Safety

Table 5-1
Past, Present, and Reasonably Foreseeable Projects at Kingsley Field

Scheduled Project	Project Summary	Implementation Date	Relevance to Proposed Action	Resource Potentially Affected
EA for the Installation Development Plan	Implement projects identified in the 2015 Installation Development Plan including construction of a new Combat Arms Training and Maintenance Indoor Range and demolition of Buildings 535 and 4086; instruction landing system unit on Runway 14; alteration of Deployment Processing Center (Building 223); expand Building 243; consolidate maintenance functions; demolition of buildings for construction of a new munitions storage igloo; improvements to aircraft ramp parking apron.	FONSI September 19, 2017	Potential construction overlaps with ADAIR implementation	Land Use, Socioeconomics – Income and Employment, Safety
Oregon Air National Guard, Proposed Establishment and Modification of Oregon Military Training Airspace EIS	Modifications to existing and additions of military airspace to provide efficient, realistic air-to-air tactical fighter training.	EIS, April 2017	Expansion of Juniper/Hart Military Operations Area Complex, proposed airspace for contract ADAIR activities.	Airspace Management, Safety, Noise, Air Quality
Future Actions				
Phase II Geothermal Feasibility Study Report	Study to determine the feasibility for development of a geothermal plant at Kingsley Field to meet energy resilience goals.	December 2017 (still conceptual)	Potential construction overlap	Air Quality, Safety, Socioeconomics – Income and Employment, Land Use

Notes:
173 FW = 173d Fighter Wing; ADAIR = adversary air; EA = Environmental Assessment; EIS = Environmental Impact Statement; FONSI = Finding of No Significant Impact

5.2.2 Nonfederal Actions

Nonfederal actions such as new development or construction projects occurring in the area surrounding Kingsley Field were considered for potential cumulative impacts. Kingsley Field ANGB is located between a primarily rural area and the southern portion of Klamath Falls city limits on 254 ac of exclusive land at Crater Lake Regional Airport. Anticipated future nonfederal projects that may overlap in the potentially affected area or project timing with the Proposed Action were also considered and are shown in **Table 5-2**.

Table 5-2
Past, Present, and Reasonably Foreseeable Nonfederal Projects at Kingsley Field

Scheduled Project	Project Summary	Implementation Date	Relevance to Proposed Action	Resource Potentially Affected
Past Actions				
Crater Lake-Klamath Regional Airport – Proposed Extension of Safety Area for Runway 14-32	EA was prepared to analyze the impacts for extending the safety area for Runway 14-32.	Finding of No Significant Impact issued in 2001	Airport runway that would be used by ADAIR operations	Safety, Noise, Air Quality
Klamath Falls Airport Master Plan Study (Mead & Hunt, Inc., 2005)	Capital Improvements include rehabilitation of runways/taxiways, environmental mitigation (bird hazards), fog seal runway, snow removal equipment, demolition and reconstruction of hangar over the next nine years.	January 2005	Airport enhancements and improvements benefiting ADAIR operations	Safety
Construction of Taxiway J, Connecting Taxiways, and Associated Drainage Improvements, Crater Lake-Klamath Regional Airport EA (Mead & Hunt, Inc., 2015)	Construction of a taxiway parallel to and east of Runway 14-32 (Taxiway J) 10,301 feet in length with construction of three new exit taxiways connecting to the parallel taxiway.	Draft EA 2015	Taxiways would be used by ADAIR operations	Safety
Present Actions				
Oregon Department of Transportation, U.S. 97: Algoma Road to Miller Island Road project (ODOT, 2018b)	Project includes the repaving approximately 10 miles of US 97 north, west, and south of Klamath Falls. Purpose is to improve road and safety conditions.	Summers of 2018 and 2019 (Construction Phase)	Potential impact on traffic and access of Kingsley Field	Transportation, Noise, Safety, Air Quality

Table 5-2
Past, Present, and Reasonably Foreseeable Nonfederal Projects at Kingsley Field

Scheduled Project	Project Summary	Implementation Date	Relevance to Proposed Action	Resource Potentially Affected
Future Actions				
Oregon Department of Transportation, Extension of Brett Way project (ODOT, 2018a)	Extension of Brett Way just north and east of Kingsley Field and south of Highway 140, new road crossing over railroad, eliminate crossing at Summers Lane and cul-de-sac, improvements at intersection of Homedale and Highway 140. Roadway would include construction of two 12-ft travel lanes, one 14-ft center lane, and two 4-ft shoulders. The purpose of the project is to improve safety.	Currently in design phase; expected construction in 2020	Located north and east of Kingsley Field; construction Could coincide with ADAIR implementation.	Transportation, Noise, Safety, Air Quality, Land Use

Notes:
ADAIR = adversary air; EA = Environmental Assessment; ft = foot(feet); ODOT = Oregon Department of Transportation

5.3 CUMULATIVE EFFECTS ANALYSIS

The following analysis considers how projects identified in **Tables 5-1** and **5-2** could cumulatively result in potential environmental consequences with the Proposed Action and with the Proposed Action including the mitigation measures developed for the High Noise Scenario. As noted previously, the type of aircraft that would be used by contract ADAIR is unknown at this time. The mitigation would only apply if aircraft similar to the High Noise Scenario comprise the contract ADAIR aircraft.

5.3.1 Airspace Management and Use

Cumulative impacts on airspace management and use from mitigated contract ADAIR operations, in addition to past, present, and reasonably foreseeable future actions are expected to be negligible. Implementation of airspace modifications associated with the Proposed Establishment and Modification of Oregon Military Training Airspace EIS would have been implemented and with the addition of ADAIR sorties, changes to the existing operational airspace capacity would be negligible.

5.3.2 Noise

The Proposed Action would result in negligible to major impacts on noise under the High, Medium, and Low Noise Scenarios. Mitigation was developed for the High Noise Scenario and implementation of that mitigation would result in negligible to moderate impacts. Several construction projects are proposed as described in the EA for the Kingsley IDP during the same period as the Proposed Action at Kingsley Field; however, since construction noise is localized to the construction sites and would be short term, no long-term cumulative noise impacts are anticipated. The Proposed Action when added to past, present, and reasonably foreseeable future actions at Kingsley Field would result in a negative, incremental cumulative

impact on noise. The addition of contract ADAIR aircraft and future proposed actions could increase the number of sonic booms; however, this increase is expected to be negligible in the proposed ADAIR airspace compared to what currently exists; therefore, no cumulative effect on noise is expected in the airspace.

5.3.3 Safety

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Kingsley Field would follow existing safety procedures and policies for ground and flight operations. Safety zones would not change under contract ADAIR. Contract personnel would be trained and required to follow safety procedures in accordance with established aircraft flight manuals as implemented by the contract. Training sorties would increase by approximately 27 percent during the ADAIR implementation. This increase could pose an increased risk to flight safety; however, through compliance with the BASH plan and flight safety rules, the cumulative impact would be minimized. As such, no cumulative impacts on ground and flight safety is expected with implementation of the mitigated Proposed Action.

5.3.4 Air Quality

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off the Kingsley Field would result in negligible cumulative impacts on air quality. With the addition of ongoing construction projects in the area, including the Oregon Department of Transportation's Brett Way Extension project north and east of Kingsley Field, PM_{10} emissions could increase; however, these increases would be short in duration and the incremental impact on air quality would be negligible.

ADAIR training activities would occur at times below the mixing height (3,000 ft AGL) (see **Section 4.2.1**) in the Juniper/Hart MOA Complex and W-93; however, the duration would be short (approximately 11.4 minutes per sortie); therefore, impacts on air quality would not be significant. Overall, no incremental change to air quality is expected when adding the mitigated Proposed Action to past, present, and reasonably foreseeable future actions; therefore, cumulative impacts on air quality is expected to be negligible.

5.3.5 Biological Resources

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Kingsley Field would result in less than significant cumulative impacts on biological resources. While construction activities would be occurring on- and off-installation during contract ADAIR operations, some wildlife species may be displaced, but it is anticipated those species would return once construction is completed. There are no projected impacts on threatened and endangered species on the installation. When added to past, present, and foreseeable future action, the mitigated Proposed Action would result in an increased risk of aircraft bird and other wildlife strikes. Compliance with the Kingsley Field's BASH prevention program would reduce the potential cumulative risk of additional sortie operations associated with aircraft bird and other wildlife conflicts. The increased use of chaff and flares in combination with the deposition of plastic and other debris in the Pacific Ocean would have the potential for cumulative impacts on avian and marine species; however, the volume and size of plastic components from chaff and flares are very small. Cumulatively, the deposition of plastic components may affect but is not likely to adversely affect federally listed species occurring in the marine environment; therefore, there would be no significant cumulative effects on biological resources.

5.3.6 Land Use

The mitigated Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off the Kingsley Field would result in an incremental change to land use compatibility with surrounding land uses from changes in the noise setting; however, cumulative impacts on land use would be less than significant. There are several proposed construction projects at Kingsley Field; however, the modifications associated with Buildings 404, 219, and 307 under all three alternatives include minimal interior modifications and would not create a cumulative change to the surrounding on-installation land use.

5.3.7 Socioeconomics – Income and Employment

The mitigated Proposed Action, as well as past, present, and reasonably foreseeable future actions on and off Kingsley Field would not result in an adverse cumulative impact on the region's employment. Construction projects on installation would result in a cumulative beneficial impact as local sales and payroll taxes would increase. The mitigated Proposed Action would increase annual expenditures in the local economy up to approximately $30 million at the installation. This along with other proposed projects at Kingsley Field and by local governments would create an economic boost to the region and represents a long-term, moderate, beneficial cumulative impact on the local economy.

5.3.8 Environmental Justice and Protection of Children

The mitigated Proposed Action, as well as past, present, and reasonably foreseeable future actions on and off the Kingsley Field are not expected to have a disproportionate cumulative impact on minority and low-income populations or children from increased noise.

5.3.9 Cultural Resources

The mitigated Proposed Action, as well as past, present, and reasonably foreseeable future actions on and off the Kingsley Field are not anticipated to result in incremental cumulative impacts on cultural resources, archaeological resources, historic resources, or Native American Traditional Cultural Properties.

5.3.10 Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances

The mitigated Proposed Action, as well as past, present, and reasonably foreseeable future actions on and off Kingsley Field are not anticipated to result in significant cumulative impacts on the management of hazardous materials and wastes, contaminated sites, and toxic substances. Storage and quantity of jet fuels, solvents, oil, and other hazardous materials supporting contract ADAIR operations would increase in addition to past, present, and foreseeable future projects; however, this increase would result in a minor cumulative effect. The proposed contract ADAIR project in addition to other proposed projects would require compliance with the 173 FW *Hazardous Waste Management Plan*. The plan ensures that procedures for managing hazardous waste are in accordance with federal, state, and local regulations; therefore, no cumulative impacts on the storage and disposal of hazardous waste is expected. No environmental contamination is known to occur within the project area, and no impact on contaminated sites would occur. The addition of the proposed contract ADAIR project and foreseeable future projects would be required to adhere to the *Asbestos Management and Operating Plan* for any modifications to existing structures. No significant adverse cumulative impacts on hazardous materials and wastes, contaminated sites, and toxic substances are expected.

5.3.11 Transportation

The mitigated Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Kingsley Field, is not anticipated to result in significant cumulative impacts on transportation. The Oregon Department of Transportation's Brett Way Extension project would improve vehicle transportation in the immediate area, and therefore, result in a minor beneficial cumulative impact. While the mitigated Proposed Action would add 47 contracted personnel, the increase of privately owned vehicles travelling to and from the installation would not result in a significant cumulative impact as the existing transportation network to Main Gate is adequate to handle the incremental increase in traffic.

5.4 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

CEQ regulations (Section 1502.16) specify that analysis must address "…the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity." Attention should be given to impacts that narrow the range of beneficial uses of the environment in the long term or

pose a long-term risk to human health or safety. This section evaluates the short-term benefits of the proposed project compared to the long-term productivity derived from not pursuing the proposed or alternative actions.

Short-term effects on the environment are generally defined as a direct consequence of a project in its immediate vicinity. For example, short-term effects could include localized disruptions from construction. Environmental commitments, mitigation measures, and BMPs in place for each project should reduce potential impacts or disruptions. Under the Proposed Action, these short-term uses would have a negligible cumulative effect.

The mitigated Proposed Action involves providing dedicated contract ADAIR sorties to employ adversary tactics within existing Kingsley Field airspace. There would be no short-term effects on the airspace used by contract ADAIR activities and therefore no adverse impact on the long-term productivity and future use of the MOAs proposed for contract ADAIR use. The mitigated Proposed Action also includes elements affecting the base such as ADAIR aircraft, facilities, maintenance, and personnel. Under the Proposed Action and alternatives, there would be no new construction. Existing installation facilities would be used with some internal modifications. While other maintenance activities would be occurring in the vicinity of the Proposed Action facilities, construction associated with these modifications represent a negligible effect on the short-term use of construction labor, goods, and services. No negative effects are expected from the Proposed Action short-term use or long-term productivity.

5.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects result primarily from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action.

The Proposed Action would use existing airspace to conduct contract ADAIR activities and is not expected to result in a significant irreversible and irretrievable commitment of airspace resources. The Proposed Action calls for an additional 2,000 sorties which represents an increase of 27 percent in the number of operations. As such, flight operations and training would increase the consumption of additional fuel; and thereby, increasing the irreversible and irretrievable commitment of fuels. The addition of 47 contract personnel to support the Proposed Action also would create additional fuel consumption from daily commutes to and from Kingsley Field. Consumption of fuel associated with the Proposed Action, in addition to the total use of available fuels, is expected to result in a negligible decrease to the overall supply of regional petroleum resources. Additionally, use of training ordnance (chaff and flares) in the special use airspace proposed for contract ADAIR training operations would result in a 39 percent increased commitment to chemicals and other ordnance materials; however, this increase is expected to be a minor demand in relation to the overall supply of chemicals and ordnance materials. No significant irreversible or irretrievable commitment of resources is anticipated from implementing the Proposed Action.

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