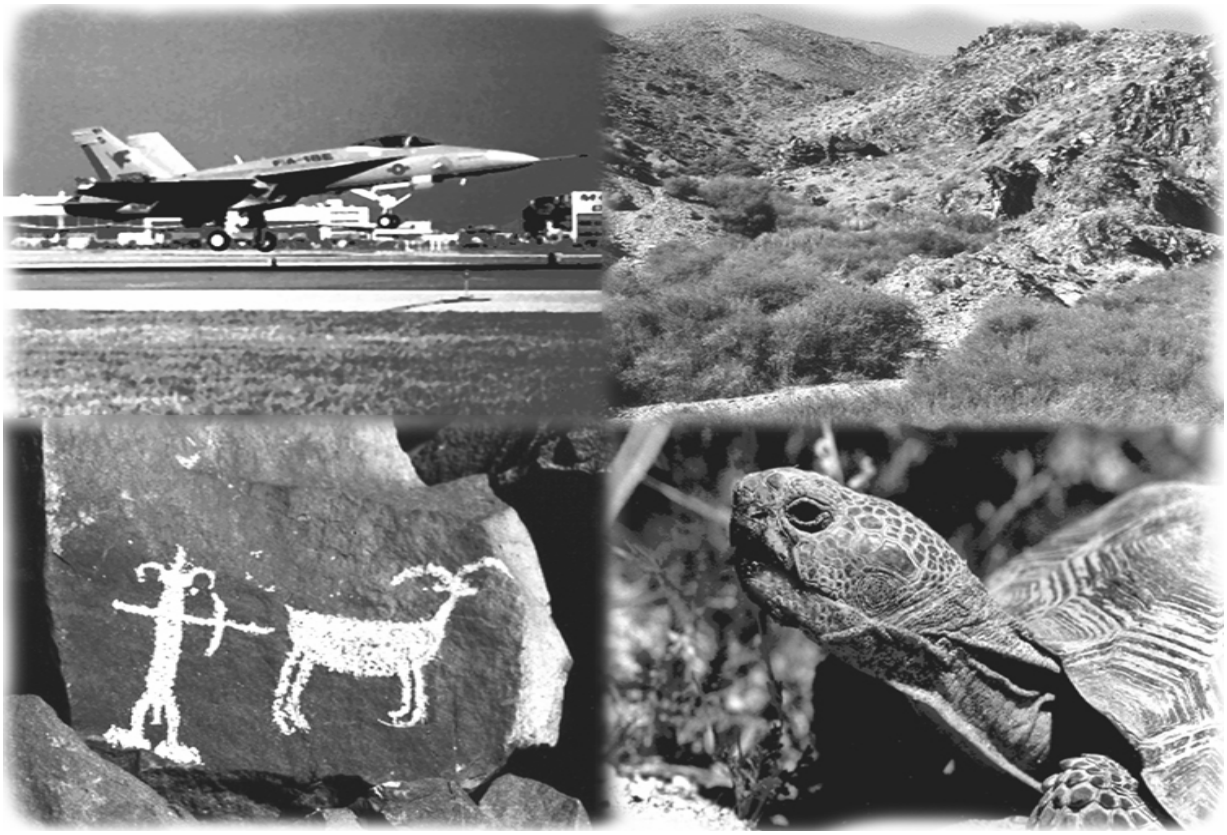
Volume I

Draft

ENVIRONMENTAL IMPACT STATEMENT
For Proposed Military Operational Increases and Implementation of Associated Comprehensive Land Use and Integrated Natural Resources Management Plans



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EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This Draft Environmental Impact Statement (EIS) analyzes the potential environmental consequences that may result from the United States (U.S.) Navy's proposed action and alternatives. The proposed action is an increase in the tempo of military test and evaluation (T&E) and operational training activities conducted at Naval Air Weapons Station (NAWS) China Lake. The minor land use changes that would result from a decision to accommodate an increase in military operations would be reflected in the NAWS China Lake Comprehensive Land Use Management Plan (CLUMP). Under the terms of the California Desert Protection Act (CDPA) of 1994 (16 U.S.C. § 410aaa et seq.), the CLUMP is the strategic planning vehicle through which NAWS manages land use and environmental resources. The CLUMP reflects the integration of range management strategies, the installation's Integrated Natural Resources Management Plan (INRMP), which is required under the Sikes Act as amended in 1997 (16 U.S.C. § 670a et seq.), and other management tools such as the Integrated Cultural Resources Management Plan (ICRMP).

This EIS has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [U.S.C.] § 4321 et seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [C.F.R.] §§ 1500-1508), and Department of the Navy Procedures for Implementing NEPA (32 C.F.R. § 775). This EIS satisfies the requirements of NEPA and will be filed with the U.S. Environmental Protection Agency (USEPA) and distributed to appropriate federal, state, local, and private agencies, organizations, and individuals for review and comment.

NAWS China Lake is located in the Western Mojave Desert of southern California, approximately 150 miles (241 kilometers) northeast of Los Angeles (Figure ES-1). The Station, composed of the North Range and the South Range, encompasses approximately 1,700 square miles (4,403 square kilometers) and is located in portions of Inyo, Kern, and San Bernardino counties. The NAWS land ranges, operated by the Department of the Navy for more than 50 years, provide a safe, secure, and highly instrumented volume of land and airspace in which to conduct controlled tests and operationally realistic training.

ES.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to accommodate an increase in current test and training operations at NAWS and to achieve compliance with the CDPA and the Sikes Act as amended. The established mission of NAWS is to conduct state-of-the-art weapons T&E and operational training within a safe, secure, and operationally diverse land range test environment. The need for the proposed action and subsequent development of the CLUMP, INRMP, and associated EIS have been driven by the following factors: 1) changes to the type, tempo, and location of military test and training operations that support the military readiness mission in response to changing world events, Department of Defense (DoD)/Navy fiscal directives, and NAWS business development initiatives, and 2) passage of new laws and regulations affecting land use and environmental resources management.

ES.3 PUBLIC INVOLVEMENT

The public notification process for the CLUMP and EIS was designed to reach all interested parties; community organizations; federal, state, and local agencies; and Native American tribes. The public scoping process was conducted from April 1 to June 30, 1997, and included direct mailings and publication of the Notice of Intent to prepare an EIS in the Federal Register (April 1, 1997) and in local newspapers. Six public scoping meetings were held in the vicinity of NAWS.

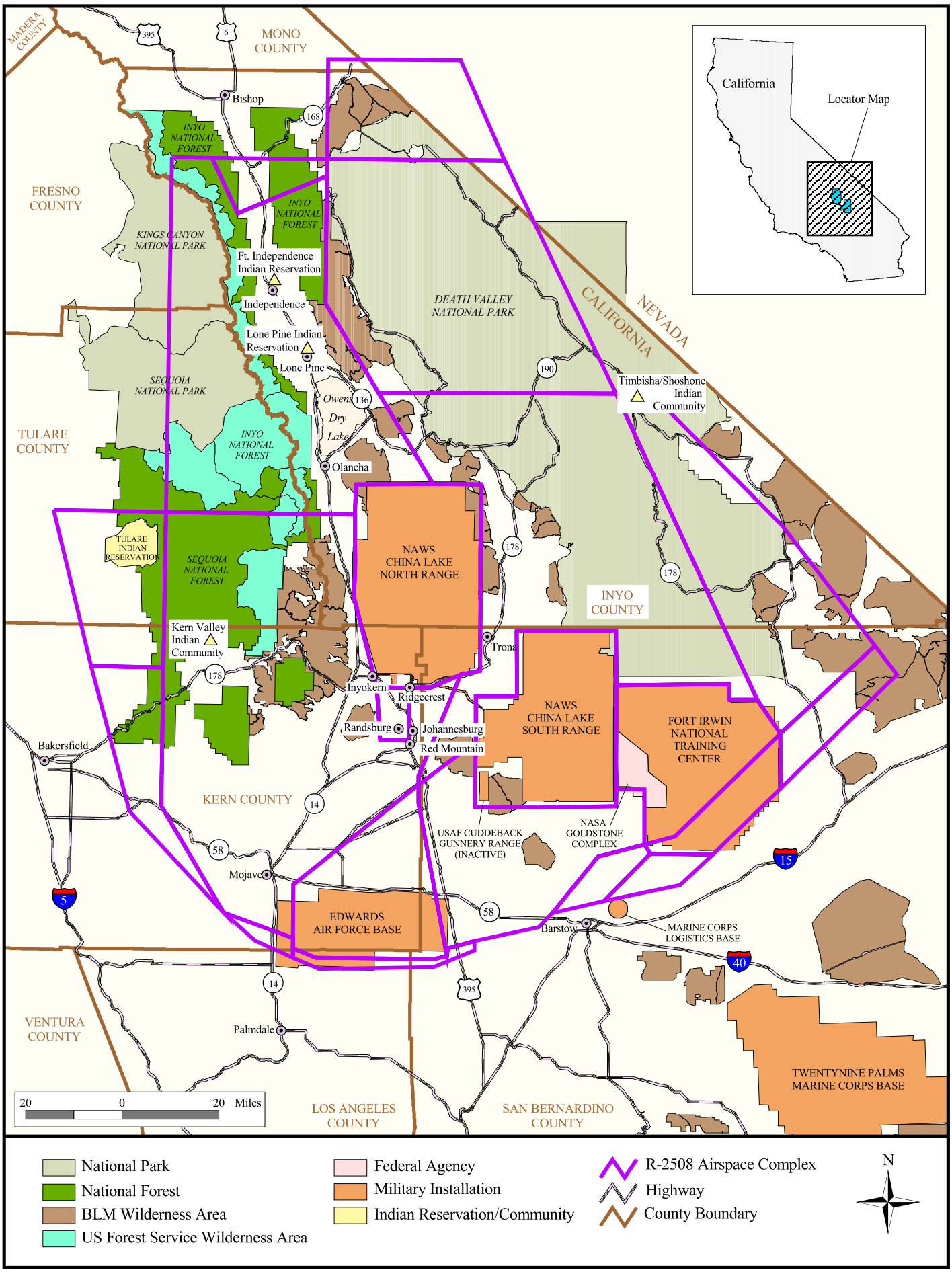

Figure ES-1 NAWS China Lake and Vicinity

During the EIS scoping process, approximately 40 written comments were received from individuals; interested groups; federal, state, and local agencies; and Native American tribes. The Navy considered all comments received during the scoping process when determining the issues to be evaluated in the EIS. A summary of the scoping comments and relevant scoping materials are included in Appendix A of Volume II of this document.

This EIS will be available for public review and comment for 90 days. Public hearings will be conducted during the review period in Ridgecrest, Inyokern, Trona, Independence, and Barstow. Public comments received will be reviewed and appropriately incorporated in the Final EIS. Responses to all public comments will be presented in the Final EIS appendices. The Final EIS will be available for a 30-day public review prior to publication of the Navy's Record of Decision (ROD). The ROD will be published in the Federal Register.

ES.4 DESCRIPTION OF THE PROPOSED ACTION

The proposed action includes a moderate expansion of military operations, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

ES.4.1 Military Operations

Proposed changes to military operations include increases in the type and tempo of ongoing military T&E, training, and support operations. Increases in military operations would be phased over 5 years (according to operational needs) and include expansion of range flight operations (both subsonic and supersonic operations), airfield flight operations, and range ground operations (target and test site use and ground troop training [GTT] type, tempo, and location). Specific operational increases are outlined in the "Moderate Expansion Alternative" column of Table ES-1.

ES.4.2 Nonmilitary Uses

Nonmilitary uses requiring access to NAWS-administered lands would continue to be accommodated at NAWS. Public access would continue to be limited to specific areas on a case-by-case basis due to established safety and security requirements. Limited public access to designated areas would continue to be permitted according to the terms and conditions granted by the NAWS Commanding Officer. The Navy would continue to accommodate nonmilitary uses to the extent that these activities are compatible with military operations; do not create a safety, security, fiscal, or regulatory risk; and do not adversely impact the Station's natural and cultural resources. Nonmilitary land uses that would continue under the proposed action are summarized at the bottom of Table ES-1.

ES.4.3 CLUMP and INRMP Implementation

Since NAWS is required by law to have a CLUMP and INRMP in place for any level of range operations, the proposed action includes implementation of the CLUMP and INRMP reflecting minor changes in land use projected for accommodating moderate increases in military operations. The CLUMP is a long-term, strategic plan that formalizes corporate process for land use planning and management at NAWS. This plan provides an integrated framework for the management of military operations, public health and safety practices, and environmental resource conservation programs. As the strategic planning vehicle for NAWS, the CLUMP incorporates implementation of the Station's INRMP. The INRMP establishes the goals and management guidelines to conserve and protect the Station's natural resources in accordance with Sikes Act amendments, and other applicable directives in a manner that is consistent with the Station's operations.

Table ES-1 Comparison of Alternatives

Military Uses			
Activity	***No Action Alternative***	***Limited Expansion Alternative***	***Moderate Expansion Alternative***
Range Flight Operations	*Continue current level of test and training operations at approximately 4,600 flight hours per year.*	*Subsonic operations would increase by 15% over 5 years. Use would increase by 690 additional flight hours to a total of 5,290 annual flight hours.*	*Subsonic operations would increase by 25% over 5 years. Use would increase by 1,150 additional flight hours to a total of 5,750 annual flight hours.*
	Continue current level of supersonic operations at an average of three per month (36 per year).	*Supersonic operations would increase by approximately 2 per week, or up to a total of 100 events per year.*	*Supersonic operations would increase by approximately 2 per week, or up to a total of 100 events per year.*
Airfield Flight Operations	*Continue current level of operations at approximately 27,000 annual flight operations.*	*Operations would increase by 15% over 5 years. Use would increase by 4,050 additional flight operations to a total of 31,050 annual operations.*	*Operations would increase by 25% over 5 years. Use would increase by 6,750 additional flight operations to a total of 33,750 annual operations.*
Range Ground Operations			
Target and Test Sites	*Continue current use of existing authorized target and test sites on the North and South ranges, which include those at Airport Lake, Baker, Charlie, George, and Coso ranges (North Range), and at Charlie Airfield and Randsburg Wash Gunline (South Range). Total acreage of target and test sites currently used is 7,000 acres (2,833 hectares). Tempo of target and test site use would remain at approximately 4,600 hours annually.*	*Continue current operations, plus* *1) Increase tempo of target and test sites and associated ordnance use by approximately 15% over 5 years. Use would increase 690 hours to a total of 5,290 hours annually.* *2) Resume use of all previously disturbed but currently underutilized target and test sites range-wide (approximately 2,140 acres [866 hectares]), for a total target and test site acreage of 9,140 acres (3,699 hectares).* *3) Re-introduce the use of high explosives (HE) at Wingate Airfield in Mojave B North (South Range) for the delivery of precision-guided munitions (for limited use [2-3 times per year]).*	*Continue current operations, plus* *1) Increase tempo of target and test sites and associated ordnance use by approximately 25% over 5 years. Use would increase 1,150 hours to a total of 5,750 hours annually.* *2) Resume use of all previously disturbed but currently underutilized target and test sites range-wide (approximately 2,140 acres [866 hectares]), for a total target and test site acreage of 9,140 acres (3,699 hectares).* *3) Re-introduce the use of HE at Wingate Airfield in Mojave B North (South Range) and at the Bullseye Target in Superior Valley (South Range) for the delivery of precision-guided munitions (for limited use [2-3 times per year]).*

Military Uses			
Activity	**No Action Alternative**	**Limited Expansion Alternative**	**Moderate Expansion Alternative**
Range Ground Operations (cont.)			
Ground Troop Training	*Continue current patterns of GTT at existing areas of operations. Types 1[a] and 2[b] would remain at current levels.*	*Continue current operations, plus increase the tempo of Type 1 and 2 operations in established areas over 5 years.*	*Continue current operations, plus increase the tempo of Type 1 and 2 operations in established areas over 5 years, establish a Type 1 operation area in the Coso Target Range, and introduce Type 3[c] training at Airport Lake.*
	North Range: 1,650 use-days on 33,900 acres (13,719 hectares).	*North Range: Increase use by 1,650 use-days for a total of 3,300 use-days on 33,900 acres (13,719 hectares).*	*North Range: Increase use by 3,150 use-days at Airport Lake and Coso Target Range for a total of 4,800 use-days and add 24,748 acres (10,015 hectares) for a total use area of 58,648 acres (23,734 hectares).*
	South Range: 2,300 use-days on 287,515 acres (116,354 hectares).	*South Range: Increase use by 2,300 use-days for a total 4,600 use-days on 287,515 acres (116,354 hectares).*	*South Range: Increase use by 2,300 use-days for a total of 4,600 use-days on 287,515 acres (116,354 hectares).*
	Total Use-Days: 3,950 *Total Acres/Hectares: 321,415/130,073*	*Total Use-Days: 7,900* *Total Acres/Hectares: 321,415/130,073*	*Total Use-Days: 9,400* *Total Acres/Hectares: 346,163/140,088*

[a] *Type 1: Small-scale; light infantry only, no vehicles.*
[b] *Type 2: Medium-scale; infantry with wheeled vehicles only (e.g., trucks).*
[c] *Type 3: Large-scale; infantry with wheeled and tracked vehicles (e.g., tanks).*

Nonmilitary Uses	
Activity	**No Action, Limited Expansion, and Moderate Expansion Alternatives**
Native American Uses	*Continue access to Coso Hot Springs and Prayer Site per Memorandum of Agreement. Consider other access on a case-by-case basis.*
Research and Education	*Continue ongoing projects and consider others on a case-by-case basis.*
Recreation	
Camping	*Allow camping at Birchum Springs on a case-by-case basis.*
Golf and Gym	*Keep golf course and gymnasium open to the public.*
Hiking	*Consider on-Station hikes on a case-by-case basis.*
Equestrian	*Accommodate access at a specified area on G-Range Approach Corridor on a case-by-case basis.*
Off-Road Vehicle	*Permit off-road vehicle use of Randsburg Wash Access Road during public events sponsored by the Bureau of Land Management.*
Petroglyph Tours	*Allow petroglyph tours as described in the NAWS Public Access Policy.*
Bird Watching	*Allow Audubon Society annual bird count.*
Photography	*Allow photography on a case-by-case basis.*

Use-Day = one person for one 8-hour day

ES.5 ALTERNATIVES ANALYSIS

Guidance for the development of alternatives is provided in CEQ regulations (40 C.F.R. § 1502.14) and Navy Procedures described in 32 C.F.R. § 775. The analysis of alternatives is the heart of an EIS and is intended to provide the decision-maker and the public with a clear understanding of relevant issues and the basis for choice among identified options. NEPA requires that an EIS be prepared to evaluate the environmental consequences of a range of reasonable alternatives.

Consistent with the purpose and need identified in Chapter 1, selection criteria were developed to help identify viable alternatives and eliminate unreasonable alternatives from further consideration. Selection criteria for this EIS include the following: 1) reasonable alternatives must fulfill the need for, and purpose of, the proposed action and 2) alternatives must be consistent with the goals, policies, and management strategy defined in the CLUMP (Appendix H, Vol. III).

The selection criteria described above were used to develop the three alternatives analyzed in this EIS. The No Action Alternative maintains the Navy's current level of operations. The Limited Expansion and Moderate Expansion alternatives propose increases in the type, tempo, and location of military T&E and training operations (approximately 15 percent for the Limited Expansion Alternative and 25 percent for the Moderate Expansion Alternative). The CLUMP and INRMP would be implemented under all alternatives since these plans are required by law. Table ES-1 compares the specific elements of each alternative and Table ES-2 provides a summary of impacts and mitigation measures, by resource area, for each of the alternatives analyzed.

ES.6 CUMULATIVE IMPACTS

Both on-station and off-station past, present, and reasonably forseeable projects were identified part of the cumulative impact analysis. Of the projects reviewed, the proposed expansion of Fort Irwin NTC has the greatest potential for cumulative impacts in combination with implementation of the proposed action. Potential impacts to air quality, biological resources, and cultural resources may be significant; however, the scope of the proposed Fort Irwin expansion project is still being developed and potential cumulative impacts cannot be quantitatively evaluated. As the proposed action for the land expansion is finalized, an EIS will be prepared that will address the potential for adverse effects. The West Mojave Coordinated Management Plan and the Northern and Eastern Mojave Planning Efforts are intended to improve environmental resources management and are expected to have beneficial cumulative impacts. Potential cumulative impacts resulting from other relevant projects combined with the proposed activities addressed in this EIS were determined to be less than significant.

ES.7 OTHER REQUIRED CONSIDERATIONS

ES.7.1 Possible Conflicts Between Actions and Objectives of Federal, State, and Local Land Use Plans, Policies, and Controls

The proposed action would comply with existing federal regulations and be compatible with state, regional, and local policies and programs. The proposed action would be in compliance with all applicable federal acts, executive orders, and policies.

ES.7.2 Irreversible or Irretrievable Commitment of Resources

The proposed action would constitute an irreversible and irretrievable commitment of nonrenewable or depletable resources for the materials and energy expended during the conduct of military test and training activities. Implementation of the proposed action would result in a positive benefit of improved environmental resources management processes. The limited consumption of environmental resources resulting from the proposed action would not limit future potential land or environment resource use.

Table ES-2
Summary of Environmental Impacts

Resource	No Action Alternative	Limited Expansion Alternative	Moderate Expansion Alternative
Land Use	*No changes to existing land uses would occur. Impacts would remain less than significant.*	*No changes to existing land uses would occur. Reuse of target and test sites on ranges would be compatible with established use. Reintroduction of HE ordnance at Wingate Airfield would be compatible with established uses. Impacts would be less than significant.*	*No changes to existing land uses would occur. Reuse of target and test sites on ranges would be compatible with established use. Reintroduction of HE ordnance at Wingate Airfield and Bullseye Target and establishing GTT operations in Coso Target Range and Airport Lake would be compatible with established use. Impacts would be less than significant.*
Noise	*Flight operations at Armitage Airfield would continue to expose off-station areas to community noise equivalent level (CNEL) values up to 65 decibels (dB). These noise levels are consistent with established guidelines for land use zones that surround the Station. Noise levels for range flight operations are below 65 dB. CNEL noise contours for ordnance use remain on-station. Impacts would remain less than significant.*	*Increased flight operations at Armitage Airfield would expose off-station areas to noise levels up to 65 to 70 dB CNEL. These noise levels are consistent with established guidelines for land use zones that surround the Station. Noise levels for increased range flight operations would be below 65 dB. CNEL noise contours for increased ordnance use would remain on-station. Impacts would be less than significant.*	*Increased flight operations at Armitage Airfield would expose off-station areas to noise levels up to 65 to 70 dB CNEL. These noise levels are consistent with established guidelines for land use zones that surround the Station, with the exception of a 3-acre (1.2-hectare) area currently zoned for residential use (Federal Interagency Committee on Noise guidelines consider 70 dB to be "normally unacceptable" for residential use). This is considered an adverse but less than significant impact. Noise levels for increased range flight operations would be below 65 dB. CNEL noise contours for increased ordnance use would remain on-station. Impacts would be less than significant.*
Air Quality	*Continued operations would create no increases in current emissions. Impacts would remain less than significant.*	*Net emissions changes would be below de minimis levels; a General Conformity Determination is not required. Net emissions changes would not significantly affect regional air quality. Impacts would be less than significant.*	*Net emissions changes would be below de minimis levels; a General Conformity Determination is not required. Net emissions changes would not significantly affect regional air quality. Impacts would be less than significant.*
Biological Resources	*Current operations have less than significant impacts on threatened and endangered species and species/habitats warranting NAWS stewardship. Ongoing implementation of the NAWS Desert Tortoise Habitat Management Plan (DTHMP) minimizes the potential for*	*Proposed operations would have less than significant impacts on threatened and endangered species and species/habitats warranting NAWS stewardship. Proposed operations are not expected to result in adverse impacts to designated critical habitat or to the goals and*	*Proposed operations would have less than significant impacts on threatened and endangered species and species/habitats warranting NAWS stewardship. Proposed operations are not expected to result in adverse impacts to designated critical habitat or to the goals and*

Resource	***No Action Alternative***	***Limited Expansion Alternative***	***Moderate Expansion Alternative***
Biological Resources (cont.)	*current range operations to impact tortoises or tortoise habitat. Compliance with the terms of the 1995 Biological Opinion for the DTHMP ensures that impacts are less than significant. Ongoing implementation of the Station's fire management policy in the Superior Valley further reduces the potential for impacts to the desert tortoise. Continued implementation of the wild horse and burro management program reduces impacts to riparian areas. Impacts would remain less than significant.*	*objectives of the Station's DTHMP. As discussed for the No Action Alternative, potential impacts to desert tortoise would remain below a level of significance through continued compliance with the terms of the 1995 Biological Opinion. Ongoing implementation of the Station's fire management policy in the Superior Valley would further reduce the potential for impacts to the desert tortoise. Impacts would be less than significant.*	*objectives of the Station's DTHMP. As discussed for the No Action Alternative, potential impacts to desert tortoise would remain below a level of significance through continued compliance with the terms of the 1995 Biological Opinion. Ongoing implementation of the Station's fire management policy in the Superior Valley would further reduce the potential for impacts to the desert tortoise. Impacts would be less than significant.*
Cultural Resources	*Current operations have less than significant impacts on cultural resources. Historic preservation procedures for managing cultural resources continue to be implemented at NAWS. The Station has prepared a draft base-wide Programmatic Agreement (PA) between NAWS, the State Historic Preservation Office, and the Advisory Council on Historic Places. NAWS Section 106 compliance efforts will continue to be implemented in accordance with 36 C.F.R. 800 requirements and procedures defined in the PA for implementation of the CLUMP and the ICRMP. The PA and ICRMP provide the framework for completing the Section 106 process in a phased, station-wide approach. Continued application of routine impact avoidance procedures also minimizes the potential for impacts on cultural resources. Impacts would remain less than significant.*	*As discussed for the No Action Alternative, NAWS Section 106 compliance efforts would continue to be implemented in accordance with 36 C.F.R. 800 requirements and procedures defined in the PA for implementation of the CLUMP and the ICRMP. The PA and ICRMP provide the framework for completing the Section 106 process in a phased, station-wide approach. This procedure would ensure that impacts to cultural resources would be less than significant.*	*As discussed for the No Action Alternative, NAWS Section 106 compliance efforts would continue to be implemented in accordance with 36 C.F.R. 800 requirements and procedures defined in the PA for implementation of the CLUMP and the ICRMP. The PA and ICRMP provide the framework for completing the Section 106 process in a phased, station-wide approach. This procedure would ensure that impacts to cultural resources would be less than significant.*

Resource	***No Action Alternative***	***Limited Expansion Alternative***	***Moderate Expansion Alternative***
Geology and Soils	*Ongoing mission support for military test and training activities, and non-military uses, are conducted in established operating areas and roadways. Minor wind erosion occurs at disturbed areas but is localized. Impacts would remain less than significant.*	*Operations proposed under the Limited Expansion Alternative would not significantly impact geology and soils at NAWS.*	*Operations proposed under the Moderate Expansion Alternative would not significantly impact geology and soils at NAWS.*
Water Resources	*Current operations do not significantly impact the quality or supply of surface and groundwater resources at NAWS.*	*Operations proposed under the Limited Expansion Alternative would not significantly impact the quality or supply of surface and groundwater resources at NAWS.*	*Operations proposed under the Moderate Expansion Alternative would not significantly impact the quality or supply of surface and groundwater resources at NAWS.*
Socioeconomics	*Current military test and training operations at NAWS do not adversely affect economic activities in the ROI. Minority or low income populations are not disproportionately affected. Impacts would remain less than significant.*	*Implementation of the Limited Expansion Alternative would not adversely affect economic activities in the ROI. Minority or low income populations would not be disproportionately affected. Impacts would be less than significant.*	*Implementation of the Moderate Expansion Alternative would not adversely affect economic activities in the ROI. Minority or low income populations would not be disproportionately affected. Impacts would be less than significant.*
Utilities and Public Services	*Current military test and training operations at NAWS do not exceed the Station's utility system capabilities or the public utilities service capacity. Impacts would remain less than significant.*	*Operations proposed under the Limited Expansion Alternative would not exceed the Station's utility system capabilities or the public utilities service capacity. Impacts would be less than significant.*	*Operations proposed under the Moderate Expansion Alternative would not exceed the Station's utility system capabilities or the public utilities service capacity. Impacts would be less than significant.*
Public Health and Safety	*Current military test and training operations at NAWS are conducted in accordance with established health and safety procedures. Children would not be exposed to disproportionate safety risks. Impacts would remain less than significant.*	*Implementation of the Limited Expansion Alternative would be conducted in accordance with established health and safety procedures. Children would not be exposed to disproportionate safety risks. Impacts would be less than significant.*	*Implementation of the Moderate Expansion Alternative would be conducted in accordance with established health and safety procedures. Children would not be exposed to disproportionate safety risks. Impacts would be less than significant.*
Hazardous Materials and Wastes	*Current military test and training operations generate 57 tons (52 metric tons) of Resource Conservation and Recovery Act (RCRA) wastes and approximately 300 tons (272 metric tons) of non-RCRA wastes annually; these amounts do not exceed the Station's processing capabilities or permit conditions. Impacts would remain less than significant.*	*Implementation of the Limited Expansion Alternative would generate approximately 15% more RCRA and non-RCRA wastes over 5 years. This increase would not exceed the Station's processing capabilities or permit conditions. Impacts would be less than significant.*	*Implementation of the Moderate Expansion Alternative would generate approximately 25% more RCRA and non-RCRA wastes over 5 years. This increase would not exceed the Station's processing capabilities or permit conditions. Impacts would be less than significant.*

Resource	No Action Alternative	Limited Expansion Alternative	Moderate Expansion Alternative
Traffic and Circulation	*Vehicular traffic would remain at current levels. Impacts would remain less than significant.*	*Implementation of the Limited Expansion Alternative would generate a minor vehicular traffic increase (84 vehicles annually) associated with GTT activities. Impacts would be less than significant.*	*Implementation of the Moderate Expansion Alternative would generate a minor vehicular traffic increase (140 vehicles annually) associated with GTT activities. Impacts would be less than significant.*

ES.7.3 Energy Requirements and Conservation Potential of the Proposed Action and Alternatives

Direct energy requirements of the proposed action are limited to those necessary to operate established facilities, vehicles, and equipment. No superfluous use of energy related to the proposed action has been identified, and proposed energy uses have been minimized to the maximum extent possible without compromising the integrity of the testing, training, and facility management activities. Therefore, no additional conservation measures related to direct energy consumption by the proposed action are identified.

ES.7.4 Relationship Between Short-Term Uses and Long-Term Productivity

Implementation of the proposed action would result in increased air emissions, noise, aircraft and vehicle traffic, and generation of hazardous wastes. These impacts would be positively offset by the enhanced long-term productivity of NAWS to successfully meet its long-term goal of accommodating current and future military readiness requirements, and land management stewardship responsibilities.

ES.7.5 Unavoidable Adverse Effects

With the exception of an adverse but less than significant impact associated with projected noise levels affecting a 3-acre (1.2-hectare) area zoned for residential use (see Table ES-2), all potentially adverse impacts of the proposed action would be mitigable to a less than significant level by the implementation of procedures described in this document.

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ACRONYM LIST

AFB	Air Force Base
AGL	above ground level
AFFTC	Air Force Flight Test Center
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act
AMT	armored maneuver training
AOC	Area of Concern
APE	area of potential effect
APCD	Air Pollution Control District
APZ	accident potential zone
AQMD	Air Quality Management District
ARPA	Archaeological Resources Protection Act
AST	above ground storage tank
ATAA	Air Traffic Activity Analyzer
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Space
BASH	bird-aircraft strike hazard
BEAP	Base Exterior Architecture Plan
BEQ	Bachelor Enlisted Quarters
BLM	Bureau of Land Management
BMP	Best Management Practices
BO	Biological Opinion
BOSC	Base Operations and Support Contract
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal/EPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CBC	California Building Code
CCF	Central Coordinating Facility
CCR	California Code of Regulations
CDCA	California Desert Conservation Area
CDCAP	California Desert Conservation Area Plan
CDFG	California Department of Fish and Game
CDPA	California Desert Protection Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Controlled Firing Area
CFR	Code of Federal Regulations
CH&SC	California Health and Safety Code
CHRIMP	Consolidated Hazardous Material Reutilization and Inventory Management Program
CIP	Capital Improvements Plan
CLPD	China Lake Police and Physical Security Division
CLPL	China Lake Propulsion Laboratories
CLUMP	Comprehensive Land Use Management Plan
CNEL	community noise equivalent level
CO	carbon monoxide
COG	Council of Governments
CSUB	California State University, Bakersfield
CTR	Coso Target Range
CUPA	Certified Unified Program Agencies
dB	decibel
dBA	A-weighted decibel scale
dBC	C-weighted decibel scale
DDWEM	Division of Drinking Water and Environmental Management
DoD	U.S. Department of Defense
DOI	U.S. Department of Interior
DoN	U.S. Department of the Navy
DTHMP	Desert Tortoise Habitat Management Plan
DTMA	Desert Tortoise Management Area
DTSC	Department of Toxic Substances Control
EA	Environmental Assessment
EC	Environmental Coordinator
ECR	Electronic Combat Range
EIS	Environmental Impact Statement
EMR	electromagnetic radiation
EO	Executive Order
EOD	explosive ordnance disposal
EPCRA	Emergency Planning and Community Right to Know Act

ACRONYM LIST

EPO	Environmental Project Office
ESA	Endangered Species Act
ESQD	explosive safety quantity distance
FAA	Federal Aviation Administration
FCLP	Field Carrier Landing Practice
FICON	Federal Interagency Committee on Noise
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FLPMA	Federal Land Policy Management Act
FSR	Facility Service Request
FTS	Flight Termination System
GIS	Geographical Information System
GTT	ground troop training
HABR	High Altitude Bombing Range
HE	high explosive
HERF	hazards of electromagnetic radiation to fuel
HERO	hazards of electromagnetic radiation to ordnance
HERP	hazards of electromagnetic radiation to personnel
HMC&M	Hazardous Material Control and Management
HSWA	Hazardous and Solid Waste Amendments
HWSTF	Hazardous Waste Storage and Transfer Facility
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
IWV	Indian Wells Valley
IWVWD	Indian Wells Valley Water District
JPPB	Joint Policy and Planning Board
KCFD	Kern County Fire Department
KGRA	Known Geothermal Resource Area
L_{dn}	day/night average sound level
L_{eq}	equivalent sound level
LOS	level of service
MCAGCC	Marine Corps Air Ground Combat Center
MCL	maximum containment level
MESA	Missile Engagement Simulation Arena
MFSO	Missile Flight Safety Officer
mgd	million gallons per day
MILCON	military construction project
mld	million liters per day
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MR	Munitions Rule
MRIP	Munitions Rule Implementation Policy
MSDS	Material Safety Data Sheet
MSL	mean sea level
MVA	megavolt amperes
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NASA	National Aeronautics and Space Administration
NAVAIR	Naval Air Systems Command
NAWC	Naval Air Warfare Center
NAWCWD	Naval Air Warfare Center Weapons Division
NAWS	Naval Air Weapons Station
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NEW	net explosive weights
NHL	National Historic Landmarks
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
NOTS	Naval Ordnance Test Station
NO_x	nitrogen oxides
NPS	National Park Service
NRCS	U.S. Natural Resources Conservation Service
NTC	National Training Center
NWC	Naval Weapons Center
O_3	ozone
OB/OD	Open Burning/Open Detonation
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement

ACRONYM LIST

PAO	Public Affairs Office
Pb	lead
PCBs	polychlorinated biphenyls
PG&E	Pacific Gas and Electric
PM_{10}	particulate matter less than 10 microns in diameter
ppm	parts per million
PSF	pounds per square foot
RCC	Range Control Center
RCRA	Resource Conservation and Recovery Act
R&D	research and development
RDT&E	research, development, test, and evaluation
ROC	reactive organic compounds
ROD	Record of Decision
ROG	reactive organic gases
ROI	Region of Influence
RPD	Ridgecrest Police Department
RSM	Range Safety Manual
RSO	Range Safety Office
RTIP	Regional Transportation Improvement Program
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendment and Reauthorization Act
SCE	Southern California Edison
SDWA	Safe Drinking Water Act
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	state implementation plan
SLAM	Standoff Land Attack Missile
SNORT	Supersonic Naval Ordnance Research Track
SO_2	sulfur dioxide
SO_x	sulfur oxides
SR	State Route
STATSGO	State Soil Geographic
STIP	State Transportation Improvement Program
SWDIV	Southwest Division
SWPL	Salt Wells Propulsion Laboratory
SWRCB	State Water Resources Control Board
T&E	test and evaluation
TDS	total dissolved solids
TSCA	Toxic Substances Control Act
UAV	Unmanned Aerial Vehicle
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
UXO	unexploded ordnance
WMCMP	West Mojave Coordinated Management Plan
WWTP	Wastewater Treatment Plant

ACRONYM LIST

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CHAPTER 1

Purpose and Need

1.0 INTRODUCTION

This Draft Environmental Impact Statement (EIS) has been prepared by the U.S. Department of the Navy (DoN) in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [U.S.C.] § 4321 et seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [C.F.R.] §§ 1500-1508), and DoN Procedures for Implementing NEPA (32 C.F.R. § 775). This EIS satisfies the requirements of NEPA and will be filed with the U.S. Environmental Protection Agency (USEPA) and distributed to appropriate federal, state, local, and private agencies, organizations, and individuals for review and comment.

The Naval Air Weapons Station (NAWS) China Lake is located in the Western Mojave Desert region of California, approximately 150 miles (241 kilometers) northeast of Los Angeles (Figure 1-1). NAWS is part of the Naval Air Systems Command (NAVAIR) and is host to the Naval Air Warfare Center Weapons Division (NAWCWD) and other Department of Defense (DoD) activities. NAWCWD is the Navy's full-spectrum research, development, test, and evaluation (RDT&E) center of excellence for weapons systems associated with air warfare, aircraft weapons integration, missiles and missile subsystems, and assigned airborne electronic warfare systems. NAWCWD is a multi-site organization that includes the land range at NAWS and the Point Mugu Sea Range. NAWS operates and maintains NAWS support services including facilities and infrastructure operations, airfield operations, safety and security services, and land use and environmental management programs in support of the NAWCWD mission.

The land ranges located at NAWS encompass more than 1.1 million acres (404,687 hectares) of diverse desert terrain and are extensively instrumented to support Navy and DoD test and training missions. While the proposed action supports the missions of NAWS and NAWCWD, for purposes of this EIS the proponent will be referred to as NAWS.

This EIS addresses the Station's proposal to accommodate an increase in the tempo of military test and evaluation, (T&E) and operational training activities conducted at NAWS. The minor land use changes that would result from a decision to accommodate an increase in military operations would be incorporated in the NAWS China Lake Comprehensive Land Use Management Plan (CLUMP). The CLUMP was developed in accordance with the California Desert Protection Act (CDPA) of 1994 (16 U.S.C. § 410aaa et seq.) and is the strategic planning vehicle through which NAWS manages land use and environmental resources. The CLUMP reflects implementation of the installation's Integrated Natural Resources Management Plan (INRMP), which is required under the Sikes Act as amended in 1997 (16 U.S.C. § 670a et seq.)

The Navy is the lead agency for the decision to implement the CLUMP with the Bureau of Land Management (BLM) as a cooperating agency. As part of the decision-making process, the Navy will review the EIS, consider the environmental impacts and other factors relative to national defense, and then decide whether to implement the Preferred Alternative (Moderate Expansion Alternative) or to select one of the other alternatives. A decision to proceed with the Preferred Alternative would result in implementation of the CLUMP with associated land management process improvements and specified increases in military (T&E) and training operations. If the Limited Expansion Alternative is selected, the CLUMP will be implemented with a more modest increase in military T&E and training operations. If the No Action Alternative is selected, the CLUMP will be implemented and operations would remain at current levels.

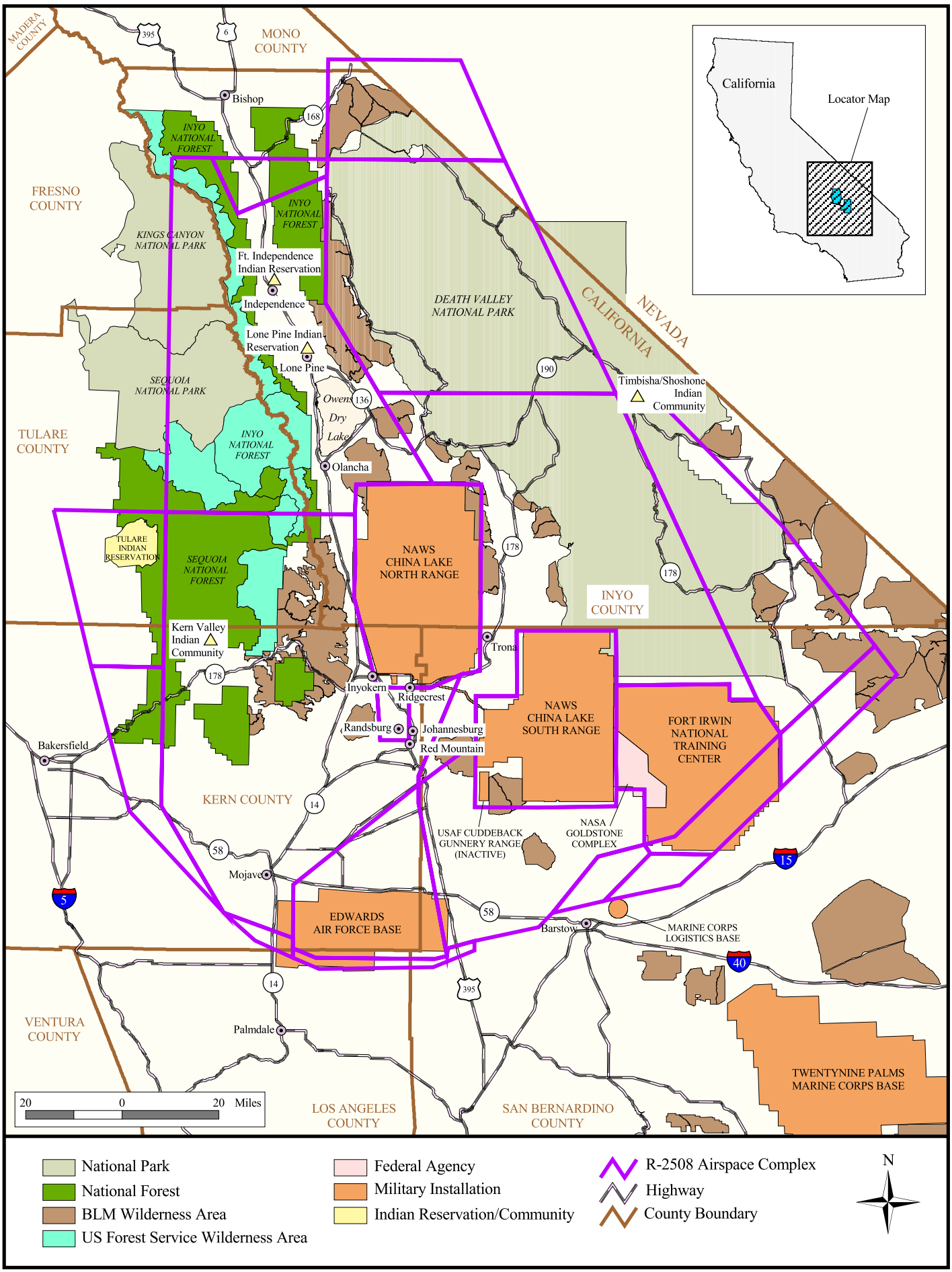

Figure 1-1 Regional Vicinity Map of NAWS China Lake

1.1 PURPOSE AND NEED

PURPOSE: 1) To accommodate an increase in current test and training operations at NAWS; and 2) To achieve compliance with the California Desert Protection Act (16 U.S.C. § 410aaa et seq.) and the Sikes Act as amended (16 U.S.C. § 670a et seq.).

NEED: 1) To meet the established NAWS mission by conducting state-of-the-art weapons systems testing and evaluation and providing a safe, secure, operationally realistic and thoroughly instrumented land range testing environment and to maximize the operational readiness of our military services by providing realistic training environments; and 2) To comply with applicable directives for the responsible management of public lands and the conservation and protection of the Station's environmental resources.

The strategic vision for NAWS is to be the Navy's premier land based test and training center for weapons systems associated with air warfare, missiles and missile subsystems, aircraft weapons integration, and airborne electronic warfare systems. In accomplishing this vision, the Station provides a safe, operationally realistic, and thoroughly instrumented land range test and training environment that fulfills Navy and DoD T&E and training requirements. The combination of the NAWS location, complex and varied terrain, widespread instrumentation sites, unique test capabilities, and highly skilled technical workforce provides the most advanced and efficient method of conducting critical T&E and training necessary to maintain technical standards in the Navy. NAWS ranges are used by U.S. and allied military services for the T&E of land and air weapons systems, to provide realistic training opportunities, and to maintain the operational readiness of these forces. Test and training are critical to the successful assessment, safe operation, and improvement of the capabilities of current and future weapon systems.

The purpose of the proposed action is to accommodate an increase in current test and training operations at NAWS, and to achieve compliance with the CDPA and the Sikes Act as amended. The need for the proposed action and subsequent development of the CLUMP, INRMP, and associated EIS have been driven by the following factors:

- Changes to the type, tempo, and location of military test and training operations that support the military readiness mission in response to changing world events, DoD/Navy fiscal directives, and NAWS business development initiatives.
- Passage of new laws and regulations affecting land use and environmental resources management.

In response to these factors, NAWS conducted a detailed analysis of the Station's operational land use and environmental management needs to guide the development of the CLUMP, INRMP, and EIS. As a first step, a needs assessment was conducted by NAWS managers and staff to identify the following:

- Planned military test and training operations to accommodate current and projected military readiness missions.
- Opportunities to enhance environmental resource management programs and procedures.
- Methods to facilitate land use decision-making in response to planned and emerging needs.

Additional information regarding the need for accommodating a moderate increase in military operations and the need for CLUMP implementation is provided in the following subsections.

1.1.1 Military Operations Increase

NAWS has a need to meet the established NAWCWD operational requirements to conduct state-of-the-art weapons system testing and evaluation by providing a safe, operationally realistic, and thoroughly instrumented land range environment and to maximize the level of operational readiness of our military services by providing a realistic training environment. The evolution of international threats and operational technologies has increased the number

and type of military operations that require large land ranges for T&E and training activities. Consequently, the role of NAWS as a testing and training center has increased to support and accommodate operational readiness needs.

In preparation for the development of the CLUMP and this EIS, a NAWS planning team conducted an analysis of current and projected operations that are expected to be needed to meet established and evolving T&E and training mission requirements. As a result of this analysis, NAWS developed projections for the land use patterns (type, tempo and location) needed to accommodate the expected T&E operations, and aircrew and group troop training (GTT) operations. The specific T&E and training proposals evaluated in this EIS are based on NAWS current knowledge of priorities for future test and training operations, and the desires of NAWS managers to attract and accommodate more testing and training on the NAWS ranges. These projections were based on contemporary operational trends and customer feedback regarding expectations for future work to be conducted at NAWS.

T&E operations are needed to ensure that weapons systems reliably perform to their designed specifications. T&E events are conducted on the full spectrum of air warfare systems at NAWS to validate the system's capabilities and performance before it is deployed. NAWS provides an optimum combination of topographically diverse and highly instrumented land ranges and associated airspace to perform evaluations of the effectiveness and reliability of technically complex weapons and weapons systems in a safe and secure operational environment. While the tempo of testing may vary from year to year, the extensive land range areas and the restricted airspace over NAWS lands (R-2505, R-2506, and R-2524) and the larger R-2508 Airspace Complex are needed to support the test mission (Figure 1-2; the R-2508 Airspace Complex is depicted in Figure 1-1).

Training operations are critical to ensuring that our military services maximize their state of readiness. Readiness equates to military forces that are proficient at their jobs, ready to deploy quickly, capable of conducting joint operations (multi-service and/or multi-nation), and able to fight effectively. Mastering complicated equipment, particularly current highly technological operating and weapons systems, requires intensive and realistic training with that equipment (aircraft, weapons, and logistic support) on a simulated battlefield. Aircrew training operations address requirements for proficiency in the use of evolving aircraft and weapons system technologies and war-fighter tactics for navigation, target acquisition, weapons systems delivery, threat evasion, and battle damage assessment in realistic combat scenarios and threat environments throughout the varied terrain on the NAWS ranges. GTT activities provide opportunities for small and medium size forces to perform individualized training missions. The proximity of the NAWS ranges to customers' home bases, and the diversity of the NAWS terrain and threat assets provide an ideal environment for meeting ongoing and evolving aircrew and GTT needs.

In view of the need for realistic training, the Navy has recognized that the diverse and well-equipped assets at NAWS are needed to support Fleet readiness. This view was validated in August 1999 by the Commander, Third Fleet who confirmed that "the requirement for unit level training in air-to-ground weapons delivery continues to grow" and that the "need for the R-2508 Airspace Complex and the Superior Valley air-to-ground training range" are "critical to Fleet readiness". The need for GTT on the varied terrain conditions and against contemporary threat environments at NAWS is also shared by regional ground forces including the Navy Seals based at Naval Amphibious Base Coronado, and Marine Corps forces from Marine Corps Air Ground Combat Center at (MCAGCC) at Twentynine Palms and Marine Corps Base Camp Pendleton. In addition, Army forces from the National Training Center (NTC), Fort Irwin, and other ground forces training units have recognized the unique mission training assets available at NAWS and have used the NAWS ranges to meet specific training requirements.

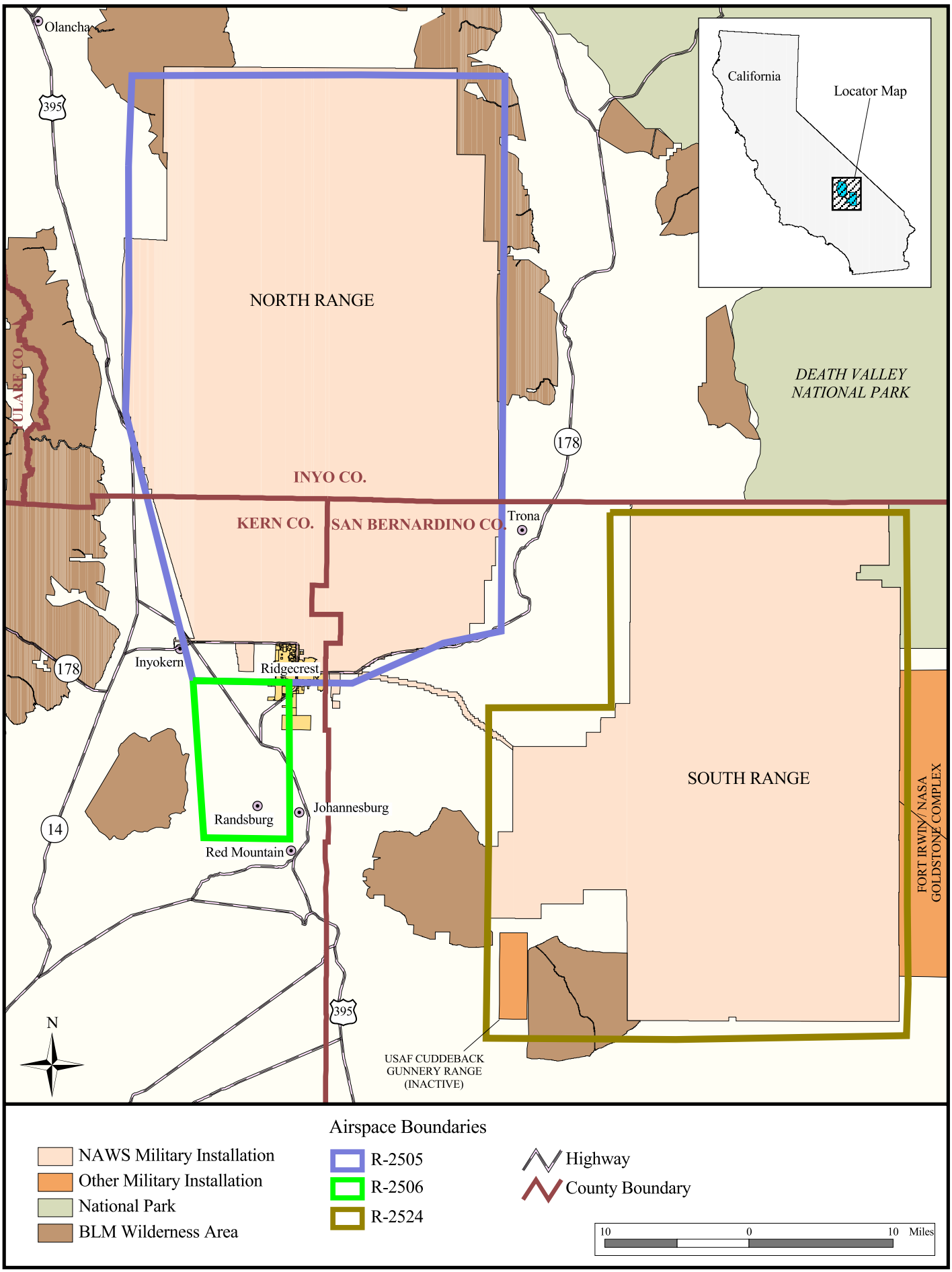

Figure 1-2 NAWS China Lake R-2505, R-2506, and R-2524 Airspace Areas

Based on identified and anticipated T&E and training needs, the proposed changes to current military operations at NAWS include increases to range flight operations for T&E operations, aircrew training, daytime supersonic flights, and night-time flight operations. Increases are also proposed for airfield flight operations and range ground operations including increases to the tempo of use, establishing new areas of operations for GTT activities, and maximizing the use of established disturbed land areas throughout the NAWS ranges. Specific elements associated with the proposed action and alternatives are described in Chapter 2.

1.1.2 CLUMP Implementation

The passage of the CDPA in 1994 re-authorized the Navy's continued use of public withdrawn lands at NAWS to meet the Station's established test and training requirements in support of the mission. The CDPA required the development of a land use management plan in accordance with the Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. § 1701 et seq.). The CLUMP development process included an extensive needs assessment analysis that integrated input from NAWS and NAWCWD managers, customers, and staff who were consulted to identify operational needs and potential improvements to existing land management processes. Land use and environmental resource management requirements were identified through internal discussions with senior managers, range operations managers, test planners, environmental planning and resource managers, land use planners, facilities planners, airfield operations personnel, legal counsel, and public affairs representatives. The general public, interested organizations, Native American tribes, and federal, state, and local agencies were also given an opportunity to participate with the Navy in the development of the CLUMP through briefings and NEPA public scoping meetings conducted throughout the region in support of the EIS. Additional information regarding public involvement is provided in Section 1.4.

As noted above, the CLUMP was developed in accordance with the requirements of the CDPA using FLPMA guidelines. Implementation of the CLUMP includes implementation of the INRMP, as required by the Sikes Act (as amended in 1997). The CLUMP also meets the requirements of Navy's environmental management regulations contained in 32 C.F.R. § 775, incorporates the planning guidelines described in the Navy's Environmental and Natural Resources Program Manual (U.S. Navy 1994a), and incorporates the appropriate components of the following on-Station management plans:

- Naval Weapons Center China Lake Master Plan (1989);
- Draft NAWS China Lake Range Management Plan (1996);
- Draft Integrated Cultural Resources Management Plan (ICRMP);
- Draft Update to the Air Installation Compatible Use Zones (AICUZ) report; and
- Draft INRMP (see Section 1.1.3).

The latter four management plans will remain as draft documents until the completion of this EIS process, and the implementation of the CLUMP in accordance with the U.S. Navy's Record of Decision (ROD).

1.1.3 INRMP Implementation

INRMP implementation is required by the Sikes Act (as amended in 1997). The Sikes Act requires the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations, sustainable multipurpose uses of resources, and public access for use of natural resources, subject to safety and military security considerations. To facilitate this program, the amendments require the Secretaries of the military departments to prepare and implement INRMPs for each military installation in the U.S. unless the absence of significant natural resources on a particular installation makes preparation of an installation plan inappropriate.

The INRMP must provide for management activities only to the extent that such activities are consistent with use of the installation for military preparedness.

INRMPs have specific goals that are shaped by the military mission, DoD guidelines and directives, pertinent laws and regulations, public needs, public values, ecological theory and practice, and management experience. Among the most important goals are the restoration, maintenance, and protection of biological diversity, biological integrity, and ecological health, while allowing for the military mission and appropriate human uses. As required by the Sikes Act, as amended, the INRMP shall, to the extent appropriate and applicable, provide for:

- no net loss in the capability of the installation's lands to support the military mission of the installation;
- fish and wildlife management, land management, and fish and wildlife-oriented recreation;
- fish and wildlife habitat enhancement or modification;
- wetland protection, enhancement, and restoration where necessary for support of fish, wildlife, or plants;
- integration of, and consistency among, the various activities conducted under the INRMP and other NAWS management plans as applicable;
- establishment of specific natural resource management goals and objectives and time frames for the proposed action;
- sustainable use by the public of natural resources to the extent that the use is consistent with the military mission and the needs of fish and wildlife resources;
- public access to the military installation, subject to requirements necessary to ensure safety and military security, that is necessary or appropriate for the sustainable uses of natural resources;
- enforcement of applicable natural resource laws (including regulations); and
- such other activities as the Navy has determined are appropriate.

As noted above, the INRMP will remain a draft document until the completion of this EIS process, and the implementation of the CLUMP in accordance with the Navy's ROD.

1.2 OVERVIEW OF NAWS

NAWS is located in the upper Mojave Desert of southeastern California and consists of two major land areas: the North Range, encompassing 606,926 acres (245,615 hectares), and the South Range, encompassing 503,510 acres (203,764 hectares). The North Range lies in portions of Inyo, Kern, and San Bernardino counties and the South Range is located entirely within San Bernardino County. The South Range eastern perimeter borders NTC Fort Irwin and the National Aeronautics and Space Administration (NASA) Goldstone Facility, and the northeast corner abuts Death Valley National Park (see Figure 1-1). BLM lands are adjacent to the North Range and between the North and South ranges. NAWS is also included in the R-2508 Airspace Complex, which includes approximately 19,600 square miles of airspace in the upper Mojave Desert Region (see Figure 1-1). Management of military aircraft operations in the R-2508 Complex is performed by the R-2508 Joint Policy and Planning Board (JPPB). The JPPB consists of the Commander of the NAWCWD; the Air Force Flight Test Center (AFFTC), Edwards Air Force Base (AFB); and NTC Fort Irwin.

Mainsite and Headquarters, which are in the southern boundary of North Range, are about 150 miles (241 kilometers) northeast of Los Angeles in the northeast corner of Kern County. The incorporated city of Ridgecrest adjoins the Mainsite boundary on the south. Other nearby communities include Inyokern, 10 miles (16 kilometers) west of Mainsite, and Trona, 18 miles (29 kilometers) east of Mainsite.

NAWS encompasses approximately 1,700 square miles (4,403 square kilometers) or more than 1.1 million acres (445,156 hectares) of remote, unpopulated desert land. In addition to extensive test and training ranges, the installation has several developed areas that include Mainsite, Armitage Airfield, the Propulsion Laboratories, and

the Coso Known Resource Area within the North Range. The administrative area for the Electronic Combat Range (ECR) is the primary developed area in the South Range.

Throughout its history, the Navy at NAWS has supported both Naval and DoD air weapons systems RDT&E needs. Military operations at this site began during the Navy's rapidly expanding air combat role during World War II. The site was officially established as the Naval Ordnance Test Station (NOTS), Inyokern, California, on November 8, 1943. In response to increasing capabilities, NOTS was renamed the Naval Weapons Center (NWC), China Lake, in July 1967. On January 22, 1992, NWC was officially placed under NAWCWD, an operational division of NAVAIR. NAWCWD's mission is to provide Naval forces with effective and affordable integrated warfare systems and life-cycle support to ensure battlespace dominance. This mission is accomplished through NAWCWD's extensive test and training programs.

Test and training programs conducted on the NAWS land ranges and on the sea range adjacent to Point Mugu are managed by an integrated NAWCWD management team with the Commander headquartered at NAWS. Land use management and environmental compliance are the responsibility of the Commanding Officer of NAWS, who reports to the Commander, NAWCWD. In this capacity, NAWS is responsible for developing the CLUMP and serves as the land manager of all NAWS lands, while NAWCWD is the primary user. According to its mission statement, NAWS operates and maintains base facilities and provides base support services, including airfields, for the NAWCWD organization at NAWS, assigned tenants and activities, and transient units. In support of this effort, NAWS manages the diverse facilities and support functions for the R&D and T&E of weapons systems and related technology conducted by NAWCWD. NAWS operates and maintains Station facilities, roads, and utilities, and provides other support services, including safety, security, and environmental management. NAWS environmental management programs include the administration of natural, cultural, air quality, and groundwater resources, and hazardous waste programs for the Station.

Although NAWS lands are authorized for Navy use, they are also used by the other military services (Marine Corps, Air Force, and Army) and other government agencies including the Department of Energy and NASA. Commercial customers pursuing independent testing or research and foreign nations' allied forces also use NAWS facilities to meet their test and training needs.

While NAWS accommodates a wide range of Navy, DoD, and other customer test and training needs, some uses are not compatible with NAWS operations. For example, in 1992 the Navy at NAWS formally considered the Army's proposal for joint use of NAWS lands in the Randsburg Wash management unit as an alternative in the NTC Fort Irwin Land Expansion Project Draft EIS. In response to this proposal the Navy conducted a detailed mission compatibility analysis, which determined that the Army's requirements were not compatible with existing and expected Navy uses in this area. The NTC Fort Irwin Commander concurred with this finding and withdrew the joint use proposal.

In 1999, the Army proposed another joint use scenario to conduct armored maneuver training (AMT) in the Station's Superior Valley as a possible alternative for their Land Expansion Project. This proposal was also analyzed for compatibility with ongoing Navy test and training operations. After a thorough review, the Navy determined the proposed use by NTC Fort Irwin was incompatible with established Navy operations. Superior Valley continues to be used as a tactical bombing range supporting Pacific Fleet aviator readiness training. The Superior Valley Bombing Range has been used for aviator readiness training since World War II; since the late 1950s, this range has been used for tactical aircrew training by the Navy, the Marines, and the Air Force. Since 1996 the Superior Valley Bombing Range has been used on a full-time basis to provide aviator training to the pacific fleet squadrons from NAS Lemoore, NAS Fallon, and other DOD aircrew training activities. As such, there remains a potential for unexploded ordnance (UXO) in the target areas and adjacent range areas that would preclude AMT use. Airspace safety, air quality considerations, and communication frequency saturation were identified as additional constraints to AMT use. Based on these findings, the proposed joint use of NAWS lands as an alternative for the NTC Fort Irwin Land Expansion Project was eliminated from further consideration.

1.3 RELATED ENVIRONMENTAL DOCUMENTS

According to CEQ regulations for implementing NEPA, "material relevant to an EIS may be incorporated by reference with the intent of reducing the size of the document." A number of programs and projects at NAWS have undergone environmental review and documentation to ensure NEPA compliance. In addition, other technical studies have been conducted at NAWS and elsewhere to address specific topics of interest.

Several of these documents are referenced because the actions addressed are applicable to the ongoing operations of NAWS and are integral to this EIS and accompanying CLUMP. Documents incorporated by reference are kept on file at the NAWS Environmental Project Office (EPO) and include the following:

- Final EIS for the Navy Coso Geothermal Development Program, FEIS, Navy 1979 (U.S. Navy 1979)
- Feral Burro Management Program, Final EIS, Navy, October 1981 (U.S. Navy 1981)
- Interim Wild Horse Management Program, EA, Navy, November 1982 (U.S. Navy 1982)
- Reactivation of the Superior Valley Bombing Range at NAWS China Lake, EA, Navy, June 1995 (U.S. Navy 1995b)
- Short Range Surface-to-Surface Weapons System at China Lake, EA, Navy, February 1995 (U.S. Navy 1995c)
- AIM-9X Ground-to-Air and Air-to-Air Captive-Carry Demonstration and Evaluation Flight Testing at China Lake, EA, Navy, March 1996 (U.S. Navy 1996b)
- Joint Standoff Weapon Baseline, BLU-108, and Unitary Test and Evaluation Program at China Lake, EA, Navy, January 1996 (U.S. Navy 1996c)
- Live-Fire Survivability Testing at China Lake, EA, Navy, May 1996 (U.S. Navy 1996d)
- Tomahawk Flight Test Operations on the West Coast of the United States, EA, Navy, October 1998 (U.S. Navy 1998c)
- Final EIS for Development of Facilities to Support Basing U.S. Pacific Fleet F/A-18E/F Aircraft on the West Coast of the United States, Vol. I, NAS Lemoore, CA, EIS, Navy, May 1998 (U.S. Navy 1998d)
- Non-Warhead Standoff Land Attack Missile (SLAM) and Future Model SLAM Firings, EA, Navy, November 1998 (U.S. Navy 1998e)

In addition to these documents, several regional land use and environmental planning efforts were considered in the development of the CLUMP and the EIS. These include the California Desert Conservation Area Plan (CDCAP), the proposed draft WMCMP, and the Mojave Desert Ecosystem Program. NAWS has participated in the development of these plans and has taken an active role in integrating land use planning efforts with other federal, state, and local agencies and Native American tribes in accordance with FLPMA and DoD guidance. Chapter 5 provides more information on these related plans.

1.4 PUBLIC INVOLVEMENT

NEPA requires an early and open process to determine the scope of issues that should be analyzed in the EIS before an alternative is selected for implementation. The EIS process is designed to involve and inform the public and local, state, and federal agencies, and Native American tribes of the potential environmental consequences of a federal agency's proposed action.

The public notification process for the CLUMP and EIS was designed to reach all interested parties; community organizations; federal, state, and local agencies; and Native American tribes. The public scoping process was conducted from April 1 to June 30, 1997, and included direct mailings and publication of the Notice of Intent to prepare an EIS in the Federal Register (on April 1, 1997) and in local newspapers. Six public scoping meetings were held in the vicinity of NAWS.

During the EIS scoping process, approximately 40 written comments were received from individuals; interested groups; federal, state, and local agencies; and Native American tribes. The Navy considered all comments received during the scoping process when determining the issues to be evaluated in the EIS. Issues identified during public scoping included the following:

- Public access to NAWS lands
- Management of cattle, wild horse, and burro grazing
- Conservation of sensitive cultural and natural resources
- Noise related to military activities
- Hazardous materials management on NAWS lands

A summary of the scoping comments and relevant scoping materials are included in Appendix A of Volume II of this document. This EIS will be available for public review and comment for 90 days. Public hearings will be conducted during the review period in Ridgecrest, Inyokern, Trona, Independence, and Barstow. Public comments received will be reviewed and appropriately incorporated in the final EIS. Responses to all public comments will be presented in the Final EIS appendices. The Final EIS will be available for a 30-day public review period prior to publication of the Navy's ROD. The ROD will be published in the Federal Register.

CHAPTER 2

Description of the Proposed Action and Alternatives

2.0 INTRODUCTION

The Navy proposes to accommodate an increase in the tempo of military T&E, and operational training activities conducted at NAWS, China Lake. Increases in range operations could result in minor changes in the use of lands managed by NAWS. The minor land use changes that would result from a decision to accommodate an increase in military operations would be reflected in the NAWS China Lake CLUMP. Under the terms of the CDPA of 1994 (16 U.S.C. § 410aaa et seq.), the CLUMP is the strategic planning vehicle through which NAWS manages land use and environmental resources. The CLUMP reflects the integration of range management strategies, the installation's INRMP, which is required under the Sikes Act as amended in 1997 (16 U.S.C. § 670a et seq.), and other management tools such as the ICRMP.

Three alternatives are evaluated in this EIS. One alternative maintains the status quo, and two alternatives accommodate increases in current military T&E and training activities to meet established and evolving readiness needs. The No Action Alternative would maintain existing operating conditions. The Limited Expansion Alternative would accommodate limited operational increases. The Moderate Expansion Alternative, identified as the Navy's preferred alternative, would accommodate broader operational increases. Because NAWS is required by law to have a CLUMP and an INRMP in place for any level of range operations, the CLUMP and INRMP are an element of each of the three alternatives. Therefore, this EIS serves as the NEPA-compliance document for the CLUMP and INRMP as well. The draft CLUMP and INRMP, which are provided in Volume III of this document, reflect the management objectives related to the minor changes in land use projected for the Moderate Expansion Alternative. If the No Action Alternative is selected, current conditions (as described in Chapter 3 of this EIS) would continue and the CLUMP and INRMP would be modified to reflect the management objectives of existing management plans and policies. If the Limited Expansion Alternative is selected, the CLUMP and INRMP would be modified to reflect the management objectives related to land uses that would accommodate limited operational increases.

The final CLUMP will be implemented at NAWS through a Station-wide NAWCWD Instruction. Once finalized, the CLUMP will implement the Station's INRMP in accordance with the Sikes Act as amended in 1997. The INRMP has been reviewed and endorsed by the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG). Key natural resource issues addressed in the plan include the protection of threatened and endangered species, the conservation of non-listed species warranting management consideration, habitat conservation (including fire management in critical habitat), water resources management, feral grazing management, and resources inventory and data management. The INRMP is being coordinated with other land and resource management agencies and applies a management approach that is consistent with biodiversity conservation and ecosystem management principals. Implementation of the CLUMP and INRMP will continue to accommodate mission-compatible non-military land uses to the extent practicable under the Station's safety, security, fiscal and regulatory considerations.

2.1 DEVELOPMENT OF ALTERNATIVES

Guidance for the development of alternatives is provided in CEQ regulations (40 C.F.R. § 1502.14) and Navy Procedures described in 32 C.F.R. § 775. The analysis of alternatives is the heart of an EIS and is intended to provide the decision-maker and the public with a clear understanding of relevant issues and the basis for choice among identified options. NEPA requires that an EIS be prepared to evaluate the environmental consequences of a range of reasonable alternatives. The alternatives in this EIS were developed using the following procedures:

- Review of the CDCAP (U.S. Department of the Interior [DOI] 1980) to identify applicable guidelines for NAWS land use and resources management.
- Assessment of the current and projected needs for future military land use, nonmilitary land use, military airspace use, and environmental resource management on NAWS.
- Performance of a compatibility analysis of current and projected military and nonmilitary uses on sensitive environmental resources on NAWS lands to identify potential land use and environmental resource management issues.

- Identification of public concerns and issues related to CLUMP development through a public scooping process and full consideration of comments received during this process regarding land management and environmental resources management.
- Development of land use management goals and guidelines that integrate appropriate components of keystone NAWS management plans and business initiatives.
- Compliance with the CDPA and the Sikes Act by implementing a land use management plan developed in accordance with FLPMA and Sikes Act guidelines.
- Development of a process that accommodates the needs of evolving T&E and training technologies to remain competitive for future business growth.
- Consideration of limited nonmilitary uses that are compatible with military operations and the Station's stewardship goals for natural and cultural resources, and that do not create a fiscal, compliance, security, or public health and safety risk.
- Consideration of the integration of the CLUMP with other regional land use and environmental planning and management initiatives.

2.1.1 Selection Criteria for Alternatives

Consistent with the purpose and need identified in Chapter 1, selection criteria were developed to help identify viable alternatives and eliminate unreasonable alternatives from further consideration. Selection criteria for this EIS include the following:

- Reasonable alternatives must fulfill the need for, and purpose of, the proposed action.
- Alternatives must be consistent with the goals, policies, and management strategy defined in the CLUMP.

Alternatives that did not meet both of these criteria were not carried forward for further analysis in this EIS.

2.1.2 Alternatives Considered But Eliminated

Five alternatives were initially considered while preparing this EIS. Further analysis resulted in a determination that two of these alternatives would either not meet or would exceed the Navy's operational readiness needs at NAWS. These alternatives were subsequently eliminated from further consideration in this EIS. A description of these alternatives and reasons for their elimination is provided in the following sections.

2.1.2.1 Decreasing Military T&E and Training Land Use Patterns

An alternative that would decrease military T&E from current conditions would not meet NAWS criteria to accommodate ongoing and evolving T&E and training technologies. NAWS is one of the few U.S. military installations with state-of-the-art capabilities for the T&E of weapons and weapon systems, and the land ranges approved for high hazard test and training of military weapons systems and tactics. Therefore, decreasing military land use patterns would not meet the Station's needs for accommodating current and future forecasted levels of the military T&E and training readiness operations.

2.1.2.2 Increasing Military T&E and Training Patterns Greater than the Proposed Action

Alternatives that would increase military T&E and training land use patterns greater than those proposed in the Moderate Expansion Alternative would exceed the current projected T&E and training needs identified by NAWS. The specific levels of T&E and training activities proposed as part of the Moderate Expansion Alternative are based on the Station's current knowledge of priorities for future test and training. As such, alternatives that increase land use patterns beyond those described in the Moderate Expansion Alternative do not appear to be required at this time and, therefore, were eliminated from further consideration.

2.2 ALTERNATIVES

The criteria described in Section 2.1 were used to develop the three alternatives analyzed in this EIS. The No Action Alternative maintains the Navy's current level of operations. The Limited Expansion Alternative and Moderate Expansion Alternative propose increases in the type and tempo of some T&E operations and training activities–approximately 15 percent for Limited Expansion and 25 percent for Moderate Expansion. Table 2-1, located at the end of this section, compares the specific elements of each alternative. Table 2-2, following Table 2-1, shows existing and proposed GTT use-days and acreage for applicable ranges for each alternative. Current and proposed operations associated with each alternative are described in more detail in Sections 2.2.1, 2.2.2, and 2.2.3.

Military land uses common to all alternatives, and that would not change under any of the alternatives, include the levels of permanently assigned personnel, ongoing R&D activities, and facilities and infrastructure support activities. None of the alternatives include a significant increase in permanently assigned personnel. Operational increases would be accommodated through improved management procedures. R&D activities generally would be expected to remain at current levels within the existing facilities at Mainsite, Michelson, Thompson, and Lauritsen Laboratories; Missile Engagement Simulation Arena (MESA); and at the Propulsion Laboratories land use management unit (Salt Wells Propulsion Laboratory [SWPL] and China Lake Propulsion Laboratory [CLPL]). None of the alternatives include the expansion or construction of additional support facilities or infrastructure. Any major facility construction action would require separate NEPA analysis and documentation.

2.2.1 No Action Alternative

Under the No Action Alternative, existing operating conditions would be maintained. Nonmilitary activities would continue according to current patterns of use. The CLUMP would be implemented to better manage land use and environmental resources, and would reflect accommodation of the military T&E and training operations (type, tempo and location) currently conducted at NAWS. The No Action Alternative also includes implementation of the INRMP in accordance with the Sikes Act (as amended). Key components of the No Action Alternative are described in the following subsections.

2.2.1.1 Military Operations

Since the establishment of NAWS as the Navy's ordnance T&E facility in 1943, the tempo and types of operations have fluctuated (Gerrard-Gough et al. 1978). These fluctuations have been due to changing world situations, the introduction of advances in war-fighting doctrine and technology (most recently focusing on longer-range and highly-accurate standoff weapons, including guided missiles), phased development of weapons acquisition programs, and the DoD T&E budget. For example, NAWS operations reached a high during the early 1980s when the DoD budget was robust, but since the close of the Cold War, lower levels of activity have been experienced. Most of the factors influencing tempo and types of operations are fluid in nature and will continue to cause fluctuations in NAWS activity levels. Thus, simply using the most recent recorded data may not be representative of long-term operational trends.

Accordingly, it became important to choose a baseline that accurately reflects the typical NAWS level of operations and against which relative impacts of the proposed action could be measured. Airfield operations data from 1996 were used to describe flight activity tempo and 1998 operations were used to describe aircraft "mix" (i.e., type of aircraft using the airfield). The operational tempo data were derived from the Air Traffic Activity Analyzer (ATAA) data recorded by Air Traffic Control (ATC) personnel and then adjusted to reflect the current aircraft mix for the F/A 18 series (ratio of A/D models versus E/F models). The resulting operations scenario is considered representative of a typical year at NAWS and is within 3 percent of the actual airfield operations conducted during 1999 (approximately 27,800 annual operations).

NAWS range flight operations data from 1996 were used for describing range activity tempo and 1998 operations were used to describe the aircraft mix. The 1996 data represent the most complete data available for an entire operational year and were gathered to support the initial air quality and noise analyses for this EIS. These data were developed from

range radar and test managers' records and were then adjusted to reflect the 1998 aircraft mix according to the aircraft changes described above (i.e., F/A 18 series, ratio of A/D models versus E/F models). These data (4,600 annual operations for subsonic flights and 36 annual operations for supersonic flights) are considered representative of the typical aircraft activity on the NAWS ranges. With regard to aircraft associated with range and airfield flight operations, types currently based at NAWS include T&E and training aircraft such as high-performance fighters, bombers, and electronic warfare aircraft. In addition, both foreign allied and domestic transient aircraft use the range.

Range ground operations data were compiled from range test managers' records for operations conducted on the North and South ranges during 1998. Range ground operations on the NAWS ranges include ordnance use at targets and test sites, and GTT activities. Ordnance use on the ranges varies from year to year depending on customer needs. GTT data for 1998 are the most complete data available and are representative of the current operational tempo being conducted at NAWS. As described in the preceding paragraphs, this operational activity provides the best representation of the broad range of test and training activity currently occurring at NAWS with respect to airfield and range operations. Accordingly, these data are used throughout this document to describe baseline operations.

Figures 2-1 and 2-2 illustrate the current military land use patterns for the North and South ranges, respectively. These figures also depict the 18 land use management units, further discussed in Section 3.1. A more detailed discussion of current military operations is provided in the following sections.

Range Flight Operations

Subsonic. Subsonic flight operations for test and training would continue at approximately 4,600 flight hours per year. Test and training flights would continue to be conducted over the North Range at Baker, Charlie, George, Airport Lake, Coso, and Coso Military Target ranges. Routine operations are conducted at subsonic speeds. South Range operating areas include those at Mojave B North, Randsburg Wash, and Superior Valley. Most test flight operations stage from Armitage Airfield; however, many training operations originate from other military airfields. Approximately 20 percent of the total annual flight hours occurring over the ranges are conducted for aircrew training. Approximately 10 percent of range flight operations are conducted in the evening (7 p.m. to 10 p.m.) or at night (10 p.m. to 12 a.m.).

Supersonic. Supersonic aircraft operations would remain at current levels of approximately three operations per month for a total of 36 per year. Supersonic flights are conducted during regular business hours (i.e., 7 a.m. to 5 p.m.) over both North and South ranges.

Airfield Flight Operations

Airfield use would remain at approximately 27,000 annual flight operations. In this context, operations are defined as flights that originate and/or terminate at Armitage Airfield (one take-off and one landing equals two flight operations). Flight operations from Armitage Airfield either use the NAWS ranges or continue on to other locations within the R-2508 complex or other ranges and airfields. The airfield generally operates from 6:30 a.m. to 10:30 p.m. Monday through Friday, and 4 p.m. to 10:30 p.m. on Sunday. Approximately 10 percent of airfield flight operations are conducted in the evening (7 p.m. to 10 p.m.) or at night (10 p.m. to 12 a.m.).

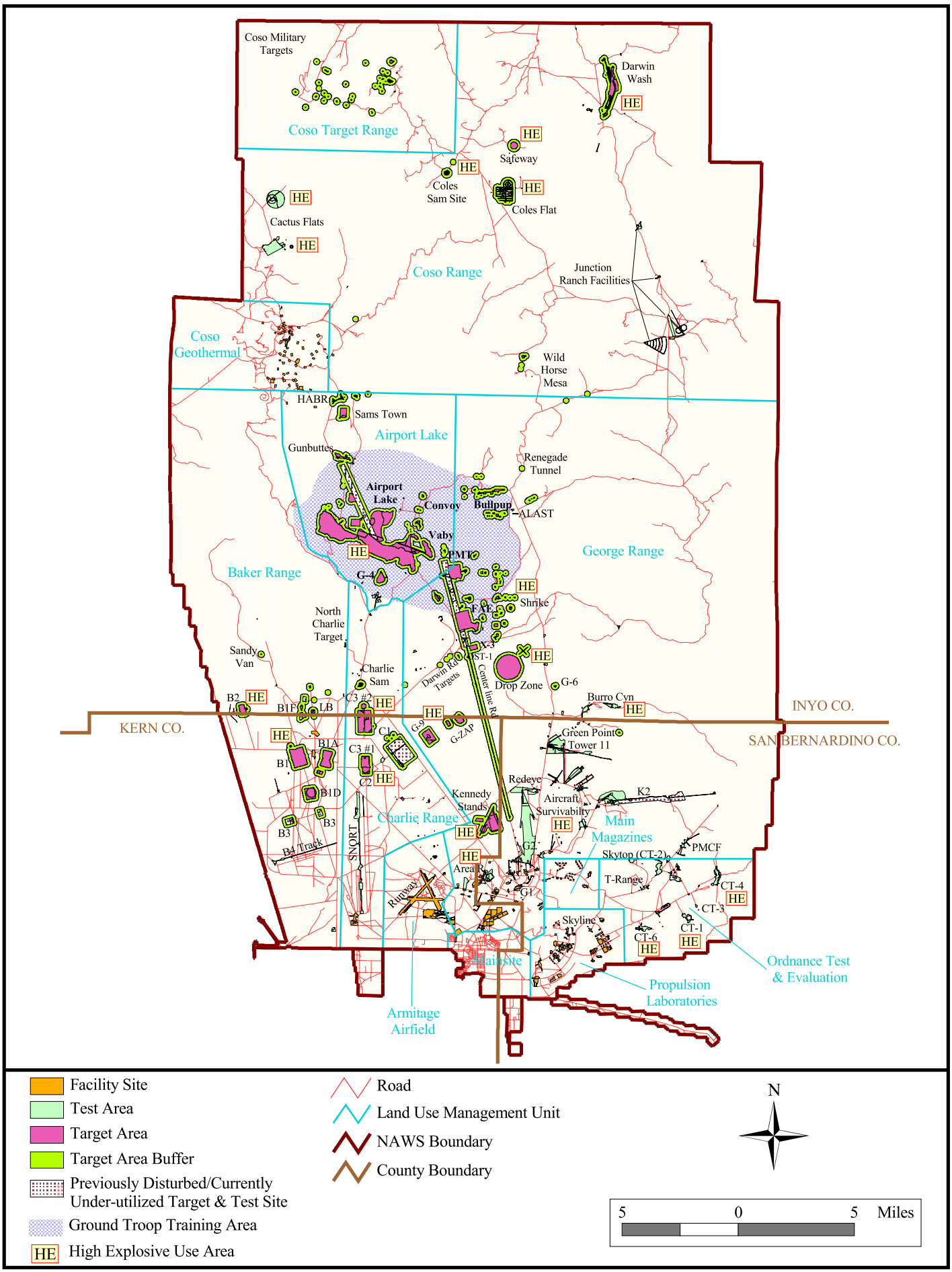

Figure 2-1 Military Land Uses for No Action Alternative, North Range

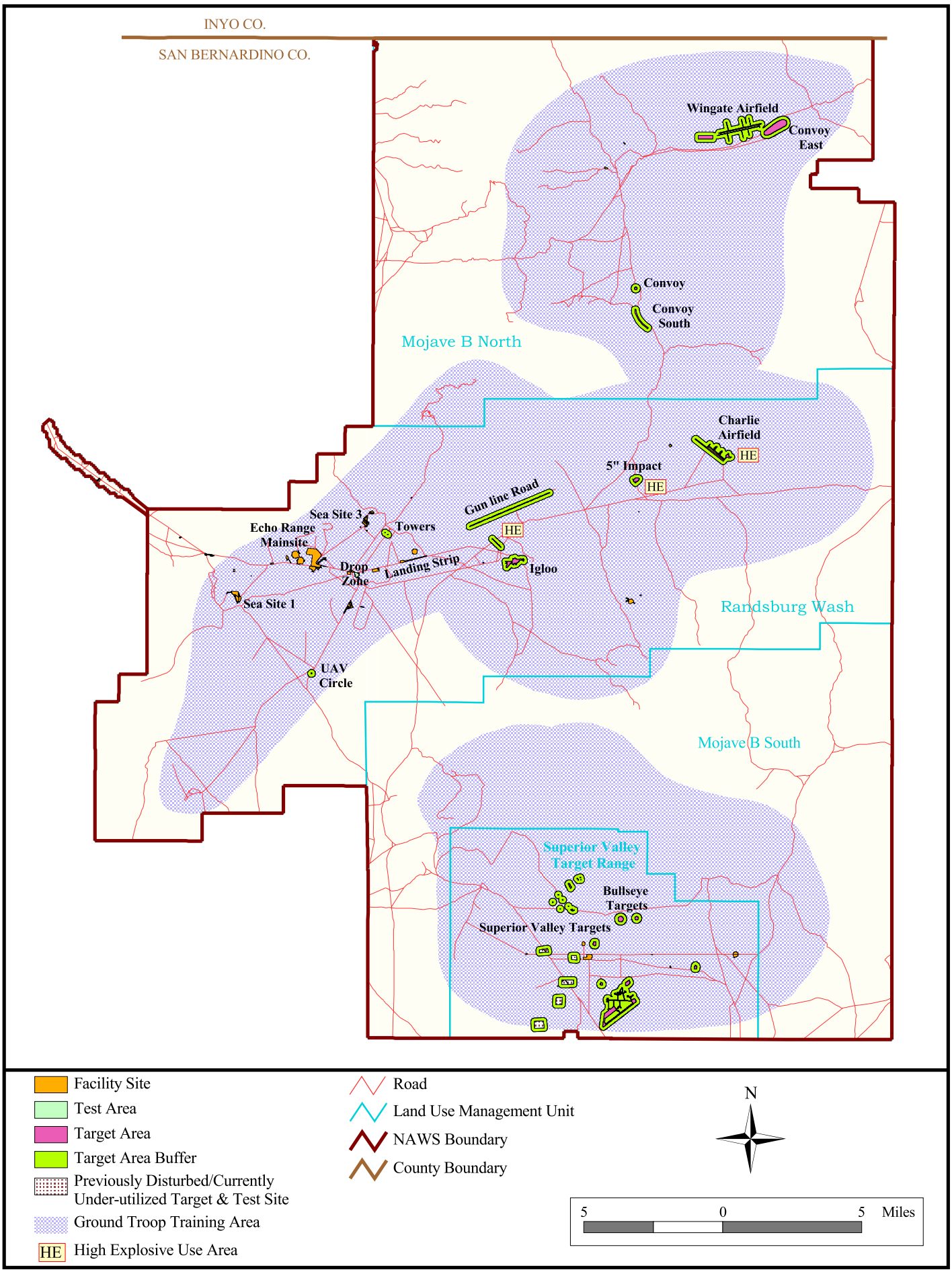

Figure 2-2 Military Land Uses for No Action Alternative, South Range

Range Ground Operations

Target and Test Site Use. Test and training operations on the ranges generally would continue at current patterns (type, tempo and location). All existing target and test sites in the North and South ranges would continue to be used approximately 4,600 hours annually. Ordnance use, including HE and inert ordnance, would continue according to established patterns at Airport Lake, Baker, Charlie, George, and Coso ranges on the North Range, and at Charlie and Wingate Airfields and the Randsburg Wash Gunline on the South Range. Ordnance use would continue at currently authorized sites and generally at the same rate of use (see Table 3.1-3). As described in the referenced table, ordnance use at NAWS varies from year to year depending on customer needs. HE use represents approximately 20 percent of all the ordnance used in a given year on NAWS ranges with the other 80 percent being inert. In general, all target and test sites at NAWS are authorized for the use of inert ordnance; however, HE use is limited to specific sites. Approximately 90 percent of the HE ordnance used at NAWS is used at the Airport Lake land management unit, with the remainder being disbursed at other authorized areas depending on customer needs. For more information on HE use at authorized impact sites, see the target ordnance matrix in Appendix B-1.

Ground Troop Training. Under the No Action Alternative, Type 1 and Type 2 training exercises would remain at current levels (type and tempo) and within existing footprints in the North and South ranges. Type 1 operations are generally small-scale operations using foot soldiers only without any ground vehicle support. Type 2 activities are generally considered to be medium-scale operations with ground troops using wheeled vehicles only. On the North Range, five Type 1 and three Type 2 exercises would continue at approximately 1,650 use-days in the Coso Basin of the Airport Lake and George Range. A use-day is defined as the use by (or activity of) one person, with associated equipment, for one day. On the South Range, ten Type 1 and four Type 2 exercises would continue at approximately 2,300 use-days at the Mojave B North, Randsburg Wash, and Superior Valley GTT areas.

2.2.1.2 Nonmilitary Uses

In general, nonmilitary uses would not change under the No Action Alternative. Public access would continue to be limited to specific areas on a case-by-case basis due to established safety and security requirements. Limited public access to designated areas would continue to be permitted according to the terms and conditions granted by the NAWS Commanding Officer. The Navy would continue to accommodate nonmilitary uses to the extent that these activities are compatible with military operations; do not create a safety, security, fiscal, or regulatory risk; and do not adversely impact the Station's natural and cultural resources.

Figure 2-3 illustrates areas on the North Range where nonmilitary land uses would continue to be accommodated under this alternative (there are no nonmilitary land use areas on the South Range). A more detailed discussion of current nonmilitary uses is provided in the following subsections.

Native American Use

Native American access to NAWS-administered lands would continue to be accommodated in accordance with the existing Memorandum of Agreement (MOA) between the Navy and Native American tribes. Accordingly, access to the Coso Hot Springs and Prayer Site would continue to be accommodated. Access to the area is granted for tribal traditional rites and passages. Requests for access to other locations on-Station would continue to be considered on a case-by-case basis.

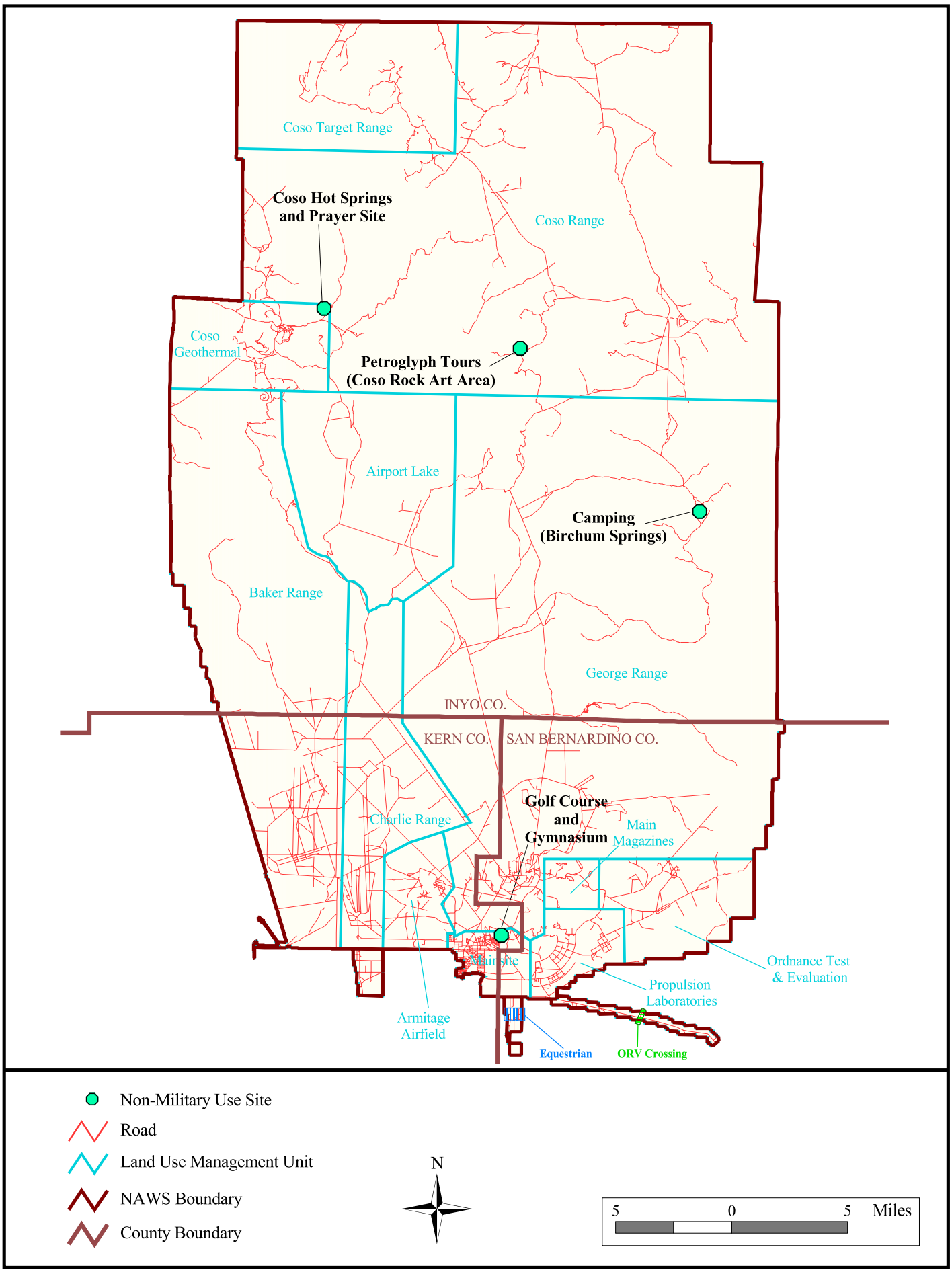

Figure 2-3 Non-Military Land Uses for No Action Alternative on NAWS China Lake, North Range

Research and Education

Access to Station lands for on-going research and educational programs would continue to be accommodated. Research and educational activities vary from year to year depending on the need or interest of visiting activities and the Station's environmental resources managers. Typically, research projects focus on natural or cultural resource field studies and help augment the Station's knowledge of sensitive and protected environmental resources. Any new proposals for access related to research or education would be considered on a case-by-case basis.

Recreation

NAWS would continue to accommodate limited mission-compatible recreational uses within its boundaries on a case-by-case basis. These uses are described below.

Camping. Camping at the Birchum Springs Campground (near the head of Mountain Springs Canyon) would continue to be accommodated on a case-by-case basis. All recreational camping requires a Command-approved escort trained in environmental, security, and safety issues. Before camping, the NAWS escort provides a briefing on Station safety and security and protection of natural and cultural resources. Campers are limited to 16 individuals per night and all Station safety and security measures are enforced.

Golf and Gym Access. Public access to the gymnasium and golf course would continue to be permitted. These facilities are located at Mainsite.

Hiking. Hiking on existing roads would continue to be allowed. Hiking currently occurs on B-Mountain.

Equestrian Use. Equestrian use of the G-corridor (south of Mainsite along the southern boundary of the North Range) would continue to be permitted during scheduled events. All equestrian use would be restricted to existing trails.

Off-road Vehicle Use. Off-road vehicle (ORV) use would continue to be allowed at BLM scheduled public events crossing the Randsburg Wash Access Road. These BLM events are expected to continue at approximately 8 per year, with approximately 100 riders per event. Per agreement between the Navy and BLM, off-road crossing is permitted only over the Randsburg Wash Access Road twice per event within an established footprint.

Petroglyph Tours. Public access to the Little Petroglyph Canyon would continue to be accommodated on a case-by-case basis. Petroglyph tours are described in NAWS Instruction 5532.1, Use of Range Areas. Most tours are limited to Little Petroglyph Canyon (permission to tour other petroglyph areas is rarely granted because of difficult access and the high sensitivity of the art) and are conducted under a cooperative agreement between the Station and the Maturango Museum in Ridgecrest. Museum-sponsored tours are limited to 6 tours (of up to 50 individuals each) per month, with additional tours of smaller groups allowed. These public tours are conducted by certified tour guides, who are trained in Station safety and security requirements, including measures for protecting the rock art. NAWS personnel provide annual training for tour guide certification. Additional tours of Little Petroglyph Canyon are allowed on a case-by-case basis, provided the total number of individuals in the canyon at any one time does not exceed 75. Tours by other authorized tour guides would also continue on a case-by-case basis.

Bird Watching. The Audubon Society's annual bird count (held one day each December) would continue to be accommodated. Typical attendance ranges from 12 to 20 people. Individuals make bird observations and record trends in bird populations.

Photography. Photography would continue to be allowed. Photographs are taken in the Birchum Springs and Little Petroglyph Canyon areas.

2.2.1.3 CLUMP and INRMP Implementation

Under the No Action Alternative, NAWS would implement a CLUMP and INRMP (both are included in Volume III of this EIS). The CLUMP is a long-term, strategic plan that formalizes corporate process for land use planning and management at NAWS. This plan provides an integrated framework for the management of military operations, public health and safety practices, and environmental resource conservation programs. The CLUMP contains land use policies, goals, guidelines, and procedures for the management of military operations and environmental resources, and is designed to accommodate and guide the Navy's use and management of its lands until the next congressional land withdrawal reauthorization. It augments existing planning and management processes, facilitates mission-related land use, integrates programs to conserve and protect cultural and environmental resources, enhances specific ongoing health and safety programs, and accommodates a limited number of mission-compatible nonmilitary land uses (on a case-by-case basis, as described in Section 2.2.1.3). The CLUMP incorporates established standard procedures for avoidance and minimization of impacts to environmental resources. These standard procedures include:

- Conducting early consultation between the EPO and an action proponent to discuss the scope of proposed projects, including the type of project, location, and timing.
- Siting projects in previously disturbed areas or in areas that are not environmentally sensitive.
- Providing environmental briefings to alert range users and operations personnel to the presence of protected or sensitive resources and to notify users and operations personnel of NAWS compliance requirements and of the expectations for customers to conform to established policies and procedures.
- Conducting pre-project site surveys for new land-disturbing activities to determine presence or absence of protected and/or sensitive resources and establish project area boundaries.
- Implementing required measures to avoid adversely affecting sensitive resources.
- Conducting post activity monitoring for intensive ground-use projects to ensure that avoidance and minimization measures are employed and remain effective. Post activity site monitoring is conducted by range and EPO personnel to ensure that projects are conducted in approved areas, comply with established NAWS policies and procedures, and that ground disturbing activities remain within established land use footprints. If a project does not comply with established policies or procedures, the activity is notified of the issue by Command correspondence and, if appropriate, recompense is sought from the activity.

By implementing these procedures, most projects are sited in existing disturbed areas, thereby avoiding impacts to new areas. Potential impacts from a project are often minimized by relocating it to a nearby area, or by reconfiguring the area boundary to avoid a sensitive resource. When new undisturbed areas are required to support a project, environmental personnel work with project planners and range users to ensure the project affects the smallest area possible. Impacts to undisturbed lands from new or ongoing projects are further minimized through environmental briefings to range users and range operations personnel, and by restricting vehicular traffic to established roads and trails. Environmental briefings provide range users and operators with updated information on the types of sensitive resources found on the ranges, specific areas to be avoided, and reporting methods to follow in the event a sensitive resource is impacted by their activity. Controlled off-road traffic is permitted only for specific purposes such as ordnance or test item recovery. Impacts to sensitive resources are further minimized through compliance with the provisions of USFWS Biological Opinions (BOs) and the Station's Programmatic Agreement (PA) with the California State Historic Preservation Office (SHPO)/Advisory Council.

As the strategic planning vehicle for NAWS, the CLUMP incorporates implementation of the Station's INRMP. The INRMP establishes the goals and management guidelines to conserve and protect the Station's natural resources in accordance with Sikes Act amendments, and other applicable directives in a manner that is consistent with the Station's operations.

2.2.2 Limited Expansion Alternative

The Limited Expansion Alternative is a proposal designed to meet Navy and DoD current and near-term operational needs. This alternative incorporates limited operational increases in military operations. Nonmilitary activities would continue according to current patterns of use. The CLUMP would be implemented to better manage land use and environmental resources, and would reflect the management objectives related to land uses that would accommodate limited operational increases. As with the No Action Alternative, natural and cultural resources would continue to be conserved with implementation of the CLUMP management process. Key components of the Limited Expansion Alternative are described in the following sections.

2.2.2.1 Military Operations

Proposed changes to military operations under the Limited Expansion Alternative include increases in the type and tempo of ongoing military T&E, training, and support operations. Increases in military operations would be phased over 5 years (according to operational needs) and include expansion of range flight operations (both subsonic and supersonic operations), airfield flight operations, and range ground operations (target and test site use and GTT type, tempo, and location). Figures 2-4 and 2-5 show the military land uses proposed as part of the Limited Expansion Alternative for the North Range and South Range, respectively. The specific increases in operations associated with the Limited Expansion Alternative are discussed in the following subsections.

Range Flight Operations

Subsonic. Subsonic flight operations for test and training would increase by up to 15 percent over baseline operations over 5 years. Specifically, an increase of up to 690 additional flight hours for a total of up to 5,290 annual flight hours when fully implemented would occur. Flight operations would continue to occur over the North Range (Airport Lake, Baker, Charlie, George, and Coso ranges) and the entire South Range.

Supersonic. The frequency of supersonic flight operations would increase to approximately 2 flights per week, or up to 100 events per year. Supersonic flight events would continue to occur over both the North and South ranges.

Airfield Flight Operations

Airfield flight operations would increase by up to 15 percent over baseline operations over 5 years. Specifically, operations would increase up to 4,050 additional flight operations for a total of up to 31,050 annual flight operations when fully implemented.

Range Ground Operations

Target and Test Site Use. In response to increases in range flight operations described above, the tempo of established target and site use would increase by approximately 15 percent over baseline use. This would result in increased use of up to 690 additional hours over 5 years for a total of up to 5,290 hours annually after full implementation. Additionally, use of all previously disturbed but currently underutilized target and test sites would be resumed (approximately 2,140 acres [866 hectares]) for a total of 9,140 acres (3,699 hectares) of test and target sites range-wide. These previously used target and test sites are located in the Baker, Charlie, George, Airport Lake, and Coso land management units on North Range and in the Randsburg Wash and Superior Valley land management units on the South Range.

In response to increases in range flight operations described above, the tempo of inert and HE ordnance use would increase by approximately 15 percent at all approved target and test sites throughout the North and South ranges. In addition, HE use would be re-introduced at Wingate Airfield in Mojave B North for the delivery of precision-guided munitions (for limited use [2-3 times per year]). The use of precision-guided weapons (versus unguided ordnance) reduces the potential for target misses. The ordnance use areas would not require additional construction or grading.

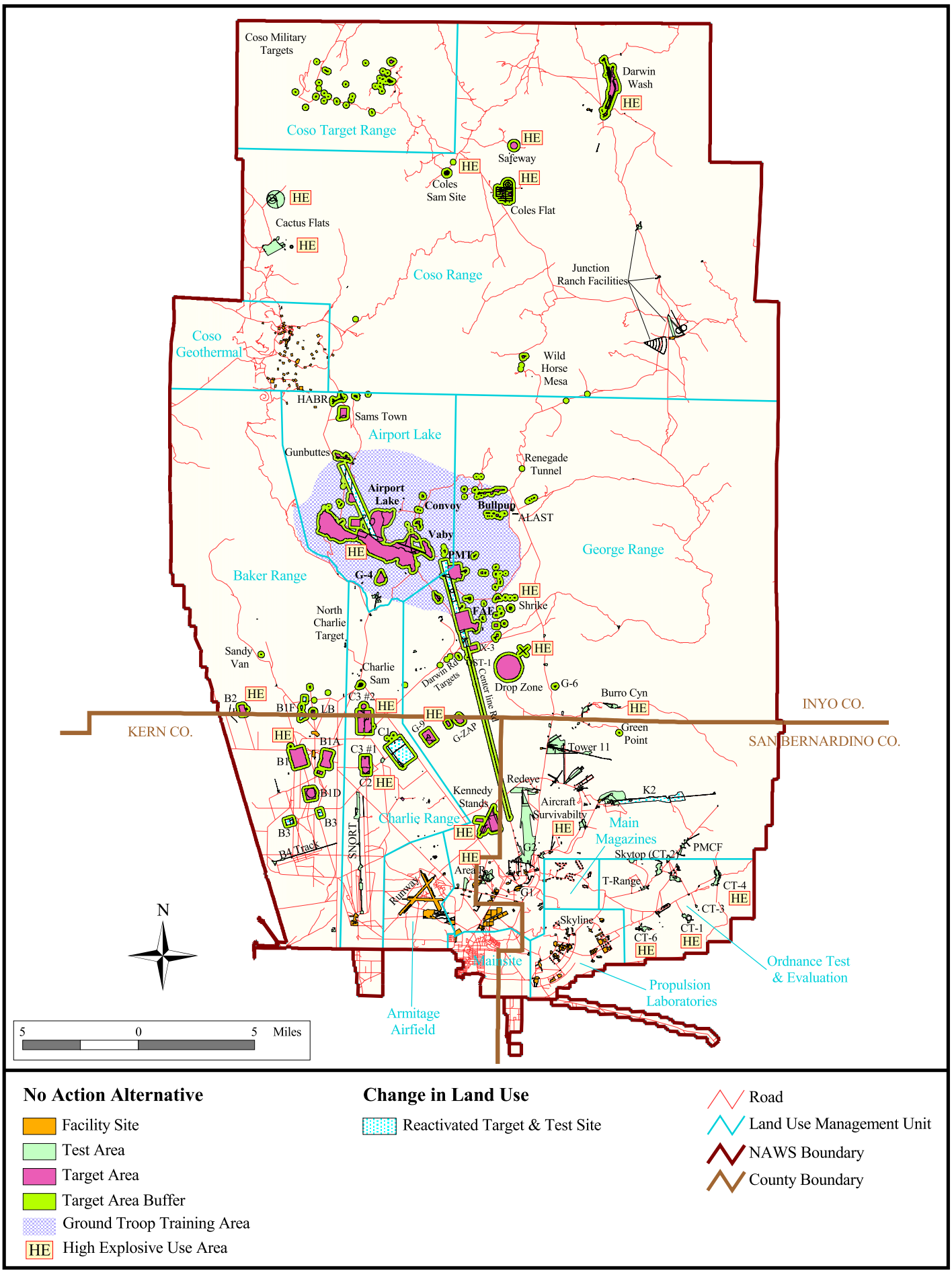

Figure 2-4 Military Land Uses for Limited Expansion Alternative, North Range

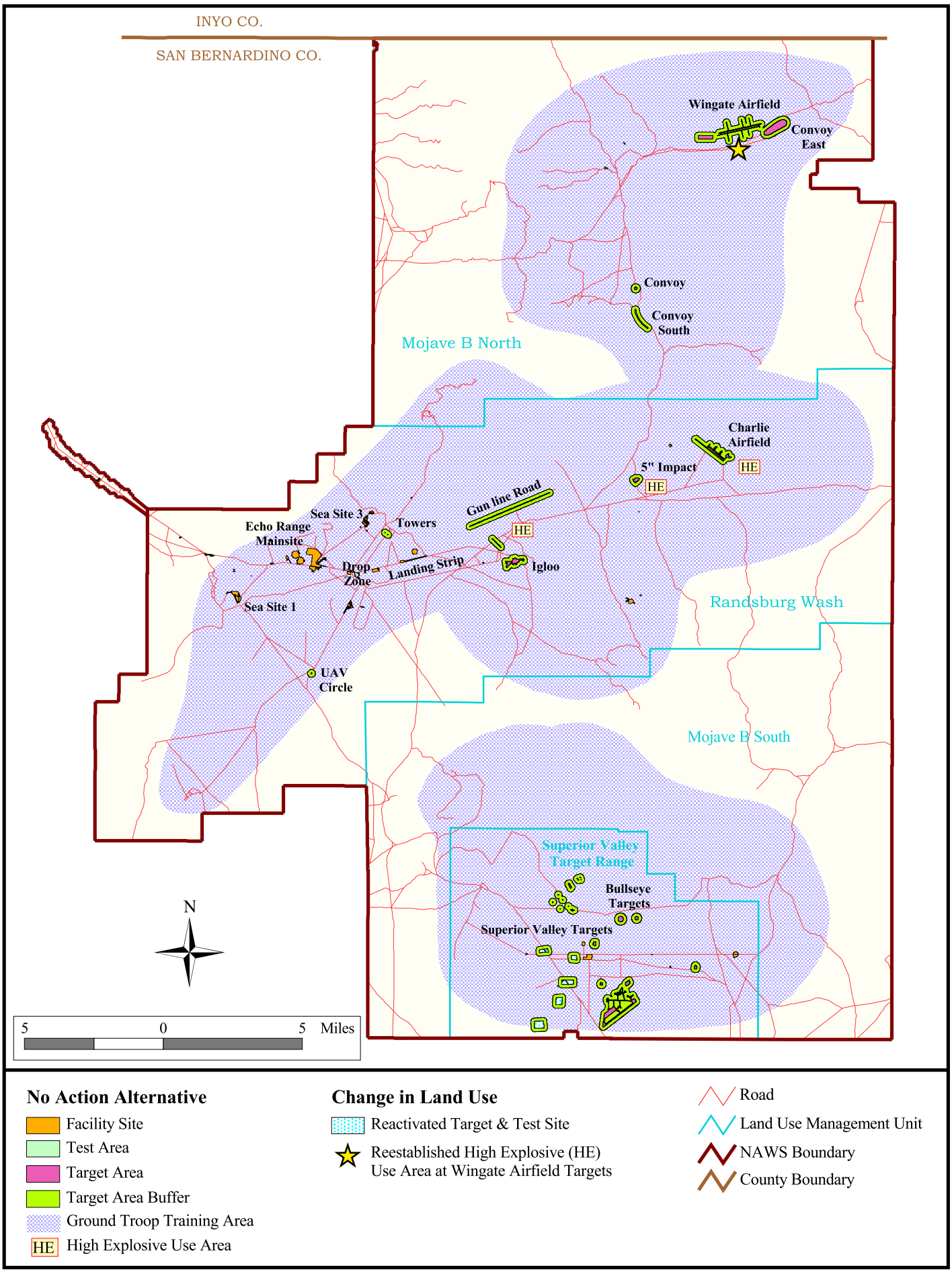

Figure 2-5 Military Land Uses for Limited Expansion Alternative, South Range

Ground Troop Training. The tempo of GTT would double for Types 1 and 2 exercises on the North and South ranges. The tempo increase on North Range would add 1,650 annual use-days while annual use-days on South Range would increase by 2,300. The annual totals for the North Range would be 3,300 use-days while the South Range total would be 4,600. All GTT would remain within existing footprints on both ranges and users would continue to receive established safety and environmental briefings before conducting operations.

2.2.2.2 Nonmilitary Uses

Under this alternative, nonmilitary uses would remain the same as those described for the No Action Alternative in Section 2.2.1.2.

2.2.2.3 CLUMP and INRMP Implementation

Since NAWS is required by law to have a CLUMP and INRMP in place for any level of range operations, the Limited Expansion Alternative includes implementation of the CLUMP and INRMP reflecting minor changes in land use projected for accommodating limited increases in military operations. As described under the No Action Alternative, the CLUMP formalizes and streamlines land management practices; ensures operational readiness by facilitating ongoing and evolving test and training operations; protects public health and safety; conserves and protects cultural resources; and, through implementation of the INRMP, conserves and protects natural resources.

2.2.3 Moderate Expansion Alternative

The Moderate Expansion Alternative is the Navy's preferred alternative and provides NAWS the greatest flexibility to accommodate current and evolving Navy and DoD readiness operations. This alternative allows for a moderate expansion of military operations. Nonmilitary activities would continue according to current patterns of use. The CLUMP, reflecting proposed land use increases, would be implemented to better manage land use and environmental resources. As with the No Action Alternative, natural and cultural resources would continue to be conserved with implementation of the CLUMP management process. Key components of the Moderate Expansion Alternative are described in the following sections.

2.2.3.1 Military Operations

Proposed changes to military operations under the Moderate Expansion Alternative include increases in the type and tempo of ongoing military T&E, training, and support operations. Increases in military operations would be phased over 5 years (according to operational needs) and include expansion of range flight operations (both subsonic and supersonic operations), airfield flight operations, and range ground operations (target and test site use and GTT type, tempo, and location). Figures 2-6 and 2-7 show the military land uses proposed as part of this alternative for the North Range and South Range, respectively. The specific operational increases associated with the Moderate Expansion Alternative are discussed in the following sections.

Range Flight Operations

Subsonic. Subsonic flight operations for test and training would increase by up to 25 percent over baseline operations over 5 years. Specifically, an increase of up to 1,150 flight hours would occur, for a total of up to 5,750 flight hours annually when fully implemented. Flight operations would continue to occur over the North Range (Airport Lake, Baker, Charlie, George, and Coso ranges) and the entire South Range. Night operations would account for approximately 20 percent of the flight-hour increases over both the North and South ranges.

Supersonic. Supersonic flight operations would increase to approximately 2 flights per week, or up to 100 operations per year. Supersonic flight events would continue to occur over both the North and South Ranges.

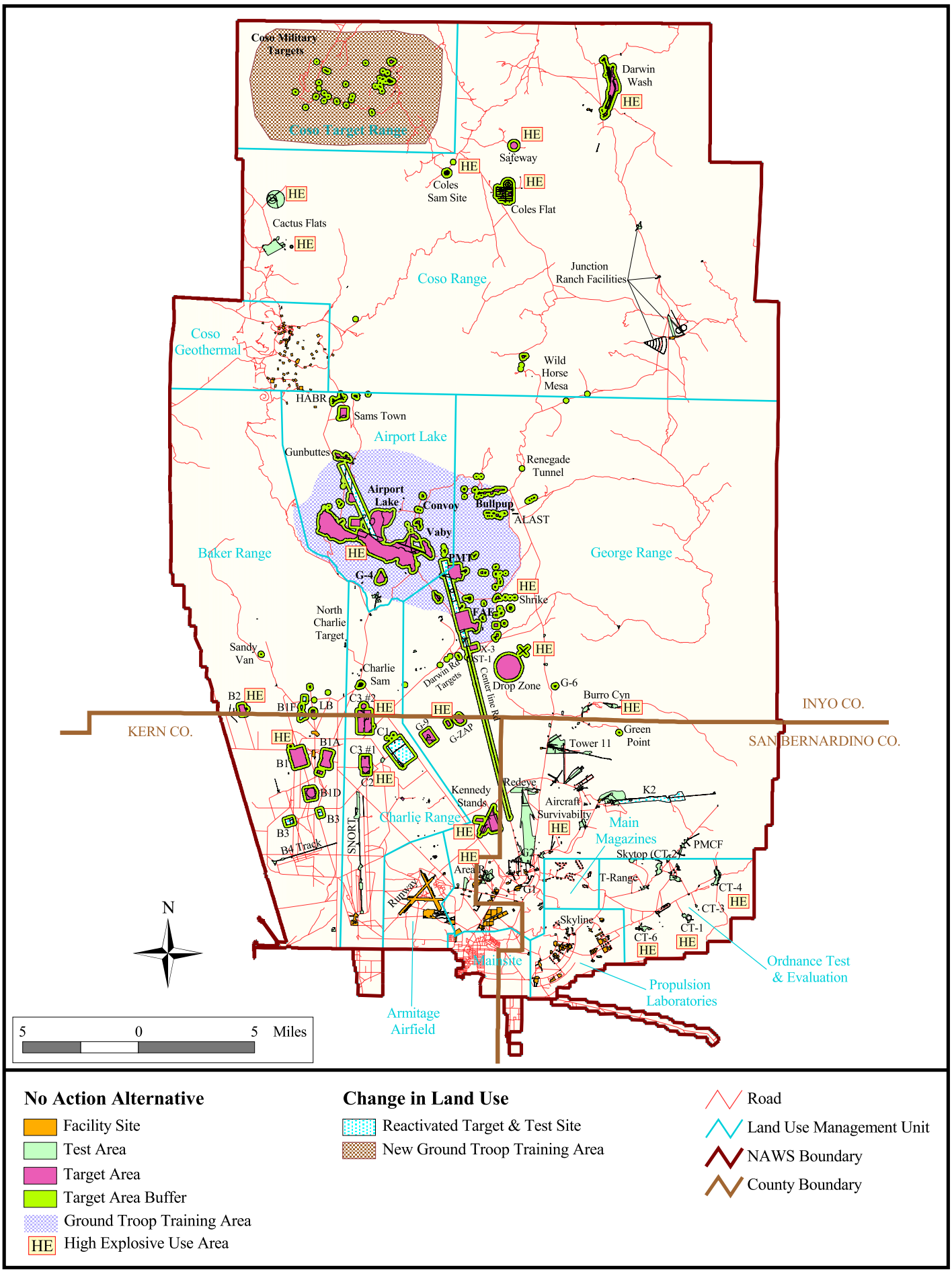

Figure 2-6 Military Land Uses for Moderate Expansion Alternative, North Range

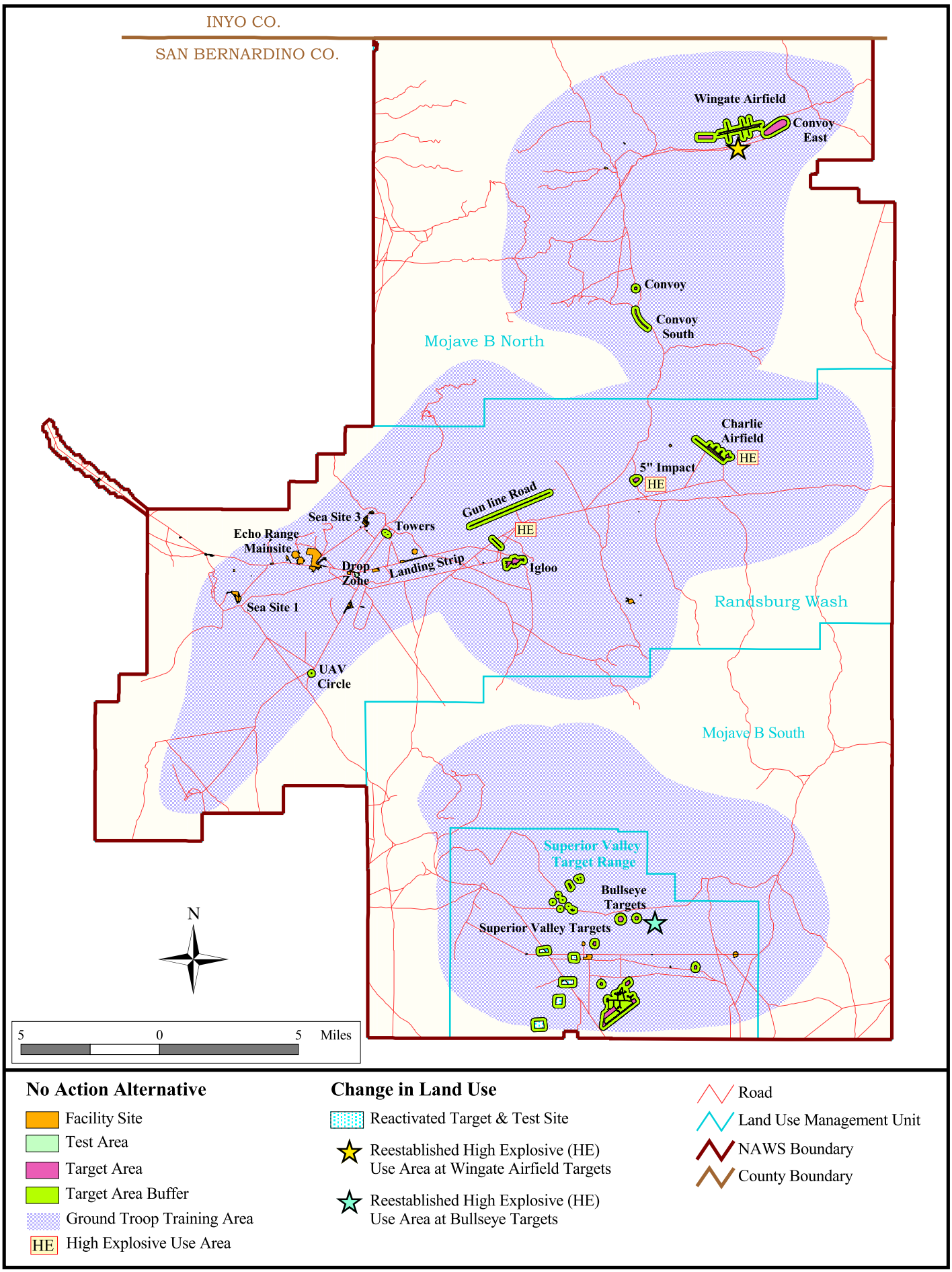

Figure 2-7 Military Land Uses for Moderate Expansion Alternative, South Range

Airfield Flight Operations

Airfield flight operations would increase by up to 25 percent over baseline operations over 5 years. Specifically, operations use would increase up to 6,750 additional flight operations for a total of up to 33,750 annual flight operations when fully implemented.

Range Ground Operations

Target and Test Site Use. In response to increases in range flight operations described above, the tempo of established target and site use would increase by approximately 25 percent over 5 years. This would result in increased use of up to 1,150 additional hours over 5 years for a total of up to 5,750 hours annually after full implementation. All target and test sites would be available to support military uses as needed. In addition, the use of all previously disturbed but currently underutilized target and test sites would be resumed (approximately 2,140 acres [866 hectares]) for a total of 9,140 acres (3,699 hectares). These previously used target and test sites are located in the Baker, Charlie, George, Airport Lake, and Coso land management units on the North Range and in the Randsburg Wash and Superior Valley land management units on the South Range.

Additionally, the tempo and amount of inert and HE ordnance use would increase by approximately 25 percent over baseline use at all approved target and test sites throughout the North and South ranges. In addition, HE would be re-introduced at two traditional use areas, Wingate Airfield in Mojave B North and Bullseye Target in Superior Valley for the delivery of precision-guided munitions (for limited use [2-3 times per year]). These areas would not require additional construction or grading.

Ground Troop Training. The tempo of operation-compatible GTT activities would increase by 5,450 additional use-days per year over 5 years. The tempo of GTT would double for Type 1 and 2 exercises on the North and South ranges, adding 1,650 annual use-days on the North Range and 2,300 use-days on the South Range.

In addition, the Moderate Expansion Alternative would establish a Type 1 training area at Coso Military Targets and establish a Type 3 (infantry with tracked and wheeled vehicles) training area at Airport Lake with limited maneuver areas on established roads and disturbed areas made available in the George management unit. The tempo at the Airport Lake/George Range and Coso Target Range (CTR) management units would increase by 1,500 additional use-days. The annual totals for use of the North Range would be 4,800 use-days while the South Range total would be 4,600. The new Type 1 area at Coso and Type 3 area at Airport Lake would make an additional 24,748 acres (10,015 hectares) available for these exercises. Appendix D-3 provides a more thorough description of each type of exercise. All GTT would remain within these established footprints on both ranges.

2.2.3.2 Nonmilitary Uses

Nonmilitary uses would remain the same as described for the No Action Alternative in Section 2.2.1.2.

2.2.3.3 CLUMP and INRMP Implementation

Since NAWS is required by law to have a CLUMP and INRMP in place for any level of range operations, the Moderate Expansion Alternative includes implementation of the CLUMP and INRMP reflecting minor changes in land use projected for accommodating moderate increases in military operations. As described under the No Action Alternative, the CLUMP formalizes and streamlines land management practices; ensures operational readiness by facilitating ongoing and evolving test and training operations; protects public health and safety; protects cultural resources; and, through implementation of the INRMP, conserves and protects natural resources.

2.2.4 Comparison of Alternatives

Table 2-1 provides a comparison of the elements included in each of the alternatives. Table 2-2 provides a comparison of GTT use-days and acreage associated with each alternative. A comparison of land use patterns under the alternatives is presented in Figure 2-8 (North Range) and Figure 2-9 (South Range).

Table 2-1 Comparison of Alternatives

Military Uses			
Activity	***No Action Alternative***	***Limited Expansion Alternative***	***Moderate Expansion Alternative***
Range Flight Operations	*Continue current level of test and training operations at approximately 4,600 flight hours per year.*	*Subsonic operations would increase by 15% over 5 years. Use would increase by 690 additional flight hours to a total of 5,290 annual flight hours.*	*Subsonic operations would increase by 25% over 5 years. Use would increase by 1,150 additional flight hours to a total of 5,750 annual flight hours.*
	Continue current level of supersonic operations at an average of three per month (36 per year).	*Supersonic operations would increase by approximately 2 per week, or up to a total of 100 events per year.*	*Supersonic operations would increase by approximately 2 per week, or up to a total of 100 events per year.*
Airfield Flight Operations	*Continue current level of operations at approximately 27,000 annual flight operations.*	*Operations would increase by 15% over 5 years. Use would increase by 4,050 additional flight operations to a total of 31,050 annual operations.*	*Operations would increase by 25% over 5 years. Use would increase by 6,750 additional flight operations to a total of 33,750 annual operations.*
Range Ground Operations			
Target and Test Sites	*Continue current use of existing authorized target and test sites on the North and South ranges, which include those at Airport Lake, Baker, Charlie, George, and Coso ranges (North Range), and at Charlie Airfield and Randsburg Wash Gunline (South Range). Total acreage of target and test sites currently used is 7,000 acres (2,833 hectares). Tempo of target and test site use would remain at approximately 4,600 hours annually.*	*Continue current operations, plus* *1) Increase tempo of target and test sites and associated ordnance use by approximately 15% over 5 years. Use would increase 690 hours to a total of 5,290 hours annually.* *2) Resume use of all previously disturbed but currently underutilized target and test sites range-wide (approximately 2,140 acres [866 hectares]), for a total target and test site acreage of 9,140 acres (3,699 hectares).* *3) Re-introduce the use of HE at Wingate Airfield in Mojave B North (South Range) for the delivery of precision-guided munitions (for limited use [2-3 times per year]).*	*Continue current operations, plus* *1) Increase tempo of target and test sites and associated ordnance use by approximately 25% over 5 years. Use would increase 1,150 hours to a total of 5,750 hours annually.* *2) Resume use of all previously disturbed but currently underutilized target and test sites range-wide (approximately 2,140 acres [866 hectares]), for a total target and test site acreage of 9,140 acres (3,699 hectares).* *3) Re-introduce the use of HE at Wingate Airfield in Mojave B North (South Range) and at the Bullseye Target in Superior Valley (South Range) for the delivery of precision-guided munitions (for limited use [2-3 times per year]).*
Range Ground Operations (continued)			

Military Uses			
Activity	***No Action Alternative***	***Limited Expansion Alternative***	***Moderate Expansion Alternative***
Ground Troop Training	*Continue current patterns of GTT at existing areas of operations. Types 1[a] and 2[b] would remain at current levels.*	*Continue current operations, plus increase the tempo of Type 1 and 2 operations in established areas over 5 years.*	*Continue current operations, plus increase the tempo of Type 1 and 2 operations in established areas over 5 years, establish a Type 1 operation area in the CTR, and introduce Type 3[c] training at Airport Lake.*
	North Range: 1,650 use-days on 33,900 acres (13,719 hectares).	*North Range: Increase use by 1,650 use-days for a total of 3,300 use-days on 33,900 acres (13,719 hectares).*	*North Range: Increase use by 3,150 use-days at Airport Lake and CTR for a total of 4,800 use-days and add 24,748 acres (10,015 hectares) for a total use area of 58,648 acres (23,734 hectares).*
	South Range: 2,300 use-days on 287,515 acres (116,354 hectares).	*South Range: Increase use by 2,300 use-days for a total 4,600 use-days on 287,515 acres (116,354 hectares).*	*South Range: Increase use by 2,300 use-days for a total of 4,600 use-days on 287,515 acres (116,354 hectares).*
	Total Use-Days: 3,950 *Total Acres/Hectares: 321,415/130,073*	*Total Use-Days: 7,900* *Total Acres/Hectares: 321,415/130,073*	*Total Use-Days: 9,400* *Total Acres/Hectares: 346,163/140,088*

[a] *Type 1: Small-scale; light infantry only, no vehicles.*
[b] *Type 2: Medium-scale; infantry with wheeled vehicles only (e.g., trucks).*
[c] *Type 3: Large-scale; infantry with wheeled and tracked vehicles (e.g., tanks).*

Nonmilitary Uses	
Activity	***No Action, Limited Expansion, and Moderate Expansion Alternatives***
Native American Uses	Continue access to Coso Hot Springs and Prayer Site per Memorandum of Agreement. Consider other access on a case-by-case-basis.
Research and Education	Continue ongoing projects and consider others on a case-by-case basis.
Recreation	
Camping	*Allow camping at Birchum Springs on a case-by-case basis.*
Golf and Gym	*Keep golf course and gymnasium open to the public.*
Hiking	*Consider on-Station hikes on a case-by-case basis.*
Equestrian	*Accommodate access at a specified area on G-Range Approach Corridor on a case-by-case basis.*
Off-Road Vehicle	*Permit off-road vehicle use of Randsburg Wash Access Road during public events sponsored by the Bureau Land Management.*
Petroglyph Tours	*Allow petroglyph tours as described in the NAWS Public Access Policy.*
Bird Watching	*Allow Audubon Society annual bird count.*
Photography	*Allow photography on a case-by-case basis.*

Use-day = One person for one 8-hour day.

Table 2-2 Ground Troop Training Use-Days and Acreage For Applicable Ranges For Each Alternative

	Ground Troop Training Use-Days									*Acreage*		
	Type 1 [b]			*Type 2* [c]			*Type 3* [d]					
Management Unit [a]	***NAA***	***LEA***	***MEA***	***NAA***	***LEA***	***MEA***	***NAA***	***LEA***	***MEA***	***NAA***	***LEA***	***MEA***
North Range [e]												
Airport Lake	*150*	*300*	*300*	*1,500*	*3,000*	*3,000*	*0*	*0*	*1,500*	*21,472*	*21,472*	*21,472*
George [f]	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*11,891*	*11,891*	*11,891*
Coso/Coso Target	*0*	*0*	*90*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*24,748* [g]
Baker	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*485*	*485*	*485*
Charlie	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*52*	*52*	*52*
Coso Geothermal	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Ordnance T&E	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
South Range												
Randsburg Wash	*150*	*300*	*300*	*700*	*1,400*	*1,400*	*0*	*0*	*0*	*121,866*	*121,866*	*121,866*
Mojave B North	*75*	*150*	*150*	*650*	*1,300*	*1,300*	*0*	*0*	*0*	*81,521*	*81,521*	*81,521*
Mojave B South	*75*	*150*	*150*	*650*	*1,300*	*1,300*	*0*	*0*	*0*	*40,109*	*40,109*	*40,109*
Superior Valley [f]	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*44,019*	*44,019*	*44,019*
Total	***450***	***900***	***900***	***3,500***	***7,000***	***7,000***	***0***	***0***	***1,500***	***321,415***	***321,415***	***346,163*** [g]
Total Acreage Increase										***0***	***0***	***24,748*** [g]

[a] *Developed areas, which include Mainsite, Armitage Airfield, Main Magazines, and Propulsion Laboratories are not used for ground troop training.*

[b] *Type 1: Small-scale; light infantry only, no vehicles.*

[c] *Type 2: Medium-scale; infantry with wheeled vehicles only (e.g., trucks).*

[d] *Type 3: Large-scale; infantry with wheeled and tracked vehicles (e.g., tanks).*

[e] *Under The Moderate Expansion Alternative, Type 1 would increase in the North Range from 150 to 300 use-days, but would be split between Airport Lake and the newly designated ground troop training area at Coso Target Range.*

[f] *Use numbers for George Range are combined with those for Airport Lake. Use numbers for Superior Valley are combined with Mojave B South. George Range and Superior Valley are used as overflow areas from Airport Lake and Mojave B South, respectively, during ground troop training activities.*

[g] *Indicates where acreage would increase over existing conditions.*

Key:

Use-day = One person for one 8-hour day.
NAA = No Action Alternative.
LEA = Limited Expansion Alternative.
MEA = Moderate Expansion Alternative.

Source: U.S. Navy 1998.

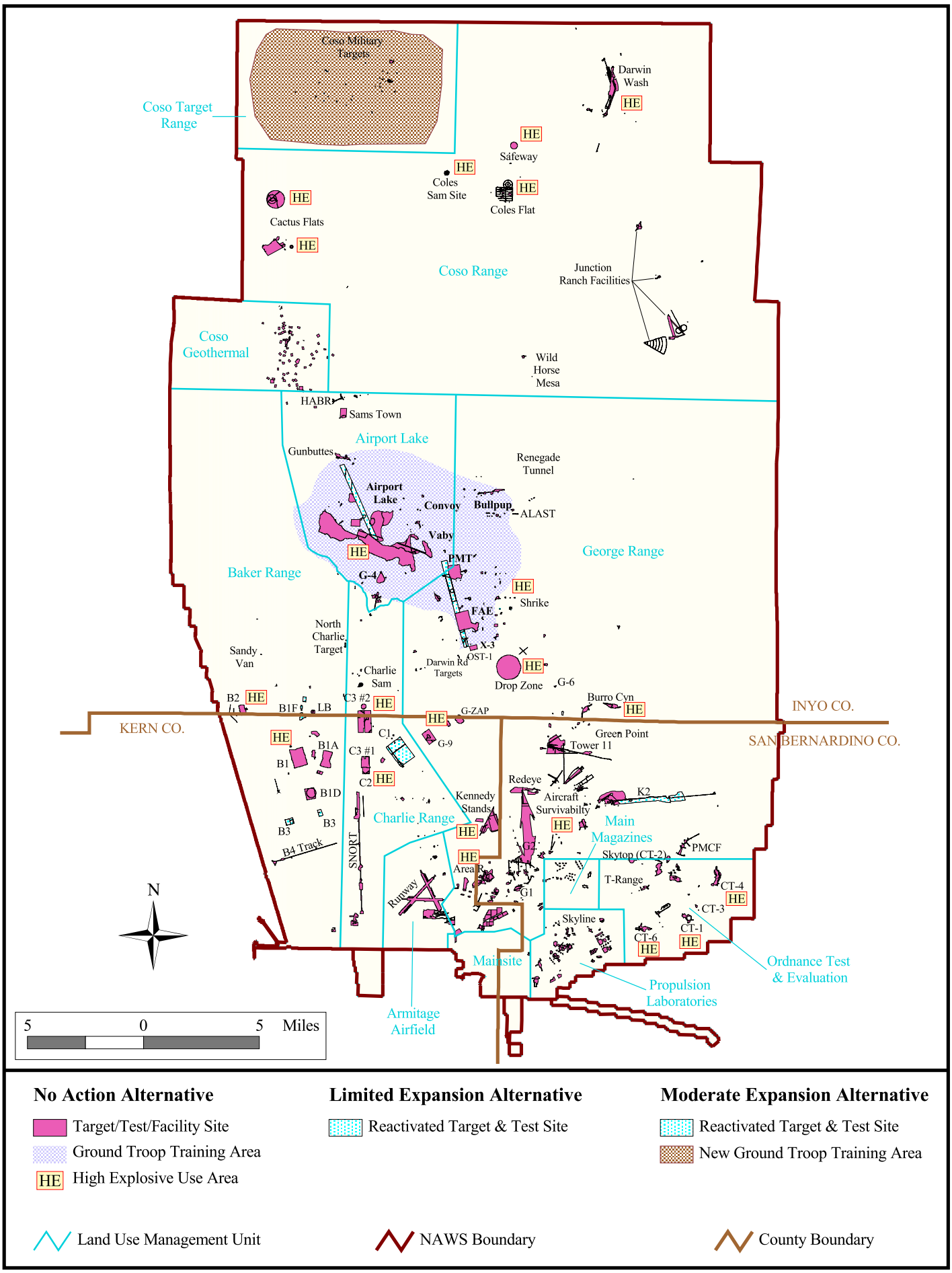

Figure 2-8 Comparison of Land Use Patterns by Alternatives, North Range

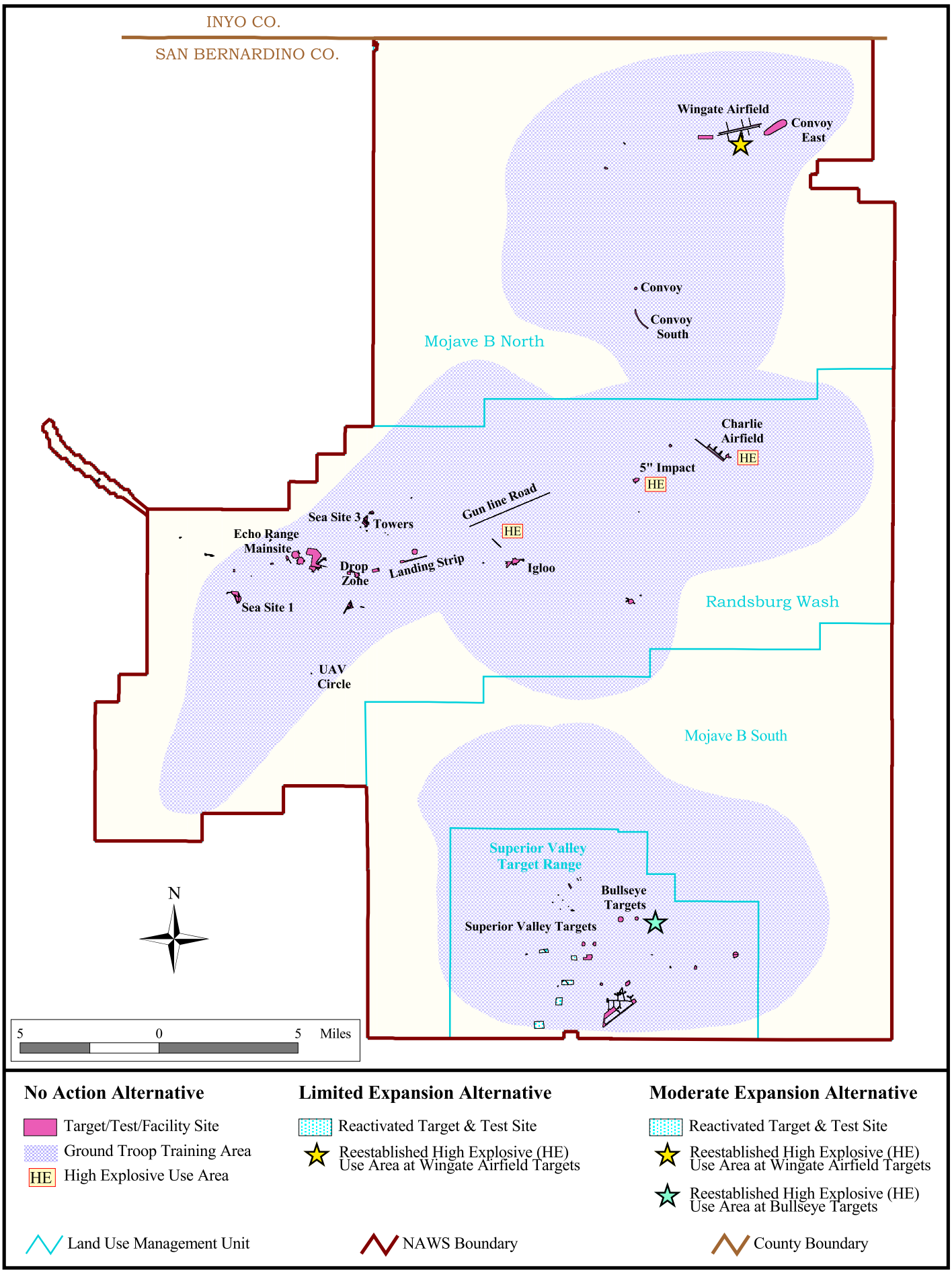

Figure 2-9 Comparison of Land Use Patterns by Alternatives, South Range

CHAPTER 3

Affected Environment

3.0
Introduction

3.0 INTRODUCTION

This chapter provides detailed information on existing environmental and socioeconomic conditions at NAWS that may be affected by implementation of the proposed action or alternatives. The affected environment is described in terms of 12 resource areas: land use, noise, air quality, biological resources, cultural resources, geology and soils, water resources, socioeconomics (including Environmental Justice), utilities and public services, public health and safety, hazardous materials and waste, and traffic and circulation. Visual resources are not addressed in this document since implementation of the proposed action or alternatives would not change the visual character of the existing landscape. No construction or physical modification to existing structures would occur, and views from scenic viewsheds and roadways would not be altered.

Information in these resource sections provides baseline data that were used to identify and evaluate potential impacts that could result from implementation of the alternatives described in Chapter 2. Baseline information is presented for the year for which the most recent and/or complete data were available, which in most cases is fiscal year 1998 (FY98). Information from other years is used as noted.

A glossary of related technical terms is presented in Chapter 11, Glossary.

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3.1
Land Use

3.1 LAND USE

This section describes existing on-Station and surrounding off-Station land use at NAWS China Lake. Land use is defined by the physical activities or designated use occurring within the Station boundary and incorporates the uses related to on-going military operations and other non-military use of Station lands. The CDPA of 1994 (16 U.S.C. 410AAA et seq.), which combined all prior public land withdrawal legislative actions relating to China Lake into one comprehensive instrument, re-authorized the Navy's continued use of public withdrawn lands for its RDT&E and training mission, and allows the accommodation of compatible nonmilitary land uses at NAWS subject to the approval of the NAWS Commanding Officer. Consistent with CDPA, the land use section includes separate discussions of military and nonmilitary land use at NAWS.

3.1.1 Current Management Framework

Land use planning activities conducted by NAWS address proposed land use actions occurring both on- and off-Station. On-Station land use planning efforts fall into three general categories: facility planning for the operation and maintenance of Station facilities and infrastructure, test planning for range operations, and planning for other nonmilitary activities. Off-Station land use planning focuses on activities with the potential to affect military operations at NAWS and is administered by NAWS staff through participation with planning staff from various city, county, state, and federal agencies in the region.

Land use activities on-Station are administered according to procedures described in an existing operating instruction (NAWCWPNINST 5090.1, Naval Air Warfare Center [NAWC] China Lake 1995b) and the NAWCWD memorandum addressing environmental planning for range department operations (NAWC 1995a). Oversight of the environmental review process is the responsibility of the EPO as a staff function of the NAWS commanding officer. Land use planning and management procedures at NAWS are currently conducted through the review processes described below.

3.1.1.1 Facility Planning

All new construction, repair, maintenance, study, or cost estimates on-Station require the project proponent to generate a Facility Service Request (FSR). FSRs are coordinated through a designated Customer Liaison Officer and submitted to the FSR Screening Committee which, with assistance from the Public Works Department Environmental Coordinator (EC), assess the need for environmental documentation and, if necessary, the type of environmental documentation to be completed.

3.1.1.2 Test Planning

Test plans and proposals for range support activities are submitted to the Range Department EC for review. The EC meets with test planners to discuss the proposed project and gather information to assist in the environmental review process. The EC is included in discussions with potential test customers to fully understand the scope of the project. The EC serves as the single point of contact with the EPO and/or legal staff concerning Range Department projects. The EC, with assistance from the Test Facilities Manager and the test customer, completes all required forms, such as the *Request for Environmental Review* to initiate the NEPA process with the EPO.

In addition, projects involving explosives, electromagnetic radiation (EMR), or airfield safety may be subject to a site approval process. Under this process a proposed action is evaluated in terms of whether it is essential to the mission, how it relates to existing environmental constraints, and whether it is compatible with existing uses and can be supported by existing infrastructure. Proposed actions meeting these criteria are considered for approval by the Site Approval Committee. Approved actions are then submitted to the Station's NEPA Coordinator for environmental review.

3.1.1.3 Air Installation Compatible Use Zone Program

The DoD has established the AICUZ program to address noise, safety and land use issues associated with aircraft operations at military airfields and installations. The purpose of the AICUZ program is to achieve compatibility between military air installations and neighboring communities by protecting the health, safety, and welfare of civilian and military personnel, and protecting the operational capabilities of military air installations. This compatibility is achieved by discouraging land use in the vicinity of military airfields that is incompatible with aircraft operations.

An AICUZ program plan was developed and implemented at NAWS China Lake in 1977. This plan established operational profiles that minimized noise impacts to neighboring communities, established Accident Potential Zones (APZs) for airfield operations, and accommodated the Station's operational needs. NAWS initiated an AICUZ plan update in 1998 to support the development of this EIS. Additional studies were conducted to provide detailed analysis of potential noise effects related to current and projected airfield flight operations. Additional noise analysis was conducted in May 2001 to incorporate updated noise modeling for airfield flight operations and off-Station population density estimates. Utilizing this information, an updated NAWS AICUZ program plan will be developed in partnership with neighboring communities and planning agencies to ensure the compatibility of ongoing and evolving airfield flight operations with land use planning and management efforts in the area. The updated AICUZ program plan will characterize noise exposure footprints associated with current and projected airfield flight operations, identify APZs, update land use compatibility guidelines for noise levels, and provide recommendations for land use planning and management for the Station and surrounding communities.

3.1.1.4 Naval Weapons Center China Lake Master Plan

The NWC China Lake Master Plan (U.S. Navy 1989a, 1989b) is one of the supporting elements of the CLUMP. The plan provides a descriptive account of the Station's real estate, land use, facilities, utility and circulation systems, and environmental resources. The Master Plan addresses planning and management of the Station's facilities and infrastructure and serves as the general land use plan. The final CLUMP would serve as an update to that portion of the Master Plan defining the land use planning and management process.

3.1.2 On-Station Land Ownership

Figures 3.1-1 and 3.1-2 show the land assets within the NAWS boundaries for the North Range and South Range, respectively. NAWS lands are comprised of property owned by the DON, U.S. Department of Interior (DOI) lands withdrawn from public domain, and lands acquired through lease, easement, or permit for Navy use. The acreage of each category is shown in Table 3.1-1.

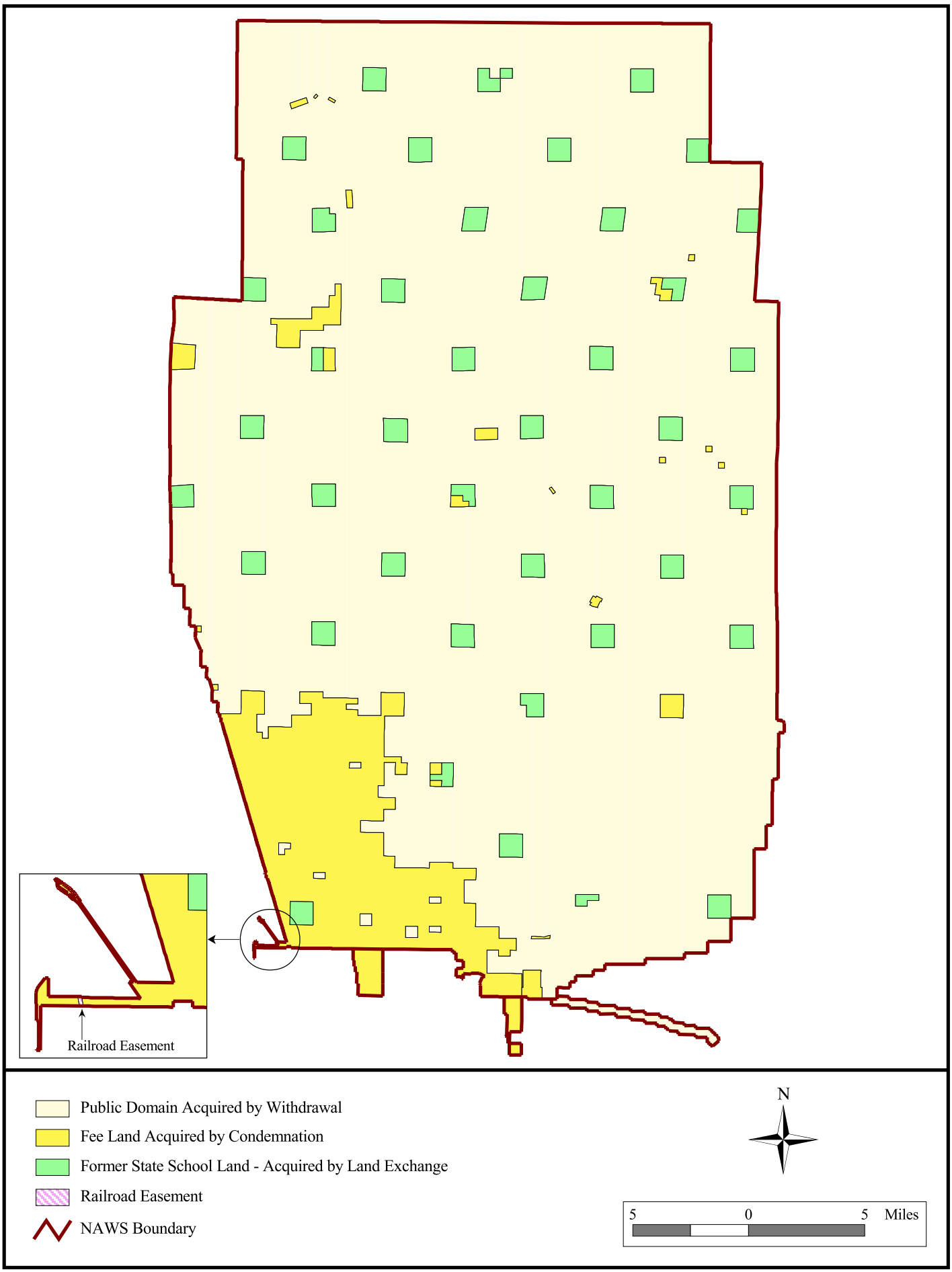


Figure 3.1-1 On-Station Land Ownership, North Range

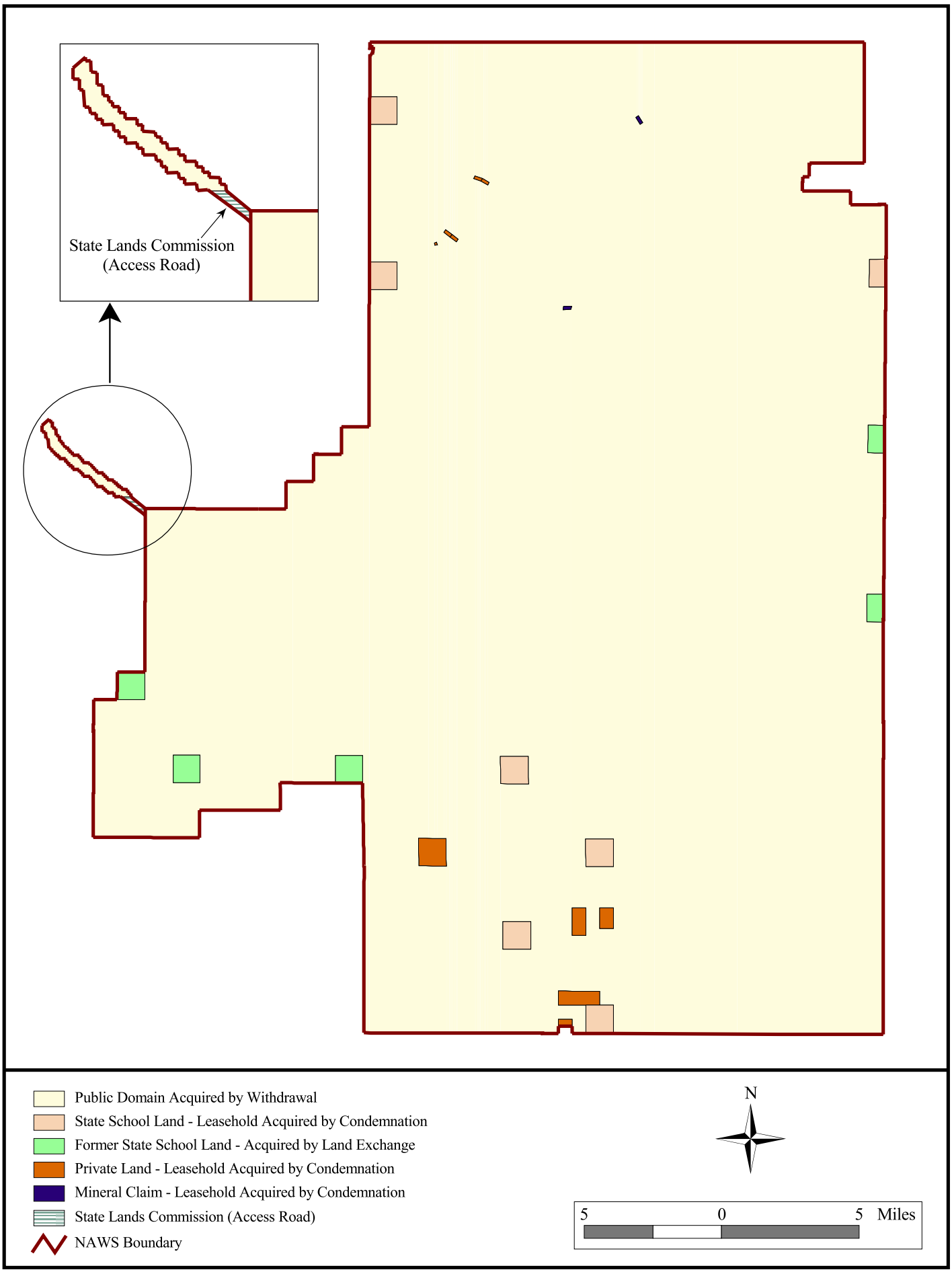


Figure 3.1-2 On-Station Land Ownership, South Range

Table 3.1-1 Lands Acquired by Lease, Easement, or Permit for Navy Use

Category	*Acres* [a]
Fee simple (owned by U.S. Navy)	*86,479*
Withdrawn from public domain (expiration 30 September 2014)	*1,023,777*
License/permit/agreement	*54*
Easement (purchase and/or condemnation) [b]	*16*
In-leased (from various sources)	*117*
Total Land Assets	***1,110,443***

[a] *Acreage calculations are based on legal descriptions contained in the CDPA (1994) and Recorded Title Reports (Navy 2001).*

[b] *The Station has granted 43 easements for access across portions of its land. Easements are granted for a variety of essential uses ranging from water pipelines and other utilities to the California Department of Transportation (Caltrans) rights-of-way along State Highway 178.*

Source: Miller 1998.

Range approach corridors, located south of the North Range, were established in 1983 to reduce risk to both people and property, and to protect flight activities from encroachment and uses that may adversely affect flight safety. The corridors primarily support aircraft approaches to targets on the George (G Range Approach Corridor) and Baker/Charlie (B/C Range Approach Corridor) ranges. Each corridor minimizes safety risks and noise levels to Ridgecrest residents and NAWS personnel that may result from flight operations. Land within the approach corridors either have been purchased by the Navy or are managed under agreements (e.g., rights-of-way). Any proposed new land use within these designated areas must be compatible with the existing use as an aircraft approach corridor.

3.1.3 On-Station Land Use

Land use at NAWS includes a variety of military activities throughout the range areas for high-hazard air warfare weapons systems RDT&E and training operations. Other military land use includes airfield operations, ordnance storage areas, laboratory and industrial areas, administrative and residential areas, and associated facilities and infrastructure. Military activities include air-to-air, air-to-surface, surface-to-air, and surface-to-surface testing and training operations. Other test and training capabilities include electronic warfare ranges, gun ranges, a radar cross-section range, high-speed test tracks, parachute testing areas, and munitions ordnance test facilities. Aircrew training and GTT activities also occur throughout the NAWS ranges. R&D operations generally occur within the laboratories located at Mainsite, while T&E operations typically take place on and over the land ranges. Aircraft operations are staged from Armitage Airfield. Support activities for the maintenance and operations of facilities and infrastructure are conducted throughout NAWS administered lands.

NAWS lands have also been used for a variety of nonmilitary uses, which include Native American religious and traditional uses; scientific research and educational projects; limited recreation opportunities; and commercial activities, such as geothermal exploration and development, utility easements, and cattle grazing.

3.1.4 Land Use Management Units

Because NAWS is over 1.1 million acres (445,156 hectares), land areas are divided into smaller units to facilitate operations planning and management. All land use management units (except Mainsite, Propulsion Laboratories, Main Magazines, and Armitage Airfield) are defined as active ranges per DoD Directive 4715.11, *Environmental and Explosives Safety Management on Department of Defense Active and Inactive Ranges Within the United States*. Also defined by their principal function and operational uses, the areas are generally separated into two principal

categories: those within the developed portions of the Station (Mainsite, Armitage Airfield, Main Magazines, and Propulsion Laboratories), and those that comprise the test and training areas of the North and South ranges (the two main categories are discussed in the sections below). The management units are shown in Figures 3.1-3 and 3.1-4, and their principal functions are listed in Table 3.1-2.

Table 3.1-2 Land Use Management Units

Management Unit	*Principal Function*
Mainsite	*Headquarters, most administrative and support functions, principal laboratories (Michelson, Thompson, and Lauritsen), and Missile Engagement Simulation Arena.*
Armitage Airfield	*Armitage Airfield (operational airfield), aircraft maintenance facilities, hangars, ordnance handling, and storage facilities.*
Main Magazines	*Magazine storage for ordnance.*
Propulsion Laboratories	*Research and development laboratories (CLPL and Salt Wells Propulsion Laboratory).*
Ordnance T&E	*Weapons test sites, ordnance test areas.*
Baker Range	*Weapons target sites, ordnance impact areas.*
Charlie Range	*Weapon target sites, ordnance impact areas, and high-speed track testing (Supersonic Naval Ordnance Research Track).*
Baker/Charlie Range Approach Corridor	*Aircraft approach corridor to Baker/Charlie ranges.*
Airport Lake	*Weapons target sites, ordnance impact areas, and ground troop training areas.*
George Range	*Weapons test and target sites, ordnance impact areas, Aircraft Survivability, and the Open Burn/Open Detonation facility.*
George Range Approach Corridor	*Aircraft approach corridor to George Range.*
Coso Range	*Weapons target sites, ordnance impact areas, aircrew training, and Junction Ranch test area that includes high-power microwave testing, Global Positioning System (GPS) jamming, and radar-cross-section.*
Coso Target Range	*Weapons testing, inert ordnance impact areas, target sites, aircrew training, and light-infantry ground troop training.*
Coso Geothermal	*Geothermal development generation of electricity (power plants), overflight for weapons testing, and safety/security buffer for weapons testing..*
Randsburg Wash	*Test range and laboratory for electronic combat systems, weapons testing, target sites, Charlie Airfield target, ordnance impact areas, aircrew training, and ground troop training.*
Mojave B North	*Weapons target sites, Wingate Airfield target, ordnance impact areas, aircrew training, and ground troop training.*
Mojave B South	*Operating areas supporting South Range testing, and aircrew and ground troop training.*
Superior Valley	*Aircrew training, weapons target sites, ordnance impact areas, and ground troop training.*

3.1.5 Developed Areas

3.1.5.1 Mainsite

Covering approximately 8 square miles (21 square kilometers) of the southern portion of North Range, Mainsite contains the Station's headquarters, principal laboratories, and most of the administrative and support functions. Mainsite is the largest developed area on-Station.

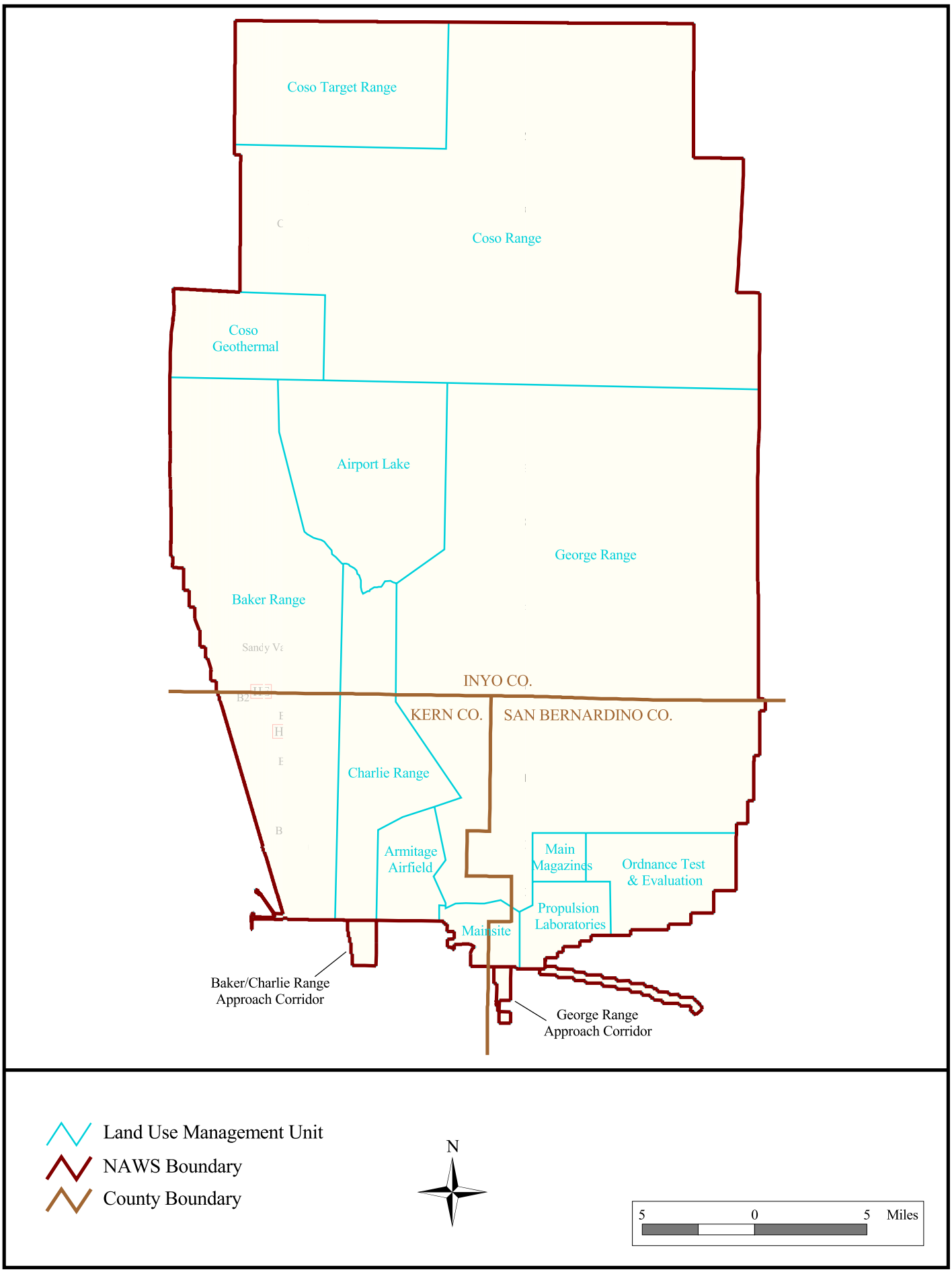


Figure 3.1-3 Land Use Management Units, North Range

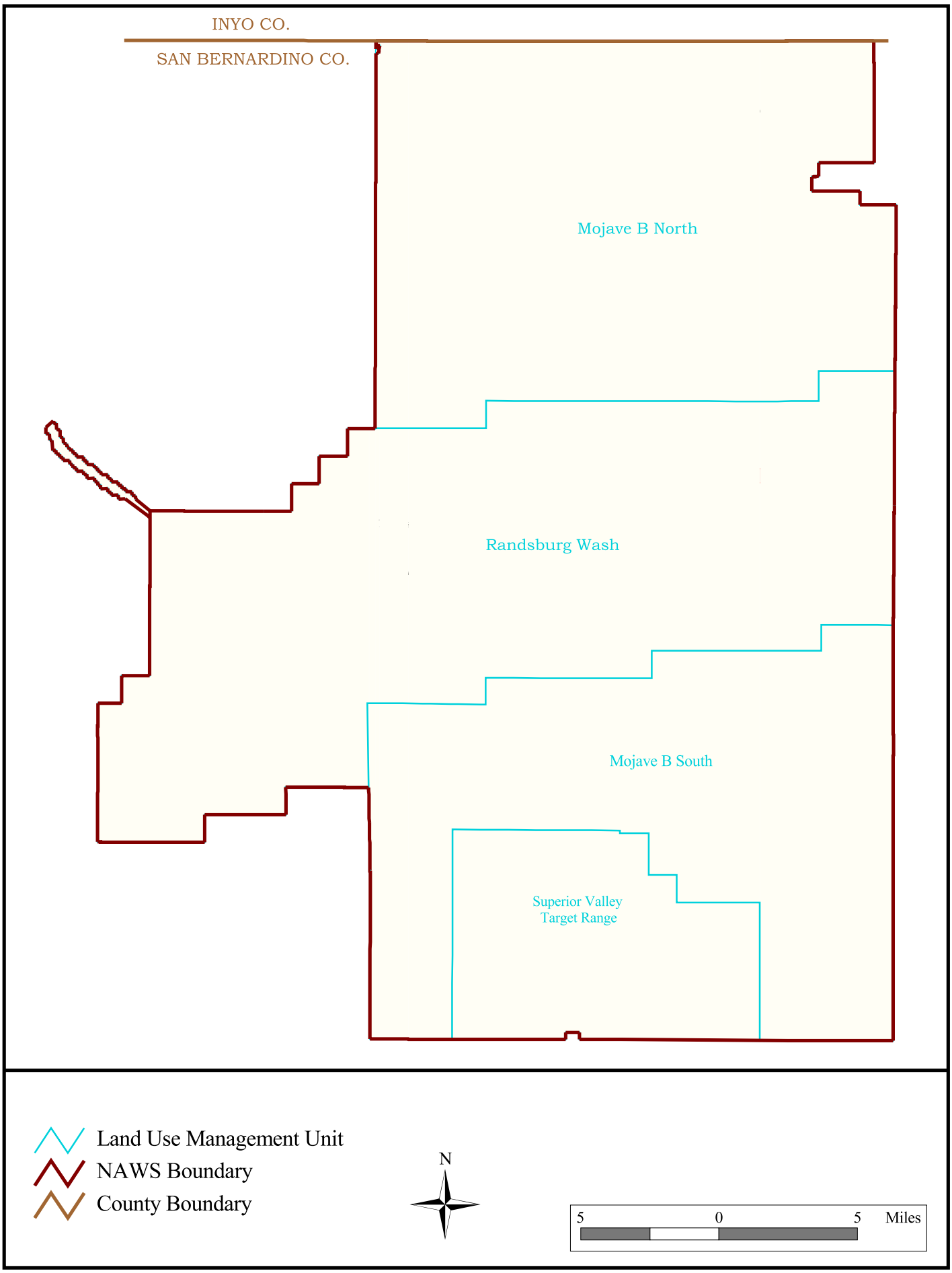


Figure 3.1-4 Land Use Management Units, South Range

3.1.5.2 Armitage Airfield

Armitage Airfield is northwest of Mainsite and covers 13 square miles (34 square kilometers). The only active airfield on NAWS, Armitage has three major runways and facilities for aircraft maintenance, hangars, ordnance handling and storage, ground support equipment maintenance, and RDT&E. Primary activities are aircraft maintenance and modification, laboratory support, aviation supply, ready magazine (explosives storage), and fuel storage. The Range Control Center (RCC) is also located in this area.

3.1.5.3 Main Magazines

Covering 5 square miles (13 square kilometers) on North Range, the Main Magazines are composed of ordnance storage, administrative facilities, and safety areas. The Magazines are used to receive, store, and distribute explosives that support RDT&E.

3.1.5.4 Propulsion Laboratories

The Propulsion Laboratories cover 12 square miles (31 square kilometers) in the southeast corner of North Range. The complex consists of two discrete areas–CLPL and SWPLs–each with more than 100 buildings and test facilities dedicated to RDT&E of propellants and explosives.

3.1.6 North Range Test and Training Areas

Although land management units show specific designated use areas, those units can be used singularly or in combination to meet the specific needs of a test or training mission.

3.1.6.1 Ordnance Test and Evaluation Area

The Ordnance T&E land management unit covers 24 square miles (62 square kilometers) in the southeast part of North Range. There are several test sites for ordnance test operations. Facilities are also available for evaluating weapon reaction to: (1) military hazards, such as aircraft fuel fires, bullet impacts, and drops (accidental displacement during transport); and (2) environmental factors such as temperature, humidity, vibration, and salt spray.

3.1.6.2 Baker Range

The Baker Range management unit covers 121 square miles (313 square kilometers) in the western portion of North Range. Baker is used primarily for T&E and training for air-to-surface weapon systems (i.e., rockets, bombs, guns), but also supports weapons system software validation, weapons ballistics, fuse functioning, and pilot proficiency in air-to-surface weapons delivery. Most bombs, rockets, and gunnery used on Baker Range are inert; however, high explosive (HE) ordnance can be dropped on B1-A and B-2 target areas.

3.1.6.3 Charlie Range

The Charlie Range management unit covers 42 square miles (109 square kilometers) in the southern part of North Range. Charlie is used for T&E and aircrew training for air-to-surface weapon systems, weapons system software validation, weapons ballistics, fuse functioning, and pilot proficiency in air-to-surface weapons delivery. Charlie Range is also used for unconventional tests (e.g., tethered balloon tests with sensors). The Supersonic Naval Ordnance Research Track (SNORT), a 4.1-mile (6.6-kilometer) heavy-duty track, and the Vehicle Barrier Track are also in this management unit.

3.1.6.4 Baker/Charlie Range Approach Corridor

The B/C Range Approach Corridor land use management unit is an off-site parcel of approximately 1,500 acres (607.03 hectares) located directly south of the Charlie Range Management Unit. The corridor is augmented by a right-of-way agreement for approximately 7,500 acres (7,500 hectares) of BLM lands and is used to provide a safe approach and departure for aircraft using the NAWS ranges and airfield.

3.1.6.5 Airport Lake Range

Covering 57 square miles (148 square kilometers) in the central portion of North Range, Airport Lake management unit is used for T&E and aircrew training for air-to-surface weapons systems. The Range is a large playa surrounded on three sides by hills and mountains, which is ideal for mobile land targets, such as remotely operated wheeled and tracked vehicles and equipment. Airport Lake is used for T&E of air-to-surface weapons systems (i.e., bombs, rockets, gunnery, guided weapons systems) requiring HE. GTT is also conducted on this range.

3.1.6.6 George Range

The George Range management unit covers 305 square miles (790 square kilometers) in the eastern part of North Range, in the northeastern portion of the Indian Wells Valley (IWV). George Range is NAWS's largest and most heavily instrumented test range. HE ordnance testing within the George Range is conducted at various impact areas and established warhead arenas. The Argus Mountains on the east and the Coso Mountains to the north act as natural buffers for safety and security and as ideal vantage points for locating test instrumentation. George Range supports the largest number of tests on the North Range, including T&E and training for air-to-surface, surface-to-air, surface-to-surface, and air-to-air guided missiles.

3.1.6.7 George Range Approach Corridor

The G Range Approach Corridor land use management unit is an off-site parcel of approximately 850 acres (344 hectares) located directly south of Mainsite. The corridor is augmented by a right-of-way agreement for approximately 2,500 acres (1,012 hectares) of BLM lands and is used to provide a safe approach and departure for aircraft using the NAWS ranges and airfield.

3.1.6.8 Coso Range

The Coso Range management unit covers 266 square miles (689 square kilometers) in the northern half of North Range. Besides providing T&E and aircrew training for air-to-surface weapons systems, Coso has specialized target areas located in the Coso and Argus mountainous region in its northeast corner. Target and test sites include Coles Flat, Wild Horse Mesa, Cactus Flats, Junction Ranch, and Darwin Wash. Because of their remote locations, many of these test areas are used for classified projects requiring an isolated and secure environment.

3.1.6.9 Coso Target Range

The CTR management unit covers 70 square miles (181 square kilometers) in the northwest corner of North Range. The Range provides realistic, tactical military targets and environments for T&E and aircrew training on air-to-surface weapon systems.

3.1.6.10 Coso Geothermal Land Management Unit

Covering 26 square miles (67 square kilometers) in the southwest corner of the Coso Range, this land use management unit has significant geothermal resources being used to generate electricity. Though the area is not

used as a weapons impact site, the Coso Geothermal Land Management Unit provides instrumentation sites for mission requirements and serves as a buffer for adjacent military operations.

3.1.7 South Range Test and Training Areas

Tactical test and training facilities, ground test ranges, and training—and a lack of development that could interfere with these activities—make South Range a prime location for weapons T&E. Key assets and instrumentation include numerous threat emitter systems, simulated targets, and Unmanned Aerial Vehicle (UAV) facilities.

3.1.7.1 Randsburg Wash

The Randsburg Wash management unit covers 282 square miles (730 square kilometers) in the middle of South Range. Randsburg Wash provides an open airspace test range and laboratory for engineering and T&E of electronic combat systems. These capabilities are used by developers, integrators, testers, and users of systems and technologies that have a role in countering or penetrating air defenses. More than 30 threat emitter systems are located throughout Randsburg Wash for T&E and aircrew training operations. GTT, gunline testing, and parachute testing and training are also conducted in this management unit.

3.1.7.2 Mojave B North

Mojave B North covers 238 square miles (616 square kilometers) at the north end of South Range. The management unit is used to test inert air-to-air gunnery, air-to-ground gunnery, ground-to-ground gunnery, rockets, and for small arms firing. Mojave B North provides a realistic, tactical military environment of threat emitters for attack and fighter aircrew training, and can also accommodate GTT.

3.1.7.3 Mojave B South

Mojave B South covers 180 square miles (466 square kilometers) in the southern section of South Range. Airspace above this management unit supports test activities in the Electronic Combat Range in Randsburg Wash and other testing in the South Range. Limited GTT activities are occasionally conducted in this area.

3.1.7.4 Superior Valley

Superior Valley covers 74 square miles (192 square kilometers) at the southern end of South Range. The Valley is used for aerial delivery of air-to-surface inert training ordnance. Ground troops may also be trained in this management unit.

3.1.8 Military Land Uses

Land uses within the management units are established to support the military operations or activities in each area. These operations fall into one of four categories: R&D, T&E, training, or support. Each category is described in the following sections. Figures 2-2 and 2-3 in Chapter 2 show the location of existing military land uses on NAWS North and South ranges, respectively.

3.1.8.1 Research and Development

Weapons R&D supports all phases of weapon systems development, from the earliest concept of a weapon to engineering and manufacturing, to Fleet use, and finally to the disposal of systems no longer needed by the military. The goal of weapons R&D is to explore the use of promising technology for the solution of the war-fighter needs.

At NAWS, research activities focus in the areas of weapons guidance and control, warheads, explosives, propellants, propulsion systems, airframes, and the basic chemistry and physics that support these areas. R&D activities generally take place in laboratories where basic and applied research is performed. NAWS laboratory facilities are primarily within the developed areas at Mainsite and in the Propulsion Laboratories areas. Seven main laboratories are situated between Mainsite and the Airfield: Michelson Laboratory, the Engineering Laboratory, Lauritsen Laboratory, Thompson Laboratories, Advanced Weapons Laboratories, and the Propulsion Laboratories Complex, at the southeast corner of the North Range, which is made up of the CLPLs and the SWPLs.

3.1.8.2 Test and Evaluation

Weapons T&E is a continuous process throughout the system's life cycle. Open-air ranges are used to evaluate the systems under natural operating conditions and, to the extent practicable, replicate realistic employment and operations scenarios. The North and South ranges can accommodate a wide variety of open-air test requirements.

Weapon systems and weapon components are tested and evaluated under realistic operating conditions in the air and on the ground ranges at NAWS. Target areas are designated for delivering ordnance, such as bullets, missiles, rockets, and bombs, and may include the use of a physical object, such as a billboard, a tank, or an electronic target. Test sites where weapons are tested under simulated conditions may include testing to determine how weapons would react to artillery fire, weather conditions, or other scenarios. Additional T&E capabilities include the following:

- High-speed test tracks, which aid in testing weapons at operational speeds.
- Testing of weapons-related systems, such as parachutes.
- Environmental/safety test facilities, where tests are performed to evaluate a weapon or weapon system's reaction to atmospheric elements, such as vibration, impact, pressure, and extreme temperatures.
- Nondestructive test facilities, such as large x-ray facilities.

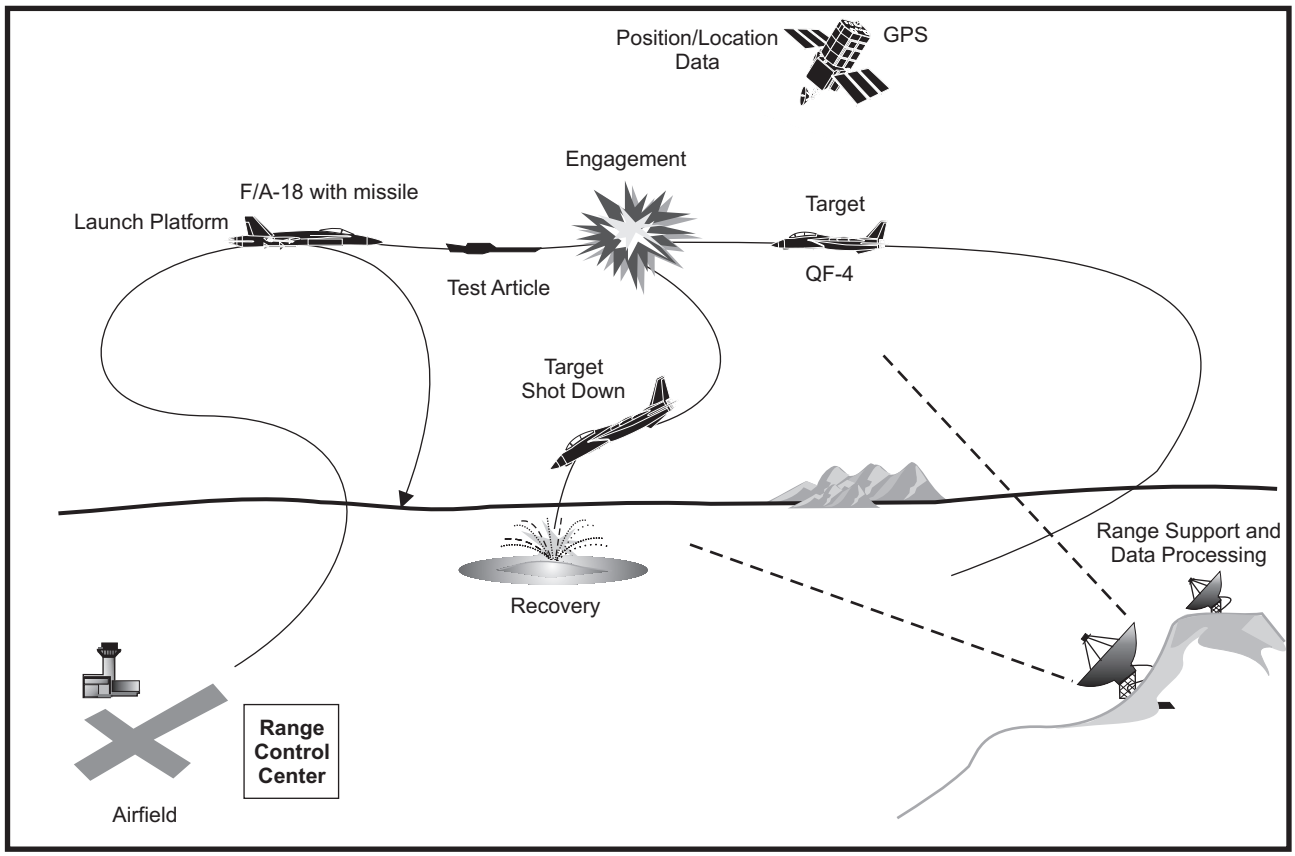
<u>Air Tests</u>

Air weapons are tested at NAWS primarily on the North Range. Air tests include air-to-air and air-to-surface operations. Air-to-air operations generally employ aircraft, a weapon system, a target, countermeasure devices, such as flares or chaff, instrumentation sites, and range support facilities. Air test operations can also employ UAVs and/or target drones. Air-to-air testing assesses and evaluates weapons and weapon systems and the integration of weapon systems with the aircraft. At NAWS, air-to-air testing occurs primarily at George Range, with other operational areas providing maneuver space and primary buffer functions.

Air-to-surface testing assesses and evaluates weapon systems, the integration of air-to-surface weapons or weapon systems to the aircraft, warhead effectiveness, and weapon systems and/or aircraft software and hardware modifications or upgrades. At NAWS, air-to-surface testing occurs primarily at George Range, Charlie Range, Airport Lake, Baker Range, and Coso Range. Typical air test scenarios are shown in Figure 3.1-5.

<u>Surface Tests</u>

Surface tests take place on the North and South ranges. These tests encompass surface-to-air, surface-to-surface, and ground tests and may involve missile launching, gun and artillery firing, and mass detonation testing of energetic materials (bombs and explosives). North Range surface tests are conducted primarily on George Range, at the high-speed test tracks, aircraft survivability facilities, and other ordnance T&E facilities. South Range surface tests occur primarily in the Randsburg Wash area and include the testing of electronic combat systems, threat emitters, light assault vehicles, surface-launched missiles, and large-caliber gun ammunition fuse testing. Typical surface test scenarios are shown in Figure 3.1-6.



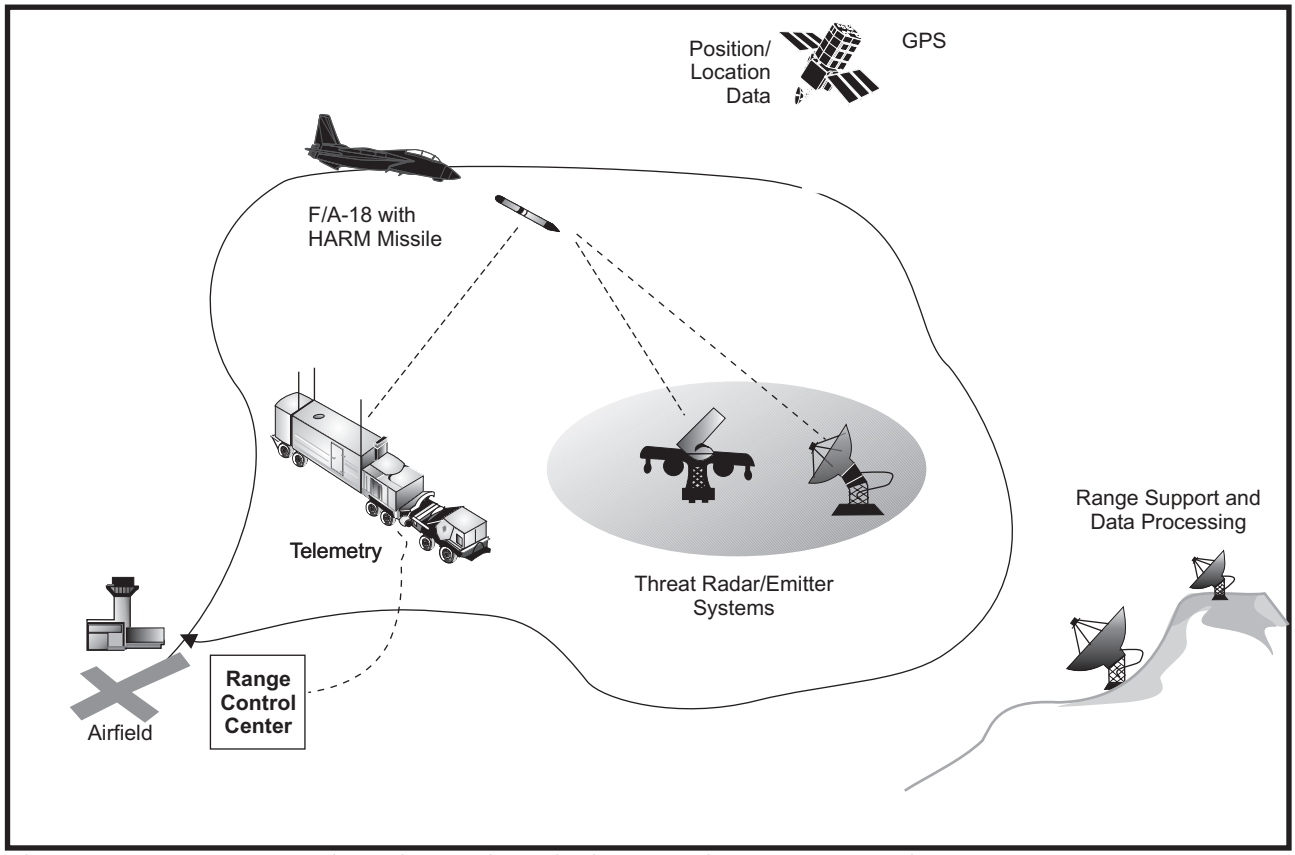


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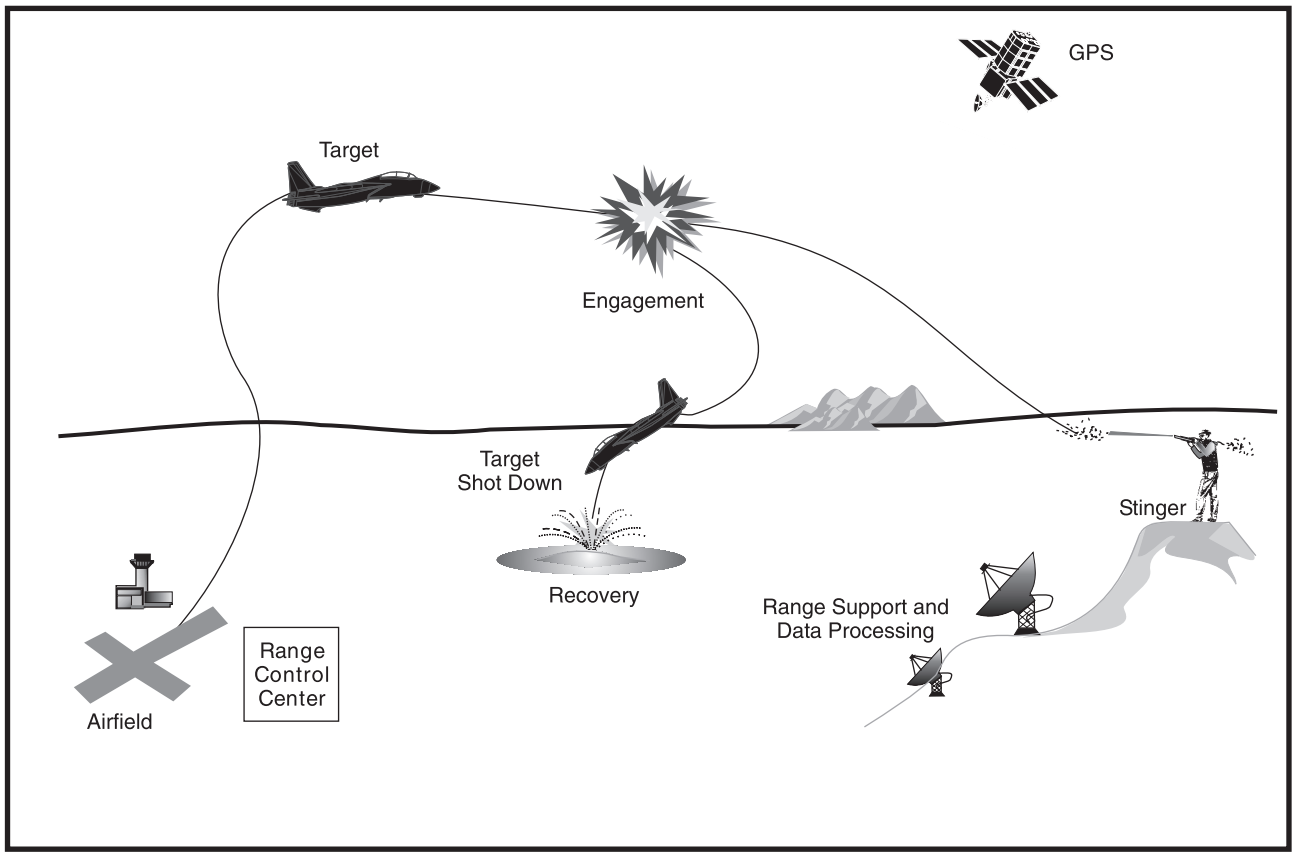
Figure 3.1-5 Representative Air-to-Air and Air-to-Surface Test Scenario



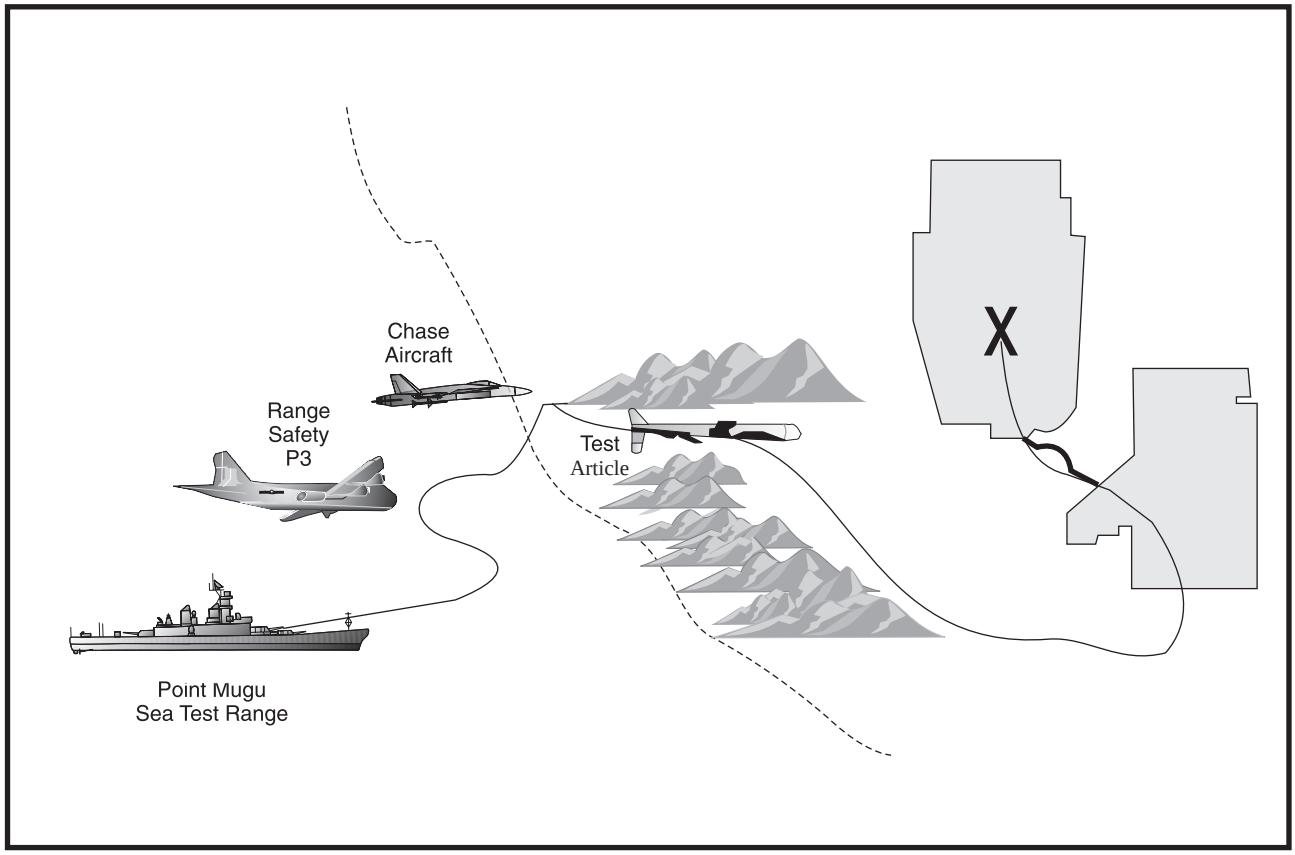


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Figure 3.1-6 Representative Surface-to-Air and Surface-to-Surface Test Scenario

3.1.8.3 Training

NAWS also provides facilities and support for aircrew and ground-based training activities by military units from all branches of the DoD. These activities are accommodated on a noninterference basis with the primary RDT&E mission. The varied terrain and environmental conditions throughout the North and South ranges support training in air-to-air and air-to-surface combat skills, including parachute systems training. GTT is also an element of NAWS operations using North Range and South Range target and test areas, road network, and facility sites.

Aircrew Training

Aircrew training occurs over both the North and South ranges. On the North Range, aircrew training takes place over the Coso Military Target Range, Baker Range, Charlie Range, George Range, and Airport Lake. Aircrew training in electronic combat over the South Range uses impact targets at Charlie Airfield in Randsburg Wash, Wingate Airfield in Mojave B North, and the Superior Valley Range.

The Superior Valley Tactical Training Range is the heaviest used area on-Station for tactical training with air-to-surface weapon systems for Fleet squadrons. This range is used primarily to deliver inert ordnance, including practice bombs, rockets, flare, chaff cartridges, and gun projectiles.

Ground Troop Training

GTT activities are conducted on both the North and South ranges. On the North Range, GTT occurs at the Airport Lake/Coso Basin area, with very limited use of Baker, Charlie, and George ranges. On the South Range, training occurs in portions of Mojave B North, Randsburg Wash, Mojave B South, and Superior Valley Tactical Training Range.

The two types of GTT activities that have routinely been conducted on the ranges are described as Type 1 and Type 2 activities. Type 1 training activities include the use of foot soldiers only (light-infantry), with no mechanized surface vehicles. Type 1 activities may include Special Forces operations, forward observation and reconnaissance, and forward air controllers training, and other types of small team tactics. Type 2 training includes foot soldiers using associated wheeled support and tactical vehicles on existing roadways and disturbed areas only.

Both of these types of GTT activities can involve aircraft insertion of troops for realistic ground warfare training, reconnaissance training, and small- and large-caliber weapons firing. Because Type 1 GTT uses no mechanized surface vehicles, these activities may occur in both disturbed and undisturbed areas throughout the ranges. Type 2 GTT is limited to existing target and test areas and other areas that have been previously disturbed. All vehicles are limited to existing roads and previously disturbed areas.

Parachute Testing and Training

Parachute drop zones are located on both the North and South ranges. The drop zone in George Range, which is on the North Range, accommodates related RDT&E operations and parachute crew training. The drop zone in Randsburg Wash on the South Range is typically used to support parachute proficiency training.

3.1.8.4 Support Activities

Most of the lands currently used for military support (administrative buildings, public works, family housing, community center, and other support facilities) are within developed areas at Mainsite and the other developed areas in the southern portion of North Range. Administrative offices, industrial buildings, laboratories, and storage areas are primarily located at Mainsite, Armitage Airfield, and the Propulsion Laboratories area. Mainsite facilities include the headquarters, administrative offices, Public Works Department compound, industrial buildings, and

testing/research buildings. Operations, maintenance, medical, administration, housing, recreation, supply, public schools, fire and police stations, childcare center, religious facilities, and the exchange/commissary facilities are also located at Mainsite.

Facilities at Armitage Airfield include three runways, aircraft maintenance facilities, aircraft fuel storage facilities, ordnance handling and storage facilities, ground support equipment maintenance facilities, a fire station, and aviation supply warehouses. The Propulsion Laboratories consist of building and test facilities dedicated to RDT&E of propellants and explosives. A few administrative facilities are also at the Range Operations Center in Randsburg Wash, at the SNORT facility on Charlie Range, and at Junction Ranch on the Coso Range. Other facilities and infrastructure are located throughout the North and South ranges. Facilities occupy approximately 8,912 acres (3,067 hectares), or 1.5 percent of the North Range, and 527 acres (213 hectares), or 0.1 percent of the South Range.

3.1.8.5 Ordnance Use

Since many of the activities at NAWS involve the testing and use of explosives (live ordnance), extensive safety programs continue to be implemented to ensure the safety of personnel and property and to minimize the risk of using explosives and their components. Safety programs and operational procedures are employed through all phases of ordnance use, including the storage, transportation, loading for test or training, detonation, and cleanup of range test and target sites. Ordnance is generally classified as live or inert. Live ordnance generally contains a HE warhead. Inert ordnance does not have a live warhead but may contain a fuze sensor, spotting charge, or other energetic materials that may pose a safety hazard. At NAWS approximately 80 percent of the ordnance used is classified as inert. HE ordnance use on-Station (approximately 20 percent), occurs primarily at the Airport Lake Target area; however, there are other target and test sites currently authorized for HE use throughout the North and South ranges. Table 3.1-3 provides a summary of contemporary ordnance use at target and test sites and includes a representative baseline operational year modeled for the purposes of this EIS.

Table 3.1-3. Summary of Ordnance Used per Fiscal Year for Target and Test Sites

Ordnance Type	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*
Rockets	*184*	*195*	*167*	*33*	*143*	*91*	*108*
Gun Ammunition							
Small Arms	*298*		*1,000*	*600*	*200*	*120*	*0*
20-40 mm	*40,907*	*30,879*	*84,642*	*65,819*	*23,944*	*39,887*	*27,722*
> 40 mm	*807*	*2,553*	*3,167*	*1,364*	*915*	*934*	*415*
Missiles	*160*	*79*	*77*	*79*	*56*	*58*	*102*
Bombs							
Guided bombs	*19*	*35*	*15*	*30*	*39*	*94*	*95*
Cluster bombs	*12*	*92*	*108*	*47*	*95*	*326*	*183*
Practice bombs	*3,149*	*4,313*	*5,140*	*2,901*	*3,111*	*2,575*	*1,443*
Other bombs	*358*	*334*	*742*	*509*	*951*	*600*	*454*
Miscellaneous Items							
Chaff (in pounds)	*NA*	*15*	*NA*	*17*	*NA*	*NA*	*NA*
Flares	*4,132*	*3,366*	*1,108*	*302*	*1,535*	*2,552*	*850*

NA = Not available.
Source: NAWS 2001.

Historic Ordnance Use

NAWS land ranges played a critical role in helping the U.S. meet the challenges and emergencies of World War II, the Korean Conflict, and the Vietnam War. The testing and training that occurred on NAWS lands during those early years were not restricted to any particular target site and resulted in unknown quantities of ordnance, both live and inert, being released throughout the Station. As a result of this type of use and as an ongoing safety consideration, all remote areas of NAWS are considered potentially contaminated to some degree by UXO see Appendix H).

Contemporary Ordnance Use

Today ordnance use on the ranges is carefully controlled and monitored. It is not uncommon for a large quantity of a particular type of ordnance to be used one year and then for the tempo to drop dramatically the following year. The type and tempo of ordnance use at NAWS fluctuates from year to year based on customer needs (which are driven by operational needs that evolve in response to world events). Inert and HE ordnance are used to meet defined mission requirements and are allocated to specific target and test sites. Authorized ordnance usage on NAWS ranges is described in Appendix C by ordnance type and target location.

Ordnance cleanup and disposal for range test and training activities are a standardized part of NAWS range operations. Current policies and practices minimize further ordnance contamination. Explosives use must meet established criteria, and debris from tests are removed from the ranges and test sites to the greatest extent possible. Explosive ordnance disposal (EOD) crews are employed to perform this function, and customers are assessed a cleanup fee as part of the test cost. UXO and related debris from previous test and training activities over the years are recovered, as funding permits.

3.1.9 On-Station Nonmilitary Land Uses

Authorized nonmilitary land uses at NAWS include Native American traditional and religious uses, geothermal production, limited recreational opportunities, and scientific research and education projects. Most activities are accommodated on a case-by-case basis so they do not interfere with military missions.

3.1.9.1 Native American Access

Native American access to NAWS lands is accommodated under an existing MOA signed in 1979. This MOA allows visitation to the Coso Hot Springs and the Prayer Site areas, which are located in the Coso Geothermal land use management unit. Both locations are areas of interest for traditional and religious purposes and are recognized as important Native American traditional sacred sites. The Hot Springs area had been developed and used as a resort by other groups in the past, but the buildings and facilities have been abandoned. In 1978, the site was listed on the National Register of Historic Places (NRHP) as a multi-component historic and Native American resource. In 1979, a Navy MOA granted access to the Hot Springs by the Owens Valley Paiute-Shoshones Band and the Kern Valley Native American Community for ceremonial activities eight times per year (NAWC 1979).

3.1.9.2 Geothermal

The Coso Known Geothermal Resource Area (KGRA) is located in the Coso Geothermal Land Management Unit and encompasses an approximate 15- by 16-mile (24 - by 26-kilometer) area extending across a portion of the North Range and onto adjacent BLM land. Four power plants occupy the land area; two on BLM lease lands (BLM East and BLM West) and two on Navy fee-owned land (Navy One and Navy Two). All four plants are operated by the Coso Operation Company and sell power to Southern California Edison (SCE) (Newton 1996).

3.1.9.3 Recreation

Public access for recreational programs is conducted in accordance with Station objectives to promote and continue environmental resource conservation. Camping at Birchum Springs, hiking, photography, and equestrian use across the G corridor are all considered on a case-by-case basis.

ORVs are prohibited except to cross the Randsburg Wash Access Road during BLM scheduled events. Public use of the golf course and gymnasium are permitted. Under NAWS guidance, tours to the Coso Rock Art in Little Petroglyph Canyon are conducted by the Maturango Museum and other groups. The Audubon Society's bird count is allowed as an annual event at NAWS.

3.1.9.4 Research and Education

NAWS considers requests for access to the ranges for educational visits and field research from educational and private researchers. The visits are usually on weekends and only allowed when they do not interfere with military operations. Information gathered during research projects is shared with the EPO to supplement the Station's database.

3.1.10 Off-Station Land Ownership

Most of NAWS is surrounded by federally managed lands, including the Army's NTC at Fort Irwin and lands managed by the BLM and National Park Service (NPS). Small parcels of state-managed land and private lands are also located in the surrounding area.

3.1.11 Off-Station Land Use

The northern two-thirds of the North Range are in Inyo County, and the southwestern and southeastern portions of North Range are in Kern and San Bernardino counties, respectively. The South Range is entirely in San Bernardino County. NAWS is located in a predominately rural area and is generally surrounded by wilderness, parks, forests, open space, and conservation areas. The communities of Ridgecrest and Inyokern are adjacent to the Station on the southern boundary of the North Range. The communities of Trona and Darwin are within 5 miles (8 kilometers) of the Station's east and northeast boundaries respectively. The urban development land surrounding NAWS provides housing, retail and light industrial services, and recreational opportunities to the local community. Ridgecrest is the only incorporated city in the NAWS region, although there are several other incorporated communities in the vicinity (shown in Figures 3.1-7 and 3.1-8).

Public lands managed by the BLM and the NPS surround the remainder of the NAWS North Range boundary and the north, west and south boundaries of the South Range. The Army's NTC at Fort Irwin is located adjacent to the east boundary of the South Range, as are lands managed for the NASA Goldstone Complex. The inactive Cuddeback Lake Gunnery Range (Air Force) is located within 5 miles (8 kilometers) of the south boundary of the South Range.

3.1.11.1 Inyo County

Adjacent land use in Inyo County includes federal wilderness, open space and conservation, undeveloped and non-wilderness, and small, widely disbursed populated areas. The Inyo County General Plan identifies land use designations for all land in the county (Inyo County 2001). The County general plan was formally updated in November 2001. No land uses were changed during the plan's revision, and established land use patterns are not expected to change in the foreseeable future. The unincorporated residential community of Darwin was originally an 1875 mining camp and is located directly north of the North Range, approximately 2.5 miles (4 kilometers) from the Station boundary. The unincorporated communities of Homewood Canyon and Valley Wells are located east of North Range.

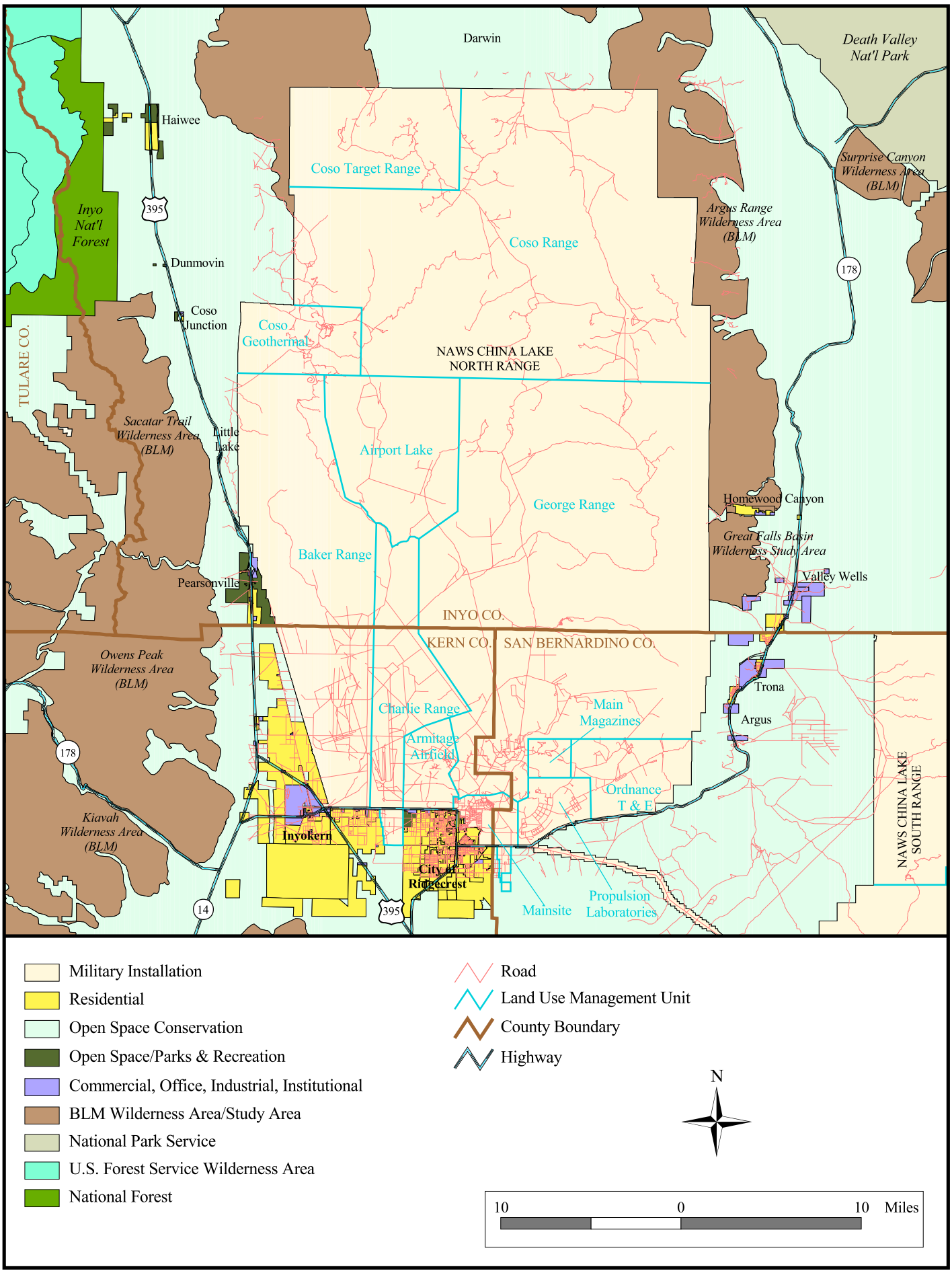

Figure 3.1-7 Off-Station Land Use, North Range

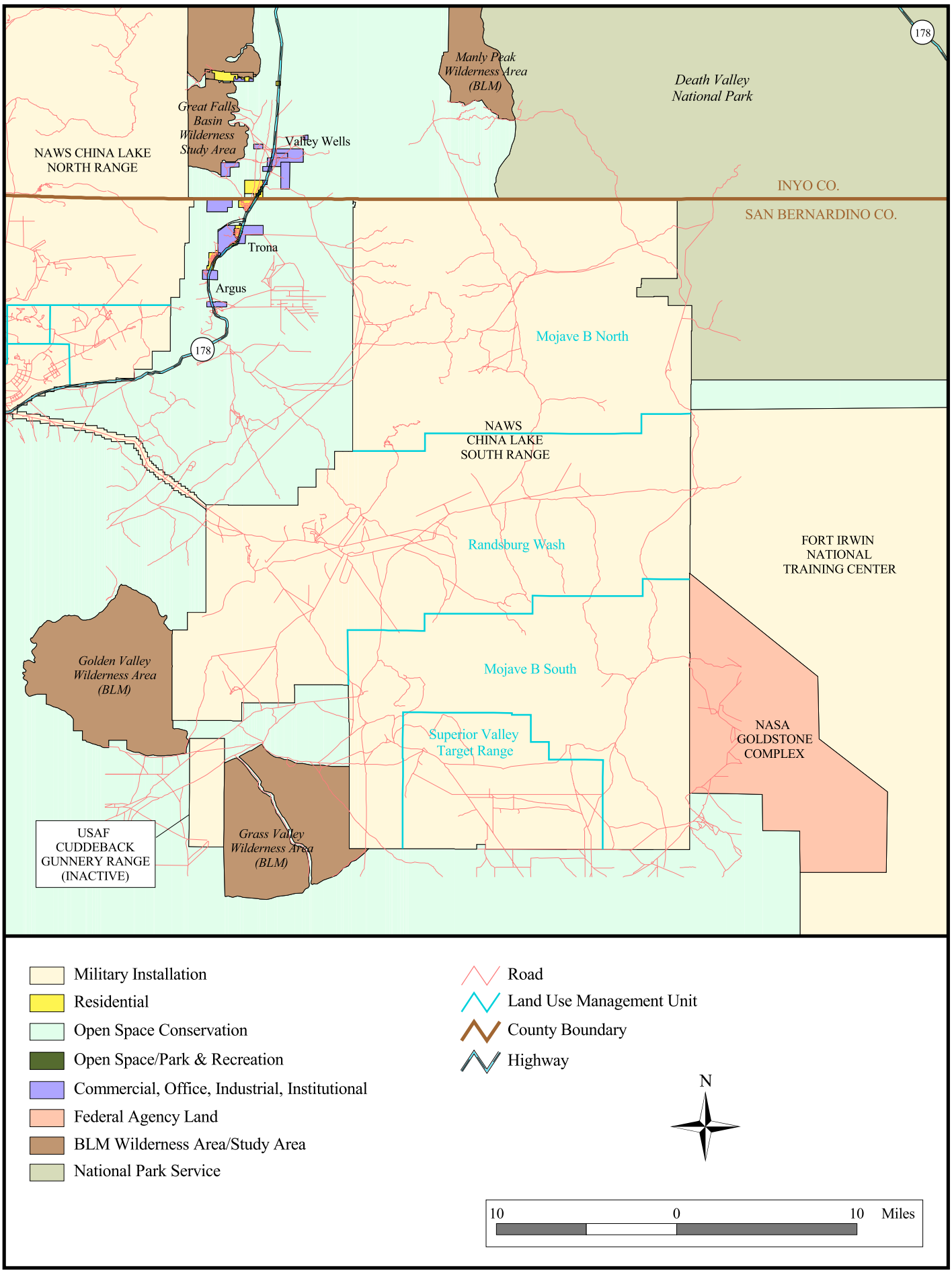

Figure 3.1-8 Off-Station Land Use, South Range

There are six unincorporated rural communities west of North Range: Pearsonville, Little Lake, Coso Junction, Dunmovin, Haiwee, and Olancha. These communities are primarily residential areas surrounded by large expanses of open space, with some highway commercial use at Coso Junction. Coso Junction has a public land use designation because of its proximity to, and association with, a Caltrans rest area. Little Lake and Pearsonville are within 1 mile (1.6 kilometers) of the west boundary of the North Range. Little Lake is a rural community with a commercial land use designation. Pearsonville is a rural community at the Inyo/Kern County boundary and has industrial, commercial and residential land use designations. All these communities lie within 10 miles (16 kilometers) of the NAWS boundary. Haiwee Reservoirs, which are part of the Los Angeles Department of Water and Power aqueduct system, are west of the Station.

3.1.11.2 Kern County

The southwest portion of the North Range, which includes Mainsite and Armitage Airfield, is in Kern County. The Kern County General Plan (Kern County 1994) identifies land use guidelines and designations for all land in the county, and contains a Desert Region section for land use management in the eastern portion of the county. Eastern Kern County is a rural area made up predominately of federal lands intermixed with private lands.

Ridgecrest and Inyokern are located in the Desert Region of Kern County and are contiguous with the southern boundary of the North Range and southwest of the North Range, respectively. Inyokern's economic base consists primarily of service-oriented establishments located along State Highway 178. Most of Inyokern is residential, with many residents employed at NAWS or businesses in Ridgecrest. Approximately 22 percent of Inyokern's land area is designated for industrial use (U.S. Navy 1997a). Most other Kern County land adjacent to NAWS is occupied by low-density residential use or open space. Land uses in the eastern portion of Kern County are expected to remain the same or similar to established use patterns in future years.

3.1.11.3 San Bernardino County

The southeast region of North Range and all of South Range are in the Mountain-Desert Planning Area of San Bernardino County. The San Bernardino County General Plan (San Bernadino County 2000) identifies land use guidelines and designations for all land in the county. The northern edge of South Range is contiguous with the boundary between San Bernardino and Inyo Counties. More than half of the eastern edge of the South Range borders the Army's NTC, Fort Irwin, and the remaining northeastern corner abuts Death Valley National Park.

The areas of San Bernardino County immediately to the east and south of NAWS are managed by BLM and are primarily designated for open space and conservation use. NAWS and BLM coordinate on issues regarding compliance with the CDCAP to ensure compatible land use for the area.

The unincorporated community of Trona is less than 3 miles (4.8 kilometers) east of the southeast boundary of North Range, and located between the North and South ranges. The community accommodates residential, commercial, and industrial land uses. Trona's largest employer, IMC Chemicals, Inc., is a mineral processing plant that has been in operation in the area since the 1870s (U.S. Navy 1997a). Established land use patterns in the vicinity of NAWS are not expected to change in the foreseeable future.

3.1.11.4 City of Ridgecrest

With a population of about 28,000, Ridgecrest is the only incorporated city near NAWS. The city is a mixture of residential, commercial, institutional, industrial, and recreational land uses. The development philosophy reflected in the Ridgecrest General Plan (City of Ridgecrest 1994) is for the city to continue their role as a support community for NAWS. Ridgecrest provides housing, shopping, recreation, and other services and facilities for NAWS and NAWCWD personnel, contractors, and their dependents. Land uses in the proximity of NAWS include commercial

and office, industrial, and medium- and high-density residential areas. Established land use patterns in the vicinity of NAWS are not expected to change in the foreseeable future.

3.1.11.5 Bureau of Land Management Resource Areas

The BLM-administered land surrounding NAWS is part of the Ridgecrest Resource Area and managed by the Ridgecrest Field Office of BLM's California Desert District. Under the FLPMA, the land is managed for multiple uses including grazing, mining, wilderness, and recreation. Grazing includes yearly and intermittent allotments for cattle and sheep. Mining sand, gravel, gold, and trona (a mineral consisting of hydrous acid sodium carbonate) has been a historic use throughout the area. Recreational use includes hunting and target shooting, camping, sightseeing, rockhounding and hobby prospecting, hiking and backpacking, rock climbing, picnicking, skydiving and hang gliding, nature activities, and ORV use. Uses permitted within particular tracts of BLM-managed land are designated by the CDCAP land use classifications. In accordance with CDCAP guidelines, BLM also exchanges federal land for private land when it results in greater compatibility with existing and proposed uses and plans.

3.1.11.6 BLM Wilderness Areas

The CDPA designated 69 individual study areas covering 3.6 million acres (1,457,000 hectares) as wilderness within the eastern Mojave Desert. BLM's *Wilderness Areas Maps and Information Guide* (DOI 1995) shows 10 wilderness areas around NAWS, all of which may include other federal, state, and private land. Table 3.1-4 lists the wilderness areas and other pertinent data.

Table 3.1-4 Bureau of Land Management Wilderness Areas Near NAWS

Area	*Acres (hectares)*	*Nominating Resource*
Argus Range	*74,890 (30,308)*	*Biological, Geological, Cultural*
Golden Valley	*37,700 (15,257)*	*Biological*
Grass Valley	*31,695 (12,827)*	*Biological*
Surprise Canyon	*29,180 (11,809)*	*Biological, Cultural*
Coso Range	*50,520 (20,445)*	*Biological, Geological*
Sacatar Trail	*51,900 (21,004)*	*Biological, Cultural*
Owens Peak	*74,640 (30,207)*	*Biological, Cultural*
Kiavah	*88,290 (35,731)*	*Biological*
Manly Peak	*16,105 (6,518)*	*Biological, Cultural, Geological*
Great Falls Basin Study Area	*8,485 (3,434)*	*Biological*

Source: U.S. Department of Interior 1995.

3.1.11.7 Death Valley National Park

The NPS has jurisdiction over Death Valley National Park, which is directly north and east of NAWS. CDPA realigned the park's boundary and changed its status from National Monument to National Park. The boundary is now contiguous with the northeast boundary of the South Range. The park encompasses 3.2 million acres (1,295,040 hectares; U.S. Navy 1997a).

3.1.11.8 National Forests

The U.S. Forest Service (USFS) has jurisdiction over Inyo National Forest, located approximately 8 miles (13 kilometers) west of the North Range. Management of national forest land is for sustained yield and multiple uses including logging, mining, grazing, and recreation such as fishing, camping, and hunting (U.S. Navy 1997a).

3.1.11.9 Other Military Land

In 1981, Fort Irwin became the Army's NTC and is the Army's principal training facility for armor maneuver training. NTC's training operations simulate full-scale air and land combat situations on more than 600,000 acres (242,820 hectares) of land that is adjacent to the eastern boundary of South Range (U.S. Navy 1997a). The Cuddeback Gunnery Range, located west of Mojave B South in South Range, is deactivated (U.S. Navy 1997a).

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3.2
Noise

3.2 NOISE

Noise is any undesirable sound that interferes with hearing or speech, is intense enough to cause damage, or is generally annoying. At NAWS the primary noise source is from aircraft operations. This section describes current noise conditions including measurement and interpretation, existing conditions, and regulatory considerations.

3.2.1 Noise Measurement

Measurement and the human perception of sound involve two basic physical characteristics; intensity (volume) and frequency (pitch). Because of the physical characteristics associated with noise transmission and reception, noise levels are measured on a logarithmic scale. A decibel (dB) change equates to a change in sound energy, not to sound loudness. For example, a 3-dB change represents a doubling in sound energy, but not a doubling in loudness. Because of how the human auditory system is structured, a 10-dB increase in noise is necessary to perceive a doubling of noise. A 1 to 2 dB change in noise is not generally perceptible to humans. Noise levels decrease as the distance to the noise source increases (e.g., an average industrial facility noise level will decrease at approximately 6 dB per doubling of distance from that facility).

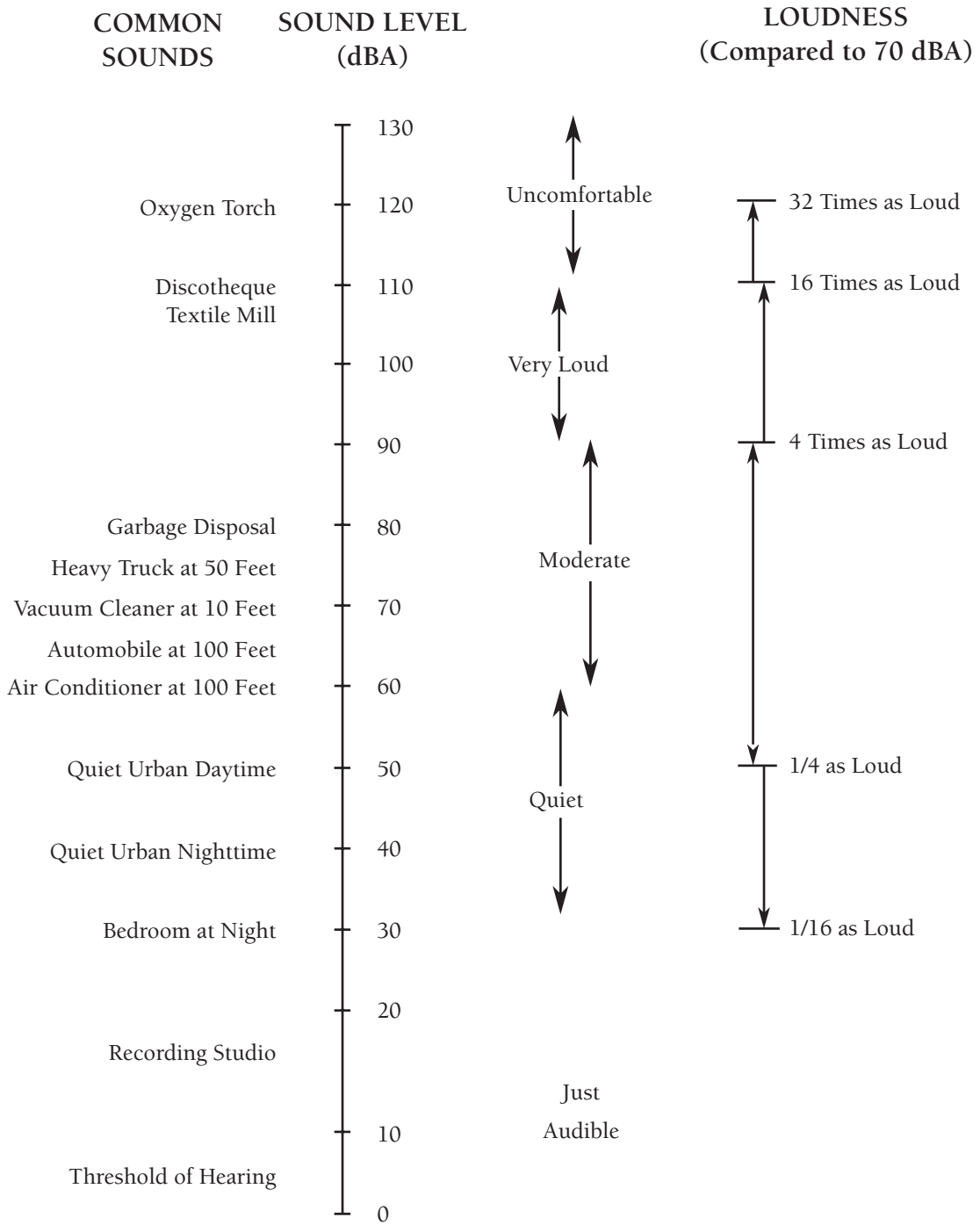
Sound frequency is the number of times per second air vibrates or oscillates. Examples of low-frequency sounds are rumbles or roars, while sirens or screeches would be high-frequency sounds. Frequency is measured as hertz, and equates to the number of cycles per second. Humans are most sensitive to frequencies between 800 and 8,000 hertz and least sensitive to frequencies below 400 hertz and above 12,500 hertz.

Adding the dB ratings for separate noise sources does not result in an accurate dB level of the combination of these sources. Conversely, the same holds true when subtracting a single dB level from a combination of noise sources. To determine an accurate measure, dB values must be converted into pressure or energy equivalents before being added, and then converted back into a composite dB rating. For example, two noises producing equal dB at a given location will produce a composite noise level 3 dBs greater than either sound alone. The minimum change in sound level that the average human ear can detect is about 3 dBs.

3.2.1.1 Frequency Adjustment Scales

Most sounds are comprised of a broad range of frequencies. Because the human ear is not equally sensitive to all frequencies, numerous weighting schemes have been used to develop dB scales that approximate the way the ear responds to noise levels. The “A-weighted” decibel scale (dBA) is the most widely used for characterizing community noise. The dBA significantly reduces the measured level of low-frequency sounds while slightly increasing the measured level of some high-frequency sounds. Figure 3.2-1 shows typical dBA levels for a variety of noise sources.

Unweighted dB measurements, peak overpressure, and the “C-weighted” decibel scale (dBC) are often used to characterize low-frequency sounds, such as blast noise or sonic booms. High-intensity, low-frequency sounds can induce vibrations in buildings or other structures. The dBC scale makes only minor reductions to the measured pressure level for low-frequency components of a sound while making slightly greater reductions to high-frequency components than does the dBA scale. Peak overpressure and unweighted dB measurements make no adjustments to the measured pressure fluctuations.



Source: Harris 1979.

Figure 3.2-1
Examples of Typical Sound Levels
in the Environment

3.2.1.2 Averaged Sound Levels

Varying noise levels are often described in terms of the equivalent constant dB level. Equivalent sound levels (Leq) are used to develop single-value descriptions of average noise exposure over various periods of time. Such average noise exposure ratings often include additional weighting factors for potential annoyance due to time of day or other considerations. The Leq data used for these average noise exposure descriptors are generally based on dBA sound level measurements.

Average noise exposure over 24 hours is often presented as a day/night average sound level (Ldn) or as a community noise equivalent level (CNEL). Ldn values are calculated from hourly Leq values, with the Leq values for nighttime (10 p.m. to 7 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime noise. CNEL values are very similar to Ldn values but include a 5-dB annoyance adjustment for evening (7 p.m. to 10 p.m.) Leq values in addition to the 10-dB adjustment for nighttime Leq values. Unless specifically noted otherwise, Ldn and CNEL values are assumed to be dBA measurements. Because CNEL and Ldn values for the same noise condition seldom differ by more than 1 dB, these values are often used interchangeably when noise level criteria and standards are interpreted.

3.2.1.3 Sound Exposure Levels

Individual, single noise events are described in terms of the Sound Exposure Level (SEL) in units of dB. The SEL measurement provides a means of describing a single, time varying noise event. It is useful for quantifying events such as an aircraft overflight, which includes the approach when noise levels are increasing, the instant when the aircraft is directly overhead with maximum noise level, and the period of time while the aircraft moves away with decreasing noise levels. SEL is a measure of the physical energy of a noise event, taking into account both intensity (loudness) and duration. SEL is usually determined on an A-weighted basis, and is defined as the constant sound level that provides the same amount of acoustic exposure in one second as the actual time-varying level for the exposure duration. It can also be expressed as the one-second averaged Leq. SEL measurements typically are higher than single peak measurements, because the noise energy is compressed into a one second time period. Because averaged sound levels (e.g., CNEL values) do not provide the best representation of what might be experienced from a single supersonic aircraft overflight, SEL measures are presented in this EIS to provide a conservative description of sound levels resulting from supersonic flight operations.

3.2.2 Current Management Situation

Various federal, state, and local agencies have developed guidelines for evaluating land use compatibility under different noise level ranges. Residential, educational, religious, and health care land uses are generally recognized as being noise-sensitive, whereas office, commercial, and industrial uses usually are not. Most on-Station land uses are not noise-sensitive. On-Station residential housing and schools are the principal noise-sensitive land uses at NAWS. (see Figures 3.1-7 and 3.1-8 in the Land Use section for off-Station land use patterns.) Off-Station noise sensitive areas include schools, medical facilities, residential areas, and DOI wilderness areas.

NAWS efforts to minimize noise associated with airfield flight operations at China Lake are addressed through the Navy's AICUZ program, as discussed in Section 3.1, Land Use. An AICUZ program plan was implemented for China Lake airfield operations in 1977. This AICUZ plan analyzed several operational scenarios to identify viable ways to minimize noise effects to neighboring communities and to reduce safety risks associated with airfield operations. The 1977 AICUZ plan implemented operational airfield scenarios that reduced the noise impacts to the community, minimized potential safety risks associated with airfield flight operations, and identified land use coordination procedures that would promote compatible land use planning in the vicinity of the airfield and range approach corridors.

NAWS initiated an update of the Station's AICUZ plan in 1998 and conducted supplemental airfield noise analyses in 2001 for existing and projected levels of airfield operations. The NAWS AICUZ program plan update will be

developed in partnership with neighboring communities and planning agencies. This update will characterize the noise footprints associated with existing airfield operations and will include noise exposure projections. The draft update to this plan characterizes the noise footprints associated with existing airfield operations and includes noise exposure projections and impact analyses for the proposed airfield flight operations tempo increases described in the Moderate Expansion Alternative. The updated AICUZ program plan will also implement noise management strategies which include opportunities for education and coordination programs to promote community understanding of the Navy's test and training mission at China Lake. The plan will continue to utilize NAWS's existing noise complaint investigation procedures and established land use planning and review procedures to achieve the Station's AICUZ objectives. NAWS airfield noise contours and land use compatibility guidelines will be provided to area planning agencies for incorporation in their respective management plans. The City of Ridgecrest encourages compliance with AICUZ land use objectives with the provision that procedures and policies be periodically reevaluated.

DoD agencies use Federal Interagency Committee on Urban Noise guidelines (Figure 3.2-2) to evaluate the compatibility of off-Station land uses with prevailing noise levels. These guidelines evaluate compatibility and building designs according to three outdoor noise-level zones: CNEL or Ldn levels below 65 dB (Zone 1), CNEL or Ldn levels of 65 to 75 dB (Zone 2), and CNEL or Ldn levels above 75 dB (Zone 3).

All land uses are compatible with Zone 1 noise conditions. Educational and residential land use is compatible with Zone 2 noise levels when acoustic treatments and designs are used to ensure acceptable interior noise levels. Residential and educational land use is not compatible with Zone 3 noise conditions. Industrial and manufacturing land uses are generally acceptable in Zone 3 with special building designs and other measures.

3.2.3 Existing Conditions

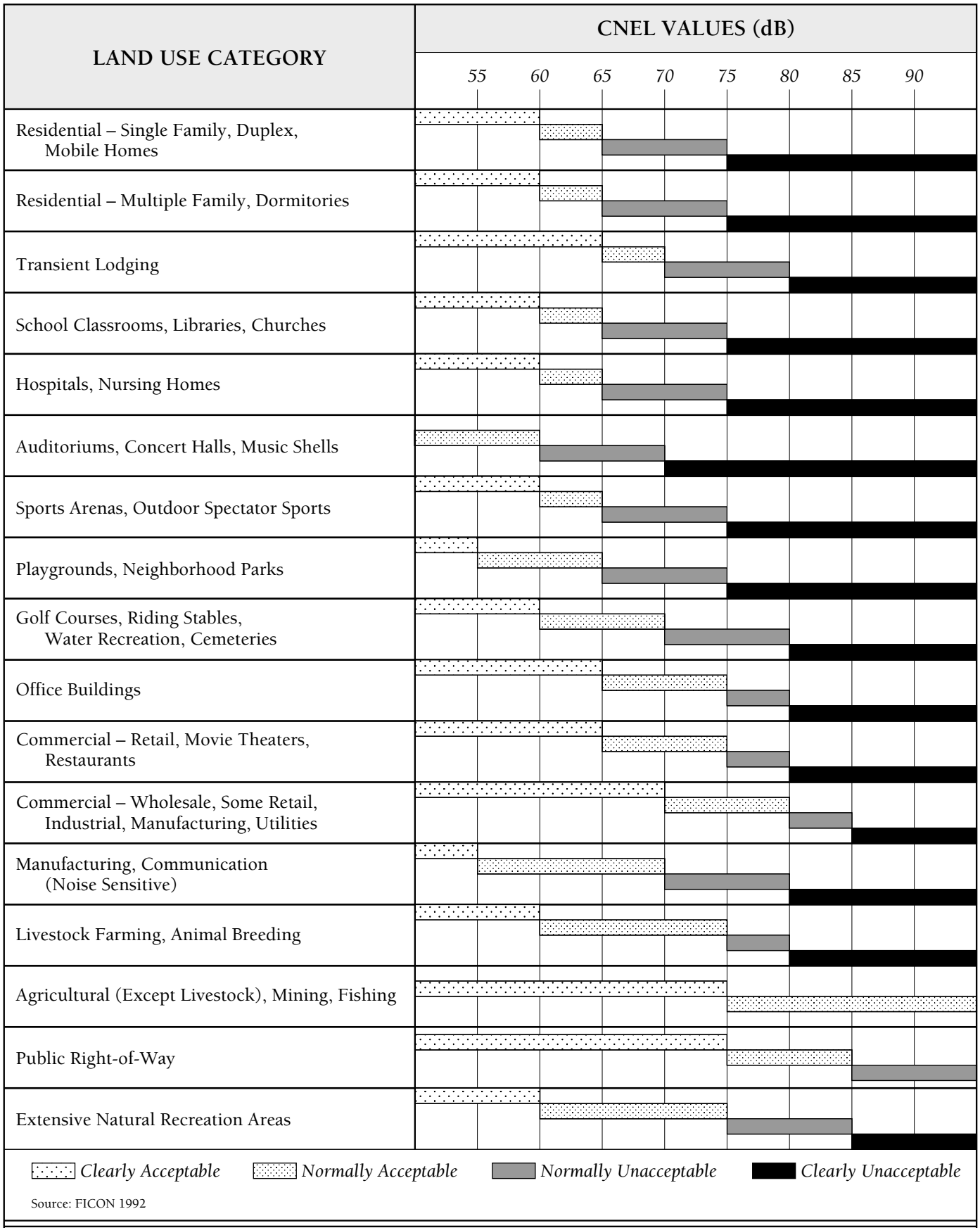
The primary sources of noise at NAWS include range flight operations (subsonic and supersonic), airfield flight operations, and the use of HE ordnance (delivered during air-to-surface and surface-to-surface operations) on the ranges. Other sources of noise occurring at NAWS include routine daily commuter traffic, routine operations and maintenance activities for Station facilities and infrastructure, and occasional facility demolition activities.

3.2.3.1 Range Flight Operations

<u>Subsonic</u>

Subsonic range test and training flight operations occur in widely dispersed patterns throughout the North and South ranges and generally occur at aircraft speeds less than 650 miles/hour (1,046 kilometers/hour). Approximately 10 percent of range flight operations are conducted in the evenings (7 p.m. to 10 p.m.) or at night (10 p.m. to 12 a.m.). Most of the dispersed flight activity over the North and South ranges occurs at altitudes of 5,000 feet (1,524 meters) or more above ground level (AGL). Existing noise conditions for subsonic flights on NAWS ranges were calculated using the MR_NMAP program. The modeled average existing noise level for all land use management units at NAWS were below 60 dB as shown in Table 3.2-1. Where noise levels were calculated to be less than 45 dB, the noise levels are presented as "<45."

As shown in Table 3.2-1, range flight operations produces annual average CNEL noise exposure contours ranging from <45 to 56 dBA.



Source: FICON 1992

Figure 3.2-2
Land Use Compatibility Guidelines

Table 3.2-1 Existing Condition CNEL for Individual Ranges

Land Use Management Unit	*CNEL*
North Range	
Airport Lake	*51*
Baker North	*<45*
Baker South	*54*
Charlie North	*56*
Charlie South	*54*
Coso	*<45*
Coso Target Range	*47*
George	*<45*
Mainsite	*<45*
Propulsion Laboratory	*<45*
South Range	
Mojave B North	*<45*
Mojave B South	*<45*
Randsburg Wash	*<45*
Superior Valley	*<45*

Source: Wyle 1998.

Supersonic

Periodic supersonic flights are conducted over the North and South ranges. These flights are conducted throughout the year during regular business hours (7 a.m. to 5 p.m.). Current annual supersonic flight operations account for approximately 24 events over the North Range flight track, three events between the South and North ranges, and nine events over two South Range flight tracks. Most existing supersonic flights occur at altitudes of 25,000 to 34,000 feet/7,620 to 10,363.2 meters (20,000 to 29,000 feet AGL/6,096 to 8,839.2 meters AGL) over the North Range and 15,000 feet/4,572 meters (11,000 to 12,500 feet AGL/3,352.8 to 3,810 meters AGL) over the South Range. For the purposes of this EIS, aircraft would be expected to achieve a supersonic speed (Mach 1) at approximately 740 miles/hour (1,190 kilometers/hour) at 5,000 feet (1,524 meters) above mean sea level (MSL). Supersonic flight speeds are between Mach 1 and 1.6 along the North Range flight corridor and Mach 1.1 to 1.9 over the South Range flight corridors.

While averaged noise exposure contours for supersonic flights are substantially below 60-dB CNEL, supersonic events do create a noticeable change in overpressure and are often accompanied by sonic booms, which can create a startling effect to areas on- and off-Station. Sonic booms are generally of short duration (1 to 2 seconds) and their intensity is greatly influenced by atmospheric conditions, air vehicle size, shape, and speed. Noise levels are greatest directly under the flight track and generally lessen as distance from the centerline increases. Due to the potential for noticeable changes in overpressure, CNEL metrics do not necessarily provide the best measure of supersonic events. Therefore, as described in the following paragraph, other metrics were used to describe supersonic flight activity.

Existing noise conditions for typical NAWS supersonic flight operations were calculated for each of the four supersonic flight tracks using the PCBoom3 model. For this analysis, a single F/A-18 E/F aircraft traveling at Mach 1.3 at 23,000 feet MSL was selected as a representative supersonic flight operation. A single event sonic-boom footprint was calculated for each of the four flight tracks. The sonic-boom footprint contours represent the relative changes in overpressure, measured in pounds per square foot (PSF), created by the supersonic flights. Figure 3.2-3 illustrates the peak overpressure contours for each individual flight track (contour levels of 1.0, 2.0, 4.0, 6.0, and 8.0 PSF are presented). Sonic-boom footprints can also be expressed using the SEL metric. The SEL unit of measure is a composite metric that represents both the intensity of the sound and its duration. The peak overpressure levels in

the illustration correspond to the following C-weighted SEL values: 101.6 dBC, 106.6 dBC, 113.6 dBC, 120.6 dBC, and 126.6 dBC (Wyle 2001).

The sonic-boom footprints for all four flight tracks have similar features. These include a very narrow region where the highest overpressures are represented by red, orange, and green lines, called the boom focus area, and the larger area down the flight track represented by blue and purple lines, called the carpet boom area. For the atmospheric and flight conditions used in this analysis, the variation in the location of the focus and carpet boom areas is expected to occur within 2 miles of the projected contours (Wyle 2001). In the focus region the peak overpressures occur in a very small area (<1,000 $ft.^2$). The maximum peak overpressure is approximately 11 PSF and occurs on the flight track centerlines within the narrow intersect of the focus boom area. The lateral portion of the focus area, represented by orange, has peak overpressures ranging from 6 to 10 PSF. The maximum focus boom overpressures for all flight tracks occur on the flight track centerline and are entirely within Station boundaries. Down track of the focus area is the carpet boom area. Here the overpressures steadily decrease with peak overpressures being directly under the flight track and decreasing toward the lateral edges of the footprint. Peak overpressures of 3 PSF are found along the track centerline decreasing out to the footprint edge of 1 PSF, which marks the cutoff point of the carpet boom area. Beyond this cutoff point, an observer would hear a low rumble but not a sonic boom. For these profiles, the cutoff distance for a sonic boom is approximately 8 to 9 miles from the flight track centerline (Wyle 2001).

As illustrated in Figure 3.2-3, the focus areas for three of the four flight tracks remain entirely within Station boundaries. For the flight track traveling from South to North Range (track #3), portions of the focus area fall within the BLM Golden Valley Wilderness Area where peak overpressures are estimated to be 6 PSF over a very small portion of that area. For all flight footprints, portions of the carpet boom area go off-Station. These overpressure levels vary from 3 PSF over BLM lands in the Spangler Hills and Trona Pinnicles areas to 1 to 2 PSF over BLM wilderness areas including the Manly Peak Wilderness Area, the Great Falls Basin Wilderness Study Area, the Argus Range Wilderness Area, and the Coso Range Wilderness Area. Other areas exposed to 1 to 2 PSF carpet boom effects include a small portion of the Death Valley National Park adjacent to the South Range northern boundary and BLM lands adjacent to the Station's North Range northwestern boundary and the South Range's northern boundary. Communities that may be affected by the carpet boom include Trona, Argus, Darwin, and Haiwee. If sonic-boom effects were to shift the 2 miles noted due to modeling variability, the City of Ridgecrest and the communities at Homewood Canyon, Valley Wells, and Coso Junction could also experience the effects of carpet booms.

3.2.3.2 Airfield Flight Operations

Most aircraft flight activity at NAWS is concentrated around Armitage Airfield, where approximately 27,000 flight operations are conducted per year. Airfield operations include those flights supporting the RDT&E mission, Fleet squadron training, and other transient flights. Approximately 10 percent of the airfield flight operations are conducted in the evening (7 a.m. to 10 p.m.) or at night (10 p.m. to 12 a.m.).

Flight activities for the airfield were modeled using NOISEMAP to analyze a "representative year." Airfield operations data from 1996 were used to describe flight activity tempo and 1998 operations were used to describe aircraft "mix" (i.e., type of aircraft using the airfield). The operational tempo data were derived from the ATAA data recorded by ATC personnel and then adjusted to reflect the current aircraft mix for the F/A 18 series (ratio of A/D models versus E/F models). The resulting operations scenario is considered representative of a typical year at NAWS and is within 3 percent of the actual airfield operations conducted during 1999 (approximately 27,800 annual operations). Noise exposure contours modeled for the representative year operations at Armitage Airfield are illustrated in Figure 3.2-4.

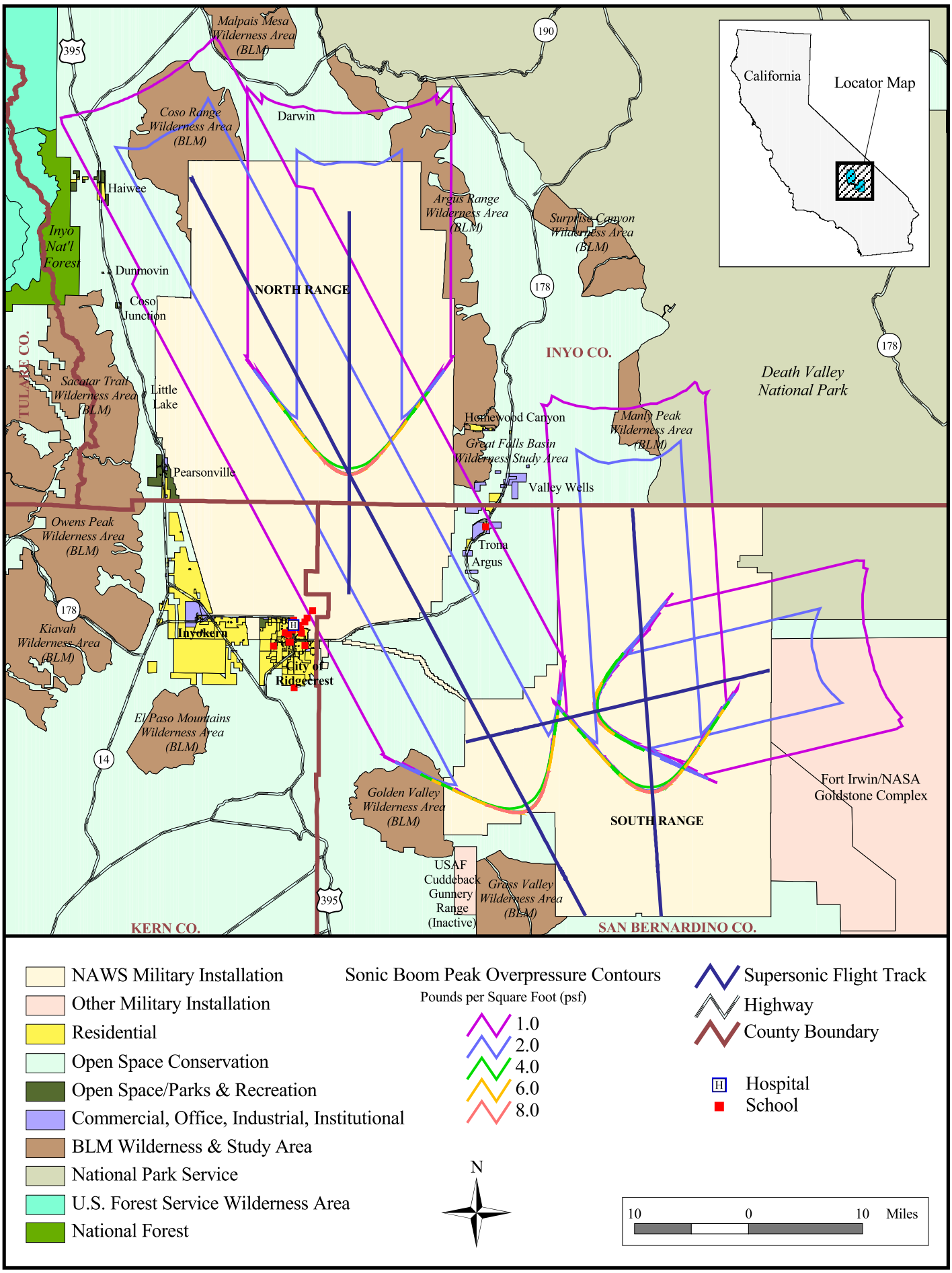


Figure 3.2-3 NAWS China Lake Sonic Boom Peak Overpressure Contours

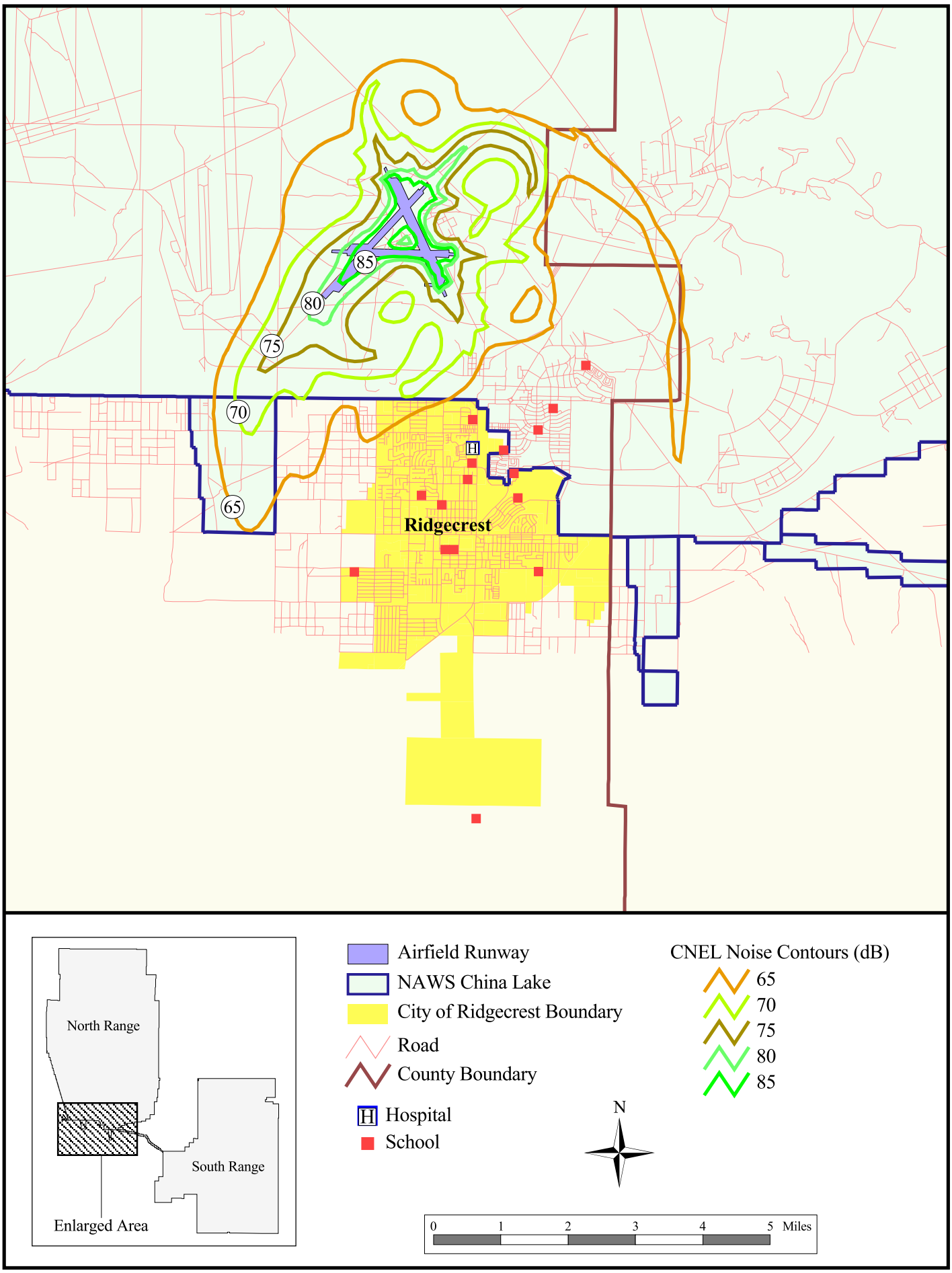


Figure 3.2-4 Existing Noise Contours for Airfield Operations

3.2.3.3 Range Ground Operations

Range ground operations include test and training activities using inert and HE ordnance at designated test and target locations, and several types of GTT activities conducted at designated areas of operation located throughout the ranges. Noise contours for range ground operations were calculated for the net explosive weights of ordnance (see Table 3.1-3) used at designated test and target sites. CNEL contours were established for these designated impact areas throughout the North and South ranges. No noise contours greater than 65-dB CNEL extend beyond the Station boundaries.

Target and Test Site Use

Test and training activities use both inert and HE ordnance at impact areas. Most weapons and ordnance fired or dropped from aircraft are inert and no noise contours greater than 65-dB CNEL extend off-Station. Target and test sites are located away from the developed portions of the Station (Armitage Airfield, Mainsite, Main Magazine, and Propulsion labs areas). A baseline year for ordnance use was developed for this EIS using an average of ordnance types used on the ranges from 1992 to 1998.

Ground Troop Training

Noise sources associated with GTT activities include ordnance use, vehicular travel, and the use of diesel generators. Noise associated with GTT ordnance use is covered in the analysis for target and test area ordnance use. Noise associated with GTT vehicle and generator use is considered to be minor since it occurs in designated range areas located away from the developed portions of the Station.

3.2.4 Noise Complaints

NAWS is located within the R-2508 Complex, a large area of designated special-use airspace for military aircraft testing and training. NAWS China Lake, NTC Fort Irwin, and Edwards AFB manage the airspace over their respective installations. Use of military airspace elsewhere within R-2508 is scheduled through the Central Coordinating Facility (CCF) at Edwards AFB. The High Desert Terminal Radar Approach Control controls air traffic in the entire Complex. The R-2508 Complex Complaint Program investigates all complaints received in the Complex as a tri-service responsibility.

The Public Affairs Offices (PAOs) at each Command are the contact for noise complaints. NAWS processes complaints regardless of the source of activities or location of incidents, which may be beyond the boundaries of the Station. Incidents reported from areas such as the Owens and Kern valleys or from public lands within National Parks, National Forests, and Wilderness Areas may not be related to flight activity associated with NAWS ranges or Armitage Airfield operations. The data shown in Table 3.2-2 are limited to only those incidents known to be associated with NAWS operations.

NAWS recorded 194 noise complaints during a 12-year period (July 1988 to December 2000). Some events generated multiple complaints. Aircraft were responsible for 161 events (75 sonic booms and 86 loud or low flyovers), ordnance detonations for two events, and SNORT accounted for one sonic boom event. Two complaints concerned generalized noise issues and not specific events. Approximately 69 percent of the complaints involved range flight operations (including sonic booms) and 27 percent involved airfield flight operations. Most complaints were received from Ridgecrest (56.6 percent), Inyokern (23.5 percent), or Trona (6.6 percent). Communities between Edwards AFB and NAWS (Randsburg, Johannesburg, and Red Mountain) generated a combined 8.4 percent of the complaints. Remaining complaints came from on-Station, Little Lake, and Darwin.

Table 3.2-2 Total Noise Complaints for NAWS Airfield and Range Operations (1988 – 2000)

	Number of Events[a]	*Percentage of Category*
Type		
Aircraft Noise/Low Flights	*105*	*54.12*
Sonic Booms[c]	*82*	*42.26*
Other[b]	*5*	*2.57*
Blast Noise	*2*	*1.02*
Activity		
Range Operations	*130*	*67.01*
Airfield Operations	*56*	*28.86*
Not Identified	*5*	*2.57*
Ordnance Detonations	*2*	*1.02*
SNORT Track Operations	*1*	*0.51*
Location		
Ridgecrest[d]	*108*	*55.6*
Inyokern[e]	*48*	*24.7*
Trona[e]	*12*	*6.19*
Johannesburg[e]	*8*	*4.12*
On-station[e]	*4*	*2.06*
Red Mountain[e]	*4*	*2.06*
Randsburg[e]	*4*	*2.06*
Little Lake[e]	*4*	*2.06*
Darwin[e]	*2*	*1.03*
Total Events	***194***	

[a] *Some complaints involved multiple aircraft or multiple flyovers and are logged as a single event. Some events produced multiple complaints; however, most multiple complaints are logged as a single event.*

[b] *Other event types include single complaints about helicopter landings, nonspecific noise, and a recurring high-pitched ringing noise.*

[c] *Sonic boom complaints are attributed to range operations.*

[d] *Aircraft noise complaints from Ridgecrest are attributed to airfield operations.*

[e] *Aircraft noise complaints from Inyokern, Trona, Johannesburg, On-station, Red Mountain, Randsburg, Little Lake, and Darwin are attributed to range operations.*

Source: NAWS 2000 noise complaint data, July 1988 to December 2000.

NAWS continues efforts to increase public awareness and understanding of its mission activities in R-2508 by participating in a wide variety of forums including City Council and Chamber of Commerce meetings in the four surrounding communities. The RCC notifies the PAO of tests planned in R-2508 and of visiting squadrons performing tests that may cause sonic booms. When possible, the PAO relays this information to local community groups before testing. When provided with 24-hour advanced notice, the PAO sends a news release to local newspapers and radio stations.

When a complaint is received, the PAO logs the date, time, and location of the incident. The information is faxed to the CCF at Edwards AFB for tracking. The CCF checks the radar tapes and within 3 to 4 days sends a report of findings to the PAO. The report provides information on the aircraft involved in the event, the speed, the altitude, and any deviations from the flight schedule. After the PAO receives the report, a staff member calls the complainant with pertinent information (e.g., if the flight was part of a scheduled test). Deviations from the flight schedule are

reported to the pilot's squadron for disciplinary action. After notifying the complainant and logging their response, the updated report is faxed back to the CCF for close out.

3.3
Air Quality

3.3 AIR QUALITY

3.3.1 Definition of Resource

Air quality is defined by ambient air concentrations of specific pollutants determined by the USEPA to be of concern with respect to the health and welfare of the general public. Six major pollutants of concern are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), suspended particulate matter less than 10 microns in diameter (PM_{10}), and lead (Pb). The USEPA has established National Ambient Air Quality Standards (NAAQS) for these pollutants, called "criteria pollutants." These standards, as well as regulatory considerations applicable to the proposed action, are discussed in this section. Descriptions of relevant technical concepts related to air pollutants and ambient air quality are also provided.

Air pollutants are often characterized as being primary or secondary pollutants. Primary pollutants are those emitted directly into the atmosphere, such as CO, SO_2, lead particulates, and hydrogen sulfide. Secondary pollutants, such as O_3, are those formed through atmospheric chemical reactions. Such reactions usually involve primary pollutants and normal constituents of the atmosphere. Meteorological conditions such as temperature, humidity, and the intensity of ultraviolet light, can also play an important role in atmospheric chemistry. Some air pollutants, such as many organic gases and PM_{10}, are a combination of primary and secondary pollutants. Inhalable (PM_{10}) and fine particulate matter ($PM_{2.5}$) are generated as a primary pollutant by various mechanical processes (for example, abrasion, erosion, mixing, or atomization) or combustion processes. However, PM_{10} and $PM_{2.5}$ can also be formed as a secondary pollutant through chemical reactions or by gaseous pollutants condensing into fine aerosols.

Compounds that react to form secondary pollutants often are referred to as pollutant precursors, or precursor emission products. The secondary pollutant of greatest concern in California is O_3, a major component of photochemical smog. The O_3 precursors fall into two broad groups of chemicals: nitrogen oxides (NO_x) and organic compounds. The terms NO_x and oxides of nitrogen are often used interchangeably to refer to the combination of nitric oxide and NO_2. This combination of NO_x is designated by the symbol NO_x. Organic compound precursors of O_3 are routinely described by a large number of different terms, including volatile organic compounds (VOC), reactive organic compounds (ROC), and reactive organic gases (ROG). ROG is used in this document as a general term to refer to organic compound precursors of O_3.

Pollutant emissions refers to the amount (usually stated as a weight) of one or more specific compounds introduced into the atmosphere by a source or group of sources. Most pollutant emissions data are presented as emission rates. Typical measurement units for emission rates on a time basis include pounds per hour, pounds per day, or tons per year. Typical measurement units for emission rates on a source activity basis include pounds per thousand gallons of fuel burned, pounds per ton of material processed, and grams per vehicle mile of travel.

Ambient air quality refers to the atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) actually experienced at a particular geographic location. The ambient air quality levels measured at a particular location are determined by the interactions of emissions, meteorology, and chemistry. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions. Chemical reactions can transform pollutant emissions into other chemical substances. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million [ppm] by volume).

3.3.2 Regulatory Framework

3.3.2.1 Ambient Air Quality Standards

California and the federal government have established ambient air quality standards for a total of 10 different criteria pollutants (shown in Figure 3.3-1). Ambient standards for some of these pollutants have been set for both short and long periods. The NAAQS are based on evidence of acute and chronic health effects. Most of the California Ambient Air Quality Standards (CAAQS) are based primarily on health effects data, but can reflect other considerations such as protection of crops or materials, or avoidance of nuisance conditions (e.g., odors).

In July 1997, the USEPA revised the violation criteria for the existing PM_{10} standards, adopted a new 8-hour O_3 standard, and adopted a new fine particle ($PM_{2.5}$) standard. These standards became effective in September 1997, but were remanded by the U.S. Court of Appeals for the District of Columbia on 14 May 1999. On appeal, the U.S. Supreme Court remanded the case to the U.S. Court of Appeals for further proceedings. Since the policies for implementing the new standards are not known at this time, the revised NAAQS will not be considered further in this document.

3.3.2.2 Attainment with Ambient Air Quality Standards

Attainment with the NAAQS and CAAQS is determined using monitoring station data from the Kern County Air Pollution Control District (APCD), San Bernardino County's Mojave Desert Air Quality Management District (AQMD), and Inyo County's Great Basin Unified APCD. Most of the air quality monitoring stations near NAWS only monitor PM_{10} concentrations, although one (Trona) also monitors various gaseous pollutants. One station (China Lake) is in Kern County, south of the North Range. There are two stations at Coso Junction located along U.S. Highway 395 in Inyo County, west of the North Range. The Trona station is in San Bernardino County between the North and South ranges. Most other monitoring stations in San Bernardino County are in the southern half of the county. The closest of these is in Barstow, located about 40 miles (64 kilometers) southeast of the South Range boundary.

Areas that violate a federal or state air quality standard are designated as nonattainment areas. Federal nonattainment designations for O_3, CO, and PM_{10} include classifications such as "severe nonattainment" and "moderate nonattainment," which indicate the severity of the air quality problem. Areas that comply with federal and state air quality standards are designated as attainment areas, and areas reclassified from nonattainment to attainment are designated as attainment/maintenance areas. Areas that lack the monitoring data to signify status are designated unclassified and treated as attainment areas for various regulatory purposes.

Table 3.3-1 lists the designated federal attainment and nonattainment areas for O_3 and PM_{10} at NAWS. As shown in the table, nonattainment designations are assigned both to areas under a single jurisdiction and to areas under combined jurisdictions. An example of the latter at NAWS is the Searles Valley Nonattainment Area (encompassing on-Station portions of Kern, Inyo, and San Bernardino counties). The Mojave Desert Nonattainment Area includes the on-Station portions of San Bernardino County outside of the Searles Valley Nonattainment Area. Figure 3.3-2 provides a visual illustration of the attainment/nonattainment areas at NAWS.

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS (1)	NATIONAL STANDARDS (2)	
			Primary	Secondary
Ozone (O_3)	8 Hour (3)	•	0.08 ppm (157 μg/m^3)	Same as Primary Standards
	1 Hour	0.09 ppm (180 μg/m^3)	0.12 ppm (235 μg/m^3)	
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)	•
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual Average	•	0.053 ppm (100 μg/m^3)	Same as Primary Standard
	1 Hour	0.25 ppm (470 μg/m^3)	•	
Sulfur Dioxide (SO_2)	Annual Average	•	0.030 ppm (80 μg/m^3)	•
	24 Hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)	•
	3 Hour	•	•	0.50 ppm (1300 μg/m^3)
	1 Hour	0.25 ppm (655 μg/m^3)	•	•
Respirable Particulate Matter Less than 10 Microns in Diameter (PM_{10})	Annual Arithmetic Mean	30 μg/m^3	50 μg/m^3	Same as Primary Standards
	24 Hour	50 μg/m^3	150 μg/m^3	
Respirable Particulate Matter Less than 2.5 Microns in Diameter ($PM_{2.5}$) (3)	Annual Arithmetic Mean	no separate standard	15 μg/m^3	Same as Primary Standards
	24 Hour		65 μg/m^3	
Sulfates	24 Hour	25 μg/m^3	•	•
Lead (Pb)	30 Day Average	1.5 μg/m^3	•	•
	Calendar Quarter	•	1.5 μg/m^3	Same as Primary Standard
Hydrogen Sulfide (HS)	1 Hour	0.03 ppm (42 μg/m^3)	•	•
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 μg/m^3)	•	•
Visibility Reducing Particles	8 Hour (10:00 a.m. to 6:00 p.m. PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with CARB Method V.	•	•

Sources: California Air Resources Board 2001; U.S. Environmental Protection Agency 2001.

ppm – parts per million
μg/m^3 – micrograms per cubic meter
mg/m^3 – milligrams per cubic meter
• – no standard established

(1) CO, SO_2 (1- and 24-hour), NO_2, O_3, PM_{10}, and visibility reducing particles standards are not to be exceeded. All other California Standards are not to be equaled or exceeded.

(2) Not to be exceeded more than once a year except for annual standards.

(3) The ozone 8-hour standard and the PM 2.5 standards are included for informational purposes only. In 1999, a federal court ruling blocked implementation of these standards, which EPA proposed in 1997. The EPA has asked the U.S. Supreme Court to reconsider that decision.

Figure 3.3-1
California and National Ambient Air Quality Standards

Table 3.3-1 NAWS Federal Attainment and Nonattainment Areas for Ozone and PM_{10}

Pollutant	*Area*	*Attainment Status*	*NAWS Coverage*
Ozone	*Inyo County*	*Attainment*	*Northern portion of the North Range*
	San Bernardino County	*Attainment*	*Southeastern portion of the North Range and all of the South Range.*
	Kern County	*Serious Nonattainment*	*Southwestern portion of the North Range.*
PM_{10}	*Inyo County Attainment Area* [a]	*Attainment*	*The northeastern portion of the North Range is designated as an attainment area for the federal PM_{10} standard.*
	Searles Valley [b] *and Mojave Desert* [c] *Nonattainment Areas*	*Moderate Nonattainment*	*Most portions of the North Range and all of the South Range.*
	Owens Valley Nonattainment Area [d]	*Serious Nonattainment*	*Northwestern corner of the North Range.*

[a] *Portion of Inyo County not included in Searles Valley and Owens Valley Non-Attainment areas.*

[b] *The Searles Valley Nonattainment Area encompasses on-Station portions of Kern, Inyo, and San Bernardino counties.*

[c] *Mojave Desert Nonattainment Area includes the on-Station portions of San Bernardino County outside of the Searles Valley Nonattainment Area.*

[d] *Owens Valley Nonattainment Area encompasses an on-Station portion of Inyo County.*

Source: 40 C.F.R. 81.305.

State nonattainment designations for PM_{10}, O_3, hydrogen sulfide, and sulfate particles also apply to various portions of NAWS. The Kern County and San Bernardino County portions of NAWS are within a nonattainment area for O_3, while the Inyo County portion of NAWS is unclassified for the state O_3 standard. All of Kern, Inyo, and San Bernardino counties, including NAWS, are designated as nonattainment for the state PM_{10} standard. The Searles Valley Planning Area portion of San Bernardino County, including portions of the North and South ranges, is designated nonattainment for the state hydrogen sulfide and sulfate standards.

At NAWS, high PM_{10} concentrations are infrequent events, with the highest concentrations usually associated with dust storms originating in the Owens Valley. Exceedences of the federal 24-hour PM_{10} standard have occurred in recent years at the Coso Junction, Coso Junction east, and China Lake monitoring stations. No exceedences of this standard have been recorded in recent years at the Trona or Barstow stations. The more stringent state 24-hour PM_{10} standard has been exceeded at all of the monitoring stations.

Though O_3 concentrations in east Kern County are influenced by transport from the San Joaquin Valley, they remain low. Recent data (1997 to 1999) from the Mojave monitoring station show that the Mojave area is meeting the federal 1-hour O_3 standard. Monitoring data from northern San Bernardino County (Trona) and Inyo County (Bishop) show no exceedences of the standard.

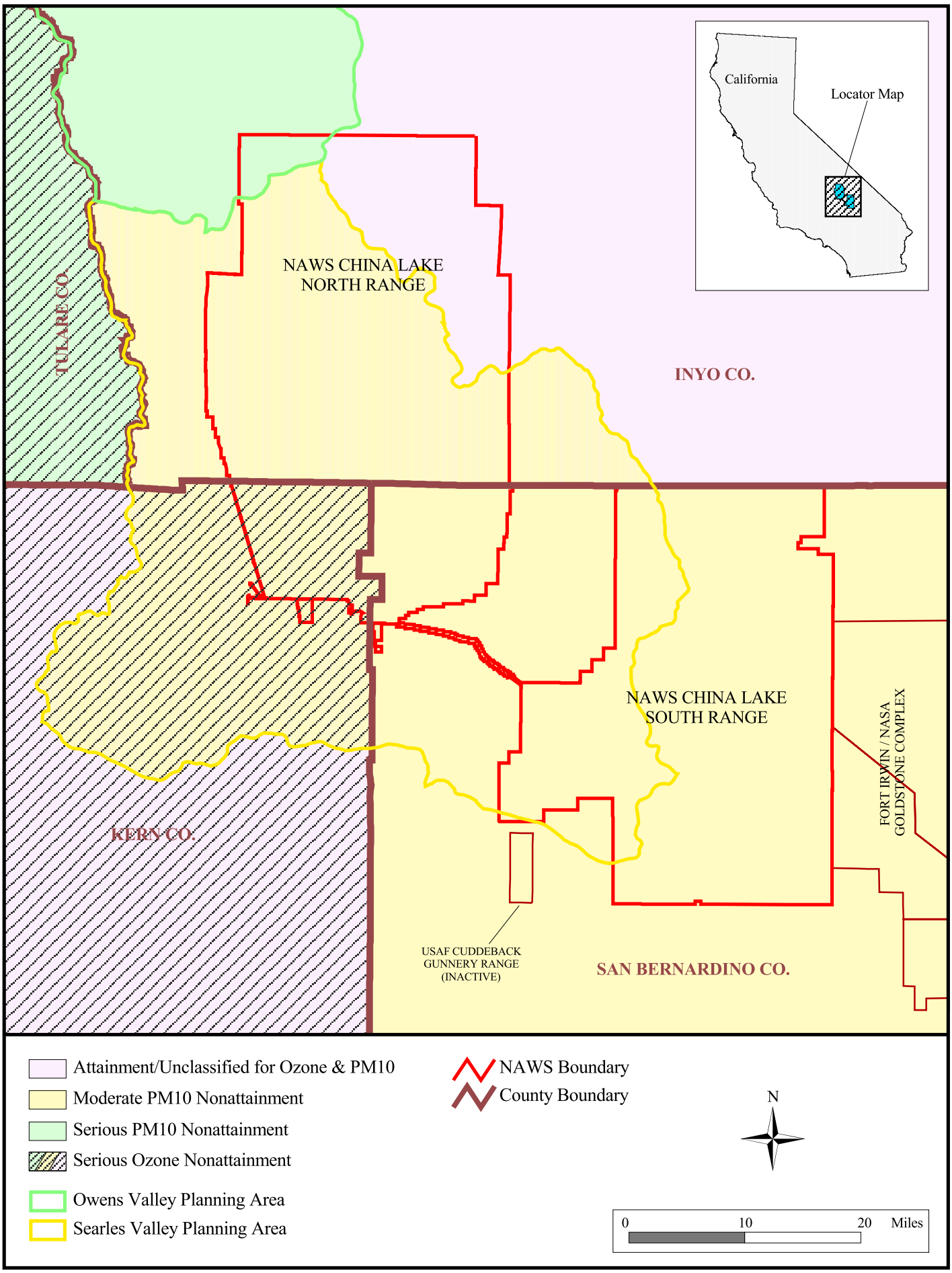


Figure 3.3-2 Federal Attainment and Nonattainment Designations for the NAWS China Lake Vicinity

3.3.2.3 Federal Requirements

State Implementation Plan

Section 110 of the Clean Air Act (CAA) requires each state to develop, adopt, and implement a state implementation plan (SIP) to achieve, maintain, and enforce federal air quality standards throughout the state. The SIP must be approved by the EPA. Deadlines for achieving these standards vary according to air pollutant and the severity of existing air quality problems. In California, the SIP consists of separate elements for different regions of the state. SIP elements are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated. Local councils of governments and APCDs have the primary responsibility for developing and adopting the regional elements of the California SIP.

The O_3 SIP for the Southeast Desert portion of Kern County uses 1990 as a baseline year. Ozone exceedences in the desert portion of Kern County have been attributed primarily to O_3 transport from the San Joaquin Valley (Kern County APCD 1997a). The desert O_3 nonattainment area in Kern County includes portions of both Edwards AFB and NAWS. Emissions associated with the two bases have not been itemized separately in federal or state air quality plans (Kern County APCD 1997b). Initial emission forecasts for the desert portion of Kern County estimated that emissions associated with military aircraft and jet engine testing would remain constant between 1987 and 2000. A 1994 update to the O_3 SIP increased military aircraft emission estimates for 1996 by 5 percent, to 3.17 tons (2.87 metric tons) per day of ROC and 2.09 tons (1.89 metric tons) per day of NO_x. Emission estimates for military aircraft in 2000 were increased an additional 20 percent to 3.49 tons (3.16 metric tons) per day of ROC and 2.30 tons (2.08 metric tons) per day of NO_x. Other emission source categories associated with NAWS (e.g., ground support equipment, aircraft refueling, ordnance use) are not identified separately in the available emission forecasts.

In 1991, a PM_{10} SIP for the Searles Valley Planning Area was jointly prepared by the Kern County APCD, the Mojave Desert AQMD (formerly the San Bernardino County APCD), and the Great Basin Unified APCD (Great Basin Unified APCD *et al.* 1991). The Mojave Desert AQMD portion of the PM_{10} SIP was updated in 1995 and again in 1996. The SIP contains strategies to control and reduce locally-generated PM_{10} emissions in each county. These strategies included control measures for industrial process fugitives, unpaved industrial roads, paved industrial roads, and construction and demolition activities. The Searles Valley Planning Area PM_{10} SIP uses 1990 as the baseline year. PM_{10} emissions associated with military aircraft were projected to remain nearly constant at 0.83 tons (0.75 metric tons) per day from 1991 through 2010, dropping to 0.82 tons (0.74 metric tons) per day for 1997 and then returning to 0.83 tons (0.75 metric tons) per day for the remainder of the forecast period (Kern County APCD 1997a). Other emission source activity categories associated with NAWS are not identified separately in the emission forecasts for the Searles Valley Planning Area. High PM_{10} concentrations in the Searles Valley Planning Area are typically the result of pollutant transport from the Owens Valley.

The Mojave Desert PM_{10} Planning Area SIP also uses 1990 as a baseline year and forecasted PM_{10} emissions associated with military base operations to remain constant through 2000 (Mojave Desert AQMD 1995a). Although part of NAWS is within the Mojave Desert PM_{10} nonattainment area designated by EPA, Mojave Desert AQMD considers all of NAWS to be outside of the "planning area," which is limited to the Barstow/Victor Valley region. Therefore, the Mojave Desert PM_{10} SIP does not include any NAWS PM_{10} emissions in its baseline inventory or its emissions forecast.

The Owens Valley PM_{10} SIP (Great Basin Unified APCD 1997) focuses on wind erosion from the Owens Lake playa as the dominant cause of PM_{10} problems. None of the other identified emission sources (entrained dust from paved and unpaved roads, residential wood combustion, prescribed burning, industrial facilities, and agricultural operations) are associated with the small portion of NAWS that falls within the Owens Valley PM_{10} nonattainment area.

Clean Air Act Conformity Process

Section 176(c) of the CAA requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. The EPA has promulgated separate rules that establish conformity analysis procedures for transportation-related actions and for other (general) federal agency actions. Transportation conformity requirements apply to highway and mass transit projects funded or approved by the Federal Highway Administration or the Federal Transit Administration. General conformity requirements apply to actions involving ongoing federal agency responsibility and control over direct or indirect sources of air pollutant emissions.

The EPA general conformity rule establishes a process that is intended to demonstrate that the proposed federal action would not:

- Cause or contribute to new violations of federal air quality standards.
- Increase the frequency or severity of existing violations of federal air quality standards.
- Delay the timely attainment of federal air quality standards.

Compliance with the general conformity rule can be demonstrated in several ways. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant *de minimis* level (i.e., an established emission threshold). If net emissions increases exceed the relevant *de minimis* level, a formal conformity determination process must be followed. A conformity determination includes a demonstration that the proposed action conforms to the SIP through any one of the following five ways:

- Showing that direct and indirect emissions from the activity are specifically identified and accounted for in the SIP.
- Showing that direct and indirect emissions associated with the federal agency action are accommodated within emissions allowances contained in an approved SIP.
- Showing that emissions associated with future conditions will not exceed emissions that would occur from a continuation of historical activity levels.
- Arranging emission offsets to fully compensate for the net emissions increase associated with the action.
- Obtaining a commitment from the relevant air quality management agency to amend the SIP to account for direct and indirect emissions from the federal agency action.

Application of the Clean Air Act Conformity Rule

The EPA general conformity rule applies to federal actions occurring in federal nonattainment or maintenance areas when the total direct and indirect emission increases of nonattainment pollutants (or their precursors) exceed specified thresholds. As noted above, the emission thresholds that trigger requirements of the conformity rule are called *de minimis* levels and are outlined in Table 3.3-2.

Table 3.3-2 Relevant *de minimis* Levels for NAWS Nonattainment Areas

Pollutant	*Nonattainment Status*	*Area*	*Relevant de minimis Level*
O_3	*Serious Nonattainment*	*Kern County*	*50 tons (46 metric tons) per year of reactive organic compounds or nitrogen oxide emissions.*
PM_{10}	*Moderate Nonattainment*	*Searles Valley and Mojave Desert Nonattainment Areas*	*100 tons (91 metric tons) per year.*
	Serious Nonattainment	*Owens Valley Nonattainment Area*	*70 tons (64 metric tons) per year.*

Source: 40 C.F.R. 93.153(b)(1).

3.3.2.4 State and Local Requirements

The California CAA of 1988 (26 California Health and Safety Code [CH&SC] § 10,000 et seq.) requires APCDs and AQMDs to develop air quality management plans to meet state ambient air quality standards for O_3, CO, SO_2, and NO_2. However, the state CAA does not set specific deadlines for achieving state air quality standards. Instead, attainment is required "as expeditiously as practicable."

3.3.3 Climate and Meteorology

NAWS's climate is typical of the southern California high desert: hot summers, cold winters, large daily temperature fluctuations, and low rainfall and humidity. Summer daytime temperatures often exceed 100 degrees Fahrenheit (38 degrees Celcius), while summer nighttime temperatures drop into the 60s. Winter daytime temperatures average in the 50s, with winter nighttime temperatures in the 30s. Precipitation averages 4.25 inches (10.8 centimeters) per year, with about 20 days per year of measurable precipitation. It snows an average of 2 days per year. However, in areas of higher elevation (e.g., Coso Range), the amount of rain or snowfall may be much higher. Maximum precipitation tends to occur from November through March. Winds flow through low mountain passes and gaps in the mountain ranges that surround NAWS, with the strongest winds occurring in late winter and early spring.

3.3.4 Existing Air Emissions at NAWS

3.3.4.1 Air Emissions Sources

The dominant air emissions sources at NAWS are related to range flight operations, airfield flight operations, and range ground operations. These emissions sources are discussed below. There are also a number of activities at NAWS that emit minor amounts of air pollutants. These activities include gasoline station use, welding, painting, vehicle and aircraft maintenance, propellant mixing and curing, research laboratory operations, and facilities maintenance. All of these operations are in full compliance with air quality regulations and are permitted in accordance with the respective APCDs in Kern, Inyo, or San Bernadino counties. Other emission sources (e.g., landscape maintenance activities) are not included in the baseline emissions estimate because these sources are considered to emit negligible amounts of air pollutants.

<u>Range Flight Operations</u>

Air emissions sources associated with range flight activity include operations conducted for weapons test and aircrew training activities throughout the NAWS ranges. Flight operations are conducted for a wide range of activities. Range flights can involve aircraft based at NAWS or from other activities and airfields. Flight operations

vary according to customer requirements and can include a single aircraft delivering a test weapon to a target site, or several aircraft in a mock air-combat duel. Typical flight operations include air-to-air or air-to-surface test or training scenarios. Air-to-air operations generally employ aircraft, a weapon system, a target or targets, countermeasure devices (flares or chaff), and range support facilities. An air-to-surface scenario generally employs aircraft, weapons systems, targets, and range support facilities.

Airfield Flight Operations

Aircraft flight activity is the dominant emission source at Armitage Airfield. Airfield flight operations occur primarily over Kern County. However, portions of the primary airfield approach patterns are located over San Bernardino County, which is not part of the Kern County O_3 nonattainment area. In addition to direct aircraft flight activity, airfield operations include various ground-based emission sources. The most significant sources include in-frame engine run-ups after routine maintenance, use of ground support equipment, and fuel handling activities (mostly for aircraft refueling and defueling). In-frame engine run-ups are performed after engine maintenance activities. NAWS maintenance activities are primarily routine servicing and inspection activities. More extensive maintenance activities must be performed at other military installations. Ground support equipment at Armitage Airfield includes tow tractors, weapons loaders, air-start units, portable generators, portable air-conditioning units, and other minor equipment. Fuel transfer activities include fuel deliveries to the on-Station storage tanks, loading of fuel tankers, aircraft refueling, aircraft defueling, and fuel transfers for ground support equipment. In-frame engine run-ups, ground support equipment operation, and fuel transfer activities occur in the Kern County portion of NAWS.

Range Ground Operations

Air emission sources associated with range ground operations include the use of live and inert ordnance at designated test and target sites, GTT activities operating at previously disturbed locations and on the NAWS road network, and the use of support equipment such as portable generators.

Ordnance Use at Target and Test Sites. Many of the test and training activities at NAWS involve the use of live or inert ordnance. Inert ordnance does not explode on impact but typically has a small pyrotechnic device used as a spotting charge. Live ordnance generally contains a HE warhead that explodes upon impact or upon intentional initiation at static ground test areas. Inert ordnance produces small volumes of air emissions associated with the discharge of the pyrotechnic device. The use of live ordnance generally produces larger air emissions associated with the combustion of the HE charge or warhead, and the lofting of soil and debris from the impact area.

Ground Troop Training. Air emissions sources associated with GTT activities include vehicular travel over paved and unpaved roads, ordnance use at designated impact areas, and the use of portable generators. As discussed in Chapter 2, two types of GTT are hosted at NAWS. Type 1 involves foot soldiers only, and Type 2 involves foot soldiers using wheeled vehicles. Type 1 creates little or no air emissions while Type 2 generates air emissions associated with wheeled vehicle use. Portable generators are generally deployed at bivouac locations and with command and control sites. Both types of GTT can involve aircraft insertion of troops (addressed under range flight operations), and small- and large-caliber weapons firing.

Support Equipment. Portable generators also are used to support other range ground operations, including the use of portable high-speed film and video camera system on the North Range, and mobile radar and electronic warfare emitters on the South Range. These systems generally are deployed at prepared sites, and may be towed to a use location or mounted on a vehicle.

Permitted Stationary Emission Sources

Several existing permitted emission sources at NAWS are not analyzed further in this document because they are not associated with the proposed action or alternatives. These include the Burro Canyon Facility, Explosives Safety Test Arena, Skytop Static Test Complex, electric generators at remote sites, and ordnance safety test facilities.

3.3.4.2 Development of a Baseline Emissions Scenario

NAWS baseline emissions were modeled for 1998 operations and were developed from the most complete and accurate data available. These sources include emissions data from the NAWS Air Toxics and Criteria Pollutant Comprehensive Inventory for 1996 (Versar 1998-2000) plus other emission source data (aircraft flight operations, GTT, activities that generate fugitive dust), including the emission increases associated with the changes in the resident aircraft mix at NAWS up to 1998. The principal change in the aircraft mix at NAWS was the removal of the A-6 Intruder from the Station's inventory. The A-6 was replaced with the F/A-18 Hornet series, including the F/A-18 E/F. Detailed emission estimates were developed for range flight operations, airfield flight operations, and range ground operations (ordnance use at target and test sites, GTT, and generator use). These detailed emissions descriptions are provided in Appendix D and are summarized in the following section.

3.3.4.3 Baseline Emissions Scenario

Table 3.3-3 summarizes baseline emissions estimates for the primary NAWS range and airfield operations. As shown in the table, total baseline emissions of nonattainment pollutants from NAWS operational sources are 192.19 tons (174.35 metric tons) per year of ROC, 132.57 tons (120.27 metric tons) per year of NO_x, 841.64 tons (763.52 metric tons) per year of CO, 6.17 tons (5.60 metric tons) per year of SO_x, and 186.90 tons (169.55 metric tons) per year of PM_{10}.

Table 3.3-3 Baseline Emissions at NAWS

	Annual Emissions (Tons Per Year)				
Emission Source Category	***ROG***	***NOx***	***CO***	***Sox***	***PM_{10}***
Range Flight Operations	*1.02*	*21.52*	*10.83*	*1.05*	*16.67*
Airfield Flight Operations[a]	*190.25*	*100.31*	*828.05*	*4.29*	*69.35*
Range Ground Operations					
Ordnance Use at Target and Test Sites	*0.02*	*0.44*	*0.00*	*0.00*	*29.00*
Ground Troop Training[b]	*0.70*	*7.85*	*2.24*	*0.71*	*71.71*
Support Equipment (generators)	*0.19*	*2.46*	*0.53*	*0.12*	*0.17*
Totals[d]	***192.19***	***132.57***	***841.64***	***6.17***	***186.90***

[a] *Includes airfield-related flight activity, in-frame engine run-ups, ground support equipment, and fuel deliveries and transfers.*
[b] *Includes vehicle emissions, fugitive dust from vehicles, and ground troop training ordnance use.*
[c] *Totals include the Searles Valley, Owens Valley, and Mojave Desert nonattainment areas, and Inyo County.*
[d] *Due to rounding, totals may differ slightly than those presented in Appendix D.*
ROG = Reactive organic gases. *NOx = Nitrogen oxides.* *CO = Carbon monoxide.*
SOx = Sulfur oxides. *PM_{10} = Inhalable particulate matter.*
Source: NAWS 1996a.

Range Flight Operations

Range flight operations include a variety of aircraft test and training activities occurring throughout the NAWS ranges. The majority of these operations occur at altitudes greater than 3,000 feet (914 meters) AGL. Appendix D2 presents a detailed analysis of air emissions for baseline range flight operations.

Airfield Flight Operations

Airfield operations include aircraft flight activity, in-frame engine testing, use of ground support equipment, and aircraft refueling/defueling activities. Emission estimates for aircraft flight operations are based on flight activity within 3,000 feet (914 meters) of ground level. Appendix D1 presents a detailed analysis of air emissions for baseline airfield operations.

Range Ground Operations

Ordnance Use at Target and Test Sites. Air quality emissions associated with the use of target and test sites for test and training flight operations are related to the use of inert and HE ordnance. Ordnance use emission estimates presented in Table 3.3-3 are based on average ordnance PEP (propellants, explosives, and pyrotechnics) content. Appendix D4 presents a detailed analysis of air emissions for ordnance use at target and test sites.

Ground Troop Training. GTT emissions originate from military vehicles which includes portable field generators, fugitive dust from vehicle operation in unpaved areas, and ordnance use. Emissions from associated aircraft and helicopter flight activity related to GTT exercises are incorporated into the emissions estimate for range flight operations. Fugitive dust from vehicle activity in unpaved areas is the dominant emission source associated with GTT exercises. Appendix D3 presents a detailed analysis of air emissions for military vehicles.

Support Equipment. Estimated emissions from generators supporting range ground operations such as video tracking systems, remote data relay systems, and mobile radar systems are also presented in Table 3.3-3. Appendix D2 presents a detailed emissions analysis for generators supporting range operations.

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3.4
Biological Resources

3.4 BIOLOGICAL RESOURCES

This section provides an overview of NAWS's biological resources. Biological resources include plant and wildlife species, plant communities, and wildlife habitats. Plant communities are assemblages of plant species typically defined by the dominant plant species within the assemblage. Wildlife habitats are the natural environments of animals, consisting of biotic features (plant and animal assemblages) and abiotic features (air, water, and temperature regime). Wildlife at NAWS includes several species of invertebrates, fish, amphibians, reptiles, birds, and mammals.

This section focuses on plant and wildlife species and their habitats and the current approach applied for the management of these resources. NAWS biological resources management programs focus on federally listed threatened and endangered species at NAWS, and also provide for the conservation of other species warranting NAWS stewardship, as well as wetlands and riparian habitats on the NAWS ranges. Threatened and endangered plant or wildlife species are those formally proposed or listed as threatened or endangered by the USFWS. Species warranting NAWS stewardship include plants and animals that are not federally protected but are considered important components of the Station's biological resources. Wetlands and riparian areas are permanent or ephemeral surface water features occurring on the NAWS ranges. This section also provides a discussion of existing land disturbances (effects of grazing and fires) and the related effects on biological resources.

3.4.1 Regulatory Framework

Guidance and direction for the management of biological resources at NAWS is provided through the federal laws, associated regulations, and management plans and initiatives described in the following sections.

3.4.1.1 Federal Endangered Species Act

Federal law directs that all federal agencies and departments use their authority to preserve endangered and threatened species through compliance with the Endangered Species Act (ESA; 16 U.S.C. 1531 et seq). Section 7 of the ESA requires that the USFWS be consulted before implementing an action that could affect endangered or threatened species. The ESA specifically prohibits "taking" (e.g. killing, harming, or harassing) a federally listed endangered or threatened species. Such consultations require the federal agency to prepare a Biological Assessment. After reviewing the assessment, the USFWS issues a Biological Opinion (BO) stating whether actions of the federal agency will or will not jeopardize the continued existence of any threatened or endangered species. A No Jeopardy BO will contain those reasonable and prudent measures that must be implemented for the action to minimize the potential for "take." NAWS previously consulted with USFWS and received BOs for each of the three protected wildlife species occurring at China Lake. These BOs cover a range of actions from habitat maintenance and enhancement, to a programmatic BO for Desert Tortoise covering established military operations conducted in tortoise habitat on NAWS.

<u>Mojave Tui Chub</u>

A BO for the removal of channel aquatic vegetation (cattails) in Mojave tui chub habitat was originally issued by the USFWS in 1982 and updated in 1990. In 1997, a BO was issued for a Mojave tui chub habitat enhancement plan, designed to eliminate the need for annual cattail removal from portions of the channel system. Also in 1997, a BO was issued for the expansion of channel maintenance activities. This BO included a mark/recapture and habitat monitoring program. Monitoring of the Mojave tui chub occurs annually.

<u>Desert Tortoise</u>

In 1992, NAWS worked with the USFWS to create a programmatic BO that would allow NAWS limited authority to construct facilities and conduct military operations in tortoise habitat without project-by-project consultation with the USFWS (U.S. Navy 1998b). Under this Opinion, which was signed December 3, 1992 and reissued in 1995, a

Desert Tortoise Management Area (DTMA) encompassing approximately 200,000 acres (80,937 hectares) was created. The BO authorized the implementation of the Station's Desert Tortoise Habitat Management Plan (DTHMP), which allowed for the "take" of 2 tortoises annually by direct mortality, 10 tortoises per year in the form of harassment, and up to 40 tortoises by direct mortality over the term of the BO. To date only four animals have been affected by NAWS operations- three tortoises were moved and relocated and one tortoise was injured by a vehicle. NAWS continues to implement the DTHMP within the terms and conditions of the BO. Under the terms of the BO, once the take by mortality limit of 40 animals is reached, the Station will re-initiate a Section 7 consultation to address the ongoing management of NAWS operations Station-wide with emphasis on operations occurring in the DTMA.

In addition to the aforementioned terms for "take," the Station prepares and submits an annual report of all projects covered by the provisions of the BO. Projects with the potential to affect more than 50 acres (20 hectares) outside the DTMA and projects with the potential to affect more than 2.5 acres (1.0 hectares) inside the DTMA require prior notification to the USFWS. The USFWS then directs NAWS to request formal consultation or allows the project to continue with documentation to follow in the annual report. Surveys must be conducted for all projects within potential desert tortoise habitat, and personnel working in or near tortoise habitat must be briefed regarding operational procedures to avoid harming desert tortoise and to minimize loss of their habitat. Project-specific "reasonable and prudent measures" are routinely implemented such that potential for take of desert tortoise is minimized, typically without mission conflicts. These impact minimization measures include education programs, implementing existing operating procedures for activities in the DTMA, clearly marking project area boundaries, relocating animals at-risk found within project boundaries, minimizing predation risks, and managing the DTMA in accordance with the terms of the BO. Results of survey efforts and effectiveness of take or avoidance measures for all projects are provided to the USFWS in the annual report (U.S. Navy 1998b).

Inyo California Towhee

The USFWS issued a BO in 1990 concurring that willow trimming activities do not adversely affect the Inyo California towhee. Willow trimming is a maintenance measure performed as a safety measure along the roadside in Mountain Springs Canyon.

3.4.1.2 Sikes Act

The Sikes Act as amended in 1997 requires the development and implementation of an INRMP at military installations. Guidance and directives contained in this legislation are very similar to the land use management requirements of the CDPA, and the land use planning guidelines of the FLPMA. Baseline resource conditions, resource management priorities, and applicable goals and management guidelines from the NAWS draft INRMP are a principal component of the CLUMP. Sikes Act guidance for the development of an INRMP includes:

- Addressing overall installation land management, not just land use.
- Developing management goals compatible with a military installation's mission.
- Supporting the conservation and rehabilitation of natural resources.
- Providing sustainable multipurpose uses of natural resources.
- Providing mission-compatible public access for the use of natural resources.
- Providing an opportunity for public review and comment of the draft plan.

3.4.1.3 Other Laws and Regulations

There are several other federal laws and regulations that are relevant to biological resources management decisions. The Bald Eagle Protection Act specifically prohibits taking bald and golden eagles or any part, nest, or egg of these species. Golden eagles are residents at NAWS, while bald eagles are extremely rare migrants. The Migratory Bird Treaty Act specifically prohibits taking migratory birds, including any part, nest, or egg of migratory bird species.

Management guidelines for wild horses and burros on NAWS are provided in the Wild Horse and Burro Protection Act.

3.4.2 Current Management Practices

The following sections summarize current management practices for the conservation and protection of biological resources at NAWS. In addition to the long-standing biological resources conservation and compliance programs that have been implemented at NAWS over the past 35 years, the draft INRMP was developed in May 2000 in compliance with the Sikes Act as amended.

3.4.2.1 Integrated Natural Resources Management Plan

NAWS's draft INRMP describes the Station's natural resource management programs, goals, and guidelines; prioritizes management efforts; establishes a baseline for existing resource conditions; and delineates staffing and funding requirements. The draft INRMP formalizes existing programs and focuses on the five principal resource management areas; threatened and endangered species, habitat conservation (including species warranting stewardship), water resources management, grazing management, and resources inventory and data management. Coordination of the draft INRMP with the USFWS and the CDFG has been completed and a final draft document has been developed. The draft INRMP has been submitted to USFWS and CDFG and is contained in Vol. III of this EIS. Natural resource conditions and management goals and guidelines from the draft INRMP are incorporated into the CLUMP. The INRMP also includes provisions for feral grazing management and fire management, which are described in subsections 3.4.7 and 3.4.8, respectively.

3.4.2.2 Bird-Aircraft Strike Hazard Plan

Over the years, NAWS has implemented an informal BASH program. The program was coordinated between EPO, range operations, airfield flight operations, and safety personnel. In the 12 years between 1981 and 1992, records were actively kept, and only 27 incidents involving birds were recorded with no incidents involving terrestrial animals. Downsizing of NAWS staff eliminated some personnel, and the program was not actively pursued again until 1999. NAWS has recently initiated a formal BASH program and has developed a draft BASH plan (1999). NAWS has also established a working group to support the completion and implementation of the plan. The goals of the BASH plan are:

- to provide aviators and ground support personnel with background information regarding local bird populations and behavior patterns that may affect the safety of flight operations;
- to provide recommendations to reduce the potential for bird/aircraft strikes;
- to develop a standard procedure for reporting BASH events; and
- to establish a database to track BASH events over time. The BASH database will include the type of bird or animal involved in an incident, the aircraft involved, and the area of the incident.

3.4.2.3 Habitat Enhancement Efforts

There are several ongoing habitat enhancement efforts at NAWS, including the Mojave tui chub habitat enhancement project and the range-wide spring/riparian fencing project. The Mojave tui chub habitat enhancement project has proceeded under provisions of the BO discussed in Section 3.4.1.1. These activities have involved widening and deepening 250 feet (76 meters) of the Lark Seep south channel. The cattails (which degrade chub habitat when present in dense stands) are not expected to grow in deeper waters within and along one side of the channel. Gradual slopes have been constructed along the opposite side of the channel to allow some cattail growth (a necessary component of chub habitat), and areas of open, slow-flowing water (also necessary for the chub) are being maintained. Efforts to minimize grazing effects have included the fencing of approximately 30 springs

throughout the NAWS ranges to protect these resources from horse and burro grazing impacts. The fencing allows continued access by bighorn sheep, mule deer, and other native wildlife but precludes access by larger feral animals. Other riparian areas may be fenced during subsequent years as needs are identified and funding becomes available.

3.4.2.4 Data Collection and Management

NAWS continues to fund and support biological data collection efforts by supporting and encouraging outside research. This funding or logistical support helps identify resource management issues, and allows specific proactive management actions to be taken. The Station has prioritized these data collection efforts such that federally listed species have the highest priority for support, followed by species warranting NAWS stewardship and others.

Natural resource data collected by NAWS are updated and entered into its Geographic Information System (GIS). To ensure the collected data are used to the greatest extent feasible when making management decisions, they are made available to planners and others in an appropriate format. Making the data available in a workable format to all interested sources ensures data sharing, which further enhances resource management. The GIS can be used to identify areas that support high-value resources, and can assist project proponents and planners in designing projects so that impacts to biological resources are avoided or minimized to the greatest extent feasible.

3.4.2.5 Environmental Awareness Training

Environmental awareness training is routinely provided to range users and others to ensure personnel at the Station understand the natural habitat, and to ensure that personnel are familiar with the requirements of standard practices designed to minimize disturbance to biological resources. In addition, specific briefings are provided to range users and operations personnel involved with programs occurring within desert tortoise habitat. These briefings are performed in accordance with the terms and conditions of the Station's programmatic BO for the protection and conservation of desert tortoise and its habitat Station-wide.

3.4.2.6 Public Access

NAWS continues to closely control and monitor public access in designated areas to help reduce impacts to biological resources.

3.4.2.7 Regional Environmental Management and Land Use and Planning Initiatives

NAWS continues to participate in planning initiatives, including species-specific recovery plans, and regional natural resources management and land use efforts. There are several ongoing regional land use and ecosystem management planning efforts in which NAWS has an active role. Partnerships with several agencies have been established to prepare these plans and to allow NAWS to take an active role in integrating land use planning efforts at the Station with other federal, state, and local agencies (in accordance with the FLPMA and DoD and Navy directives). These efforts are summarized in the following sections and are detailed further in Chapter 5, Cumulative Impacts.

California Desert Conservation Area Plan

The CDCAP is a comprehensive, long-range plan for managing, using, developing, and protecting the public lands under the cognizance of the CDCA (12,000,000 acres [4,856,247 hectares]), including the area surrounding NAWS.

West Mojave Coordinated Management Plan

The West Mojave Coordinated Management Plan (WMCMP) reflects a multi-agency partnership formed to develop a comprehensive, interagency planning effort for the conservation of biological resources in the West Mojave region. This 9,000,000-acre (3,642,185-hectare) planning effort involves 4 counties (Kern, San Bernardino, Inyo, and Los Angeles), 11 cities, and 4 military bases. A multi-species, multi-habitat, multi-jurisdiction plan is being developed that will focus on the recovery of the desert tortoise and management of a number of other species.

Northern and Eastern Mojave Planning Effort

The objective of the Northern and Eastern Mojave Planning Effort is to provide a regional perspective for managing federal lands and to update agency-specific management plans to reflect the changes made by the CDCAP.

Mojave Desert Ecosystem Program

The objective of the regional Mojave Desert Ecosystem Program is to develop a centralized environmental database from existing databases at federal and state land management agencies in the Mojave Desert, including NAWS. The database would assist and facilitate the collection, storage, and analysis of land management information to facilitate interagency cooperation towards an ecosystem approach to land management in the region.

3.4.3 Overview of Biological Resources

3.4.3.1 Vegetation

California is botanically divided into three floristic provinces: California, Great Basin, and Desert (Hickman 1993). All three provinces are present in the northern half of the North Range. The southern half of the North Range and all of the South Range are in the Desert floristic province. The vegetation of NAWS is also influenced by the presence of numerous springs and seeps, as well as by its diverse topography and wide range of elevational changes, ranging from 2,160 feet (658 meters) above MSL on the China Lake playa, to more than 8,839 feet (2,694 meters) above MSL on Maturango Peak. Minimum and maximum elevations on the South Range are 1,660 feet (506 meters) above MSL at the Movie Lake playa and 5,578 feet (1,700 meters) above MSL on Straw Peak (U.S. Navy 1989a).

Sixteen different plant communities are on NAWS; all are present on the North and South ranges. Transition zones occur between many of the different plant communities. The plant communities vary from barren playas, alkali sink, saltbush scrub, and creosote bush scrub at lower elevations to sagebrush scrub and pinyon woodland found in the Coso and Argus ranges. Mojave mixed woody scrub is the most common plant community type, followed by creosote bush scrub. Desert riparian areas are scattered throughout both ranges, in association with springs and seeps on the North and South ranges (U.S. Navy 1989a). Figures 3.4-1 and 3.4-2 show the major plant communities at NAWS and brief descriptions are provided in Appendix E.

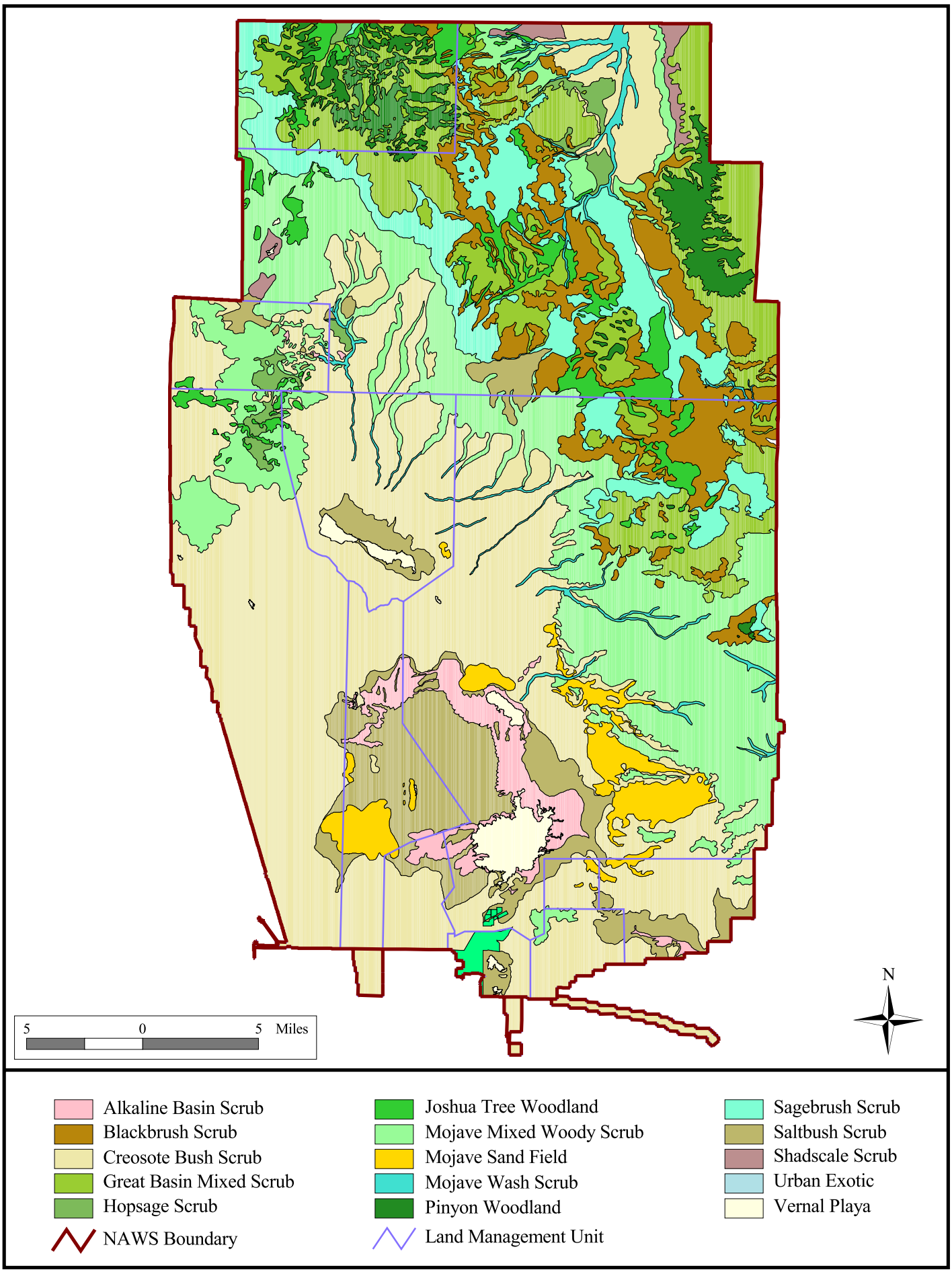

Figure 3.4-1 Plant Communities on North Range

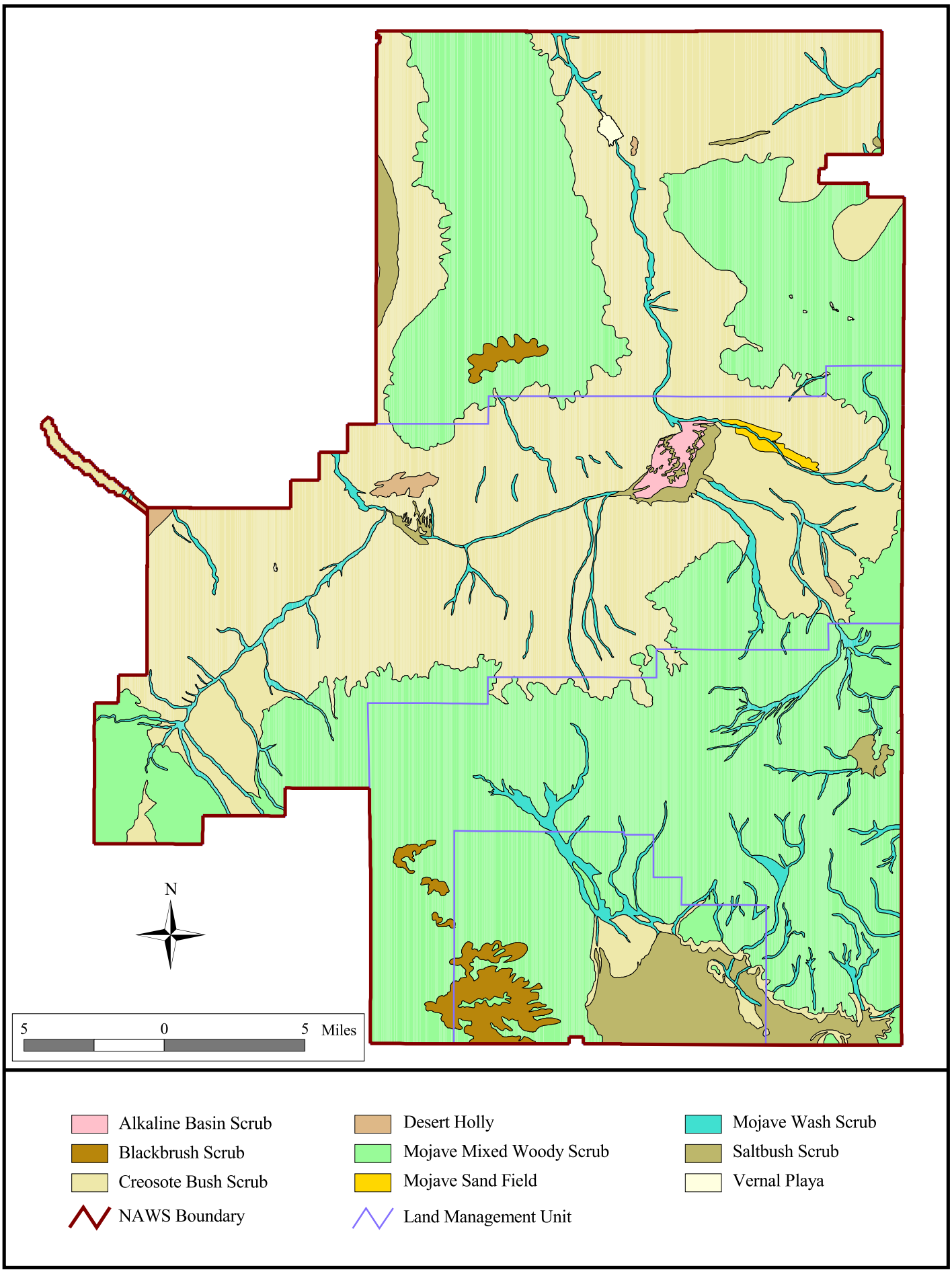

Figure 3.4-2 Plant Communities on South Range

Approximately 675 vascular plant taxa (species, subspecies, and varieties) are known to occur on NAWS ranges. Most of these plants are representative of the Desert and Great Basin provinces, but a small number of plants that typically occur in the Sierra Nevada are also present. An additional 20 taxa, primarily naturalized weeds, are known to occur only in the China Lake main complex. Table E-3 in Appendix E lists the various plant species known to occur on NAWS.

The plant communities described in this section are based primarily on a classification system developed by Holland (1986), with minor modifications by NAWS to make it more applicable to the Station. Table 3.4-1 summarizes these plant communities. Plant community classifications that supplement Holland 1986, or that are cross-referenced, include Sawyer and Keeler-Wolf 1995, Beatley 1976, Munz 1974, and Brown 1982.

3.4.3.2 Wildlife

Because of the region's varied topography and diversified habitats, wildlife on NAWS is rich and varied. This section provides an overview of wildlife resources occurring on-Station. Because of the relative scarcity of water in the desert, riparian areas and other water sources (even temporary seeps and ponds) tend to concentrate wildlife species, creating an oasis effect. Generally, these areas show the highest wildlife diversity for a given region and represent a valuable resource for wildlife.

Within all floristic provinces, there is a variety of wildlife. Many species are wide-ranging (existing in all floristic provinces), while others are restricted to microhabitats within a particular plant community. Many of the more mobile species, especially larger mammals and birds, may use a variety of plant communities, even within a single day. Less mobile species, especially some invertebrates, reptiles, amphibians, and small mammals, may live their entire life cycles within a single plant community or even within a few square meters of habitat.

This section is organized according to evolutionary grouping, including invertebrates, fishes, amphibians, reptiles, birds, and mammals. Each section discusses certain common and characteristic species that occur on the Station.

<u>Invertebrates</u>

Invertebrate species are among the most diverse on NAWS, yet are the least studied. Characteristic species of desert scrub habitats include a variety of scorpions, spiders, grasshoppers, crickets, beetles, ants, antlions, wasps, butterflies, and moths. Some of the more common species include desert tarantulas (*Aphonopelma chalcodes*), creosote bush grasshoppers (*Bootettix argenteus*), desert clicker grasshoppers (*Ligurotettix coquilletti*), termites (Order: Isoptera), broad-necked darkling beetles (*Coelocnemis californicus*), tiger beetles (*Cicindela* sp.), tarantula hawks (*Hemipepsis* spp.), and harvester ants (*Pogonomyrmex* spp; U.S. Navy 1998b).

Invertebrate species with limited ranges or those that are endemic (restricted in distribution to a particular locality) to the Station include the Argus land snail (*Eremariontoides argus*), two species of dune cockroach (*Arenavaga* spp.), Darwin Tiemann's beetle (*Megacheuma brevipennis tiemannii*), and dune weevils (*Trigonoscuta* spp.).

Surveys have shown more than 80 species of butterflies occur at NAWS (U.S. Navy 1998b). Although none of these butterflies are legally protected, nine are considered unusual due to their limited distribution (U.S. Navy 1998b). At the Station, these nine butterfly species occur only on the North Range and include Elvira's blue (*Euphilotes pallescens*), spotted blue (*E. baueri vernalis*), San Emigido blue (*Plebejulina emigdionis*), Boisduval's blue (*Icaricia icariodes*), sylvan hairstreak (*Satyrium silvinium*), American copper (*Lycaena arota*), woodland satyr (*Cercyonis sthenele*), Alpheu's sooty-wing (*Pholisora alpheus*), and arachne checker spot (*Poladryas arachne*; Pratt and Pierce 1995). Most of these nine butterflies are associated with small areas of habitat. Three in particular may be especially limited: spotted blue, San Emigido blue, and woodland satyr.

Table 3.4-1 Plant Communities on NAWS

NAWS Plant Community	*Range*	*Elevation Range (feet above MSL)*	*Defining Species*	*Acres*
Mojave Sand Field	*Both*	*2,200-3,800*	*Creosote bush* *Larrea tridentata*	*16,788*
Alkaline Sink Scrub	*Both*	*1,900- 2,050*	*Bush seepweed* *Suaeda moquinii*	*16,042*
Blackbrush Scrub	*Both*	*3,500-6,500*	*Blackbrush* *Coleogyne ramosissima*	*48,914*
Creosote Bush Scrub	*Both*	*1,900- 5,500*	*Creosote bush* *Larrea tridentata*	*416,342*
Desert Holly Scrub	*Both*	*Below 3,000*	*Desert holly* *Atriplex hymenolytra*	*1,395*
Desert Transition Scrub	*Both*	*4,000-6,500*	*Linear-leaved goldenbush* *Ericameria linearfolia*	*Unknown* [a]
Great Basin Mixed Scrub	*North*	*5,000-8,000*	*Bitterbrush* *Purshia tridentata var. glandulosa*	*66,695*
Hopsage Scrub	*Both*	*3,000-5,000*	*Spiny hop sage* *Grayia spinosa*	*5,498*
Mojave Mixed Woody Scrub	*Both*	*2,500-5,500*	*Bladder sage* *Salazaria mexicana*	*350,398*
Mojave Wash Scrub	*Both*	*3,000-4,000*	*Cheesebush* *Hymenoclea salsola*	*27,134*
Sagebrush Scrub	*North*	*4,500-6,000*	*Big sagebrush* *Artemisia tridentata*	*40,997*
Saltbush Scrub	*Both*	*Below 5,000*	*Allscale* *Atriplex polycarpa*	*67,076*
Shadscale Scrub	*North*	*3,500-5,000*	*Shadscale* *Atriplex confertifolia*	*3,590*
Joshua Tree Woodland	*Both*	*4,000-7,000*	*Joshua tree* *Yucca brevifolia*	*18,430*
Pinyon Woodland	*North*	*Above 6,500*	*Pinyon pine* *Pinus monophylla*	*18,959*
Playa	*Both*	*1,400-7,500*	*Stinkweed* *Cleomella obtusifolia*	*7,976*
Riparian	*Both*	*Throughout*	*Arroyo willow* *Salix lasiolepsis*	*Unknown* [a]
Disturbed	*Both*	*Throughout*	*Devil's lettuce* *Amsinkia tessellata*	*1,785* [b]

[a] *Desert Transition Scrub and Riparian plant communities at NAWS are being mapped. Acreages of these plant communities at NAWS are currently not available.*

[b] *Disturbed acreage includes only urban exotic vegetation around developed areas.*

MSL = mean sea level.

Sources: Munz 1974; Beatley 1976; Brown et al. 1982; Holland 1986; Hickman 1993; Sawyer and Keeler-Wolf 1995; U.S. Navy 1998b.

In addition, a large number of invertebrates exist within the playas and can emerge during periods of standing water after rains. While these habitats support many smaller invertebrates, the most obvious are the larger branchiopods, such as several species of fairy shrimp, including giant fairy shrimp (*Branchinecta gigas*), tadpole shrimp (*Lepidurus lemmoni*), brine shrimp (*Artemia* sp.), and, potentially, clam shrimp (*Eocyzicus digueti*; U.S. Navy 1996a). Through support of independent research efforts during the last 20 years, NAWS has developed a list of invertebrate species occurring on its ranges, including in the sand dune systems and associated sand field plant communities. Many of these could represent endemic species (U.S. Navy 1996a).

Fishes

There are more than 120 springs, two seeps (i.e., pools formed by water slowly percolating to the surface), and approximately 20 constructed ponds on NAWS. However, only five fish species occur on the Station. The federally endangered Mohave tui chub (*Gila bicolor mohavensis*) has been present on the Station since it was introduced in the 1970s. The other species, mosquito fish (*Gambusia affinis*), bullhead catfish (*Ictalurus* sp.), goldfish (*Carassius auratus*), and large mouth bass (*Micropterus salmoides*), are introduced nonnative species. The Mojave tui chub, mosquito fish, and bullhead catfish are known to exist in the Lark Seep and G-1 Seep system located on the south-central portion of the North Range. Goldfish are present in the Lark Seep and G-1 Seep system and in a number of constructed ponds. Largemouth bass occur in ponds at Area R on the North Range (U.S. Navy 1998b).

Amphibians

Although the desert is characterized as an arid environment, there is enough moisture associated with naturally and artificially occurring water sources to support amphibious species. Amphibians are generally secretive, remaining underground or beneath debris near water, are often active only at night, and usually are confined to permanent water sources. Table E-4 (in Appendix E) includes amphibians that have been identified or that are likely to occur on the Station. Only two species of native amphibians, the western toad (*Bufo boreas*) and Pacific tree frog (*Pseudacris* [*Hyla*] *regilla*), have been identified. Although the slender salamander (*Batrachoseps* sp.) has not been observed, its habitat is present, and it also may occur at the Station. During the summer of 1998, an unsubstantiated report of slender salamanders was made immediately east of the Station boundary in Great Falls Basin. Bullfrogs (*Rana catesbeiana*) have been found in the Lark Seep channel as an introduced exotic species.

Reptiles

Some of the most conspicuous wildlife species on NAWS ranges are the reptiles. Thirty-one species of reptiles have been identified at NAWS, including a variety of lizards and snakes. The federally threatened desert tortoise (*Xerobates* [*Gopherus*] *agassizii*) occurs on the Station, with higher densities on the South Range. Common lizards include the desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus draconoides*), desert collared lizard (*Crotaphytus insularis*), desert spiny lizard (*Sceloporus magister*), side-blotched lizard (*Uta stansburiana*), long-tailed brush lizard (*Urosaurus graciosus*), desert horned lizard (*Phrynosoma platyrhinos*), and western whiptail (*Cnemidophorus tigris*). Gilbert's skink (*Eumeces gilberti*) is common in the desert riparian areas. Common snakes include the red racer (*Masticophis falgellum*), western patch-nosed snake (*Salvadora hexalepis*), glossy snake (*Arizona elegans*), gopher snake (*Pituophis melanoleucus*), common kingsnake (*Lampropeltis getulus*), long-nosed snake (*Rhinocheilus lecontei*), night snake (*Hypsiglena torquata*), sidewinder (*Crotalus cerastes*), and the Mojave rattlesnake (*C. scutulatus*). Less common species include the chuckwalla (*Sauromalus obesus*), and Panamint alligator lizard (*Elgaria* [*Gerrhonotus*] *panamintina*) (U.S. Navy 1996a). Two snapping turtles (*Chelydra serpentina*) have been found in the Lark Seep channels as an introduced exotic species. Reptile species known to occur on the NAWS ranges are listed in Table E-4 in Appendix E (U.S. Navy 1998b).

Birds

Probably the most well documented categories of wildlife species occurring on NAWS are its native and transient bird populations. To date, 310 different bird species, including the federally threatened Inyo California towhee, have been identified. The Audubon Society conducts an annual Christmas bird count on the North Range and since 1988 has completed more than 800 surveys at the wastewater ponds in the southern portion of George Range. Table E-5 in Appendix E presents the bird species that have been identified on NAWS (U.S. Navy 1998b). The majority of birds occurring at NAWS are migratory species. Some of the bird species identified as common or fairly common at NAWS (based on Blue and Moore 1995) are described for the following habitat types: desert scrub, alkali sink, scrub woodland, riparian, wetland/ponds, and disturbed.

Desert scrub habitat covers most of NAWS and includes these plant communities: creosote bush scrub, Mojave mixed woody scrub, sagebrush scrub, blackbrush scrub, shadscale scrub, hopsage scrub, Mojave wash scrub, Mojave sand field, and desert holly scrub. Many bird species occurring here also can be found within other habitat types. The more common species in this habitat include turkey vulture (*Cathartes aura*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), lesser nighthawk (*Chordeiles acutipennis*), northern flicker (*Colaptes auratus*), Say's phoebe (*Sayornis saya*), western kingbird (*Tyrannus verticalis*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), black-throated sparrow (*Amphispiza bilineata*), sage sparrow (*A. belli*), and savannah sparrow (*Passerculus sandwichensis*). Less common species include golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), and Le Conte's thrasher (*Toxostoma lecontei*).

Alkali sink habitat includes the alkali sink scrub, saltbush scrub, and vernal playa plant communities. Most of the bird species found here are migratory and usually are found only in the alkali sink habitat when standing water is present, typically only during the winter. As such, these seasonal wetlands are important habitat for many of these birds. Many of the smaller waterfowl species, such as the ducks, are occasionally observed in the pond habitat described in subsequent sections. The federally threatened western snowy plover (*Charadrius alexandrinus nivosus*) is an uncommon migrant and an extremely rare summer resident species in this habitat. The more common species associated with alkali sink habitat include the American white pelican (*Pelecanus erythrorhynchos*), snow goose (*Chen caerulescens*), Canada goose (*Branta canadensis*), green-winged teal (*Anas crecca*), mallard (*A. platyrhynchos*), northern pintail (*A. acuta*), cinnamon teal (*A. cyanoptera*), northern shovelor (*A. clypeata*), gadwall (*A. strepera*), American wigeon (*A. americana*), redhead (*Aythya americana*), bufflehead (*Bucephala albeola*), ruddy duck (*Oxyura jamaicensis*), killdeer (*Charadrius vociferus*), black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), greater yellowlegs (*Tringa melanoleuca*), lesser yellowlegs (*T. flavipes*), spotted sandpiper (*Actitis macularia*), western sandpiper (*Calidris mauri*), least sandpiper (*C. minutilla*), long-billed dowitcher (*Limnodromus scolopaceus*), Wilson's phalarope (*Phalaropus tricolor*), red-necked phalarope (*P. lobatus*), ring-billed gull (*Larus delawarensis*), California gull (*L. californicus*), black tern (*Childonias niger*), cliff swallow (*Hirundo pyrrhonota*), and the introduced red-legged partridge (*Alectrois chukar*), also known as the "chukar." Less common species include Ross's goose (*Chen rossii*) and Baird's sandpiper (*Calidris bairdii*), both of which are observed on rare occasions.

Scrub woodland habitat includes those plant communities that generally are located above 5,000 feet (1,524 meters) MSL, such as Joshua tree woodland, Great Basin mixed scrub, pinyon woodland, and desert transition scrub. In addition to the many birds occurring in the desert scrub habitat, the following species are fairly common: Anna's hummingbird (*Calypte anna*), mountain chickadee (*Parus gambeli*), black-headed grosbeak (*Pheucticus melanocephalus*), and savannah sparrow (*Passerculus sandwichensis*).

Riparian habitat, with water availability and relatively lush, dense vegetative cover, provides the most important habitat on NAWS. Riparian habitat is present along washes, around seeps and springs, and adjacent to ponds, wherever sufficient water is near the surface to sustain woody trees and dense shrubs. The riparian corridors and "oasis" of vegetation provide important migration corridors for neotropical migrants. The federally endangered

southwestern willow flycatcher (*Empidonax traillii extimus*) is a known migrant but does not breed on the Station. Common and characteristic bird species observed in this habitat type include the Inyo brown toyhee (*Pipilo fuscus eremophilus*), mourning dove (*Zenaida macroura*), long-eared owl (*Asio otus*), black-chinned hummingbird (*Archilochus alexandri*), black phoebe (*Sayornis nigricans*), tree swallow (*Tachycineta bicolor*), ruby-crowned kinglet (*Regulus calendula*), loggerhead shrike (*Lanius ludovicianus*), orange-crowned warbler (*Vermivora celata*), yellow warbler (*Dendroica petechia*), yellow-rumped warbler (*D. coronata*), Wilson's warbler (*Wilsonia pusilla*), song sparrow (*Melospiza melodia*), Lincoln's sparrow (*M. lincolnii*), white-crowned sparrow (*Zonotrichia leucophrys*), dark-eyed junco (*Junco hyemalis*), lesser goldfinch (*Carduelis psaltria*), and Lawrence's goldfinch (*C. lawrencei*). Less common species include Pacific-slope flycatcher (*E. difficilis*) and MacGillivray's warbler (*Oporornis tolmiei*), both of which are observed on rare occasions.

Wetland and pond habitat at NAWS provides a source of more permanent surface and open water and vegetation for resting, feeding, and nesting. Common and characteristic bird species dependent on wetland/pond habitat include the eared grebe (*Podiceps nigricollis*), great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), black-crowned night-heron (*Nycticorax nycticorax*), American coot (*Fulica americana*), black-necked stilt, American avocet, greater yellowlegs, lesser yellowlegs, marsh wren (Cistothorus *palustris*), common yellowthroat (*Geothlypis trichas*), song sparrow, Lincoln's sparrow, red-winged blackbird (*Agelaius phoeniceus*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*).

Non-native vegetation found on the golf course and in residential and developed Station areas represents the disturbed habitat type. There are several bird species that commonly reside in this habitat type but that are not necessarily limited to disturbed areas. These include killdeer, mourning dove, Anna's hummingbird, northern flicker, western kingbird, barn swallow (*Hirundo rustica*), American robin (*Turdus mirgratorius*), loggerhead shrike, European starling (*Sturnus vulgaris*), yellow-rumped warbler, white-crowned sparrow, dark-eyed junco, western meadowlark (*Sturnella neglecta*), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), and house finch (*Carpodacus mexicanus*). Less common species occurring in the disturbed habitat include great-tailed grackle (*Quiscalus mexicanus*), Bullock's oriole (*Icterus bullockii*), and an occasional vermilion flycatcher (*Pyrocephalus rubinus*) at the golf course. The rock dove or domestic pigeon (*Columba livia*) and house sparrow (*Passer domesticus*) generally are limited to disturbed habitat.

Mammals

NAWS ranges support more than 80 mammal species. Twelve bats have been identified including eight species of *Myotis*, as well as the western pipistrelle (*Pipistrellus hesperus*), big brown bat (*Eptesicus fuscus*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), pallid bat (*Antrozous pallidus*), Mexican free-tailed bat (*Tadarida brasiliensis*), and western mastiff bat (*Eumops perotis*).

Many small mammals, such as several species of kangaroo rat (*Dipodomys* spp.), live in the driest portions of the desert, deriving all of the water they need from the seeds they eat. Through much of the desert, Merriam's kangaroo rat (*D. merriami*) is the most abundant small mammal, although the Panamint kangaroo rat (*D. panamintinus*) and the Great Basin or chisel-toothed kangaroo rat (*D. microps*) are also common, especially in saltbush communities. Other common small mammals include the state-listed Mohave ground squirrel (*Spermophilus mohavensis*), Botta's pocket gopher (*Thomomys bottae*), several species of pocket mouse (*Perognathus* spp. and *Chaetodipus* spp.), deer mouse (*Peromyscus maniculatus*), canyon mouse (*P. crinitus*), cactus mouse (*P. eremicus*), brush mouse (*P. boylii*), the carnivorous southern grasshopper mouse (*Onychomys torridus*), and a species of vole (*Microtus* sp.). Abundant in somewhat wetter areas are the western harvest mouse (*Reithrodontomys megalotis*) and desert woodrat (*Neotoma lepida*). Less common is the desert shrew (*Notiosorex crawfordi*). Other common mammals in the desert include the desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), and California ground squirrel (*Spermophilus beecheyi*). The pinyon pine and other woodlands support an additional mix of small mammals, including the Panamint chipmunk (*Tamias panamintinus*),

pinyon mouse (*Peromyscus truei*), dusky-footed woodrat (*Neotoma fuscipes*), common porcupine (*Erethizon dorsatum*), and striped skunk (*Mephitis mephitis*) (U.S. Navy 1989b, 1998b).

A number of wide-ranging carnivores are also relatively common in the desert including coyote (*Canis latrans*), desert kit fox (*Vulpes macrotis*), ringtail (*Bassariscus astutus*), long-tailed weasel (*Mustela frenata*), American badger (*Taxidea taxus*), mountain lion (*Felis concolor*), and bobcat (*Lynx rufus*) (U.S. Navy 1989b, 1998b). The common gray fox (*Urocyon cinereoargenteus*) occurs in the pinyon pine and other woodlands. Larger mammals include mule deer (*Odocoileus hemionus*), Nelson's bighorn sheep (*Ovis canadensis nelsoni*), as well as the feral burros (*Equus asinus*) and feral horses (*Equus caballus*) (U.S. Navy 1989a,b, 1997a). Appendix E, Table E-6, lists the mammal species known to occur on NAWS.

3.4.4 Federally Listed Threatened and Endangered Species

3.4.4.1 Plant Species

There are currently no known occurrences of federally listed threatened or endangered plant species on NAWS lands. However, some areas of the Station contain habitat that could support such listed species. One noteworthy example is the Lane Mountain milk-vetch (*Astragalus jaegerianus*) that was listed as an endangered species by USFWS on October 6, 1998 (USFWS 1998a). This species has been identified approximately 4 miles (6.4 kilometers) south of NAWS boundary. Potential habitat is located on the South Range in Superior Valley and on the gentle slopes bordering the valley (Bagley 1986). Focused surveys have been conducted in this area of the Station but no occurrences of the Lane Mountain milk-vetch have been confirmed to date.

3.4.4.2 Wildlife Species

Three wildlife species formally listed by USFWS as threatened or endangered are known to occur on NAWS: Mojave tui chub, desert tortoise, and Inyo California towhee (*Pipilo crissalis eremophilus*). In addition, several nonresident threatened or endangered bird species occur on-Station as transients or migrants. Threatened and endangered wildlife species known to occur on NAWS are included in Table 3.4-2. The term "transient" refers to a species that occurs at the Station typically for short duration while en route to another destination during migration. The term "migrant" refers to a species that occurs at the Station for longer periods during migration or that may winter at the Station. In Table 3.4-2, the term "vagrant" refers to a species whose occurrence in the area is extremely rare or accidental; these species do not typically occur at the Station.

The Mojave tui chub is a federally listed endangered fish species. The known distribution of the Mojave tui chub on NAWS is shown on Figure 3.4-3. Mojave tui chub occurred in large lakes of the Great Basin region during the Pleistocene. Some 11,500 years ago, retreating ice caps resulted in the loss of once extensive aquatic systems, and the chub became restricted to more confined habitats. They typically are associated with deep pools and slough-like areas of the Mojave River, where they are the only native fish in that system. It is likely that the Mojave tui chub no longer exists in natural habitats within its native range. Hybridization with the introduced arroyo chub (*Gila orcutti*) has contributed to population declines in many areas. Genetically pure populations now occur only in refugia (that is, habitats that are maintained in a more or less stable state) located at NAWS, as well as at other off-Station areas including MC Spring and Soda Springs, along the western shore of Soda Lake, and at Camp Cady, along the Mojave River channel west of Afton Canyon. Mojave tui chub are primarily zooplankton and benthic invertebrate feeders (U.S. Navy 1998b).

Table 3.4-2 Federally Listed Threatened and Endangered Wildlife Species on NAWS

Species Common Name (Scientific Name)	*Status Federal/ State*	*Habitat on NAWS*	*Occurrence*	*Range*
Mojave tui chub (Gila bicolor mohavensis)	*E/E*	*Lark Seep, G-1 Seep*	*Resident*	*North*
Desert tortoise (Xerobates [Gopherus] agassizii)	*T/T*	*Creosote bush scrub, saltbush scrub, and Joshua tree woodland; Designated Critical Habitat on South Range*	*Resident*	*Both*
Inyo California towhee (Pipilo crissalis eremophilus)	*T/E*	*Riparian habitats in the southern Argus Range; Designated Critical Habitat on North Range*	*Resident*	*North*
California brown pelican (Pelecanus occidentalis californicus)	*E/E*	*Recorded twice at Lark Seep*	*Vagrant, extremely rare*	*North*
Bald eagle (Haliaeetus leucocephalus)	*FPD/E*	*Migrate over most habitats*	*Transient, extremely rare*	*North*
Western snowy plover (Charadrius alexandrinus nivosus)	*T*	*Wastewater Treatment Facility ponds, G-1 Seep*	*Uncommon migrant, extremely rare summer resident*	*North*
Southwestern willow flycatcher (Empidonax traillii extimus)	*E/E*	*Riparian habitats, as well as the housing area and golf course*	*Transient, fairly common*	*North*
Least Bell's vireo (Vireo bellii pusillus)	*E/E*	*Riparian habitats, as well as the housing area and golf course*	*Transient, extremely rare*	*North*

[a] *Only the Pacific coastal population of western snowy plover is listed. Plovers occurring on NAWS are considered to be part of an unlisted inland population.*
E = Endangered.
T = Threatened.
FPD = Federal Proposed Delisted.

Sources: USFWS 1996a, 1996b; CDFG 1997; U.S. Navy 1998b, 1999a.

Mojave Tui Chub

In 1971, 400 Mojave tui chub were introduced from the Soda Springs population into the Lark Seep system at NAWS. The population was augmented with another 75 individuals in 1976. As water levels rose through the years, this population has increased and expanded in range. Mojave tui chub currently occur throughout the Lark Seep/G-1 Seep drainage system, which consists of the two seeps and about 5 miles of interconnecting channels. Estimates in 1995 and 1997 place the population at 7,500 to 10,000 chub, making this the largest known population in the world. During sampling, more than 90 percent of the chub were in the channels, rather than in the two seeps (U.S. Navy 1998b). At the G-1 Seep, the chub occur in a small area where the channel terminates into the seep. Habitat within the slow-flowing channel likely mimics the chub's natural Mojave River habitat and may help buffer the fish from changes in water temperature and quality.

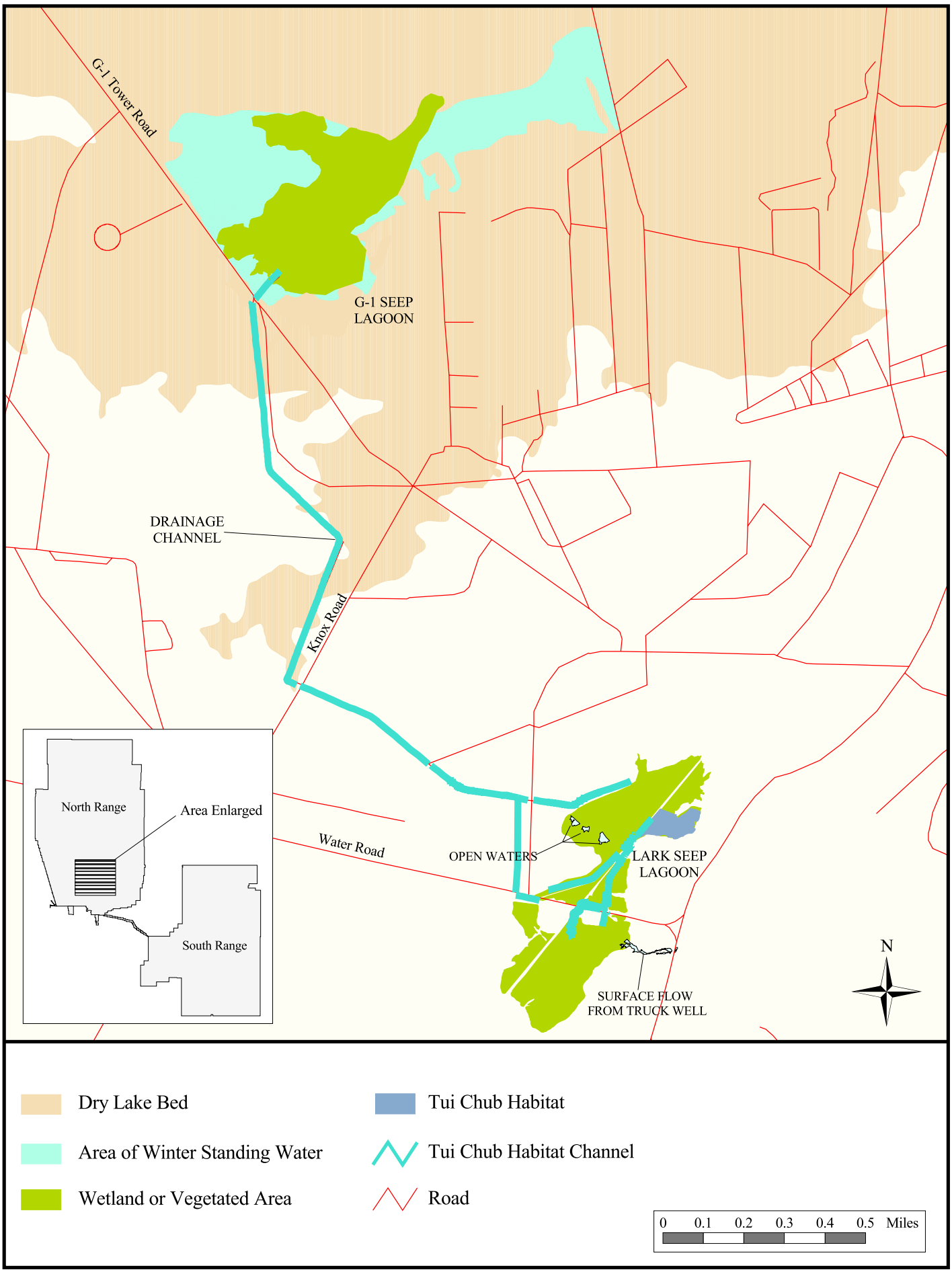

Figure 3.4-3 Distribution of Mojave Tui Chub on NAWS China Lake

Managing the channel vegetation to maintain and enhance Mojave tui chub habitat has been a priority for NAWS. The seep system occurs because of the rising groundwater table resulting from seepage from the City of Ridgecrest's wastewater treatment ponds, and to a lesser extent from the Station's golf course and housing area. The current system of channels was excavated during the 1960s to prevent facility damage from the rising groundwater in the seeps. The seep lagoons and channels support cattails (*Typha latifolia*) which, if not cleared, form dense stands that block the flow of water and reduce habitat quality for the chub. Habitat enhancement activities have involved widening and deepening 250 feet (76 meters) of the Lark Seep south channel. The cattails are not expected to grow in the deeper waters of the central portion of the channel.

Gradual slopes have been constructed along the opposite side of the channel to allow for cattail growth (a necessary component of chub habitat) and to maintain areas of open, slow-flowing water (also necessary for the chub). These habitat-enhancing activities have proceeded under the provisions of the BO issued by the USFWS (discussed in Section 3.4.1.1).

Desert Tortoise

In August 1989, USFWS listed the Mojave population (west of the Colorado River) of the desert tortoise as endangered under the emergency listing provisions of the ESA. The state of California listed the species as threatened in June 1989, and the USFWS formally listed the desert tortoise as threatened in April 1990. The USFWS finalized the Desert Tortoise Recovery Plan in 1994 and designated critical habitat in 1995. A portion of the Superior-Cronese Critical Habitat Unit, one of four units of Critical Habitat designated by the USFWS in the Western Mojave Recovery Unit, is in the southern portion of South Range (USFWS 1994).

At NAWS, tortoises occur in creosote bush scrub and saltbush scrub communities, at elevations ranging from 1,660 feet (506 meters) to 4,000 feet (1,219 meters) above MSL. Surveys of the North Range and South Range conducted in 1990 and 1991 demonstrated that the highest density tortoise habitat tends to be on gentle slopes (bajadas), in creosote bush scrub with sandy-loam to pebbly soils (Kiva Biological Consulting 1991). Desert tortoise densities on NAWS are shown in Figures 3.4-4 and 3.4-5. The densities of desert tortoise populations were estimated using the standard reference method of the time (Kiva Biological Consulting 1991). Tortoise population densities were identified as low-density habitat (less than 20 animals per square mile), moderate-density habitat (20 animals per square mile), and high-density habitat (21-50 animals per square mile).

On the North Range, surveys identified 136 square miles (352 square kilometers) of potential desert tortoise habitat, with 7 square miles (18 square kilometers) of moderate-density habitat and 129 square miles (334 square kilometers) of low-density habitat (Figure 3.4-4). On the South Range, 219 square miles (567 square kilometers) of potential desert tortoise habitat were identified, with 30 square miles (78 square kilometers) of high-density habitat, 23.5 square miles (61.0 square kilometers) of moderate-density habitat, and 165.5 square miles (428.6 square kilometers) of low-density habitat (Figure 3.4-5). The Desert Tortoise Critical Habitat designated by the USFWS in the southern portion of the South Range is also shown on Figure 3.4-5 (USFWS 1994).

Inyo California Towhee

USFWS listed the Inyo brown towhee (*Pipilo fuscus eremophilus*) as a threatened species on August 3, 1987 and wrote a recovery plan that designated critical habitat on NAWS lands in the Mountains Springs Canyon and Wilson Canyon areas in 1998. This subspecies is now recognized as the Inyo California towhee (Pipilo *crissalis eremophilus*; USFWS 1998b). The Inyo California towhee is the only federally listed bird species resident on NAWS.

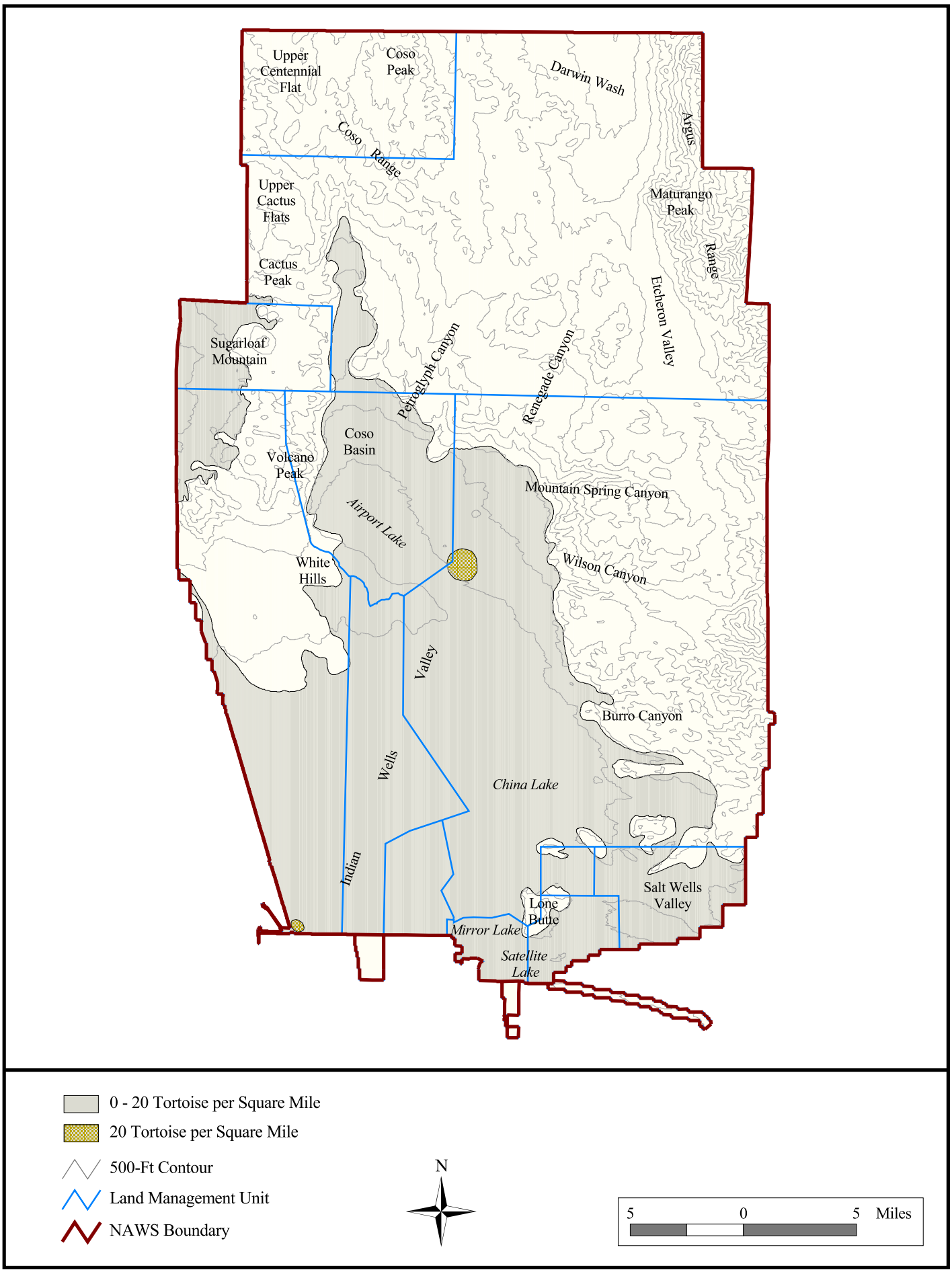

Figure 3.4-4 Known Desert Tortoise Habitat Areas and Densities, North Range

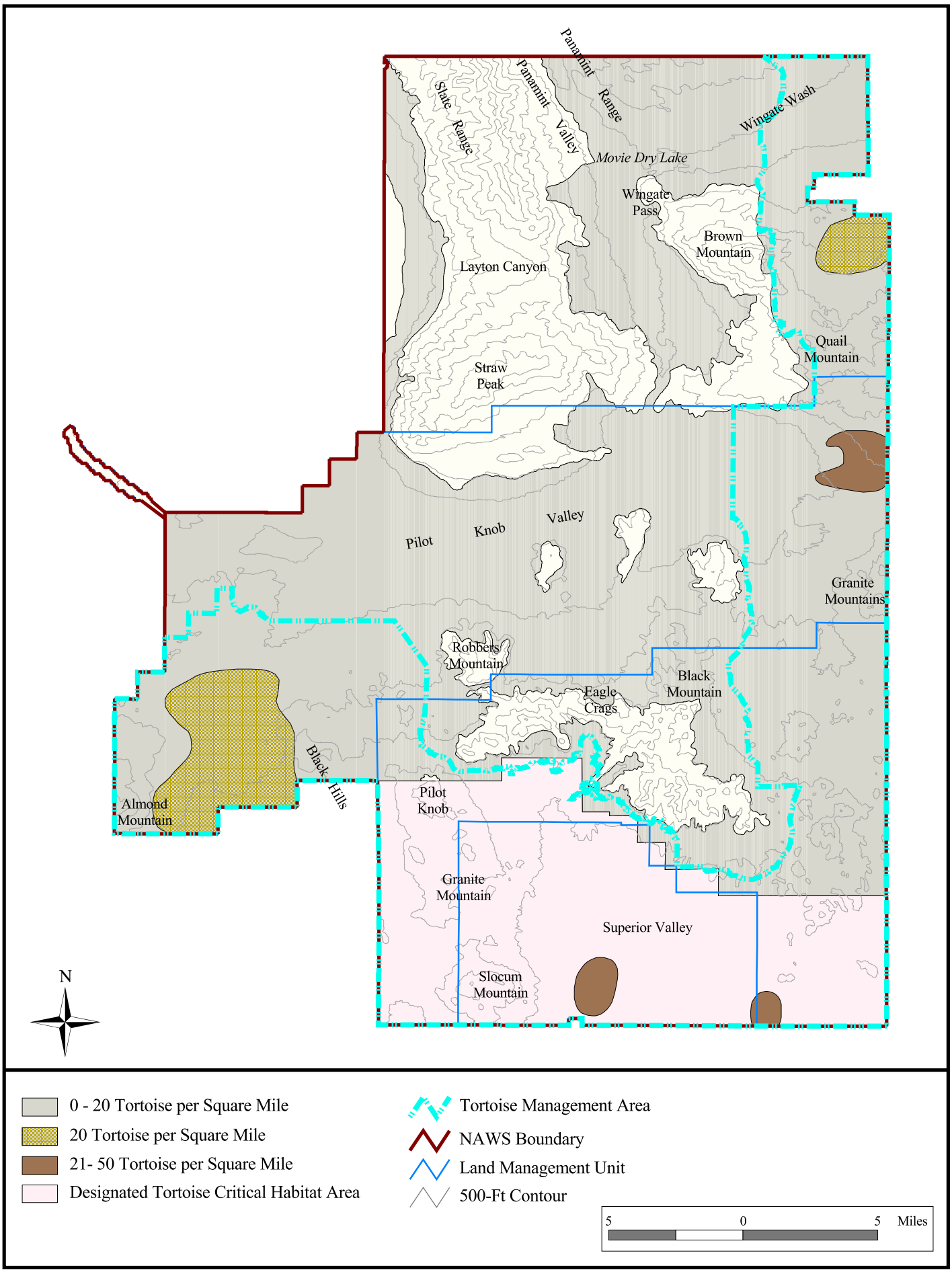

Figure 3.4-5 Known Desert Tortoise Habitat Areas, Densities, Critical Habitat and Management Areas, South Range

The towhee is a medium-sized, sparrow-like songbird. Territories are centered around desert riparian vegetation but range possibly up to 0.5 mile (0.8 kilometer) into the adjacent upland plant communities (LaBerteaux 1989, 1994). The upland plant community surrounding the riparian habitat may be either creosote bush scrub or Mojave mixed woody scrub (Holland 1986), with or without a Joshua tree (*Yucca brevifolia*) overstory. Size of territories usually range from 25 to 62 acres (10 to 25 hectares). The size decreases during the breeding season to about 20 to 49 acres (8 to 20 hectares; U.S. Navy 1989a,b; USFWS 1998a).

Inyo California towhees are a relict of a species that was widespread in the southwestern United States and northern Mexico. This subspecies is thought to have become restricted to mountain areas in the northern Mojave Desert as a result of climatic changes beginning in the Pliocene era. It is now restricted to riparian habitats in the southern Argus Mountain Range of Inyo County (Figure 3.4-6).

Data gathered during the spring and summer of 1998 (following an above-average rainfall year) indicate that the towhee's range has extended about 4 miles farther north than previously believed (LaBerteaux/Garlinger 1998). Estimates indicated a population of approximately 570 adult towhees in 1998. Sixty-nine percent of the entire habitat of the towhee is on the North Range. The remaining habitat is on adjacent BLM and state lands (Cord and Jehl 1979; USFWS 1998b).

The primary threat to towhees is the degradation or destruction of riparian habitat that has occurred on off-Station lands. On NAWS lands, potential for habitat degradation results primarily from burros and horses using springs and grazing on native vegetation in upland areas (USFWS 1998b).

Nonresident Bird Species

Five federally listed nonresident birds occur as migrants with varying degrees of abundance at NAWS: the California brown pelican (*Pelecanus occidentalis californicus*), bald eagle (*Haliaeetus leucocephalus*), least Bell's vireo (*Vireo bellii pusillus*), willow flycatcher, and western snowy plover.

Immature California brown pelicans have been recorded only twice, both times at Lark Seep. As such, they are considered vagrants. The bald eagle has recently been proposed for federal delisting from the endangered species list. The eagle and least Bell's vireo occur at the Station only as extremely rare transients during migration. The willow flycatcher is a fairly common transient during migration. Willow flycatchers migrating through the Station could belong to several subspecies, most likely including the endangered southwestern willow flycatcher. These four species are not known to breed on the Station. Because they are extremely rare or are primarily associated with riparian or wetland habitats, which are currently managed for their resource values, these nonresident birds are not considered further in this document.

The western snowy plover is common during the spring at the city of Ridgecrest's wastewater treatment facility ponds. It is not certain whether these individuals are from the threatened Pacific coast population or the unlisted inland population. The western snowy plover may breed at the ponds or at the G-1 Seep, where fledged juveniles have been observed. However, no nests or nonflying juveniles have been located, and breeding has not been documented at the Station. Because the western snowy plovers are associated with habitats that are currently managed for their resource values, they are not considered further in this document.

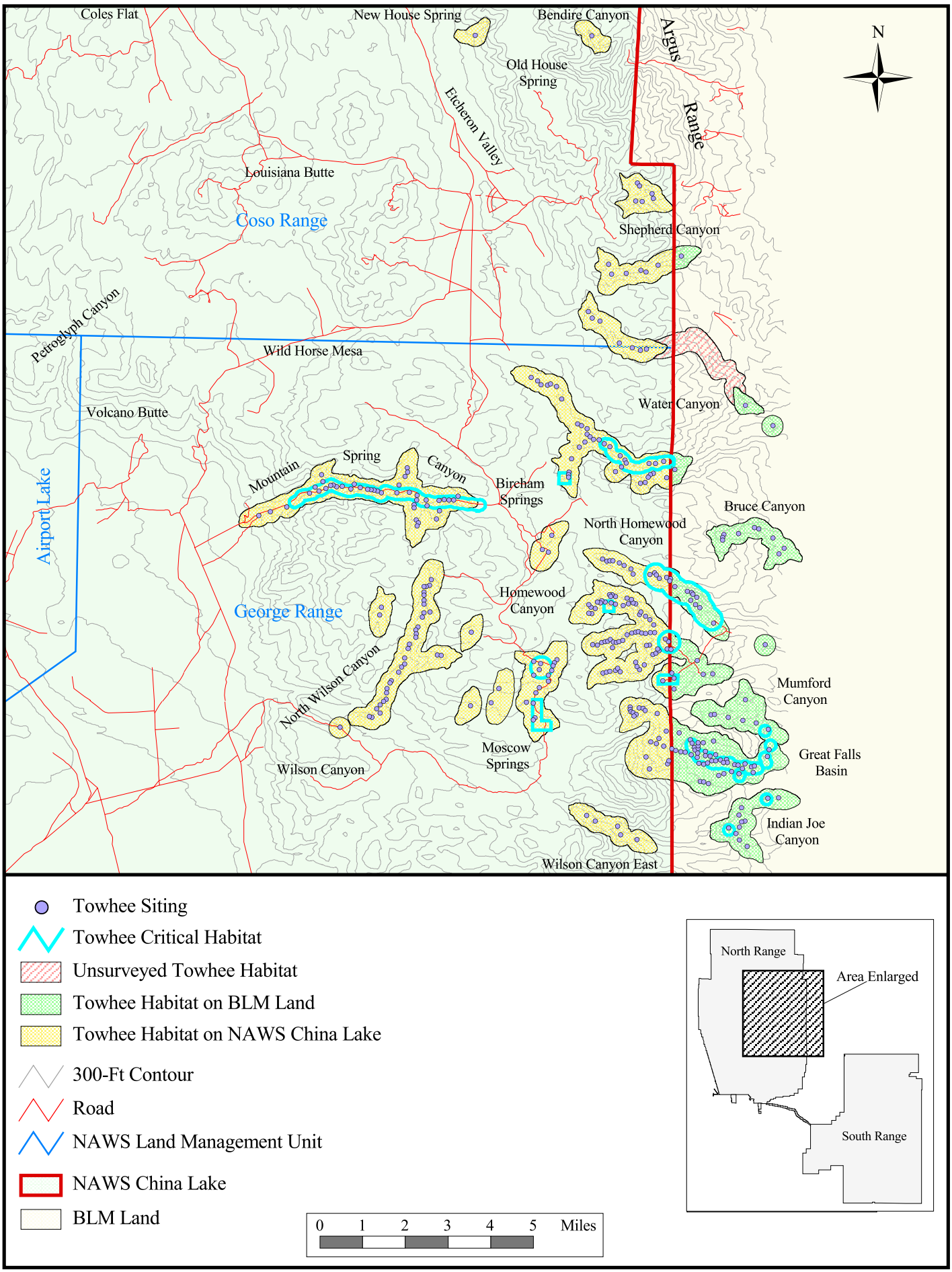

Figure 3.4-6 Inyo California Towhee Distribution on NAWS China Lake and BLM Land

3.4.5 Species Warranting NAWS Stewardship

Species warranting NAWS stewardship include those species that are not federally protected but are considered important components of the Station's biotic system. The conservation of these species is a management goal of the draft INRMP (in which they are referred to as "sensitive" species) and they are provided management consideration during the land use planning process defined in the CLUMP. Should a species warranting NAWS stewardship be at risk due to the needs of a proposed project, efforts are made to avoid and minimize impacts to these resources. However, they are not afforded the level of protection required for species listed under the federal ESA. A species may be considered as warranting stewardship if it has a limited range, is endemic to a particular area, is of questionable or unclear taxonomic status, or is of scientific interest. NAWS also considers those species exhibiting unique or rare features (such as creosote clones or Joshua tree spikes) and those occurring in a known valuable habitat or in a protected habitat (such as wetlands) as warranting stewardship. Plant and wildlife species warranting NAWS stewardship are discussed in Appendix E.

3.4.6 Wetlands and Other Water-Related Habitats

Wetlands typically are defined as areas that are inundated or saturated by surface or groundwater, and often support vegetation typically adapted for life in saturated soil conditions. Wetlands serve important biological functions such as providing nesting, breeding, foraging, and spawning habitat for an aquatic or land species.

Past activities that may have disturbed wetlands and other surface water features at NAWS include historic water withdrawal from springs to support mining, grazing, and human uses. Wild horses, wild burros, and cattle have degraded vegetation along riparian corridors, thereby increasing sedimentation, water temperatures, and nutrient load.

More than 120 springs have been identified at NAWS. These springs range from small areas with almost imperceptible discharge to areas supporting extensive riparian vegetation with discharges of up to 6 gallons (23 liters) per minute (Glenn Lukos Associates 1998). A few of these springs may disappear and reappear, depending on rainfall. Water is currently extracted for domestic use from New House Spring and Tennessee Spring in support of the Junction Ranch test site.

Seeps at NAWS consist of two interconnected seep systems, the Lark Seep system and the G-1 Seep system, located near the southern end of the North Range. Leakage and percolation from the city of Ridgecrest's wastewater treatment facility evaporation storage ponds and some water from the NAWS golf course and housing area formed these seeps. The seep systems include areas of open water and are connected by constructed channels that provide habitat for the federally listed endangered Mohave tui chub. Dominant vegetation types in these seeps include cattail marsh, tule marsh, and alkali meadow (Glenn Lukos Associates 1998).

NAWS contains several major playas and as many as 80 smaller playas, ranging from hundreds of acres to less than 1.0 acre (0.4 hectare). The major playas on the North Range are China Lake, Mirror Lake, Satellite Lake, Paxton Ranch Playa, and Airport Lake. Movie Lake is the major playa on South Range (Glenn Lukos Associates 1998).

3.4.7 Grazing Management at NAWS

Cattle grazing began in the NAWS area in the 1880's. This type of use was accommodated on-Station from 1959 through a formal agreement with BLM and from 1998 to June 2000 under a 2-year interim permit issued by the same agency. During the period of the interim permit, NAWS evaluated the cattle-grazing program to determine if management adjustments were needed to ensure the program complied with applicable environmental requirements and was still compatible with the Station's mission. After thorough evaluation and technical review by NAWS environmental personnel, the NAWS Commanding Officer determined that cattle grazing was not compatible with the Station's mission and could no longer be accommodated on NAWS lands. Formal notification of the NAWS

decision was provided to the BLM Area Manager in May 2000, and cattle grazing activities were formally terminated on NAWS lands in the fall of 2000.

Feral horses and burros have existed on NAWS and surrounding lands since early miners and ranchers imported them in the late 1800s. Horses and burros were either released or escaped from their intended use to become feral animals. Wild burros presently occur on both the North and South ranges throughout desert tortoise habitat and at the eastern end of Randsburg Wash on the South Range and south of Eagle Crags, including Pilot Knob and Granite Mountain (Figure 3.4-7). Horses continue to graze primarily in the Coso land use management unit on the North Range (Figure 3.4-8). The number of feral horses and burros increased dramatically between the late 1960s and early 1980s, causing significant environmental damage, as well as safety concerns for pilots and motorists.

Both domestic and feral animal grazing was investigated during the period of 1998 through 2000 by NAWS staff, and associated effects on habitats were identified at several riparian areas on the North Range. Although the removal of commercial cattle grazing from NAWS-administered lands is expected to minimize environmental degradation, wild horse and burro grazing continues to affect these resources in the Coso Range land management unit. Wild horses and burros reduce the numbers of plants and degrade wildlife habitat, especially riparian vegetation and springs. In addition, the structure of cryptogramic crusts (soils with a high potential to support vegetation) can be damaged through trampling and compaction. Once the surface of these soil crusts is disturbed, re-establishing vegetation becomes difficult. In summary, the associated effects on NAWS habitats due to grazing include the trampling and compaction of soils, increased soil erosion, often severe restriction of native plant species re-vegetation, and the overall reduction of plant and animal species diversity (U.S. Navy 1981).

To minimize environmental degradation associated with feral animal grazing, NAWS continues to remove and promote the adoption of feral animals in accordance with established programs and the Station's draft INRMP, and assists and encourages regional land managers to continue related efforts. The goal of the feral animal removal program is to maintain a herd of 168 horses on the North Range and remove all burros. The Station's burro removal program was implemented in 1980 and a horse removal program was implemented the following year. To remove live burros from the Station, NAWS conducts an annual eight- to ten-day sweep of its ranges in cooperation with the BLM. Since 1981, more than 9,500 burros have been removed from NAWS ranges and placed in the BLM's adoption program. NAWS also has removed more than 3,300 wild horses since 1981. Captured horses are also placed in the BLM's adoption program. The 1998 population estimate for wild horses was 225; the maintenance goal of 168 horses should be reached within the next 5 years. NEPA documentation for these actions was completed in the early 1980's and is referenced in Chapter 1 of this EIS.

3.4.8 Fire Management in Superior Valley Habitat

Military test and training operations occasionally cause fires in undisturbed vegetated areas adjacent to the various target areas located in the Superior Valley management unit. Brush fires in these areas are infrequent and generally occur only after periods of extensive precipitation and the growth of weedy and herbaceous species around target impact areas. NAWS is concerned about fires occurring in the Superior Valley target impact areas because of the potential effects of fires to desert tortoises and its habitat in the NAWS DTMA. The potential effects of repeated fires could include direct mortality to individual tortoises and, in the longer term, influence the plant community composition by allowing for the establishment of non-native grasses that can out-compete the existing native vegetation needed for food by the tortoises. An additional concern is that these invasive species grow rapidly during years of sufficient rainfall and produce large amounts of biomass, allowing fires to spread rapidly and burn with increased intensity.

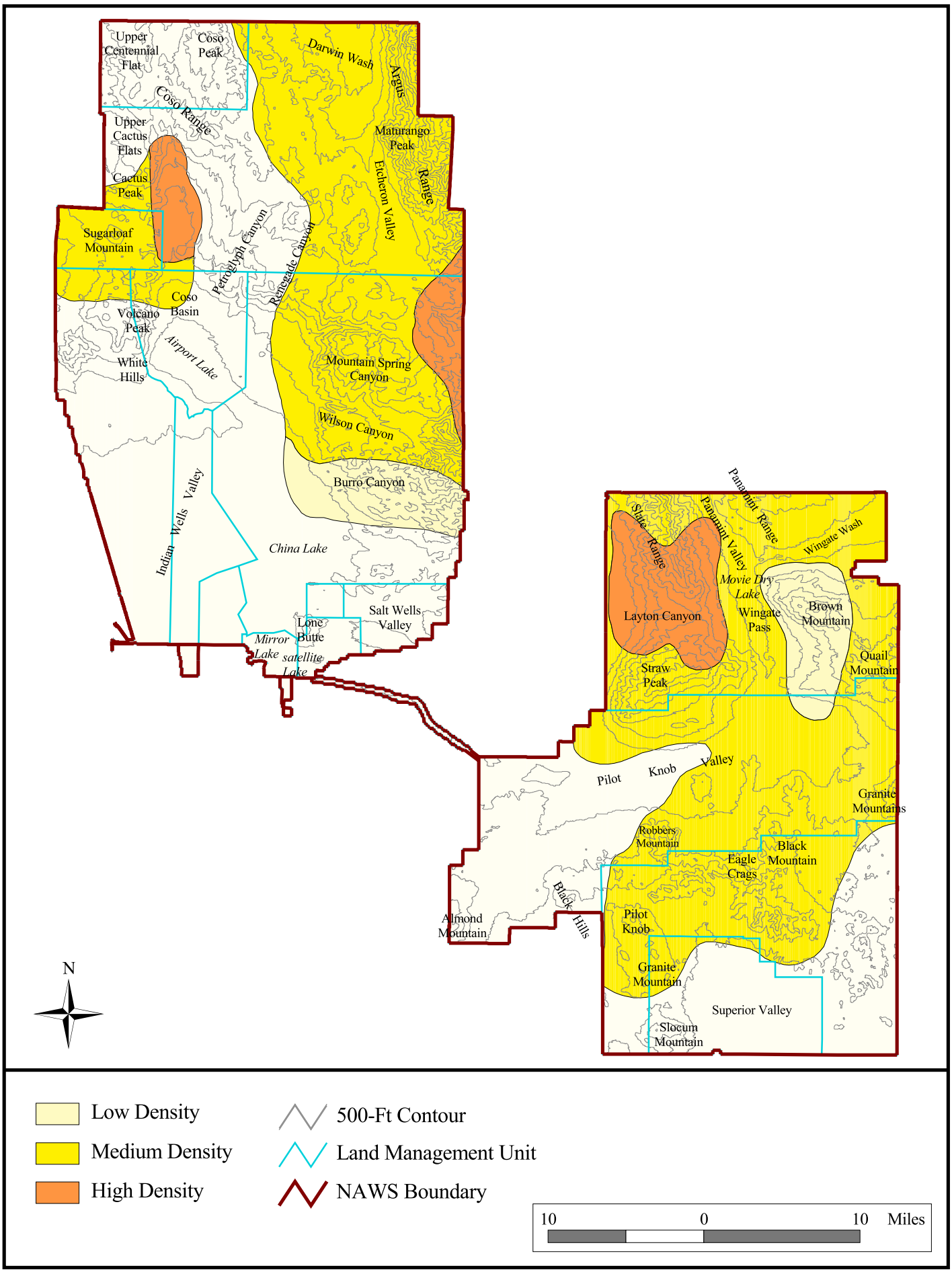

Figure 3.4-7 General Distribution of Feral Burros on NAWS China Lake

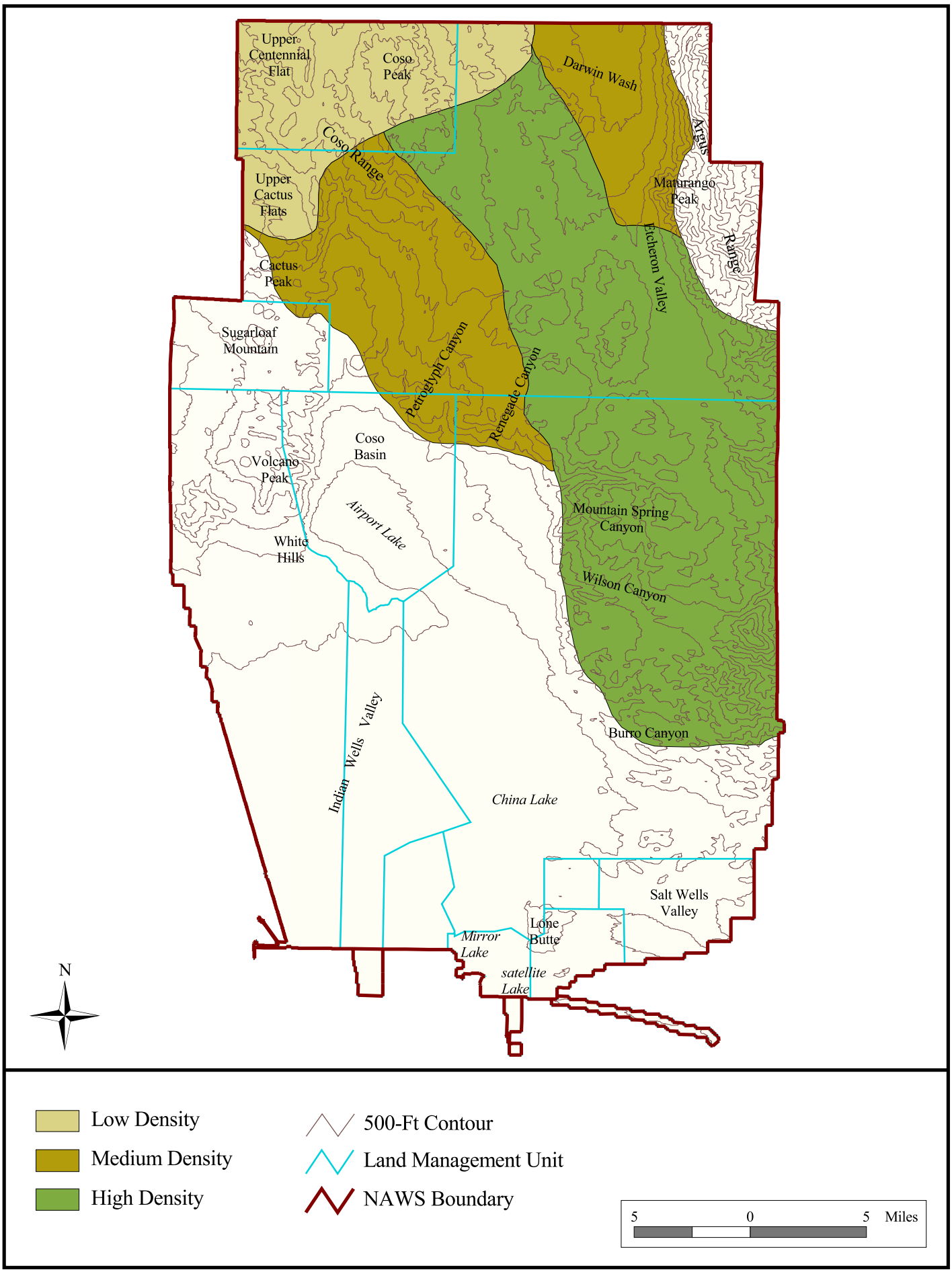

Figure 3.4-8 General Distribution of Feral Horses on NAWS China Lake, North Range

Following extensive rainfall in 1998, eight fires occurred in the Superior Valley target range as a result of ordnance use that ignited vegetation which had accumulated around target sites. These fires collectively affected a total of approximately 300 acres (121 hectares) in and adjacent to the target impact areas. These events were reported to USFWS in accordance with the conditions of the BO for implementation of the Station's DTHMP. Ensuing consultations with the USFWS assisted in establishing the emergency fire management procedures that have been developed and implemented at NAWS to control and minimize the fire risks during high-fuel periods at Superior Valley. Since 1998 only a few minor brush fires have occurred in the Superior Valley target areas and have affected less than 5 acres (2 hectares).

3.4.9 Existing Land Disturbance Patterns at Target and Test Sites on NAWS

Information on existing disturbance patterns and habitat conditions in the buffer areas around target sites was gathered during field surveys conducted in the spring of 1998. A complete report of the surveys is contained in the Station's technical report, *Characterization of Disturbance and Biological and Cultural Resources Within Target Buffer Areas* (U.S. Navy 1999). This effort characterized existing impacts in heavy-use target and test areas throughout the NAWS ranges, and evaluated the potential occurrence of biological (and cultural) resources in these high use areas. Forty-seven target sites were surveyed, representing approximately 55 percent of the target and test sites at NAWS. The objective of the field surveys was to characterize existing habitat conditions and to provide preliminary data for development of the CLUMP and EIS. The surveys were not intended to be comprehensive surveys (100 percent coverage) but were designed to characterize disturbance conditions at as many diverse targets as possible. The targets evaluated were representative of all targets at NAWS because targets surveyed were within all the range land use management units, supported different military uses (such as bombing, strafing, and HE ordnance use), and were in different habitat types. Figures 3.4-9 and 3.4-10 depict the locations of target and test sites in relation to desert tortoise habitat.

Target and test areas typically consist of a cleared area, usually devoid of vegetation, which contains the actual target objects and accommodates most of the military activities. Buffer areas were established for these areas in the CLUMP, and were based on safety considerations and the actual land disturbance patterns around these impact areas. Primary buffer zones typically extend approximately 200 meters (656 feet) from the target boundary, but may vary with target type and use. Disturbance patterns resulting from military uses generally were found to be limited to areas within the buffer areas. The nature and extent of these disturbance patterns and habitat conditions vary between targets and depend on the duration and nature of use. The disturbance patterns described within the following sections apply to both natural and cultural resources, which may occur in these areas. For the purposes of this EIS, these descriptive accounts will be presented in this section and referenced elsewhere as appropriate.

3.4.9.1 North Range

<u>Airport Lake Land Use Management Unit</u>

Surveyed portions of the Airport Lake land use management unit are located between approximately 2,300 feet (701 meters) and 3,000 feet (914 meters) above MSL in the Coso Basin. Surveyed targets on the Airport Lake Range include portions of the Airport Lake playa edge, several isolated targets north of the playa, Sam's Town, High Altitude Bombing Range (HABR) Gunbutts, and buffer areas adjacent to the extensive NAWS targets. Preliminary surveys also were conducted along the northwest edge of the playa, adjacent to the mass detonation test area.

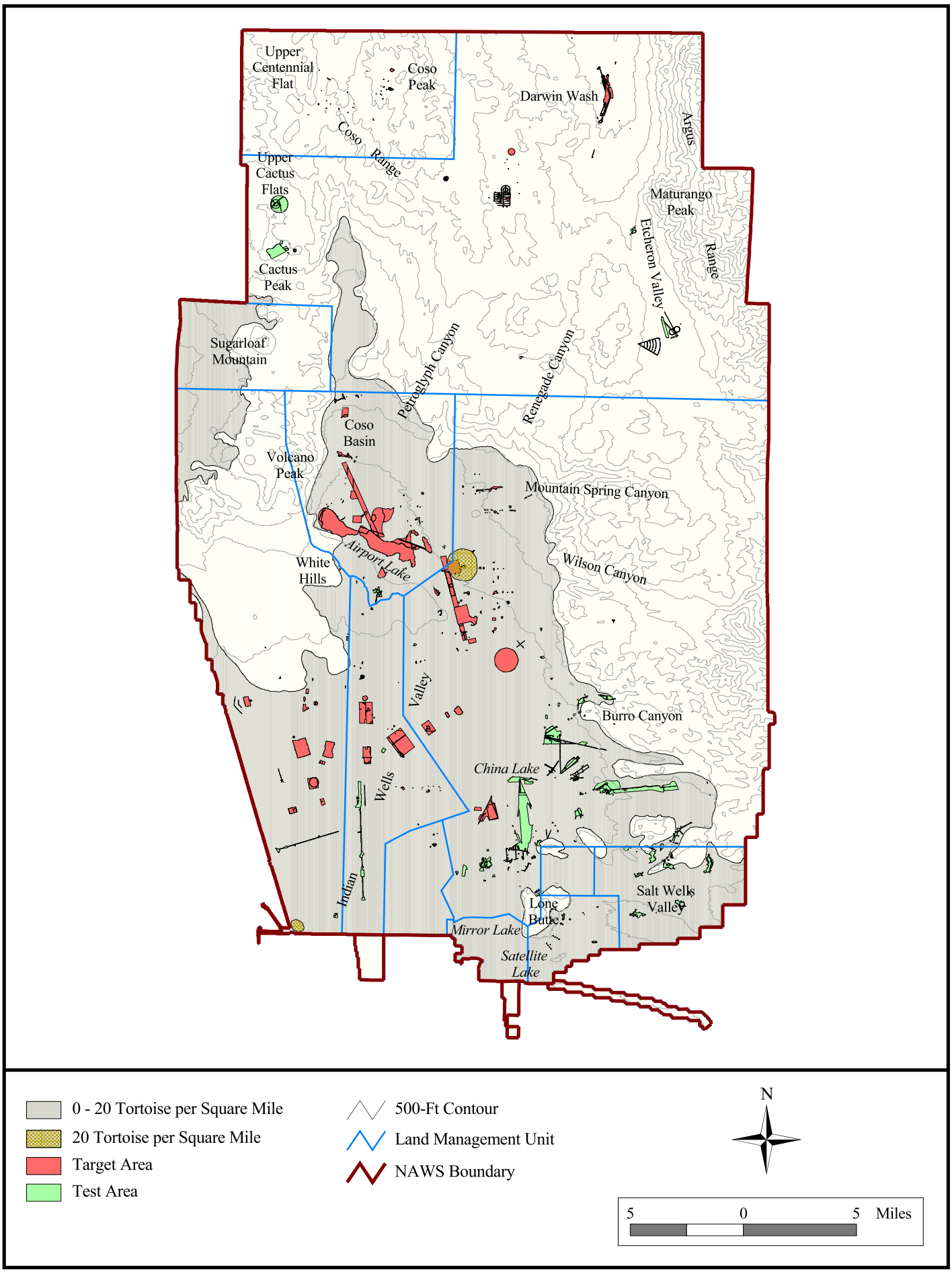

Figure 3.4-9 Tortoise Habitat Areas and Densities with Target and Test Sites, North Range

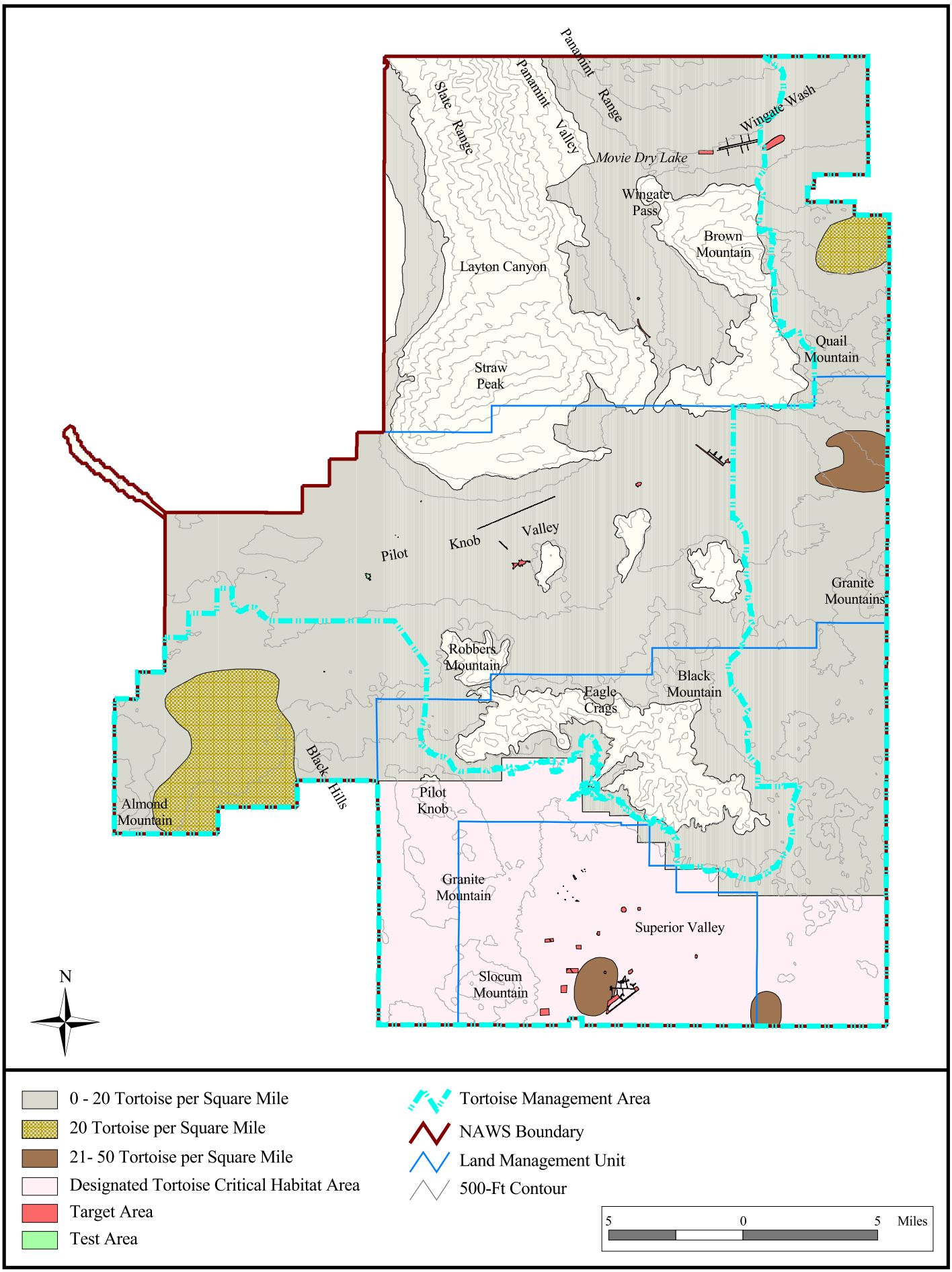

Figure 3.4-10 Tortoise Habitat Areas and Densities with Target and Test Sites, South Range

Vegetation types adjacent to the target areas include creosote bush scrub, saltbush scrub, desert holly scrub, and ecotonal areas (areas of intergradation) between these primary types. Creosote bush scrub tends to occur on the upper slopes of the basin, while saltbush scrub occurs adjacent to the northern edge of the Airport Lake playa and on the gentle lower slopes to the north. Desert holly scrub occurs on the slopes of the White Hills adjacent to the southwestern edge of the playa. Extensive areas along the northwest edge of Airport Lake are characterized by a disturbed climax habitat (vegetation resulting from disturbance that differs from naturally occurring vegetation in adjacent areas). These areas are dominated by devil's lettuce (*Amsinckia tessellata*).

In general, habitat in the buffer area around the Airport Lake targets is characterized by low-intensity disturbance. Disturbance patterns within this land use management unit are characterized by cratering and ordnance scatter as a direct result of test and training activities; ancillary scraping and blading (relatively small disturbed areas that are not on the actual cleared target site but rather are in the buffer areas) and road construction; fire from military land uses; and concentrations of ORV tracks from ordnance retrieval. Cratering and ordnance scatter are the primary causes of disturbance at isolated targets along the northeast edge of the playa and at the HABR Gunbutts. ORV tracking occurs but is generally low to moderate in intensity. Several vehicle targets are on the southwest edge of the playa on either side of the main western access road. Intensive ORV tracking occurs adjacent to the road, and blading and scraping have resulted in higher intensity disturbance patterns. Several isolated targets located on the playa lakebed have been placed on fill materials obtained from adjacent uplands. Windblown sand has accumulated along the eastern edge of the PMTC target, resulting in an area of moderate disturbance.

The most biologically important effects of disturbance occur in areas where the soil profile has been substantially modified and where fire has removed the naturally occurring cover. Where the soil profile is disturbed, shrub cover is low and often consists of small, widely spaced individual shrubs. The understory in these areas generally is dominated by split grass (*Schismus* sp.) and native annuals. While these species also form the understory in adjacent undisturbed habitat, some differences in the density and cover occur.

The extensive disturbed climax habitat along the northwest edge of the playa appears to have resulted from a combination of fire and soil profile disturbance, the latter caused by blading.

No plant or wildlife species warranting NAWS stewardship were detected at sites on this land use management unit. There is moderate potential for two plant species warranting NAWS stewardship to occur on the Airport Lake Range buffer areas. Mojave fish-hook cactus (*Sclerocactus polyancistrus*) and Clokey's cryptantha (*Cryptantha clokeyi*) could occur in the White Hills and areas near the HABR Gun Butt and Sam's Town targets. Based on known habitat requirements, there is a low potential for other plant species warranting NAWS stewardship to occur on the surveyed portions of this range. Airport Lake does not provide habitat for desert tortoise. Darwin Tiemann's beetle could be present in this area because its host plant, Parry saltbush, occurs near the targets. In addition, invertebrates associated with sand (such as Jerusalem crickets and dune weevils) could occur in the sandy areas near the PMTC target.

Baker Range Land Use Management Unit

Surveyed portions of the Baker Range land use management unit are at low elevations in the IWV. Vegetation types adjacent to the target areas include creosote bush scrub, and saltbush scrub, and there are areas of transitional vegetation between these primary types. These vegetation types form a mosaic, with creosote bush scrub tending to occur on sandier soils, while saltbush scrub occurs on soils with a higher content of fine materials, and often in relatively low-lying areas. All surveyed areas on the Baker Range consisted of the buffer areas adjacent to extensive cleared target areas. While low-intensity disturbance characterizes most of the buffer area, the presence of numerous paved and unpaved roads in the otherwise low-disturbance areas fragments habitat. These roads also provide extensive disturbed edges that may facilitate the movement of invasive exotic plant species. Windblown sand has accumulated along the eastern and southern edges of several of the targets, resulting in areas of high to moderate disturbance. Stands of invasive exotic plant species, including tumbleweed (*Salsola tragus*) and filaree (*Erodium*

cicutarium), are well established on the sand accumulation areas at two of the targets. Additional areas of high to moderate disturbance, characterized by cratering and ordnance scatter, scraping, blading, road construction, and debris accumulation, occur at these sites. No plant or wildlife species warranting NAWS stewardship were detected at this site in this land use management unit. There is a low potential for shining milk-vetch to occur on areas of sand accumulation and adjacent undisturbed habitat characterized by deep sandy soils. Clokey's cryptantha also could occur in wash habitats within the buffer area. While these species could be present, none were observed in the habitat where they most likely would occur. Portions of Baker Range provide low-density desert tortoise habitat, though the extreme southwest corner is classified as medium-density (shown on Figure 3.4-4). Areas of sand accumulation and adjacent undisturbed habitat characterized by deep sandy soils may be inhabited by invertebrates typically associated with sand, including Jerusalem crickets and dune weevils.

Charlie Range Land Use Management Unit

Surveyed portions of the Charlie Range land use management unit are located at low elevations in the IWV. Vegetation types adjacent to the target areas include creosote bush scrub, saltbush scrub, alkaline basin scrub, and vernal playas; there are areas of transitional vegetation between these primary types. Surveyed areas on the Charlie Range consisted primarily of the buffer areas adjacent to targets. While low-intensity disturbance characterizes most of the buffer area, paved and unpaved roads in the otherwise low-disturbance areas fragment the habitat. These roads also provide extensive disturbed edges that may facilitate the movement of invasive exotic plant species. Additional areas of high to moderate disturbance, characterized by cratering and ordnance scatter, scraping, blading, road construction, and debris accumulation, occur at these sites.

Small vernal playas occur on and adjacent to the C3TC2 targets, located in the western central portion of Charlie Range. In addition, one vernal playa large enough to appear on USGS topography maps occurs within the 2,500-foot (762-meter) buffer area. Fairy, brine, and/or tadpole shrimp may be present in these vernal playas.

No plant or wildlife species warranting NAWS stewardship were detected at sites on this land use management unit. No major areas of sand accumulation were observed near this target. There would be a high to moderate potential for Clokey's cryptantha to occur in wash habitats within the buffer area because it is known to occur in similar habitats at similar elevations. Portions of the Charlie Range provide low-density desert tortoise habitat.

Coso Land Use Management Unit

Surveyed portions of the Coso land use management unit are located between approximately 5,500 feet (1,676 meters) and 7,000 feet (2,134 meters) above MSL in the Coso Mountains. Vegetation types within the buffer areas include pinyon woodland, sagebrush scrub, blackbrush scrub, Mojave wash scrub, and disturbed climax habitat. In the CTR area, pinyon woodland and sagebrush scrub form an intricate mosaic with singleleaf pinyon pine (*Pinus monophylla*) dominated habitat occurring on steep slopes and basalt outcrops. Sagebrush scrub occurs on intervening flats and narrow valleys. The Coles Flat area is characterized by sagebrush scrub with a sparse overstory of Joshua trees (*Yucca brevifolia*). The Ship Target on Wild Horse Mesa is adjacent to an extensive fire-related disturbed climax habitat to the south. There is a large burn area to the north of this target as well. Sagebrush scrub, Mojave wash scrub, and blackbrush scrub occur within the buffer area north of the target. Surveyed areas on the CTR and at the Ship Target consist primarily of the habitats adjacent to isolated targets. The Coles Flat Target includes an extensive cleared area.

In the CTR, high-intensity disturbance zones are generally small and located adjacent to specific targets. Several areas tentatively identified as burns were delineated as high-intensity areas. Although no charred stumps were in these areas, the shapes of the areas, the reduction in cover of the dominant vegetation, and a change in species composition suggest a burn had occurred. Areas of high to moderate disturbance generally are characterized by cratering and ordnance scatter. One large area (approximately 55 acres [22 hectares]) associated with Coso Target Number 4 had been cleared in the past. Scraping and blading are present at other CTR sites but are limited to small

areas. At Coles Flat, disturbance in the surveyed portions of the buffer area is generally low. Disturbance from cratering, ordnance scatter, scraping, and blading also is low in the Ship's Target buffer area. The area south of the Ship's Target is part of an extensive burn.

Four plant species warranting NAWS stewardship were detected at the CTR sites. These include Darwin mesa milk-vetch (*Astragalus atratus* var. *mensanus*), pinyon rock cress (*Arabis dispar*), desert bird's-beak (*Cordylanthus eremicus* ssp. *eremicus*), and a plant tentatively identified as Panamint mariposa lily *(Calochortus panamintensis*). With the exception of pinyon rock cress, these species were observed in substantial numbers in the surveyed area. One plant species warranting NAWS stewardship, Mojave fish-hook cactus, occurs at the Coles Flat Site. No species warranting NAWS stewardship were detected at the Ship's Target.

Several other plant species warranting NAWS stewardship are known to occur at similar elevations and habitats and could occur in the Coso land use management unit. These include Inyo hulsea (*Hulsea vestita* ssp. *inyoensis*), Coso mountains magnificent lupine (*Lupinus magnificus* var. *glarecola*), DeDecker's clover (*Trifolium macilentum* var. *dedeckerae*), Charlotte's phacelia (*Phacelia nashiana*), naked milk-vetch (*Astragalus serenoi* var. *shockleyi*), Booth evening primrose (*Camissonia boothii* ssp. *boothii*), and Darwin rock cress (*Arabis pulchra* var. *munciensis*).

Most of the Coso land use management unit does not provide desert tortoise habitat. While wildlife species warranting NAWS stewardship are found in this area (for example, roosting and hibernating bats), none are expected to be closely associated with the target areas.

<u>George Range Land Use Management Unit</u>

Surveyed portions of the George Range land use management unit are located between 2,400 feet (732 meters) and 3,100 feet (945 meters) above MSL on the lower slopes of the Argus Mountains. These include the Bullpup and Shrike targets and Area R/Burro Canyon static detonation sites. Vegetation types adjacent to the targets include creosote bush scrub and Mojave wash scrub. Surveyed areas on the George Range consisted of the areas adjacent to the smaller linear arrays of targets at the other two sites. While low-intensity disturbance characterizes most of the buffer areas, a few zones of high disturbance were identified. Areas of high to moderate disturbance, characterized by cratering and ordnance scatter, scraping, blading, road construction, and debris accumulation, occur at these sites. No plant or wildlife species warranting NAWS stewardship were detected at sites in this land use management unit. There is potential for Clokey's cryptantha, pygmy poppy (*Canbya candida*), crowned muilla (*Muilla coronata*), Booth evening primrose, and Mojave fish-hook cactus to occur within buffer areas on the George Range because these species are known to occur within similar habitats at similar elevations. Portions of the George Range provide low-density desert tortoise habitat. Areas of sand accumulation and adjacent undisturbed habitat characterized by deep sandy soils may also be inhabited by invertebrates typically associated with sand, including Jerusalem crickets and dune weevils.

3.4.9.2 South Range

<u>Mojave B North Land Use Management Unit</u>

Within the Mojave B North land use management unit, the Wingate Airfield Target has been surveyed for biological resources. This site is located between 1,900 feet (579 meters) and 2,000 feet (610 meters) above MSL in Wingate Pass. Vegetation types adjacent to the target include creosote bush scrub and Mojave wash scrub. Surveyed areas on the Wingate Airfield Target consisted of the buffer areas adjacent to the runway alignments, taxiways, and plane targets. While low-intensity disturbance characterizes most of the buffer areas, zones of high disturbance resulting from cratering and ordnance scatter were identified. No plant species warranting NAWS stewardship were detected at this site in this land use management unit. There is potential for Clokey's cryptantha, crowned muilla, and Mojave fish-hook cactus to occur within buffer areas on the Wingate Airfield Target Area because these species are known

from similar habitats at similar elevations. Desert tortoise scat was detected adjacent to one of the taxiways. The habitat adjacent to the target is characterized as low-density tortoise habitat.

Randsburg Wash Land Use Management Unit

Within the Randsburg Wash land use management unit, the Charlie Airfield Target has been surveyed for biological resources. This site is located between 2,000 feet (610 meters) and 2,100 feet (640 meters) above MSL. Vegetation types adjacent to the target include creosote bush scrub, salt bush scrub, and Mojave sand fields. Surveyed areas on the Charlie Airfield Target consisted of the buffer areas adjacent to the runway alignments, taxiways, and revetments. Disturbance patterns at this site are complex. Zones of high disturbance, resulting from cratering and ordnance scatter, are present around the revetments and between the runways. Areas of moderate disturbance occur in roughly concentric bands around the high-disturbance zones and adjacent to the runways. The southwestern edge of the site generally is characterized by a zone of low disturbance. No plant species warranting NAWS stewardship were detected at this site. There is potential for Clokey's cryptantha, crowned mu illa, and Mojave fish-hook cactus to occur within buffer areas on the Charlie Airfield Target area because these species are known from similar habitats at similar elevations. The habitat adjacent to the target is characterized as low-density tortoise habitat.

Superior Valley Land Use Management Unit

Within the Superior Valley land use management unit, the Bullseye, Low-High Angle Strafe Pits, and South East Airfield Target Complex were surveyed for biological resources. These sites are located between 3,000 feet (914 meters) and 3,150 feet (960 meters) above MSL. Vegetation adjacent to the targets is predominantly creosote bush scrub and salt bush scrub. Creosote bush scrub is the predominant vegetation on and adjacent to the Bullseye targets. Salt bush scrub and Mojave wash scrub occur in a large drainage adjacent to the auxiliary Bullseye Target. The remaining portions of the surveyed area are characterized by saltbush scrub. Zones of high disturbance resulting from cratering are present on portions of the Bullseye Targets and the South East Airfield Target Complex. Cratering occurs on the west side of the SAM site. Disturbance in the buffer area around the Low-High Angle Strafe Pits consists of blading and buffer areas.

Mojave fish-hook cactus was observed at two locations. One stem grows between the auxiliary Bullseye target and the wash. A second stem occurs in an area of low disturbance, approximately 130 feet (40 meters) from the SAM site target area. There is potential for Lane Mountain milk-vetch, Clokey's cryptantha, and crowned muilla to occur within buffer areas on the Superior Valley land use management unit targets because these species are known from similar habitats at similar elevations.

Desert tortoise burrows were identified adjacent to the Low-High Angle Strafe Pits (about 6 feet [2 meters]) into the buffer area from the edge of the strafe pits) and on the old burn. Two burrows were located adjacent to the strafe pits but no active burrows were identified at this location. One active burrow was identified on the old burn approximately 900 feet (274 meters) north of the runway on the Southeast Airfield Complex Target. These targets are within designated Desert Tortoise Critical Habitat. The southwestern portion of the Southeast Airfield Complex Target is in moderate-density desert tortoise habitat, while the other target areas are located in low-density tortoise habitat.

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3.5
Cultural Resources

3.5 CULTURAL RESOURCES

This section describes the cultural resources of NAWS. Prehistoric, historic, and Native American resources are discussed. This section defines the resource types; describes the framework governing historic preservation and current management of cultural resources at NAWS; provides a brief inventory of identified cultural resources; and discusses sites and districts listed, and those eligible for listing, on the NRHP (herein referred to as the National Register). A summary of sites evaluated for eligibility for the National Register and a brief discussion of cultural resources and land disturbance patterns at target and test areas throughout the range are also provided.

"Cultural resources" is a generic term commonly used to include buildings, structures, districts, archaeological sites, historic landscapes, traditional cultural places, Native American sacred sites, and objects of significance in history, architecture, archaeology, engineering, or culture. The term also includes associated documents, maps, photographs, and records. The cultural resources database at NAWS covers the past 10,500 years and encompasses a diverse representation of resources. A draft ICRMP was developed in 1999 to integrate and guide cultural resources management programs at NAWS and contains an overview of the prehistory and history of the region as well as a complete inventory of the cultural resources that have been identified on NAWS to date (NAWC 1999a).

3.5.1 Resource Types

3.5.1.1 Prehistoric Archaeological Resources

Extensive prehistoric archeological resources are contained within the NAWS boundaries, including archaeological sites of National Register quality located throughout both ranges. The oldest archaeological sites occur around the China Lake Basin. The Coso Obsidian Quarries and the Coso Rock Art in the North Range are routinely incorporated in archaeological overviews of the western United States because of the kind, quantity, quality, and condition of these sites. At various periods in the past, obsidian from the Coso quarries was a toolstone traded and used throughout southern California and the southwestern Great Basin (Hildebrandt and Jones 1997). The Coso Rock Art District National Historic Landmark (NHL) contains one of the largest concentrations of prehistoric art in the United States (Gilreath 1998; NAWC 1998b).

In addition to these high-profile prehistoric archaeological resources, NAWS has hundreds of undisturbed rockshelters and open-air living and working sites. The rockshelters often contain preserved organic materials, such as the plant and animal remains, hides, basketry, and other textiles used by prehistoric peoples. The few prehistoric burials that have been discovered at NAWS have been recovered from the dry rockshelters, further contributing to the sensitivity of such sites (Hillebrand 1972; Panlaqui 1974; Gilreath 2000).

The studies that have been completed at a few of the thousands of archaeological sites at NAWS have provided much information about the prehistory in southeastern California and areas beyond. The sites at NAWS will continue to advance our understanding of hunter-gatherer cultures of the past in the western Great Basin/Northern Mojave Desert.

3.5.1.2 Historical Archaeological Resources

NAWS also contains a variety of historic-era resources, which demonstrate major shifts in land use during the past 150 years (NAWC 1999a). The earliest noted historic resources are affiliated with prospecting and mining, followed by homesteading and ranching (JRP 1997i). The Coso Range contains remnants of the earliest mining community at NAWS in Coso Village, first occupied in the 1860s (JRP 1998). The earliest military facility established at NAWS was built nearby, sometime between 1861 and 1866, apparently to address conflicts among early settlers, miners, and Native Americans (Hildebrandt, Ruby, and Maniery 2000; PAR 2000). Freight routes and

way stations soon followed to transport supplies to the miners and ranchers, and haul away the ores, minerals, and precious metals to processing facilities and urban and industrial communities. Archaeological surveys in the Coso Mountain pinyon zone revealed the remains of an extensive charcoal production industry that dates from the late 1800s (Hildebrandt and Ruby 1999). Federal homesteading acts passed in the late 1800s and early 1900s encouraged the development of public land. Homesteads and ranches were built in both the North and South ranges (Maniery and Baker 1996). In the 1940s the area was developed into the current military use.

3.5.1.3 Historic Navy-Built Resources

For almost 60 years, NAWS has figured prominently in the RDT&E of modern air weaponry, particularly aircraft-fired rockets and guided missiles (Mikesell 1996; 1997b; NAWC 1998a). In response to American involvement in World War II, the Navy committed substantial financial resources to advance rocket RDT&E. In 1943, the California Institute of Technology (CalTech) in Pasadena and the Navy began the development of aircraft-fired rockets. To provide a safe location for this mission, a new test range for Navy rockets was sited at Inyokern, California. Four characteristics distinguished this test range, then called NOTS, from other bases built up during World War II: it was designed as a permanent facility; it employed a very high percentage of civilian employees; personnel were a mixture of highly educated civilians and military career men of some rank; and it was consciously designed to foster close communication and cooperation between these two groups.

The NOTS Inyokern, as originally created, included much of the area referred to today as the North Range Complex. With the need for increasing ranges and test areas for rockets, warheads and fuzzes, and facilities for pilot training, Mojave B Range (established as a Marine Corps aerial gunnery range in 1943) was added in 1947, and the Randsburg Wash Test Range in 1950. Today, NAWS encompasses nearly 1.1 million acres (445,156 hectares), with four areas "intensively" developed: Mainsite, Armitage Airfield, CLPL, and SWPL; (Mikesell 1997a). These four developed areas are all clustered at the southern end of the North Range Complex. By comparison, the test ranges contain fewer military buildings, structures, or facilities (Mikesell 1997b; 1997d). Many of the buildings and structures from this period have been recommended as eligible for the National Register (Mikesell 1997a; 1997d).

3.5.1.4 Native American Resources

At the time of historic contact, five ethnolinguistic groups were using what is now NAWS: Kawaiisu, Tubatulabal, Owens Valley Paiute (a Northern Paiute band), Koso (a Western Shoshone band), and Chemehuevi (a Southern Paiute band). Anthropologists have attempted to define boundaries, applying Western concepts of ownership, but such proprietary and legalistic notions of land tenure are not appropriate for this area. However, core territories and associated spheres of use can be designated for the several tribes who inhabited the area (NAWC 1999a).

The North Range includes the Argus and Coso ranges and portions of IWV. The Koso Shoshone, also known as Panamint Shoshone and including the Death Valley Timbisha Shoshone, lived in areas throughout the Coso and Argus ranges. The Owens Valley Paiute, who lived in the Owens Valley to the northeast of the Coso Range, also used many areas within the North Range.

Other groups, who did not live there, nevertheless frequented the areas in the North Range to exploit the numerous hunting and gathering resources in the area. The Tubatulabal and the Kawaiisu core territories were located in the Sierra Nevada Mountains: the Tubatulabal along the Kern River and the South Fork Valley and the Kawaiisu along the southeastern slopes of the Sierra Nevada Mountains and the Tehachapi and Paiute mountains. Both groups used the desert areas to the east to hunt and gather food and other materials that were not available in the mountains. The Kawaiisu used areas in the South Range as well as the North Range. The Chemehuevi, who lived along the Colorado River, traveled widely through the desert areas to the west and may have accessed areas within the South Range.

Coso Hot Springs is an important traditional healing site used frequently by the Shoshone and Owens Valley Paiute as well as by other Native American groups who came there for healing. The springs continue to be valued today for their healing powers, and this site is recognized as a traditional cultural property where traditional practices continue.

3.5.2 Regulatory Framework

NAWS implements cultural resources management programs and procedures that comply with federal laws and regulations governing prehistoric and historic preservation. The DoD and DoN policies and instructions provide guidelines for meeting these federal requirements. This preservation effort includes Native American traditional cultural properties. The federal laws and regulations most often addressed at NAWS, and the DoD and Navy implementing documents, are discussed in the following sections. A list of projects conducted in response to these requirements is listed in the Station's ICRMP (NAWC 1999a).

3.5.2.1 National Historic Preservation Act

The National Historic Preservation Act (NHPA) (16 U.S.C. 470) is the fundamental law concerning the protection of cultural resources on federal land. Under the NHPA, its amendments, and implementing regulations, federal agencies are required to responsibly manage federally owned or controlled cultural resources. Federal agency requirements pertinent to NAWS are addressed in Sections 106 and 110 of the NHPA.

<u>Section 106</u>

Section 106 of the NHPA addresses the potential effects of federal undertakings on historic properties and is generally called into play only when proposed projects have the potential to affect these properties. Section 106 regulations (36 C.F.R. § 800.16[1]) define historic properties as archaeological sites, districts, buildings, structures, or objects that are included or eligible for inclusion in the National Register (36 C.F.R. § 60). Thus, only those cultural resources that meet the criteria for listing in the National Register are subject to protection under this act. The NHPA defines significance in American history, architecture, archaeology, engineering, and culture as the following:

> "...districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) that have yielded, or may be likely to yield, information important in prehistory or history" (36 C.F.R. § 60.4).

Section 106 and the implementing regulations provide a systematic mechanism for taking into account the effects on National Register-eligible and potentially eligible resources from actions that are federally sponsored, funded, or licensed. It requires that the SHPO and Native American tribes with historic ties to the area be afforded an opportunity to comment on the proposed action. At NAWS, this requirement is addressed through the Station's existing operating procedures for the environmental review process (i.e., NEPA).

<u>Section 110</u>

Section 110 of the NHPA focuses on a more proactive management strategy, calling for identification and evaluation of National Register-eligible properties in advance of projected undertakings. Section 110 requires each

federal agency to establish a preservation program to identify, evaluate, and nominate resources to the National Register. The preservation program must also provide for the protection and preservation of historic properties, particularly NHLs, to ensure they are managed and maintained in a way that considers the preservation of their historic, archaeological, architectural, and cultural values. Contemporary uses for historic buildings are encouraged. Coordination with other agencies, Native American tribes, and interested parties is required. Guidelines for implementing Section 110 have been written by the Advisory Council on Historic Preservation (ACHP) and the NPS (1989).

3.5.2.2 National Environmental Policy Act

The National Environmental Policy Act (42 U.S.C. 4321 et seq.) provides the statutory basis for considering impacts on the cultural environment as a whole. NEPA places the responsibility on the federal government to "preserve important historic, cultural, and natural aspects of our national heritage and maintain, whenever possible, an environment which supports diversity and a variety of individual choice" (42 U.S.C. 4331(b)(4)). NEPA requires federal agencies to conduct an interdisciplinary analysis of the environmental consequences of their actions early in the decision-making process. If this analysis reveals that the action could potentially affect the human environment, NEPA requires the preparation of appropriate environmental documentation. For cultural resources, this analysis considers the effects of agency actions on physical features such as archaeological sites, buildings, and structures, as well as the practice of religious and other traditional lifeways, which reflect community heritage. Implementing regulations are found in 40 C.F.R. §§ 1500-1508.

3.5.2.3 Archaeological Resources Protection Act

Passed in 1979, Archaeological Resources Protection Act (ARPA) (16 U.S.C. 470aa et seq.) established civil and criminal penalties for theft or damage to archaeological resources from federally owned land. ARPA also established a permitting process for archaeological work that plans for the excavation or removal of archaeological materials on federal land. ARPA also contains provisions for the preservation of archaeological collections and data, and for maintaining the confidentiality of archaeological location information. DoD implementing regulations are located in 32 C.F.R. § 229.

ARPA requires federal agencies to protect archaeological materials and associated records, in perpetuity, for their scientific and educational use. The implementing regulation, *Curation of Federally Owned and Administered Archaeological Collections* (36 C.F.R. § 79), establishes standards, procedures, and guidelines for housing and preserving these materials. The Federal Records Act regulates the maintenance and disposal of documents that may have historic value and that are controlled by federal agencies.

3.5.2.4 Native American Graves Protection and Repatriation Act

Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3000-3013, 18 U.S.C. 1170) includes three primary components: (1) procedures for the inadvertent discovery of Native American remains or sacred or funerary objects found on federal land; (2) requirements for the inventory of all federal curation facilities with the subsequent repatriation of Native American remains and sacred objects to Native American descendants; and (3) provisions for the prosecution of those who knowingly sell, purchase, or transport Native American remains or sacred objects. Guidance for federal agency implementation of NAGPRA is found in 43 C.F.R. § 10.

3.5.2.5 American Indian Religious Freedom Act

American Indian Religious Freedom Act (AIRFA) (42 U.S.C. 1996) establishes as U.S. policy the protection of the rights of American Indians to practice their traditional religions. These practices include, but are not limited to, " …access to sites (sacred places), possession of sacred objects, and the freedom to worship through ceremonies and

traditional rites…" (42 U.S.C. 1996). AIRFA requires federal agencies to consider the effects of their actions on the exercise of Native American religion and to review the agency's policies and procedures, in consultation with traditional religious leaders, to determine appropriate measures to protect and preserve Native American religious cultural rights and practices.

3.5.2.6 DoD Directive 4710.1

The DoD Directive 4710.1 (21 June 1984) describes policy to integrate archaeological and historic preservation requirements with the planning and management of DoD activities. The directive assigns responsibilities and outlines procedures for all DoD branches and departments.

3.5.2.7 Environmental Conservation Program

The DoD's Environmental Conservation Program (DoDINST 4715.3, 3 May 1996) implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on property under DoD control. The Station's ICRMP was developed in accordance with these guidelines, as well as guidelines being developed by the Navy.

3.5.2.8 Environmental and Natural Resources Program Manual

This Navy program manual (OPNAVINST 5090.1B, 9 September 1999) defines requirements, delineates responsibilities, and issues policy for the management of the environment and natural resources for all Navy ship and shore activities. Chapter 23, "Historic and Archaeological Resources Protection," provides policy and assigns responsibilities for the management of historic and archaeological resources under Navy control. The cultural resources program at NAWS follows the guidance provided in this manual.

3.5.2.9 Facility Planning and Protection of Cultural Resources

This Navy instruction (NAVFAC INST 11010.70, 23 March 1983) assigns responsibilities and provides guidance for the protection and maintenance of historic resources, including determinations of effect and National Register eligibility. The protection of archaeological resources, as specified in ARPA, is also discussed.

3.5.2.10 Department of the Navy Policy for Consultation with Federally Recognized Native American Tribes.

This DoN instruction (SECNAVINST 11010.14, 8 February 1999) clarifies Navy policies, procedures, and responsibilities when consulting with representatives of federally recognized Native American tribes on issues with the potential to impact protected tribal resources and rights.

3.5.3 Current Management Practices

The following section summarizes the current NAWS management practices for the conservation and protection of cultural resources. Compliance with federal historic preservation laws and regulations is ensured through management programs implemented by the EPO. NAWS cultural resources management programs are developed in accordance with Navy policy and guidelines for Historic and Archaeological Protection as described in Chapter 23 of OPNAVINST 5090.1B (1994). Requirements to identify, evaluate, and protect historic properties that may be adversely affected by actions taken at NAWS are outlined in 36 C.F.R. § 800, the regulations implementing Section 106 of the NHPA. NAWS has coordinated with the SHPO to develop a draft PA to facilitate Section 106 compliance (see Section 3.5.3.1). Additional compliance requirements may be triggered by the nature of the resources that may be affected. For example, actions affecting Native American resources also may be subject to the regulations implementing NAGPRA (43 C.F.R. § 10) or requirements to avoid adversely affecting Native

American sacred sites. In general, NAWS policies avoid or minimize potential adverse effects through the implementation of management practices defined in the CLUMP and the ICRMP. These management practices include minimizing effects by modifying the scope of the proposed action, moving the impacting project, or mitigating through data recovery (NAWC 1999a).

A cultural resources management program has been in effect at NAWS since 1978. This program addresses NAWS compliance requirements and resource stewardship responsibilities for archaeological resources, historic buildings and structures, and Native American values, as well as public access for research and education projects conducted on NAWS lands. This long-standing program, with its related projects and standard procedures, was formalized in September 1999 with the development of the Station's draft ICRMP. The draft ICRMP, to be implemented over a 5-year period, includes prehistoric, ethnographic, and historic overviews; inventories of known resources; management goals and objectives; and formalized procedures and standards for integrating cultural resource management considerations into Station-wide mission support efforts. Major program elements of the ICRMP include specific management strategies to ensure NHPA Sections 106 and 110 compliance, protocols for historic buildings and structures management, recognition of Native American values, and limited accommodation of public access for research and education projects.

Other supplemental management plans have been developed to address specific cultural resource needs. The Sugarloaf Archaeological District, located in the Coso Geothermal land management unit, is guided by its own management plan, which was completed in 1991 (Cleland 1991). NAWS is addressing the need for enhancing the Station's curation facilities in accordance with the recommendations of a study performed by the U.S. Army Corps of Engineers (USACE) (Meyers and Trimble 1993). Additionally, historic preservation guidelines have been developed and integrated into the Station's environmental review process to provide guidance for the management of historic buildings and structures at NAWS (Mikesell 1997c).

3.5.3.1 NHPA Section 106 Compliance Strategy

NAWS has developed a dual strategy for NHPA Section 106 compliance for new and ongoing projects. This approach includes a case-by-case review of new projects at NAWS, and a programmatic approach for completing Section 106 requirements associated with the implementation of the CLUMP and ICRMP.

New projects are evaluated for their potential to affect resources eligible for the National Register through the Station's established environmental review process. This review process is implemented through a Station Instruction (NAWCWDINST 5090.1) and is conducted in accordance with NEPA. The review identifies any cultural resources in the vicinity of the project site, determines the potential for the proposed action to impact these resources, identifies any mitigation measures required, and provides a framework for implementing mitigation measures. In addition, protocols have been established for unexpected events that may affect cultural resources. These include the inadvertent discovery of archaeological and Native American resources after a project has been reviewed and approved. Emergency halt-work clauses are built into project stipulations, with procedures and appropriate consultations specified.

NAWS has developed a draft PA (Appendix F) to address Section 106 compliance because, due to the sheer size and scope of the land management undertaking defined in the CLUMP and ICRMP, NAWS cannot fully determine the effects of the undertaking on historic properties (36 CFR Part 800.14 (b) (1) (ii)) at this time. Implementation of the CLUMP, with its attendant military test and training activities, and implementation of the ICRMP for the management of historic properties, constitute the scope of the undertaking addressed under this agreement. The draft PA was submitted to the SHPO, Advisory Council, neighboring Native American tribes, and other interested agencies for review and comment in September 2000. Based on comments received and further discussions with SHPO, the PA was revised in July 2001 to provide the policy and administrative guidelines for the implementation of the CLUMP. Under the terms of the PA, NAWS would continue to implement routine historic properties management activities, including site avoidance using the Station's environmental review (NEPA) process; continue

to identify properties eligible for inclusion in the NRHP (historic properties); and continue to determine the effects of projects on historic properties in accordance with existing operating procedures that are defined in Appendix E of the ICRMP.

Detailed procedures for the management of historic properties, including the routine procedures for conducting NHPA Section 106 project reviews, are contained in the draft ICRMP. The ICRMP provides the framework for completing the Section 106 process in a phased, Station-wide approach at NAWS (see Table 3.5.1). Due to the size and scope of the undertaking, inventories of primary buffer areas and the evaluation of eligible resources are planned to continue over 5 years (2002-2006). NAWS has focused initial inventory and evaluation efforts on those areas proposed for operations tempo increases (Coso Military Target, Airport Lake, and Superior Valley areas). The planned schedule for the completion of Section 106 efforts is provided in Table 3.5-1 and will be updated as needed according to the ICRMP review schedule described in the PA and as funding permits. Descriptions of the efforts completed to date for Section 106 inventory and evaluation are provided in Section 3.5.5 of this document. The schedule for planned completion of Section 106 inventories and evaluations under the provisions of the PA is provided in Table 3.5.1 below.

Table 3.5-1 Schedule for Section 106 Inventories and Evaluations

PA 106 Projects	***2002***	***2003***	***2004***	***2005***	***2006***
Inventory	*Coso Targets, George Range, Superior Valley*	*Charlie Range, Darwin Wash, George Range*	*Coso Range, Junction Ranch*	*Coso Range, Main Magazines, Ordnance T&E*	*Remaining target buffers*
Evaluation	*Coso Targets, Airport Lake Superior Valley,*	*Coso Targets, Airport Lake Baker Range,*	*Coso Targets, Charlie Range, George Range*	*Coso Targets, Darwin Wash, Junction Ranch*	*Coso Range, Darwin Wash, Junction Ranch, Main Magazines, Ordnance T&E*

3.5.3.2 NHPA Section 110 Compliance Strategy

Section 110 of the NHPA requires the Station-wide identification and long-term management of cultural resources meeting National Register criteria. With more than 1.1 million acres to manage, initial Section 110 inventory surveys have been implemented throughout the NAWS ranges to establish a general pattern of cultural resource types, distribution, and densities. Data from these efforts helped define the general land use and cultural resources management strategies for the Station. Section 110 surveys are generally applied to those areas not covered under Section 106 procedures. Further efforts to implement Section 110 surveys and evaluations are ongoing and are generally implemented as funds become available or to address specific needs. Examples of recent Section 110 efforts include the inventory and National Register evaluation and nomination of NAWS-built-environment resources (i.e., War World II and Cold War era buildings and structures) (Herbert 1996; Mikesell 1996, 1997a,b,c,d) and the Coso Rock Art District/Landmark Boundary Study (Gilreath 1997). NAWS Section 110 compliance efforts will continue to be implemented in accordance with the Section 110 guidelines.

3.5.3.3 Historic Buildings and Structures

A comprehensive effort to develop a management plan for historic buildings and structures at NAWS was completed in 1996. The resulting document, *An Historic Context for Evaluating the National Register Eligibility of World War II-era and Cold War-era Buildings and Structures for NAWS China Lake* (Mikesell 1996), includes descriptions of the inventories and evaluations of 1,409 buildings located throughout the Station for National Register eligibility. Of these buildings, 158 have been determined eligible for the National Register. Historic preservation guidelines have been developed and are integrated into the Station's environmental review process to provide guidance for the management of these historic buildings and structures at NAWS (Mikesell 1997c).

3.5.3.4 Native American Values

NAWS has established formal agreements with Native American tribes to accommodate routine and case-by-case site visits to certain areas of the Station for religious and traditional purposes. NAWS has a MOA with Native American groups for access to the Coso Hot Springs and Prayer Site. Native American access to these sites for religious and traditional activities has been accommodated and formalized through an MOA that has been in effect since 1979. Access to other sites is considered on a case-by-case basis. Access to these areas is carefully controlled for security and safety considerations, as well as for resource stewardship and protection considerations.

3.5.3.5 Public Access for Education and Research

NAWS has accommodated public access for educational and research purposes for many years. The cultural resources at NAWS are of interest to many people, including rock art enthusiasts, local historians, the academic community, and several Native American tribes. Identified tribal groups include the Paiute-Shoshone from Owens Valley, the Panamint Shoshone, the Death Valley Timbisha, the Kawaiisu, and the Tubatulabal. Native American histories sometimes include places that are now enclosed within NAWS.

As with Native American interests, local residents often have historic ties to places within NAWS. Some local families trace their heritage to ranches, mines, and homesteads that were located in places now encompassed within the Station (Maniery and Baker 1996). Additionally, the Historical Society of IWV is keenly interested in the history of NAWS itself. Many of its members work or have worked at the Station, some of them since the 1940s, and topics at monthly meetings often include the history of NAWS. These talks are recorded, transcribed, and archived, providing a source of historic information for the Station and the community.

NAWS has an MOA with the Maturango Museum to provide controlled access to Little Petroglyph (Renegade) Canyon. This MOA currently allows six tours per month. Each tour is limited to 50 people and must be led by guides who have received specialized training by authorized NAWS personnel.

Academic interests have been focused on the unique archaeological resources at NAWS from the 1920s through the present. The Sugarloaf Obsidian quarries, the Coso Rock Art, the Early Man studies in the China Lake Basin, and many other individual studies have been pursued by academic interests and have added a significant amount of information to the reconstruction of regional prehistory and history. NAWS reaches out to the academic community by encouraging researchers to study the cultural resources at NAWS, and facilitating their work when possible. As an example, in August 2001, NAWS entered into a cooperative research agreement with the University Foundation of California State University, Bakersfield (CSUB). The purpose of the agreement is to provide CSUB graduate students with opportunities for archaeological research that will benefit the cultural resources management programs at NAWS.

3.5.4 Inventory of Cultural Resources

3.5.4.1 Identified Cultural Resources

Field surveys for archaeological resources have been conducted for approximately 92,500 acres (37,434 hectares) at NAWS. Figures 3.5-1 and 3.5-2 show the areas that have been surveyed. These surveys have been conducted under NHPA Section 106 and Section 110 strategies. Both strategies take a programmatic approach to performing baseline surveys, and have supported the development of the CLUMP and ICRMP to determine the quality, quantity, extent, and condition of cultural resources in areas of high use, and in areas where little information was known regarding the sensitivity of resources. A Section 106 strategy would continue to be employed for the implementation of the CLUMP and ICRMP as specified in the pending PA for cultural resources management (Appendix F).

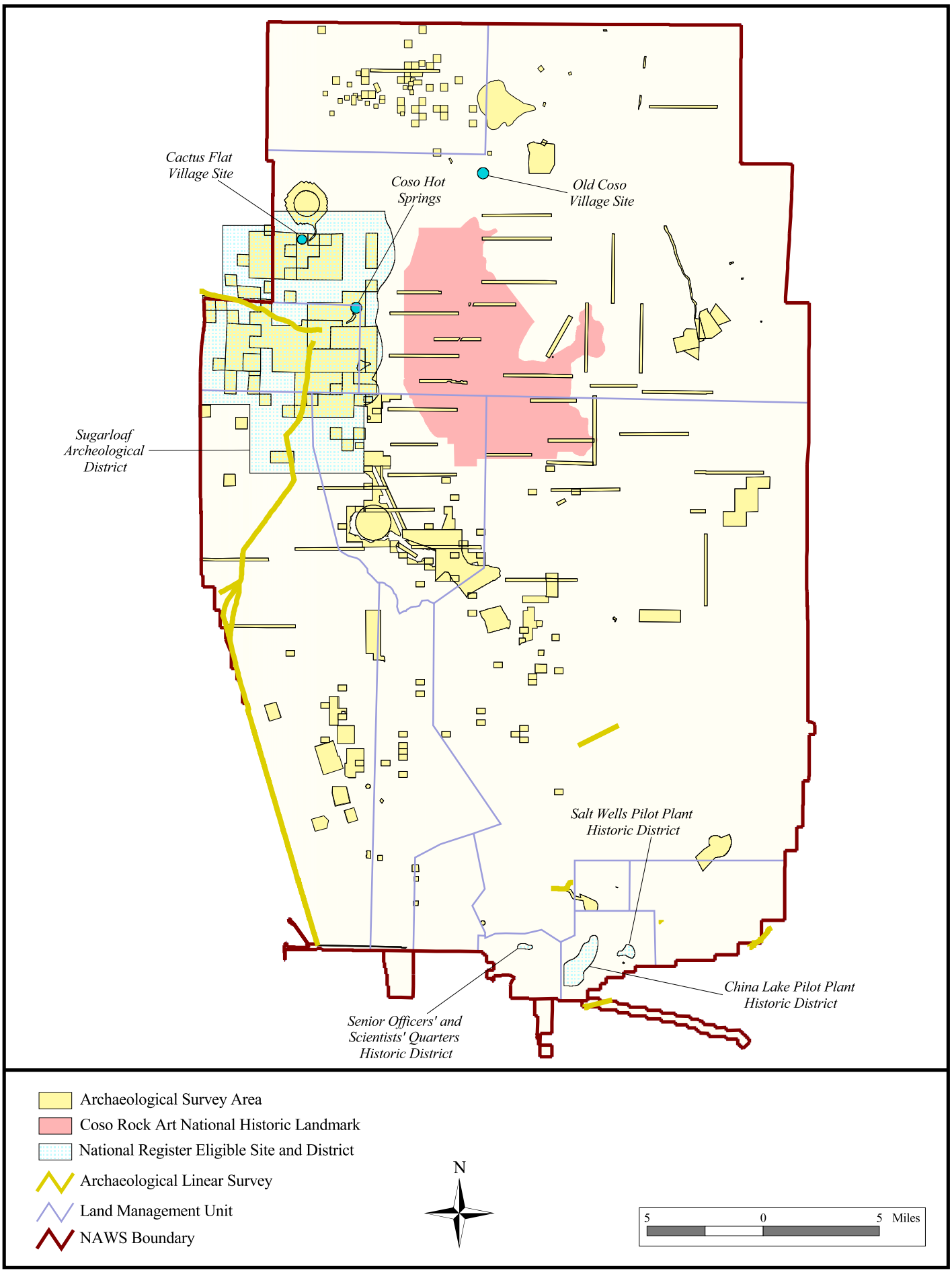

Figure 3.5-1 Known Cultural Resources and Survey Areas, North Range

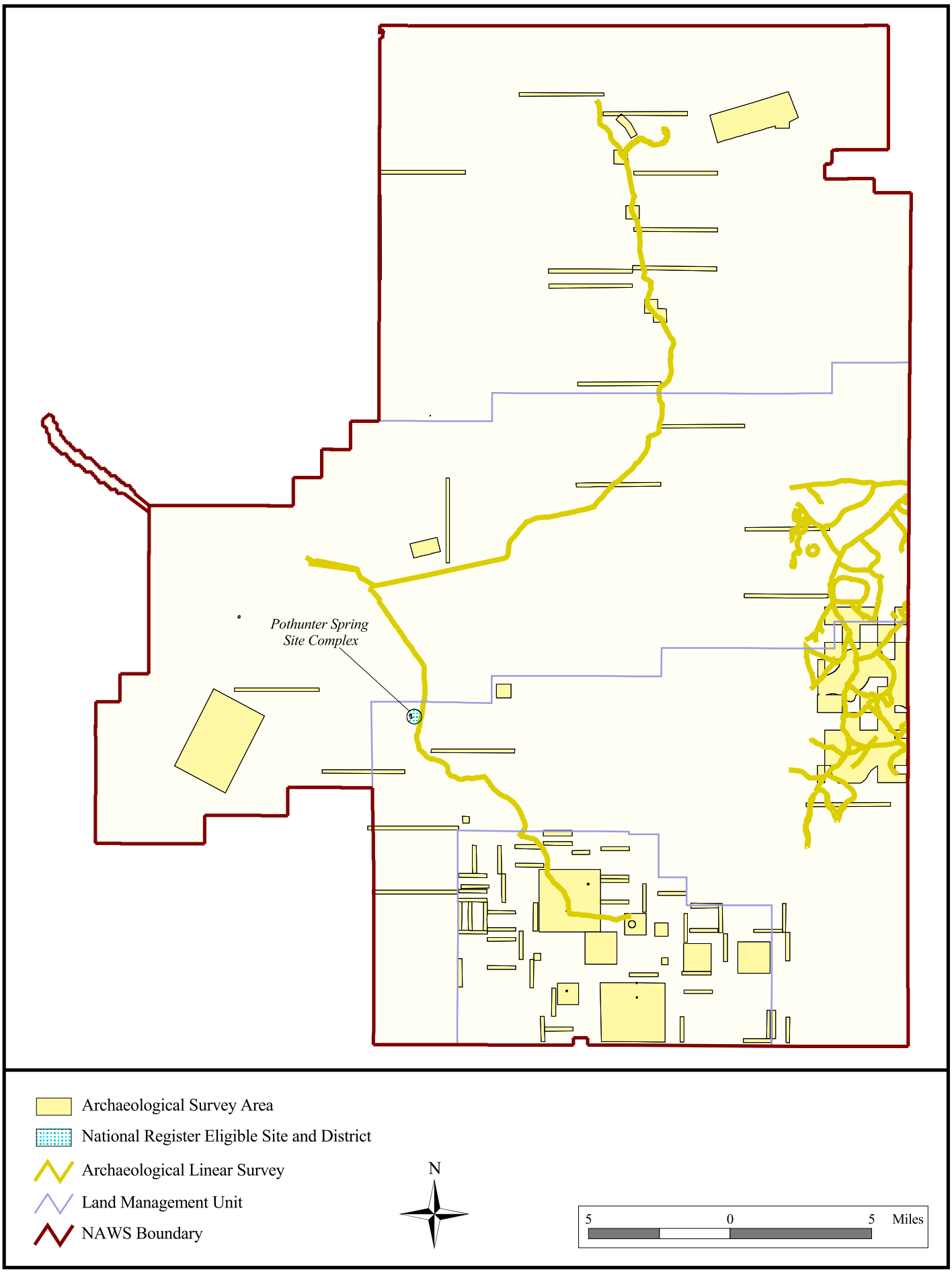

Figure 3.5-2 Known Cultural Resources and Survey Areas, South Range

Archaeological surveys conducted on the NAWS ranges have resulted in the recording of 1,736 archaeological sites (as of summer 2000). Of the recorded sites, 1,592 contain prehistoric artifacts, 88 contain historic-era materials, and 56 have both prehistoric and historic artifacts and features. Sites containing prehistoric resources recently were categorized by type using site-specific attributes (Hildebrandt and Gilreath 1996). These site types include simple flaked stone sites, limited habitation sites, habitation sites, quarry sites without habitation, rock art sites with habitation, milling stations, quarries with habitation, rock art sites without habitation, and isolated features.

Intensive efforts to inventory historic-era archaeological resources at NAWS began in 1996 (Herbert 1996; Mikesell 1996). The historic overview classified historic era archaeological sites according to historical themes that encompass a variety of specific site types (Herbert 1996). Using this classification system, the recorded pre-Navy historic resources include mining sites, homestead or ranching sites, water development sites, transportation or road sites, recreation sites, and unassociated historic refuse deposits and hearths. The review identified 756 locations where historic resources may occur, based on archival research of mining claims, homestead patents, transportation routes, early maps, and other documents. Field checks of 72 of the archival locations have been conducted to examine the correlation between archival records and resources on the ground and to assist in developing evaluation standards (JRP Historical Consulting Services 1997i).

In addition to prehistoric and historic archaeological sites, one traditional cultural property has been identified. Coso Hot Springs, including the Prayer Site, has been documented and formally recognized as an important Native American resource within the boundaries of NAWS. Additional Native American resources may be present on Station lands but have not yet been identified. Additional resources important to Native American traditional and religious interests may be identified through ensuing consultations with Native American tribes who have ties to areas within NAWS.

Recent studies have concentrated on inventorying and evaluating the developed environment at NAWS. Over 1,500 buildings and structures, nearly 90 percent of those at the Station, have been inventoried and evaluated to date (NAWS 1997). An historic context has been produced that documents the historic events relating to World War II and the Cold War that occurred at NAWS. This document outlines evaluation standards for buildings and structures associated with these events (Mikesell 1996). Following the completion of this historic context for evaluating the Navy's "built" environment at NAWS, a two-phased effort was conducted to inventory and evaluate World War II-era and Cold War-era resources. The first phase of the survey encompassed Mainsite, Armitage Airfield, CLPL, and SWPL. The second phase of the effort entailed inventorying and evaluating buildings and structures in the remote and outlying areas of the Station (Mikesell 1997b, 1997d).

3.5.4.2 Evaluated Cultural Resources

Four historic properties at NAWS are currently listed on the National Register. As a NHL, the Coso Rock Art District (formerly known as Big and Little Petroglyph Canyon NHL) was automatically listed when the National Register was created in 1966. Two petroglyph sites within the NHL, Renegade Canyon (CA-INY-281) and Big Petroglyph Canyon (CA-INY-283), are listed on the National Register as individual properties. Coso Hot Springs (CA-INY-475/H) is listed for Native American and historic-era significance. Many other sites have been evaluated as eligible but are not yet listed on the National Register.

Eligibility evaluations have been completed for 697 of the prehistoric sites that have been identified, with 545 sites recommended as eligible and 152 sites recommended as not eligible for the National Register (NAWC 1999a). Nominations to the National Register have been prepared for the Sugarloaf Archaeological District (Gilreath and Hildebrandt 1991), the Cactus Flat Village Site (Clewlow 1985a), Coso Rock Art District NHL boundary adjustment (Gilreath 2000), and the Pothunter Spring Site Complex (Clewlow 1985b).

The Sugarloaf Archaeological District is in the Coso volcanic field in an area of 38 Pleistocene-age rhyolite domes and flows (Cleland 1991). This contiguous district encompasses 44,160 acres (17,871 hectares) and has 480 sites listed as contributing elements. These sites include the most extensive obsidian deposits in the region and a prominent source of obsidian that was widely traded throughout California in prehistoric times. Sites within the district generally fall into three basic functional categories: obsidian procurement sites, subsistence sites, and habitation sites. Changes over time are reflected in patterns of quarrying methods employed, subsource locations, and lithic manufacturing techniques. The development of geothermal power generation has led to the implementation of a CRMP for the district, which defines research contexts and methodologies for performing archaeological work in this area (Cleland 1991).

The Cactus Flat Village Site is located within the Sugarloaf District (see Figure 3.5-1). A separate nomination to the National Register was prepared for this major habitation site, which includes more than 40 acres (16 hectares) on two loci (Clewlow 1985a). Cactus Flat contains lithic scatters, milling features, quarry locations, and habitation debris.

The Coso Rock Art District NHL was listed in the National Register in 1966, but the boundaries were not defined until 1978. The provisional 1978 boundary encompassed 99 square miles (257 square kilometers), but a recent study has defined new boundaries that more closely reflect the actual locations of the rock art (Gilreath 1997). More than 14,000 rock-art panels have been documented in the NHL, as well as a variety of other archaeological resources.

The Pothunter Spring Site Complex, also known as the Pilot Knob Cave Complex, is located within the South Range. The district consists of a series of sandstone rock shelters with a long, but intermittent, chronology of habitation episodes. Excavations conducted in 1985 revealed that the site was occupied most intensely in the past 650 years (Clewlow 1985b).

One historic property, the remains of an early twentieth century resort at Coso Hot Springs, is listed on the National Register for architectural and historic values (Coombs and Greenwood 1982). Relatively few pre-Navy historic-era resources, however, have been evaluated for eligibility to the National Register. Seven historic homestead/ranch sites were evaluated and found not eligible (Maniery and Baker 1996). Although several recorded sites and archivally derived locations have high potential for National Register eligibility, they have not yet been evaluated. The recent historic overview and the identification of potential historic sites from archival sources have laid the groundwork for the evaluation of known historic sites, such as Old Coso Village, and other important historic sites located at NAWS (Herbert 1996).

Although Navy use of NAWS lands exceeds the usual 50-year requirement for consideration of properties for National Register eligibility, National Register guidelines allow “exceptionally significant” properties that are under 50 years old to be determined eligible. Research indicates that significant events in the history of American weapons development occurred at NAWS. Many buildings and structures from that period of significance still exist, and retain their historic integrity (Mikesell 1996). Five buildings within the Mainsite and Armitage Airfield areas were recommended as eligible for the National Register as individual properties (Mikesell 1997a). This phase also identified three historic districts: the Senior Officers and Scientists Quarters Historic District at Mainsite with 20 housing units; the China Lake Pilot Plant Historic District, with 76 contributing elements; and the Salt Wells Pilot Plant Historic District, with 38 contributing elements. Nominations have been prepared for these resources (JRP Historical Consulting Services 1997a-h). Thirteen buildings and structures in scattered locations throughout the remote areas of the North Range and five buildings and structures at the Randsburg Wash Gun Line on the South Range were recommended eligible for the National Register as individual properties. Nominations for these resources also have been prepared (Mikesell 1997d). One hundred fifty-eight buildings and structures at NAWS have been recommended eligible for the National Register. These include: 114 at the Propulsion Laboratories, 24 in

Mainsite, 7 at Charlie Range, 5 in the Randsburg Wash area in the South Range, 5 in the Thompson Laboratory Area, 1 at Area R, 1 at Armitage Airfield, and 1 in the CT-4 areas of the North Range.

3.5.5 Cultural Resources and Existing Land Disturbance Patterns Around Target Impact Areas

The existing disturbance patterns at target and test impact areas located on the NAWS ranges were characterized during a series of field surveys conducted during the spring and summer of 1998. Forty-seven different impact areas, representing approximately 55 percent of the targets and test sites at NAWS, were surveyed throughout the ranges. Impact areas are located throughout the North and South ranges (see Section 3.1, Land Use) and have historically been used intensely for test and training activities using HE and inert ordnance. These areas receive a high degree of surface disturbance and generally are cleared of naturally occurring surface features.

The surveys performed were not intended for Section 106 inventory purposes. Rather, they were conducted under a Section 110 methodology to determine the presence or absence of cultural resources, and focused on determining the general characteristics of disturbance in and around impact areas. Target impact areas were selected for surveys from each of the land management units on the ranges at NAWS. The field surveys confirmed that impact areas generally were void of surface features and determined that disturbances outside the designated impact areas generally were confined to a narrow band of approximately 650 feet (200 meters) around each target impact area (Tetra Tech 1999). On average, the amount of intensive surface disturbance to the target buffers was 6 percent of the area within the 200-meter band. Approximately 3,000 acres (1,214 hectares) were surveyed during this effort and 45 archaeological sites were identified. A complete report of these surveys is contained in the Station's technical report, *Characterization of Disturbance and Biological and Cultural Resources Within the Target Buffer Areas* (U.S. Navy 1999). As a result of this field study, NAWS formally designated the 200-meter (656-feet) bands directly adjacent to impact areas as primary buffer zones (see the CLUMP, Section 3-3). Impacts within the primary buffer zones included craters caused by impact of air-delivered ordnance that missed the target center or skipped out of the target area, miscellaneous debris associated with target use, and ORV tracks associated with ordnance recovery. Impacts occurring outside the primary buffer zones were infrequent and very widely disbursed (Tetra Tech 1999).

Based on the initial findings of these field surveys and the target buffer disturbance report, NAWS initiated discussions with the SHPO in 1998 to design a comprehensive approach to address a Section 106 compliance process for implementing the CLUMP and the ICRMP. As a result of these discussions, NAWS formally initiated the development of a PA with the SHPO to establish the framework and guidance for a long-term program to implement Section 106 efforts to inventory, evaluate, and appropriately treat historic properties that may be impacted by the implementation of the undertakings addressed in the CLUMP and ICRMP.

Intensive Section 106 archaeological field surveys were initiated in 1998 at the primary buffer areas of targets and test sites throughout the NAWS ranges. These Section 106 surveys inventoried archaeological resources in the most intensively used target areas at NAWS. Section 106 inventory surveys are ongoing at NAWS and are being conducted in accordance with the Station's draft ICRMP and PA. For the purposes of this discussion, survey results are presented for efforts conducted through the summer of 2001.

During the summer of 1998, sample surveys were conducted for the primary buffer zones of impact areas at the Airport Lake, Baker, Charlie, and George land management units. A total of 2,880 acres (1,166 hectares) were surveyed and 72 archaeological sites were recorded (Tetra Tech and Far Western Anthropological Research Group 1999). Additional surveys were then conducted at the Coso Military Targets land management unit for a total of 1,860 acres (753 hectares) surveyed and 147 sites recorded. This effort was augmented with additional surveys of 118 acres (478 hectares) yielding 17recorded sites (Hildebrandt and Ruby 1999).

During 1999 and the spring and summer of 2000, intensive Section 106 archaeological surveys were conducted for the primary buffer zones of all remaining target impact areas not previously surveyed in all the Baker targets, Airport Lake targets, and Coso Military targets areas. Through the combined Section 106 inventory efforts, a total of 6,886 acres (2,770 hectares) were surveyed and 105 archaeological sites were recorded. Additional survey efforts for the Randsburg Wash and Coso Range land management units were conducted in spring and summer of 2001 on 500 and 250 additional acres (202 and 101 hectares), respectively, and 43 sites were recorded. Intensive Section 106 surveys conducted prior to the current survey efforts within the primary buffer zones of various targets and test sites covered 3,189 acres (1,290 hectares) and identified 12 archaeological sites.

In total, 10,785 acres (4,364 hectares) of the 19,216 acres (7,776 hectares) of primary buffer zones were surveyed as of the summer of 2001. These surveys account for 55 percent of all the primary buffers throughout the NAWS range impact areas but represent 100 percent coverage of the Station's most heavily used target areas (Coso Military Targets, Airport Lake, Baker Range, and Superior Valley). The remaining 8,431 acres (3,412 hectares) of primary buffer zones are planned for inventory completion in accordance with the schedule presented in Section 3.5.3 (Table 3.5-1). NAWS will continue efforts to complete the Section 106 compliance in accordance with the Station's ICRMP and the PA.

The following sections describe known archaeological resources located within the primary buffer zones and adjacent areas within 2,500 feet (762 meters) of the target or test areas. The purpose of these summaries is to provide a general characterization of the archaeological resources of each land management unit.

3.5.5.1 North Range

Airport Lake Management Unit

A variety of target areas are located in the Airport Lake management unit. Survey areas are depicted in Figure 3.5-3. Five intensive archaeological survey projects have been conducted within the 2,500-foot (762-meter) primary buffer zones of these target impact areas. Additional focused surveys were completed for the primary buffer zones during the spring and summer of 2000. These combined surveys have yielded 96 archaeological sites recorded. The majority are simple flaked stone sites. Other sites identified include habitation sites, limited habitation sites, milling stations, historic sites, and an isolated historic feature. Four sites have been evaluated for the National Register and recommended ineligible (Hildebrandt and Jones 1997).

Baker Range Management Unit

Eight target impact areas are located in the Baker Range management unit. Portions of the Baker Range management unit were surveyed in 1998 (Tetra Tech, Inc. and Far Western Anthropological Research Group 1999). Recorded sites include three historic sites, three simple flaked stone sites, two milling stations, and one limited habitation site. The primary buffer zones of these impact areas were surveyed in the summer of 2000, with 2,026 acres (819.9 hectares) surveyed and 21 additional archaeological sites recorded. Recorded sites include predominantly historic features and simple flake stone sites. A few limited habitation sites and one milling station were also recorded.

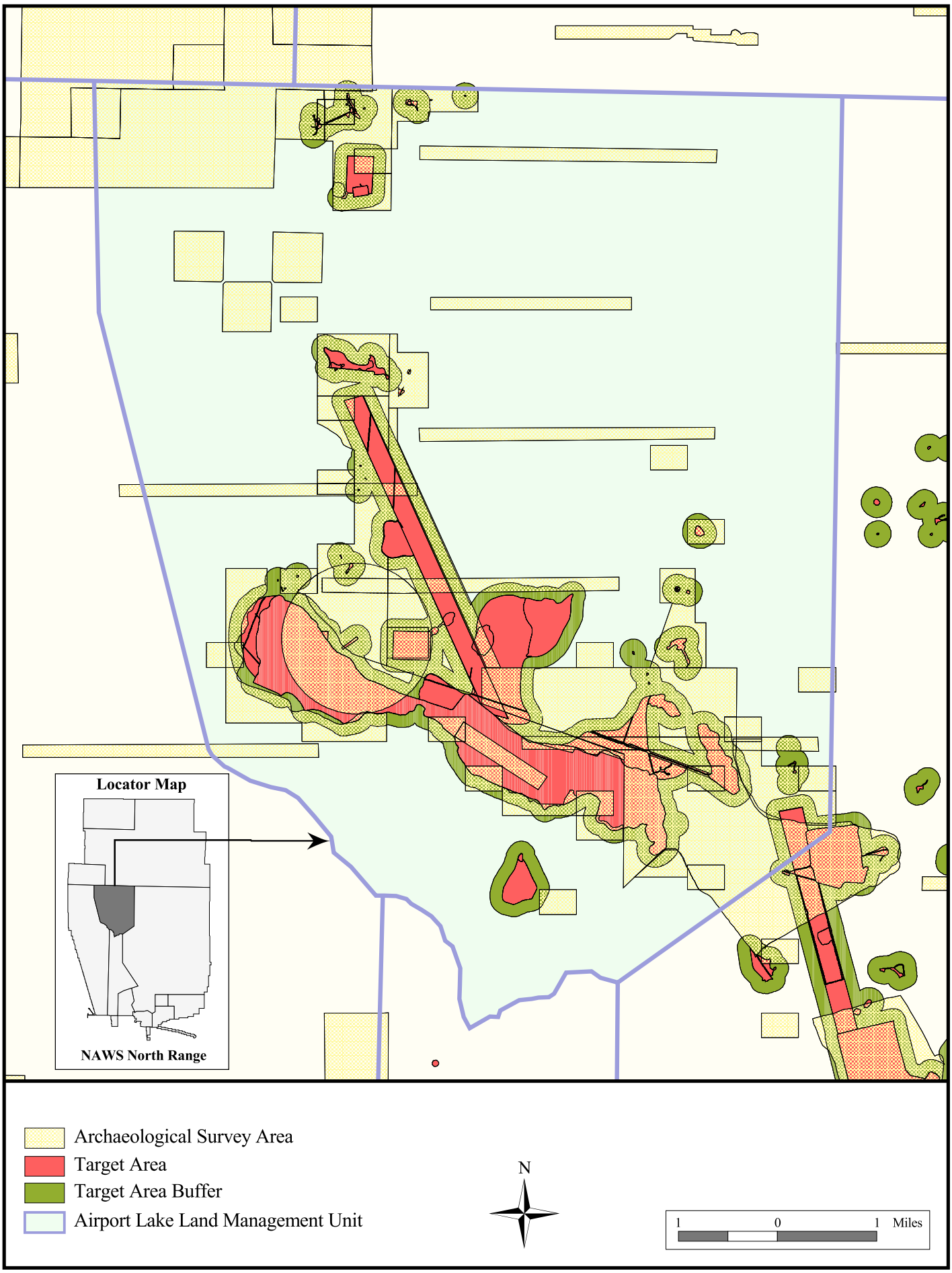

Figure 3.5-3 Cultural Resource Survey Areas at Airport Lake Targets

Charlie Range Management Unit

Five target impact areas are located in the Charlie Range management unit. Partial surveys were conducted for the C-3 No. 1 target area secondary buffer zone and 17 archaeological sites were recorded. Partial surveys were conducted for the C-3 No. 2 buffer, and five archaeological sites were recorded. Site types include prehistoric lithic deposits (most common), limited habitation, and historic homestead remains. The lithic sites in this area are unusual in the variety of stone tools and materials, which included Clovis, Lake Mojave, Silver Lake, and Pinto diagnostic projectile points.

Coso Target Range Management Unit

A wide variety of target areas are located in the CTR management unit. Survey areas are depicted in Figure 3.5-4. Systematic sample surveys within the Coso Pinyon Zone of the CTR in 1998 revealed an unusually high density of archaeological sites–mostly prehistoric petroglyphs, habitation, and historic charcoal-industry (Hildebrandt and Ruby 1999). Additional investigations during the target area characterization studies confirmed the high number of sites in the pinyon zone (Tetra Tech, Inc. 1999). An intensive survey of all target areas was conducted in fall 1998 (Hildebrandt and Ruby 1999). Survey plots of approximately 359 square yards (300 square meters) were placed over each of the 25 targets. Fifty-two archaeological sites were recorded as a result of this inventory. Because of the archaeological sensitivity of the area, a separate management plan has been developed for this land management unit (Hildebrandt, Ruby, and Maniery 2000).

Coso Range Management Unit

The Coso Range management unit contains six target impact areas and two test areas, located at Upper and Lower Cactus Flats. Like the Coso Tactical Range, the Coso Range management unit also encompasses an archaeologically-rich area. This area includes a part of the Coso Rock Art District NHL and part of the Coso Volcanic Field. The Ship Target site is the only target area in close proximity to the Coso Rock Art District NHL and is located adjacent to the District's boundary. Intensive surveys of the primary buffer at both Lower and Upper Cactus Flat test areas have been completed. Sixty-three sites were recorded; with 46 of the sites recommended eligible for the National Register. The Safeway Target primary buffer zone has been completely surveyed and no sites were identified. The other target impact areas have been partially surveyed; these sites include Cole's Flat, Darwin Wash, and Wild Horse Mesa. Site types found at these locations include rock shelters, open-air habitation sites, milling stations, lithic workshops, and rock art. The survey of Ship's Target was completed in spring of 2001. The Junction Ranch radar cross-section facility, which is not a target impact area, is also located in this management unit and is planned for survey in 2004.

George Range Management Unit

Sixteen target impact areas and two explosive material (warhead, bomb, and R&D prototype items) static test facilities are located in the George Range management unit. This large management unit includes portions of the Coso Rock Art District NHL, the Argus Range to the west, and the China Lake Basin. No George range target areas are located in the Coso Rock Art District NHL. Partial surveys have been completed for seven of the 16 impact areas. In addition, the Burro Canyon Open Burn/Open Detonation (OB/OD) area has been surveyed, evaluated, and data recovery has been performed (a final report is in progress). In spite of these potentially sensitive areas, relatively few archaeological sites have been located within the primary buffer zones. Most of the sites are limited habitation and simple flaked stone sites. The most sensitive sites include Late Pleistocene and Early Holocene archeological resources within the China Lake Basin (Von Werlhoff and Von Werlhoff 1978; Berry et al. 1985; Hildebrandt and Jones 1995, 1997; Tetra Tech 1999).

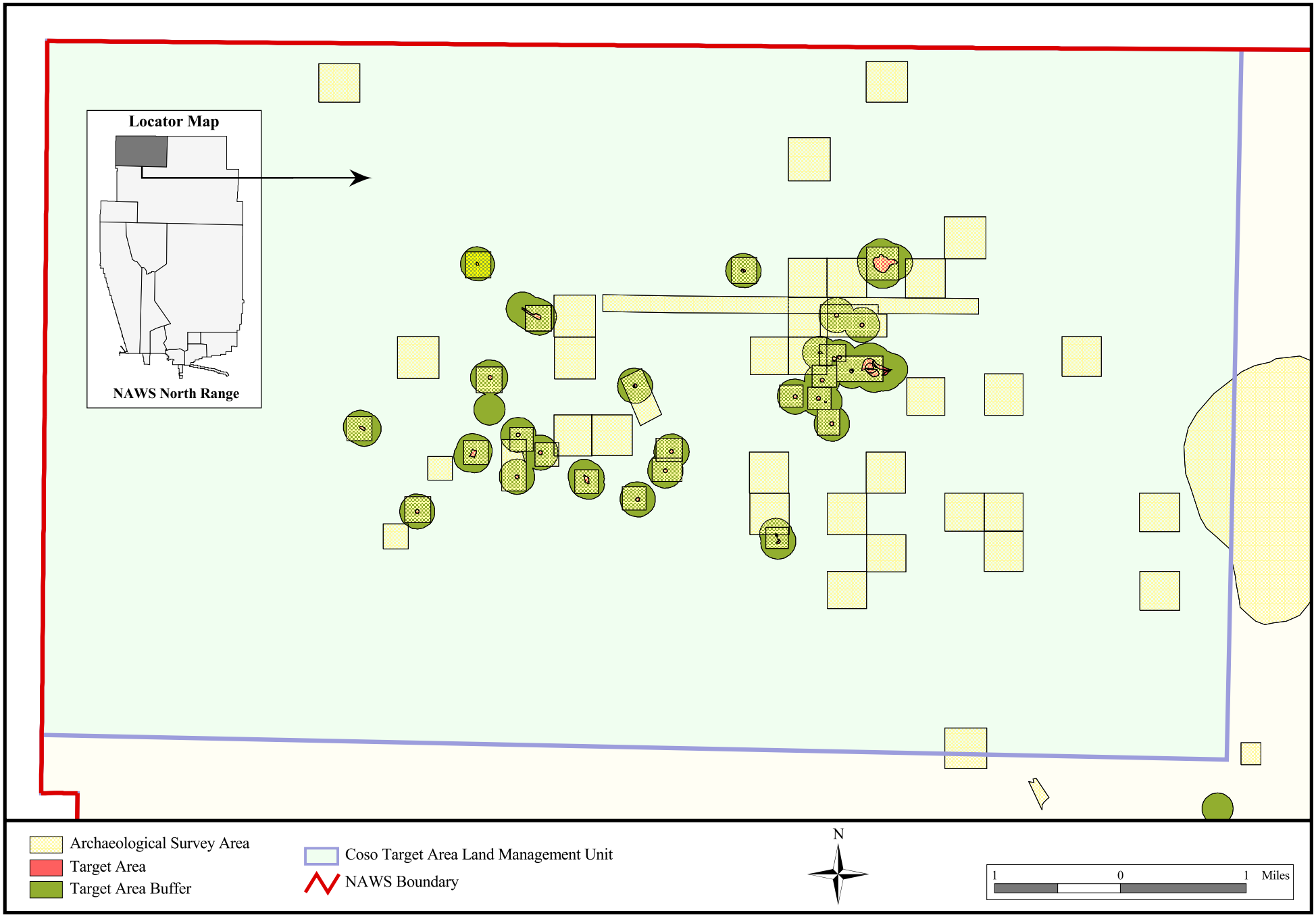

Figure 3.5-4 Cultural Resource Survey Areas at Coso Military Targets

3.5.5.2 South Range

Mojave B North Management Unit

Two impact target areas are located in this management unit: Wingate Airfield and the Convoy targets. All of Wingate Airfield has been surveyed (WESTEC Services 1979). Three sites were identified, including the Layton Monorail. The monorail has been evaluated and recommended ineligible for the National Register (JRP 2000). Forty percent of the Convoy South Target Area and 5 percent of the Convoy Tank Target Area buffer zones have been surveyed (Clewlow and Walsh 1996; WESTEC Services 1979). No sites were recorded in these areas.

Randsburg Wash Management Unit

Six target impact areas are located in the Randsburg Wash management unit. Partial surveys have been conducted near the Charlie Airfield Target Area buffer zone (Elston, et al. 1983) and two sites were recorded. Neither has been evaluated. Charlie Airfield surveys were completed in spring of 2001 and five sites were recorded. Four structures have been recommended eligible for the National Register in the Randsburg Wash land management unit.

Mojave B South Management Unit

Eighteen target impact areas are located in the Superior Valley portion of the Mojave B South management unit. Survey areas are depicted in Figure 3.5-5. Of these, 11 primary buffer area surveys have been completed, (including Bullseye Target surveys) yielding 4 prehistoric archaeological sites that have been recorded but not evaluated. Partial surveys have been conducted on six of the remaining seven primary buffer zones, yielding two sites that have been recorded but not evaluated.

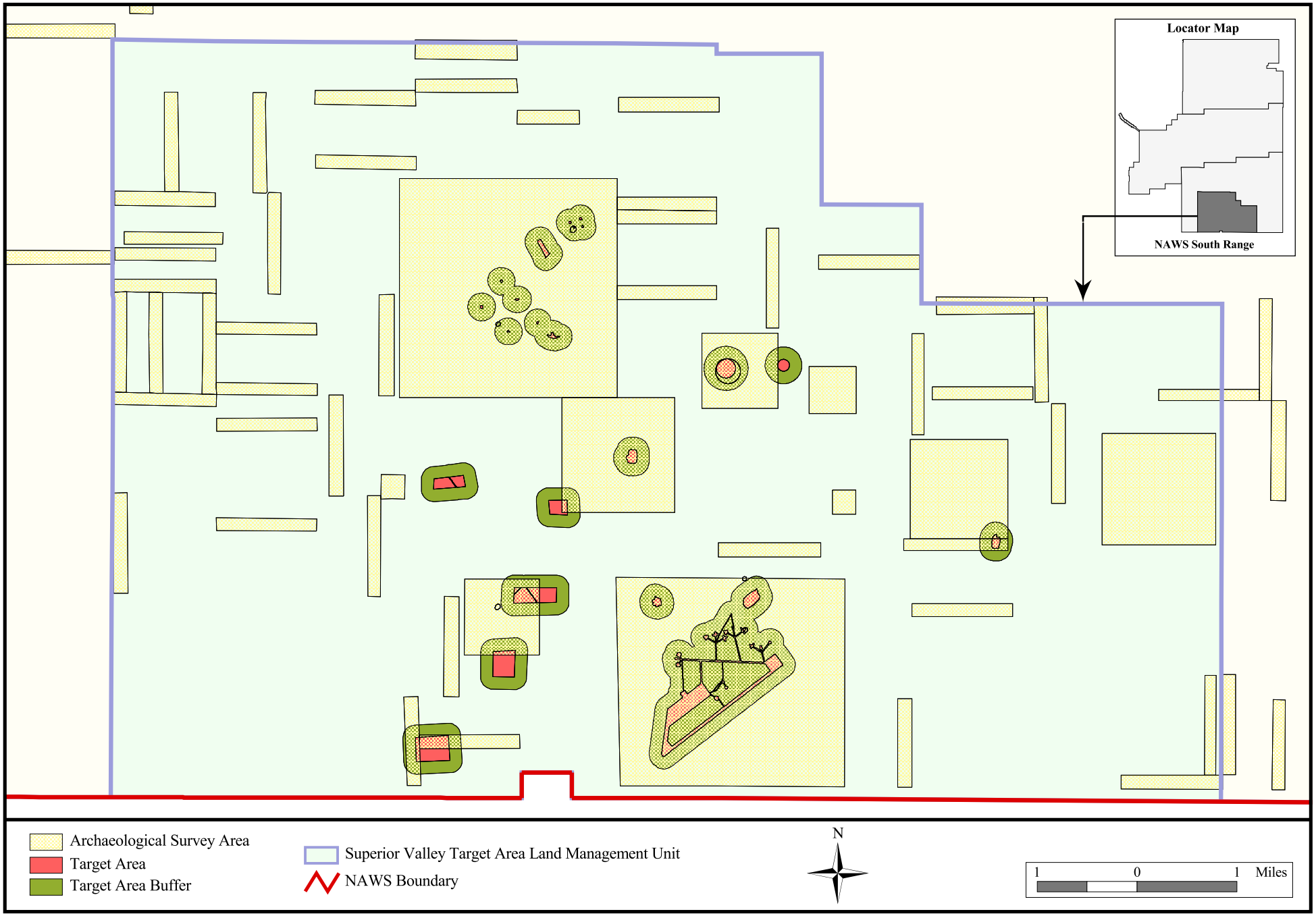

Figure 3.5-5 Cultural Resource Survey Areas at Superior Valley Targets

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3.6
Geology and Soils

3.6 GEOLOGY AND SOILS

This section describes the geologic and soil environment at NAWS, including the physiography of NAWS and its surrounding areas. Geologic resources consist of the geomorphologic features in the project area, i.e., the playas, surrounding foothills and mountains, and underlying geologic formations and sedimentary cover.

Soil resources are a subset of geologic resources. Soils are the thin, typically biologically-active layer of sediments covering the earth's surface from which most plants and many animals derive moisture and nutrients. Soils are normally formed in place from the weathering of rock material, although soils may be formed elsewhere and transported by erosion or by human activities. Traditionally, soils are classified with respect to the characteristics that affect plant growth (moisture retention capacity, drainage, depth, and organic matter content). Since soils are located at the earth's surface, their engineering characteristics, such as stability on slopes, compaction, and shrink-swell potential, are also important. Soils grade with depth to the parent rock material from which they are derived, so the difference between soil and nonsoil deposits is not necessarily distinct. The term "soil" often is used to describe any unconsolidated deposits found near the earth's surface, which is the definition used for this document.

3.6.1 Regulatory Framework

Under California Public Resources Code § 2622 (Alquist-Priolo Earthquake Fault Zoning Act of 1972), the California Division of Mines and Geology has delineated seismic zones deemed to be "sufficiently active and well-defined as to constitute a potential hazard to structures from surface faulting or fault creep." The state geologist is required to continually review new geologic and seismic data and to revise the earthquake fault zones or to delineate new zones based on new information. The Navy requires geotechnical investigations to be performed as part of the design and retrofit of structures. Construction plans are reviewed for conformance with provisions of the Alquist-Priolo Act. The California Code of Regulations (CCR) (24 CCR Part 2), also known as the California Building Code, contains the enforceable state building standards. While NAWS is not subject to these standards, the station voluntarily complies with state and local building codes.

Under the Military Construction Act of 1979, NAWS received authority for geothermal projects on acquired lands (Navy fee-owned lands). A Memorandum of Understanding (MOU) between the Secretary of the Navy and the Secretary of the Interior allows the BLM to lease certain Navy-controlled lands within the Coso KGRA for commercial geothermal development, if compatible with the NAWS mission. Navy constraints on geothermal operations were incorporated by an amendment in 1980. Historically the Navy has acted as the lead agency in developing environmental documentation for new geothermal development projects on Navy-controlled lands within the Coso KGRA. In March 1979, the Navy completed the final EIS for the Navy Coso Geothermal Development Program to evaluate the impacts of geothermal development.

3.6.2 Physiography

This section describes the physical features of NAWS and its surrounding areas, including mountain ranges, drainages, and washes. NAWS lies within two physiographic provinces: the Basin and Range, and the Mojave Desert. The Basin and Range Province extends from Oregon to Utah, through Nevada. The Mojave Desert Province includes part of Nevada, southern Arizona, and New Mexico and reaches into Mexico. California's Mojave Desert, which is part of the larger Sonoran Desert, represents a transition zone between the two physiographic provinces (Lobeck 1975).

3.6.2.1 North Range

The North Range is located within the Basin and Range Province and includes parts of the Coso and Argus ranges (Figure 3.6-1). Coso is a northwest-trending mountain range that dominates the northwest quadrant of the North Range. Coso Range extends from Owens Lake in the north (elevation 3,557 feet [1,084 meters] MSL) to Indian Wells Valley (IWV). Coso Peak (elevation 8,160 feet [2,487 meters] MSL) is the highest point within the Coso Range. Within the boundaries of the North Range surrounding Coso Peak are several small basins, including Upper Cactus Flat, Upper Centennial Flat, and Coles Flat.

South of the Coso Range is IWV, which covers most of the southwest quadrant of the North Range and extends south beyond the boundaries of the North Range. The southern rim of IWV is formed by the El Paso Mountains, Rademacher Hills, and the Spangler Hills. Near the southern end of the valley, several washes that drain Sierra Nevada canyons and the El Paso Mountains converge to form Little Dixie Wash. North of Little Dixie Wash, several washes enter IWV and drain toward the North Range. These include an unnamed wash that originates on the fan of Freeman Canyon, Indian Wells Canyon Creek, Short Canyon Creek, and Grapevine Canyon Creek.

Farther to the north, the washes from Sand Canyon and Noname Canyon merge near the boundary of the North Range and the Inyo/Kern County line. North of the Kern County line, the principal inflow to the northern end of IWV comes from Rose Valley. South of Little Lake, this drainage follows a narrow course between the steep granite outcrop of the Sierra Nevada and Quaternary lava flow deposits from volcanic vents associated with the southern Coso Range.

At the southern end of IWV, several small washes originate in the El Paso Mountains and converge near the City of Ridgecrest to form South El Paso Wash. South El Paso Wash drains across the Armitage Airfield land use management unit and terminates in the George Range land use management unit, near the China Lake playa. At the northern end of IWV is the Coso Basin. A number of washes drain from the Coso Range into the Coso Basin, between Cactus Peak and Wild Horse Mesa.

The drainages within IWV generally converge on the China Lake playa. However, only runoff from large storms reaches the playa. Most of the runoff evaporates or seeps into the alluvium before it reaches the playa. The elevation of the bed of China Lake is about 2,150 feet (655 meters) MSL. South of China Lake playa are Mirror and Satellite playa lakes, which are located in the Mainsite land use management unit. Between China Lake playa and Searles Valley is Salt Wells Valley, which lies in the southeastern corner of the North Range. The lowest elevation on the North Range is on the eastern edge of Salt Wells Valley, where the land slopes down to about 1,900 feet (579 meters) MSL. Salt Wells Valley drains east toward Searles Valley.

3.6.2.2 South Range

Figure 3.6-2 shows the topography of the South Range. The northern half of this range (north of Garlock Fault) is in the Basin and Range physiographic province. The southern half, which includes most of Randsburg Wash and all the Mojave B South Ranges, is in the Mojave Desert physiographic province.

The South Range borders Searles Valley, extending along the west flank of the Slate Mountain Range and a low topographic divide between Straw Peak (the highest point in the Slate Range at 5,578 feet [1,701 meters] MSL) and Almond Mountain. Panamint Valley, which flanks the northern half of Argus Range, extends into the South Range along a southeast trend east of Slate Range. East of Panamint Valley is the Panamint Mountain Range, which ends at the northern boundary of the South Range. The Panamint Range separates Panamint Valley from Death Valley to the east. South of Panamint Range, Wingate Wash follows the trend of Long Valley into Death Valley. South of Long Valley is Brown Mountain, which is part of the northwest-trending Quail Mountains. The Owlshead Mountains extend on a northeast trend beyond the eastern boundary of the South Range.

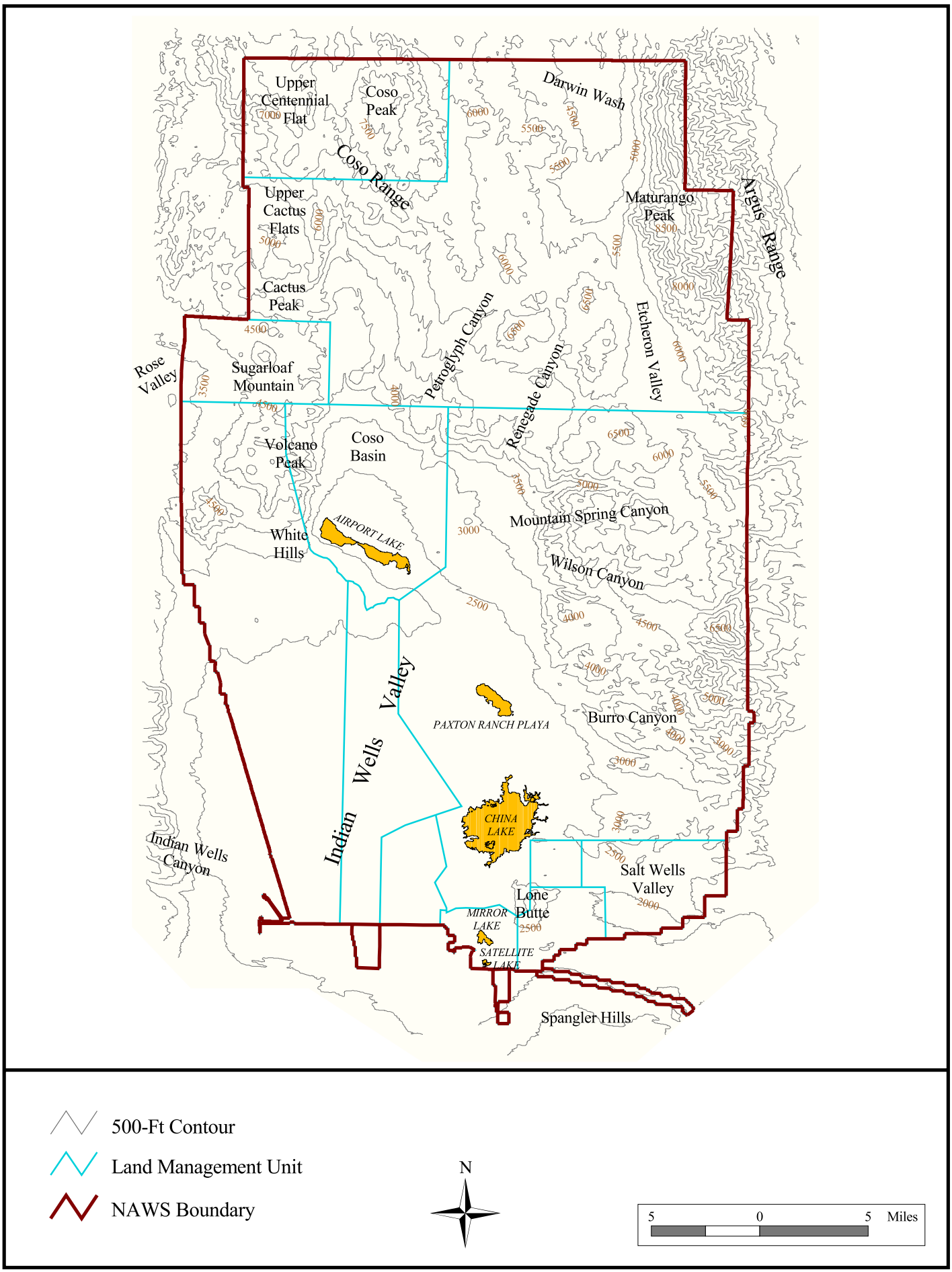


Figure 3.6-1 Topography, North Range

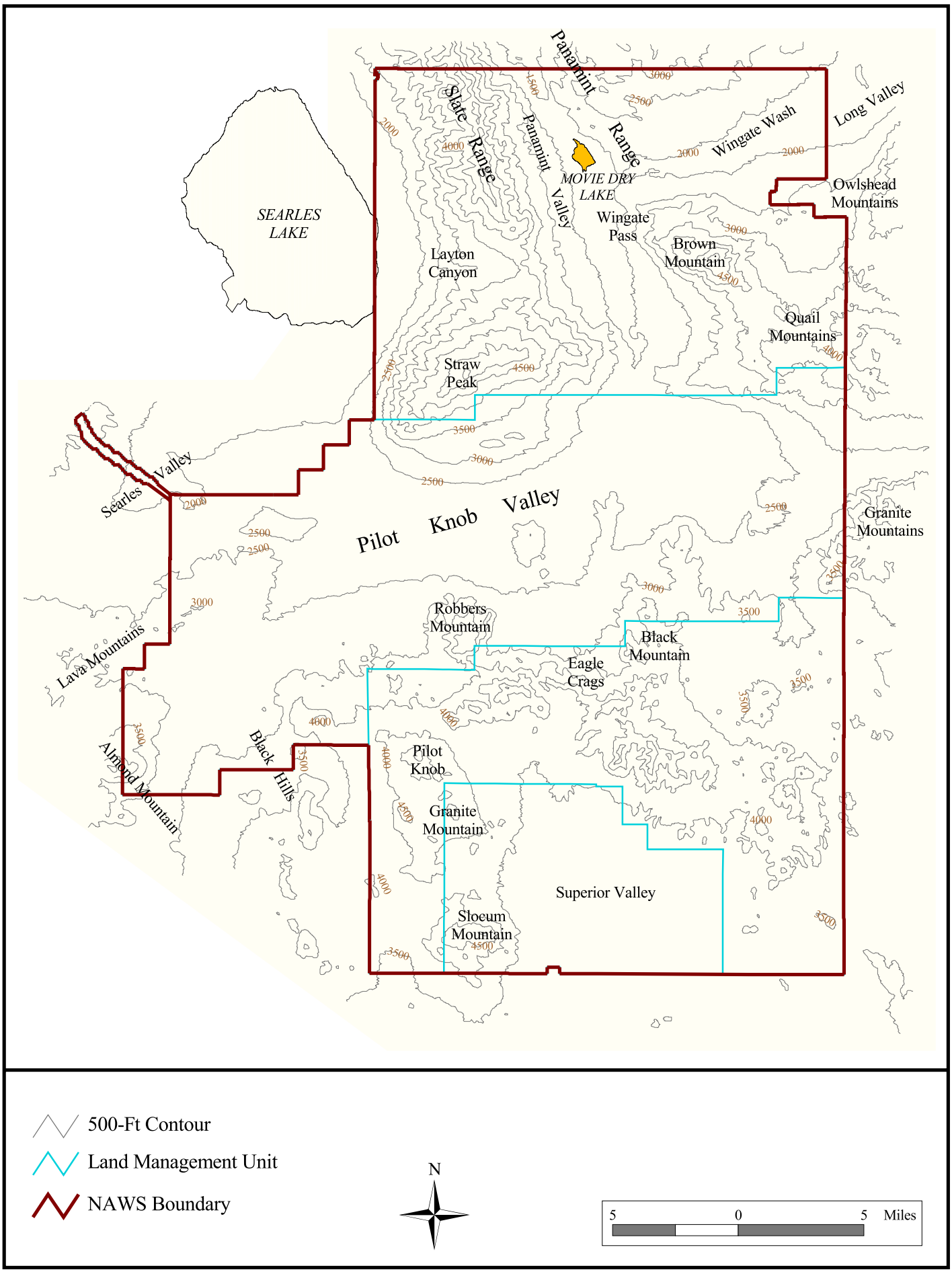


Figure 3.6-2 Topography, South Range

The southern boundary of the South Range crosses the Superior Valley. The rim of Superior Valley is formed by a cluster of low peaks within the South Range, including Pilot Knob (5,428 feet [1,654 meters] MSL) and Eagle Crags (about 5,000 feet [1,524 meters] MSL) to the north, and Granite Mountain (about 4,800 feet [1,463 meters] MSL) and Slocum Mountain (5,124 feet [1,562 meters] MSL) to the west. Most of Pilot Knob Valley drains north to the Panamint Valley through a gap between Slate Range and the Quail Mountains at an elevation of about 2,200 feet (671 meters) MSL. However, the western extremity of the South Range drains northwest into Searles Valley through a low point in the ridge between Straw Peak and Almond Mountain.

3.6.3 Soils

The State Soil Geographic (STATSGO) database identifies 14 soil associations that occur within the North Range, and 11 soil associations within the South Range (Figures 3.6-3 and 3.6-4). Table 3.6-1 provides information on the soil associations.

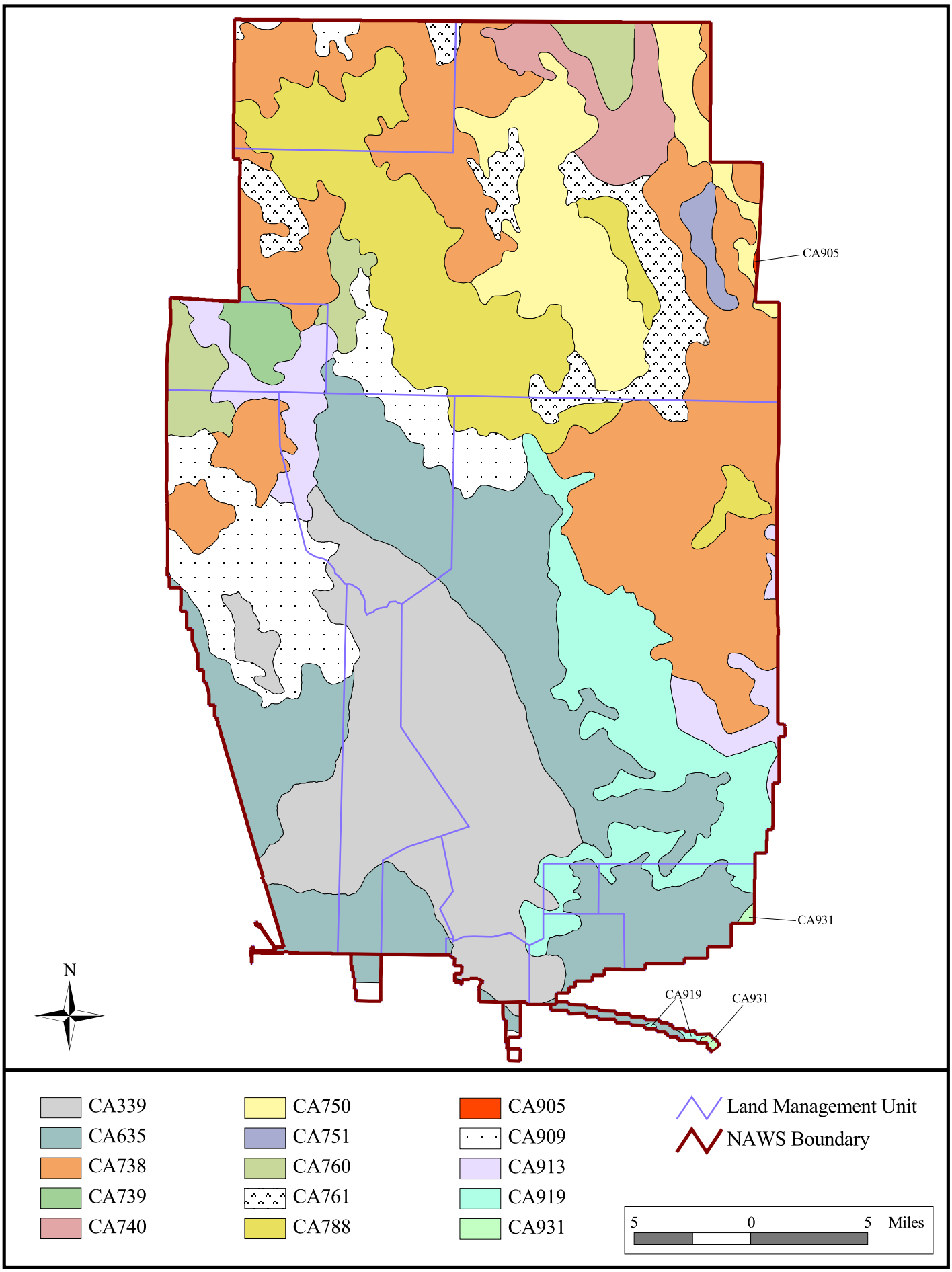


Figure 3.6-3 Soil Classifications, North Range

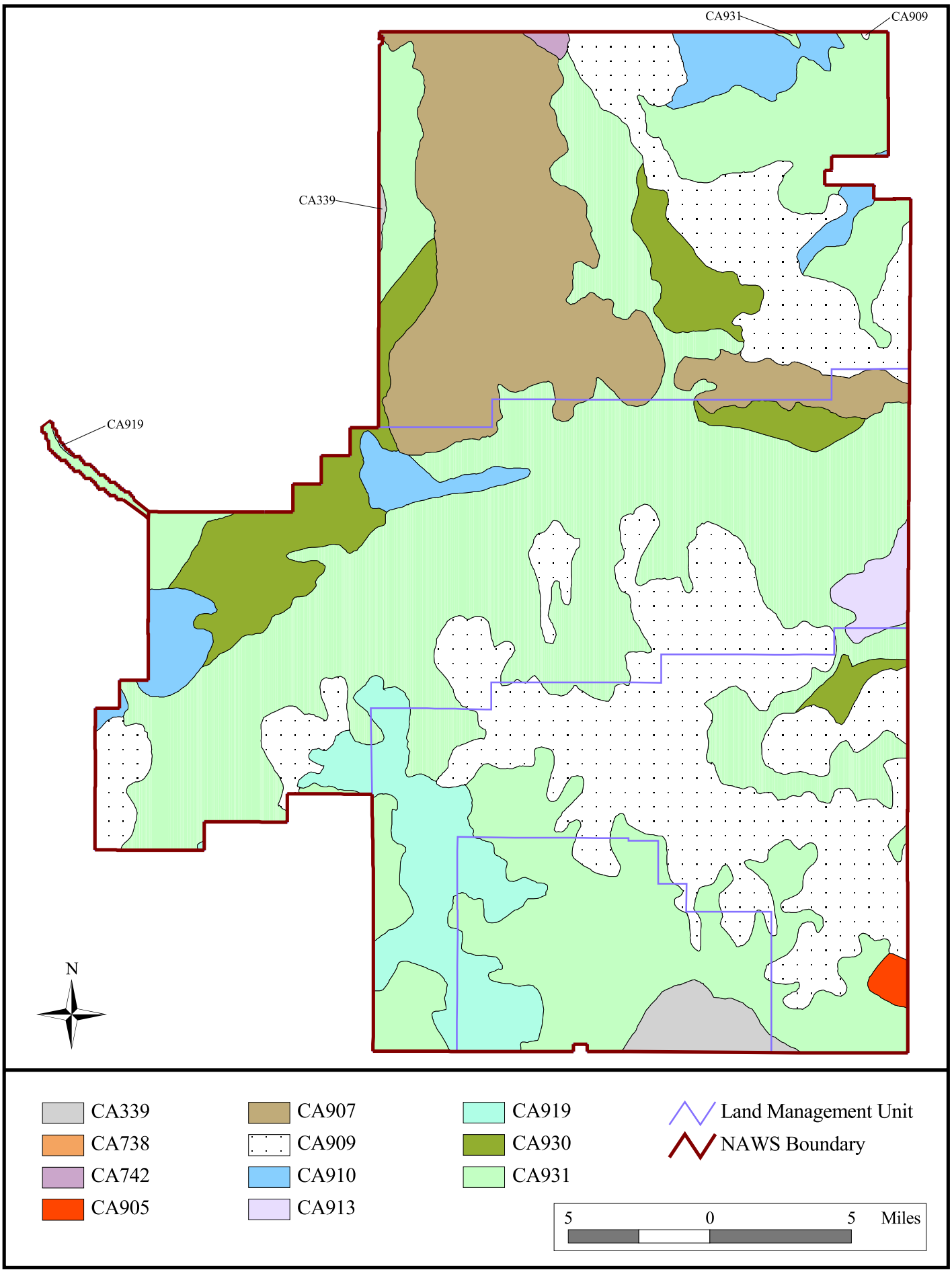


Figure 3.6-4 Soil Classifications, South Range

Table 3.6-1 Selected Soil Characteristics

Identification Number	***STATSGO Name and Location***
CA339	*Rosamond, Rosamond Variant, Playas. Found on basin floors and playas in the North and South Ranges.*
CA635	*Cajon, Wasco, Rosamond. Found on alluvial plains in the North Range.*
CA738	*Mexispring, Rock Outcrop, Ferroburro. Found associated with granitic outcrops in the North Range.*
CA739	*Upspring, Blacktop, Rock Outcrop. Found on the northeast side of Rose Valley.*
CA740	*Arizo, Yellowrock, Riverwash. Found in Darwin Wash on the North Range.*
CA742	*Bunkerhill, Salt Flats, Dune Land. Found in Panamint Valley near northern boundary of the South Range.*
CA750	*Theriot, Rock Outcrop, Uhaldi. Found in upland areas of both the North and South Ranges.*
CA751	*Rubble Land, Clanalpine Family, Bregar. Found only in Maturango Peak area of the North Range.*
CA760	*Cartago, Yermo, Tinemaha. Found in upland flats and low hills in the North Range, including Darwin Hills, west side of Rose Valley, and canyons northeast of Coso Hot Springs.*
CA761	*Ulymeyer, Rovana, Bairs. Found in Etcheron Valley and Upper Cactus Flat on the North Range.*
CA788	*Blacktop, Downeyville, Rock Outcrop. Found along central granitic ridges of Coso Range in the North Range.*
CA905	*Rock Outcrop, St. Thomas, Tecopa. Found in small region near Goldstone Lake in the southeast corner of the South Range.*
CA907	*Rock Outcrop, Tecopa, Lithic Torriorthents. Found over most of Slate Range in the northern portion of the South Range.*
CA909	*Rock Outcrop, Upspring, Sparkhule. Found over most of the Tertiary volcanic peaks in the South Range.*
CA910	*Badland, Bitterwater, Cajon. Found on south margin of Straw Peak, north margin of Lava Mountains, and the southeast foothills of Panamint Range, all within the South Range.*
CA913	*Rock Outcrop, Lithic Torriorthents, Calvista. Found on southwest slope of Argus Range and in Rose Valley on the North Range, and on the western slope of the Granite Mountains in the South Range.*
CA919	*Calvista, Rock Outcrop, Trigger. Found on the margins of Salt Wells Valley in the North Range and on the western margin of Superior Valley in the South Range.*
CA930	*Nickel, Arizo, Bitter. Found on southeastern margin of Searles Valley and on scattered locations in the South Range.*
CA931	*Cajon, Arizo, Victorville Variant. Found on the South Range.*

Source: STATSGO Database 1998, U.S. Natural Resources Conservation Services 1991; and Soil Conservation Service 1989.

3.7
Water Resources

3.7 WATER RESOURCES

This section describes the surface water and groundwater resources for NAWS including the occurrence, quality, beneficial uses, and flood hazards associated with water resources. Surface water includes all water-related features found on the surface of Station lands. Surface water topics include drainage, flooding, springs, seeps (springs with low flows), and adverse effects of grazing on surface water resources. Groundwater resources are located beneath the surface of the landscape in a variety of porous media, including unconsolidated sedimentary deposits and fractured or cavernous consolidated rock. Groundwater topics include basins, aquifers, and groundwater quality. An aquifer is a porous, water-bearing geologic formation capable of yielding quantities of water to private and commercial users through wells. The ability of an aquifer to yield water to a well depends on the size of the interconnected pores in the aquifer material, which is called permeability. Water quality relates to the chemical and physical characteristics of water that determine its suitability for beneficial uses.

Other topics related to water resources are found in the following sections:

- Wetland habitat; Section 3.4, Biological Resources.
- Water supply and wastewater treatment infrastructure; Section 3.9, Utilities and Public Services.
- Development of geothermal resources; Section 3.6, Geology and Soils.
- Investigation and remediation of surface water and groundwater; Section 3.11, Hazardous Materials and Wastes.

3.7.1 Regulatory Framework

The following sections present a summary of the applicable laws, regulations, and management plans related to the protection and use of water resources at NAWS.

3.7.1.1 Federal Laws and Regulations

The primary federal law governing water resources at NAWS is the Safe Drinking Water Act (SDWA), 42 U.S.C. § 300f et seq. Other laws that affect water resources include the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601 et seq., as amended by the Superfund Amendment and Reauthorization Act (SARA), PL 99-499; and the Resource Conservation and Recovery Act (RCRA), which relates to hazardous waste management and cleanup. Section 3.11, Hazardous Materials and Wastes, provides a discussion of these acts and water quality as it relates to hazardous materials and wastes.

The SDWA of 1977 (PL 95-190) and the Safe Drinking Water Amendments of 1996 (PL 104-182) established contaminant limitations and enforcement procedures to protect drinking water. Maximum contaminant levels (MCLs) to protect public health, and secondary MCLs to protect aesthetic qualities (taste, color, and odor), are published in 40 C.F.R. § 141 and 40 C.F.R. § 143, respectively. The Underground Injection Control Program (40 C.F.R. § 144) prohibits any underground injection of waste, except as authorized by permit or rule. SDWA requires each federal agency with jurisdiction over a public water system to comply with applicable federal, state, and local requirements, whether substantive or administrative, "in the same manner, and to the same extent, as any non-governmental entity." States have primary responsibility to enforce compliance with requirements of 40 C.F.R. § 141.

3.7.1.2 State Laws and Regulations

The primary state agencies charged with regulating water resources are the Health and Welfare Agency, the California Environmental Protection Agency (Cal/EPA), and the Resources Agency.

Within the Health and Welfare Agency, the Department of Health Services, Division of Drinking Water and Environmental Management, regulates public drinking water supplies and implements provisions of the federal SDWA.

Cal/EPA is the parent agency of the SWRCB, along with nine RWQCBs. The SWRCB was created by the Porter-Cologne Act, California Water Code §§ 13000-1399.10, and is responsible for formulating and implementing policies to protect the quality of waters of the state and overseeing the regional boards. In conjunction with the courts, SWRCB also administers water rights. The regional boards establish water quality objectives to protect existing and potential beneficial uses of water resources within each region, as provided in the water quality control plans for each region. NAWS is in the jurisdiction of the Lahontan RWQCB. Regulations enforced by the SWRCB and RWQCBs are included in Title 23 of the CCR.

Within the Resources Agency, the Department of Water Resources develops, conserves, and manages the water resources of the state. The Department of Conservation, also within the Resources Agency, includes the Division of Oil, Gas, and Geothermal Resources, which has responsibility for preventing contamination of groundwater due to drilling, operation, maintenance, and abandonment of oil, gas, and geothermal wells.

3.7.1.3 Local Agencies

Local agencies responsible for water resources management include the NAWS Public Works Department, which operates and maintains the Station's water supply system and provides services regarding flood control; local municipal agency public works departments; the Indian Wells Valley Water District (IWVWD); and other water purveyors in the region. NAWS and other local entities are cooperating under the terms of a MOU to manage groundwater resources in the IWV Basin.

In September 1995, the IWV Cooperative Groundwater Management Plan was signed by the major water producing entities within the Valley. These entities include NAWS, BLM, IWVWD, North American Chemical Corporation (now IMC Chemicals), Quist Farms, the city of Ridgecrest, IWV Airport District, Inyokern Community Services District, and Kern County Water Agency. The signatories are committed to conserving, protecting, and managing groundwater resources within the valley. The water purveyors take an active role in resource management and meet monthly to discuss groundwater issues occurring at the local and state levels, and to share groundwater data collected and analyzed by the various entities. Subcommittees are established as needed to investigate issues such as groundwater sampling protocols, water level monitoring programs, water banking/transfers, and other supplemental water supplies for IWV. However, the responsibility for managing the production and distribution of groundwater to meet each agency's needs remains with the individual water producer.

3.7.2 Surface Water Resources

Though surface water and groundwater resources are discussed separately, each is closely linked by related physical processes. For example, runoff from precipitation in the mountains and portions of the valley percolates through permeable geologic structures and recharges groundwater. Some of the recharge to a groundwater basin may originate many miles from the basin. Likewise, groundwater flowing through rock fractures or within soils overlying bedrock can discharge to the surface forming springs and seeps.

NAWS is in the South Lahontan Hydrologic Basin, a region that extends from north of Mono Lake to the Colorado Basin on the eastern side of the Sierra Nevada. Average annual precipitation in the South Lahontan Basin ranges from about 70 inches (178 centimeters) at high elevations in the Sierra Nevada to less than 5 inches (13 centimeters) in parts of the basin floor. Average annual precipitation ranges from about 10 inches (25 centimeters) in the Coso and Argus Ranges to less than 5 inches (13 centimeters) at the lower elevations (Rantz 1967, St. Amand 1986).

The Lahontan RWQCB divides the South Lahontan Basin into hydrologic units representing watersheds or groups of watersheds (Lahontan RWQCB 1994). The North Range contains all or a portion of 11 hydrologic units, as defined by the Lahontan Region Basin Plan (Figure 3.7-1). The South Range also contains all or a portion of 11 hydrologic units (Figure 3.7-2). Hydrologic unit numbers show the progressively larger watersheds to which smaller watersheds belong. For example, in Figure 3.7-1, units 21.10, 21.20, and 21.30 belong to watershed 21.00, which drains to Searles Lake, while units 24.10 and 24.20 belong to watershed 24.00, which drains to China Lake.

The Lahontan RWQCB has identified existing and potential beneficial uses of surface water for each of these hydrologic units. The highest beneficial use identified in each watershed is drinking water (municipal), but also includes 18 other beneficial uses including agricultural, industrial, wildlife, and recreation. The Lahontan RWQCB considers these beneficial uses when setting water quality objectives for surface waters within hydrologic units.

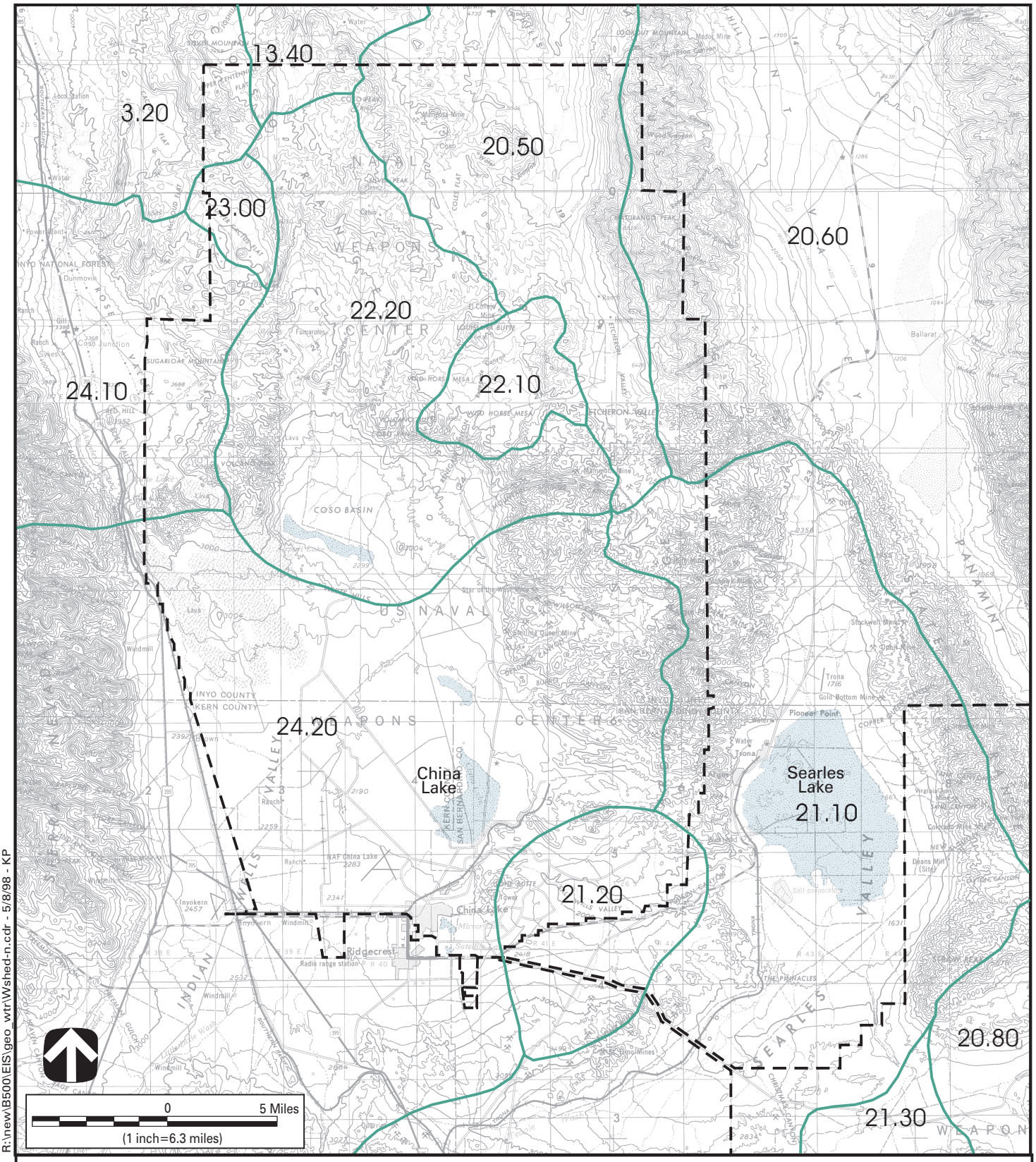
The amount of information concerning surface water conditions for each of the watersheds at NAWS varies. More information is available for the North Range than the South Range. Within the North Range, the IWV and Coso watersheds are probably the best studied. The IWV watershed contains a wide range of hydrologic conditions that in many respects represent the range of conditions throughout the region. As a result, inferences must be drawn concerning hydrologic conditions in some watersheds based on information from similar watersheds elsewhere.

3.7.2.1 North Range

<u>Drainage</u>

On the North Range, the IWV forms a natural basin that receives drainage from the southern Sierra Nevada, Coso and Argus ranges, Rademacher Hills, Spangler Hills, and El Paso Mountains. Most of the precipitation that flows into the region of the North Range falls in the Sierra Nevada. About 53 percent of the watersheds that extend within the North Range originate in the Sierra Nevada (St. Amand 1986). The Coso Hydrologic Unit, including the Renegade Canyon and Mountain Springs Canyon watersheds, receives about 31 percent of the total precipitation. About 8 percent of the precipitation falls on the southern Argus Range in the eastern part of the IWV Hydrologic Unit south of Mountain Springs Canyon. The remaining 7 to 8 percent falls on the El Paso Mountains, Rademacher Hills, and Spangler Hills in the south part of the IWV Hydrologic Unit. Although not the largest component of inflow to the IWV Valley, runoff from the El Paso Mountains is important to developed areas because of the contribution to flooding along washes leading to China Lake, Mirror Lake, and Satellite Lake playas (dry lake beds).

Some of the precipitation that falls on the west slope of Coso Range, including the watershed of Upper Cactus Flat, drains into Rose Valley. Rose Valley has one of the few permanent surface water features in the area, called Little Lake, which lies outside the Station boundary and topographically upstream of IWV. Precipitation on the northwest slope of Coso Range drains to the Owens Hydrologic Unit, which contains Owens Lake. The area containing the northeast slope of the Coso Range and the northern half of the Argus Range receives about 10 inches (25 centimeters) of precipitation per year. This area lies within the Ballarat Hydrologic Unit, which drains to Panamint Valley. The eastern slope of the southern half of Argus Range lies within the Trona Hydrologic Unit and drains to Searles Valley. Salt Wells Valley, which receives runoff from the Spangler Hills and the southern tip of Argus Range, is also part of the Trona Hydrologic Unit and is connected to the Searles Valley through Poison Canyon, which is also the route of Highway 178.



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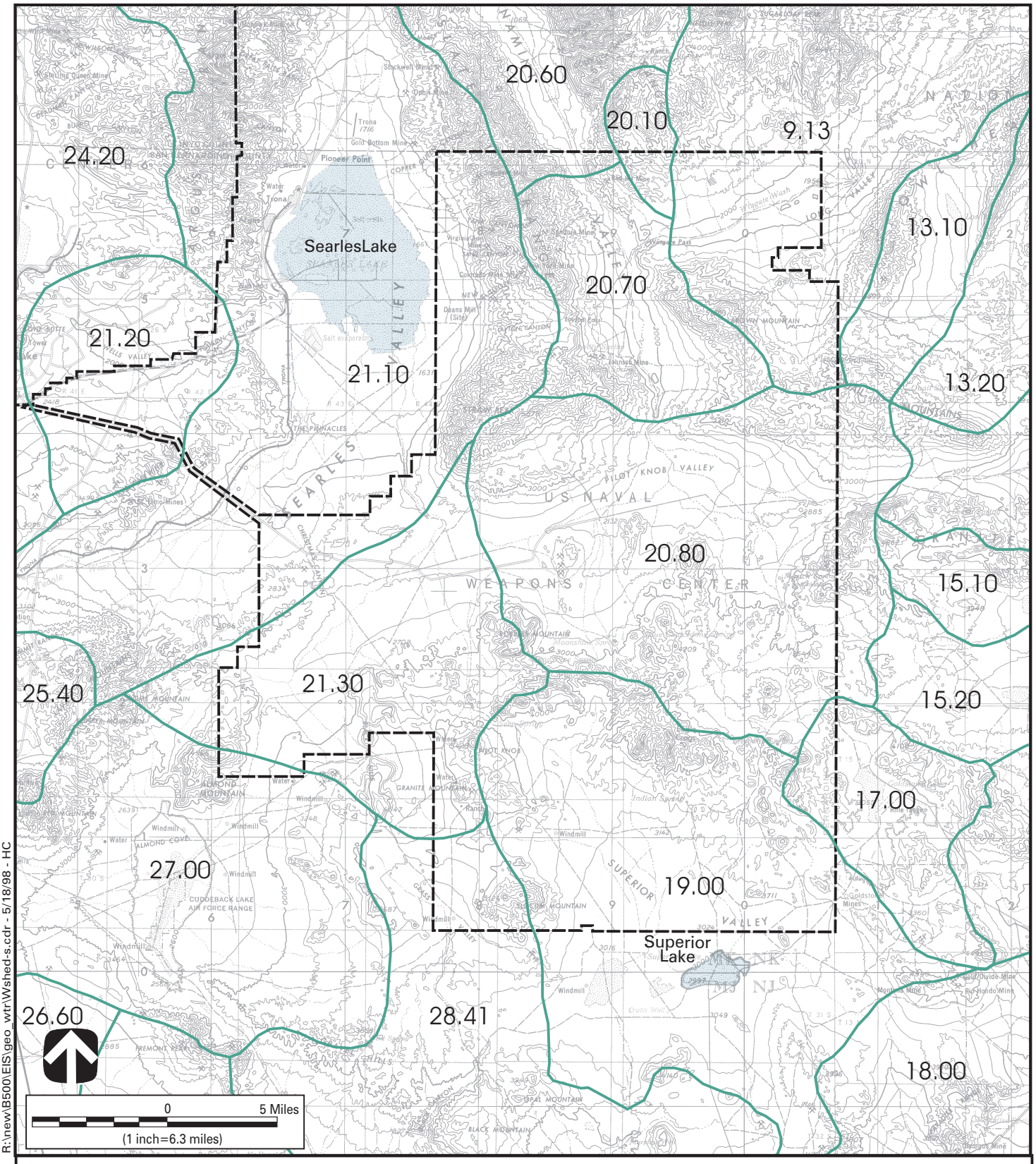
21.30 State Hydrologic Unit designation

Watershed Boundaries

NAWS China Lake Boundary

DATA SOURCE:
Adapted from LRWQCB 1997

Figure 3.7-1 Watershed Boundaries, North Range



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21.30 State Hydrologic Unit designation

Watershed Boundaries

NAWS China Lake Boundary

DATA SOURCE:
Adapted from LRWQCB 1997

Figure 3.7-2 Watershed Boundaries, South Range

Flooding

Although precipitation in the South Lahontan Basin is low, intense cloudbursts may result in occasional localized flooding. Stormwater flooding occasionally has been a significant problem for the Mainsite developed areas on the North Range. Most of the runoff in IWV comes from the southwest and forms four major ephemeral streams (streams that do not flow all year): El Paso Wash, Little Dixie Wash, Ridgecrest Wash, and Bowman Wash. El Paso Wash crosses Highway 178 about 2 miles (3.22 kilometers) west of the Main Gate and runs east of Armitage Airfield before discharging into China Lake playa. Little Dixie Wash originates in the very southwest of the basin within the southern Sierra Nevada, crosses Highway 178 east of Inyokern, and runs in a northeast direction to China Lake playa. Ridgecrest Wash enters NAWS near the Main Gate, flows northeast toward Michelson Laboratory area, and discharges to the China Lake playa. Bowman Wash originates south of Ridgecrest, runs along Bowman Road, and then discharges into Satellite Lake. Other, smaller ephemeral washes also discharge into China Lake, Satellite Lake, and Mirror Lake (U.S. Navy 1989a).

Springs and Seeps

Approximately 80 springs have been identified and mapped on the North Range. The springs range from small areas of low flow seepage to fairly large areas of riparian vegetation and flows of up to 6 gallons (22.71 liters) per minute. Many of these springs were developed by miners and ranchers before the Navy assumed management of the lands. Several smaller springs provide water for the various grazing programs during the fall and winter months in the Coso Range. New House Spring and Tennessee Spring, both in the Argus Mountain Range in the northeastern corner of the Station, are maintained by the Navy for facility use to support military operations in these remote areas. Major springs and other surface water features are discussed in Section 3.4.6, Wetlands and Other Water-Related Habitats. Most of the springs in the North Range exhibit good water quality, with total dissolved solids (TDS) ranging from 185 to 1,000 ppm (Stoner et al. 1995).

Coso Hot Springs is a series of geothermal (hot) springs in the Coso Range. Moyle (1977) identified more than 200 wells and springs within a 20-mile (32.19-kilometer) radius of Coso Hot Springs. Moyle reported that the shallow water at the land surface in the Coso Hot Springs area typically has a low pH (acidic) level, in the range of about 1.5 to 4.5. The acidity in these sources is caused by hydrogen sulfide, which produces sulfuric acid on contact with oxygen. As a result, these waters become highly mineralized and are nonpotable.

Lark Seep and G-1 Seep are brackish marshes formed on the edge of the China Lake playa. The seeps are not natural features but have resulted from various engineered sources, including leakage and percolation from the Ridgecrest wastewater treatment facility facultative evaporation and storage ponds, irrigation water from the NAWS golf course, Station housing and landscape water, and leakage from the NAWS potable water distribution system.

3.7.2.2 South Range

Drainage

Most of the South Range, including the Mojave B North and Randsburg Wash areas, is in the upper portion of the Ballarat Hydrologic Unit or the Trona Hydrologic Unit, which drain to the Panamint and Searles valleys, respectively. The crest of Slate Range forms the division between these watersheds in Mojave B North. The watershed of Wingate Wash, in the northeast corner of the South Range, is within the Amargosa Hydrologic Unit, which drains to Death Valley.

Most of the Mojave B South area in the South Range lies within the Superior Hydrologic Unit, which drains to Superior Valley. The southwest corner lies within the Mojave Hydrologic Unit, which drains to Harper Lake. The northeast corner is within the Ballarat Hydrologic Unit. The extreme eastern edge lies within the Goldstone Hydrologic Unit, which drains to the Goldstone Lake playa.

The South Range receives less than 5 inches (12.7 centimeters) of rainfall on average per year (Rantz 1967). Larger amounts of precipitation probably fall on the higher elevations within the Slate Range, Panamint Range, and Quail Mountains, as well as Eagle Crags, Brown Mountain, Pilot Knob, Slocum Mountain, Robbers Mountain, and Granite Mountain. Though most of this precipitation evaporates before reaching groundwater, the presence of springs along the alluvial apron of some of the peaks indicates that some of the rainfall percolates through joints and fractures in the bedrock. Some of these springs have been used historically by travelers as a potable water supply, although they are generally characterized by low, seasonally variable flows (U.S. Navy 1989a,b).

Although there are several dry lakebeds, there are no permanent water bodies within the South Range. Movie Lake is a playa located in the Mojave B North land use management unit in the upper Panamint Valley opposite Wingate Wash. A number of playa lakes exist on the floor of Superior Valley south of the boundary of the South Range. Goldstone Lake playa is just outside the eastern boundary of the Mojave B South land use management unit.

Flooding

As with the North Range, intense rainfall may result in flash flooding on washes within the South Range (U.S. Navy 1989a). Reports of flooding on the South Range are anecdotal, and no systematic studies of flood potential have been performed.

Springs and Seeps

More than 40 springs and seeps have been identified on the South Range. The number of springs and seeps can vary depending on climate. Major springs and seeps are discussed in Section 3.4, Biological Resources. Most of the springs occur either in the Slate Range or in the Eagle Crags area of Mojave B South.

3.7.2.3 Effects of Grazing on Surface Water Resources

As described in Section 3.4.7, the historic effects of grazing by feral and domestic animals has had substantial impacts on the quality of some surface water resources on the NAWS ranges. Impacts to water quality can occur through trampling and compacting of soils, which increase the turbidity of springs and seeps. Grazing could also introduce pathogens into the Coso Cold Spring which is used for potable water by the community of Darwin, although no adverse effects to this drinking water supply have been experienced to date or identified through water quality sampling. As described in Section 3.4.2.5, approximately 30 springs have been fenced throughout the NAWS ranges in an effort to protect the habitat and water quality around spring areas. Fencing of springs at riparian areas has proven to be an effective measure to protect the quality of these surface water resources while providing availability of these areas to native species.

3.7.3 Groundwater

Most groundwater studies in the region have focused on IWV groundwater conditions mainly because the valley represents the principal source of drinking water for the Station and for the major population centers in the area. Studies of the hydrogeology of IWV have been conducted by the U.S. Geological Survey, the Bureau of Reclamation, the Navy, and others. Additional information concerning groundwater conditions is available from studies of the Coso KGRA. However, relatively little information is available about groundwater in other areas, including the South Range. NAWS is currently performing a hydrogeologic study of IWV, Salt Wells Valley, and Randsburgh Wash to

support the investigations of Installation Restoration Program (IRP) sites at the installation. The field investigation began in June 1999 and involves exploratory borings, installation of monitoring wells, quarterly ground water quality sampling, and sampling to determine the degree of interconnection between water bearing units. The study is expected to last approximately 2 years.

3.7.3.1 North Range

The groundwater basins generally correspond to the topographically low portions of the watersheds shown in Figure 3.7-1. The basins represent the alluvium-filled regions in which groundwater is stored and extracted. (Alluvium refers to the rock, sand, silt, and clay that is eroded from hillsides, transported downhill, and deposited primarily by water.) However, groundwater is not limited to the basin areas since it is also present in joints and fractures in bedrock bordering the basins.

Groundwater basins are not necessarily isolated from each other, and groundwater may flow across the boundaries of one basin into an adjacent basin under certain conditions. For example, groundwater probably flows from the Coso Basin into the IWV basin. Groundwater may be able to flow from IWV through Salt Wells Valley and into Searles Valley. Groundwater likely flows from Owens Valley into Rose Valley and then flows south into IWV. However, the groundwater connections between basins are not well understood.

Until recently, conceptual models of IWV assumed it was a closed basin, enclosed by impermeable rock boundaries on all sides. Estimates of perennial yield were based on the assumption that the only discharge from the basin was by evapotranspiration or extraction by pumping. (Evapotranspiration refers to the combined loss of water to the atmosphere from both evaporation and the process by which plants lose water to the atmosphere, called "transpiration"). If the amount of groundwater stored in the basin is assumed to remain constant, then discharge must equal recharge. Kunkel and Chase (1969) estimated recharge at 12,000 acre-feet (14.8 million cubic meters) per year, while Dutcher and Moyle (1973) estimated recharge at about 10,000 acre-feet (12.3 million cubic meters) per year. Groundwater pumping from the valley had begun to exceed these amounts by 1959 and was estimated at about 22,000 acre-feet (27.1 million cubic meters) per year in 1985 (Berenbrock and Martin 1991). During the same timeframe, groundwater declines of up to about 70 feet (21 meters) were observed in the unconfined aquifer in the Ridgecrest area. Declines of about 80 feet (24 meters) were observed in the Intermediate Well Field area, 30 feet (9 meters) in the Inyokern area, and 15 feet (4.57 meters) or more in the Brown area, about 9 miles (14.48 kilometers) north of Inyokern (IWV Water District 1990).

The IWV basin may not be as closed as previously assumed, and groundwater may be able to leave the basin through underflow to adjacent basins. If this is correct, then recharge to the basin may be greater than previously estimated and have additional implications for groundwater management. However, the mechanism and rate of subsurface leakage from the basin have not been fully investigated. The IWV, Coso Valley, Salt Wells Valley, and Rose Valley basins underlie much of the southern portion of the North Range.

The IWV basin is the sole source of drinking water for Station facilities in the North Range. Hydrogeologic evidence indicates that more than one aquifer is present in the IWV basin beneath the North Range. At a minimum, there appears to be a shallow aquifer and a deep aquifer, separated by a clay zone (Dutcher and Moyle 1973). The shallow aquifer is present in the eastern side of the Valley and may include numerous local perched water-bearing zones. At the basin margins to the west, the separation between aquifers is less distinct than near the center of the basin. Some investigations of IWV have suggested that the aquifer is compartmentalized by barriers to vertical groundwater flow that have been caused by faulting (Bloyd and Robson 1971, Dutcher and Moyle 1973). For example, a poorly defined zone called the China Lake Barrier was identified as a fault-related feature along the trend of the Little Lake Fault Zone. However, the barrier may be caused by lithologic controls (thick clay deposits east of the fault zone) that indirectly resulted from faulting. (Lithologic refers to rock materials.)

The deep aquifer serves as the sole source of potable water for NAWS and underlies much of the IWV. This aquifer is mostly unconfined but is considered to be confined or partly confined beneath the shallow aquifer in the eastern part of the IWV. The aquifer consists of unconsolidated alluvial basin fill deposits overlain by, and interbedded with, lake bed and sand-dune deposits. The alluvial deposits comprise unconsolidated, moderately to well sorted gravel and sand that is generally highly permeable. Lacustrine deposits (sediments deposited in lakes) consist predominantly of silt and clay.

The principal users of water from IWV include the agricultural sector (primarily the Brown Road Land and Farming Company), the IWVWD, IMC Chemicals, the Inyokern Community Services District, NAWS, and private well owners (Bureau of Reclamation 1993). The Bureau of Reclamation (1993) estimated total 1990 groundwater withdrawals from the IWV groundwater basin by all water users, including the Navy, at approximately 30,000 acre-feet (37 million cubic meters) per year. Water use has been reduced since then, and 1997 production was about 22,000 acre-feet (27.1 million cubic meters; Stoner 1998). Agriculture was the largest segment of water use (about 40 percent in 1990). Since then, the agricultural share has been reduced and was about 32 percent of the total acre-feet pumped in 1997. Municipal use by IWVWD represented about 30 percent of total usage in 1990 and was roughly the same as agriculture (32 percent) in 1997. Groundwater use by the Navy was nearly 5,000 acre-feet (6.2 million cubic meters) per year (about 17 percent) in 1990, compared to 3,300 acre-feet (4.1 million cubic meters) per year in 1997. The Bureau of Reclamation (1993) projected that population growth would cause demand for water to increase to about 50,000 acre-feet (61.7 million cubic meters) per year by 2010; however, population has actually declined since 1990.

Estimates of the amount of annual recharge to the IWV groundwater basin have ranged from a conservative 7,000 acre-feet to 15,800 acre-feet (8.6 million cubic meters to 19.5 million cubic meters) to as much as 30,000 acre-feet (37 million cubic meters). Groundwater elevation data for IWV show an average water level decline of about 0.5 feet (0.15 meter) per year. In heavily pumped areas, such as the area west of Ridgecrest and along the extreme western boundary of the basin, groundwater declines have been higher. The average decline in the Intermediate Well Field was estimated at 1 to 2 feet (0.3 to 0.6 meters) per year. The observed groundwater level declines suggest that groundwater withdrawals currently exceed recharge. However, continued efforts to manage groundwater use, together with a smaller population than previously expected, could bring groundwater use within the long-term sustainable yield of the aquifer. The IWVWD is installing the infrastructure to develop the southwest well field due to the promising aquifer characteristics. Development of this resource should help minimize declines in other production areas and provide additional groundwater production potential.

Groundwater Quality

Groundwater in the shallow aquifer is typically poor quality. Unlike recharge to the deep aquifer, most of which comes from infiltration of runoff along the range fronts, recharge to the shallow aquifer includes direct infiltration from washes and playas, irrigation, leaking sewer or water distribution lines, and wastewater treatment ponds. Because it is nearer to the China Lake playa, shallow groundwater reflects the concentration of salts in shallow sediments in this area.

Good quality groundwater, with TDS in the range of 500 to 1,000 ppm, generally is found in the west and northwest portions of the IWV. Good quality groundwater occurs at depths of up to 2,000 feet (610 meters) in the Intermediate Well Field on the North Range and in the Southwest Well Field 3 miles (5 kilometers) south of Inyokern (Bureau of Reclamation 1993). Excellent quality groundwater (less than 500 ppm TDS) is found in the southwestern and central portions of the valley. However, TDS exceeds 1,000 ppm in portions of the basin nearest China Lake playa. Wells near Lark Seep, north of the wastewater ponds, contain TDS concentrations of up to 6,800 ppm, and TDS concentrations in water on the playa itself have been reported up to 72,000 ppm (Leedshill 1983). Arsenic concentrations of up to 1,199 ppm have been reported in wells near Lark Seep (Feldmeth et al. 1989).

Geothermal Water

Temperature profiles indicate geothermal sources deep beneath IWV (Bureau of Reclamation 1993). Fournier and Thompson (1980) studied the sources of the water in geothermal wells by comparing isotopic ratios. They concluded that the recharge to the Coso Geothermal area is predominantly from precipitation that falls on the Sierra Nevada, and speculated that the recharge may enter east-dipping faults. The water is heated at depth and migrates upward in a convection pattern. Convection is a slow, vertical pattern of circulation caused by the upward movement of water that becomes heated by contact with hot rock at depth and the downward movement of cold water as it percolates from lakes and streams at the earth's surface. The convective flow pattern may be influenced by the orientation of faults beneath the Coso KGRA, which is discussed in Section 3.6, Geology and Soils, and in Section 3.9, Utilities and Public Services.

3.7.3.2 South Range

Groundwater conditions in the South Range are not well documented due to limited control points (wells). The depth to groundwater ranges from about 250 to 300 feet (76.2 to 91.44 meters) below the surface. The groundwater flow direction is generally to the north-northeast in the western Pilot Knob Valley. Groundwater depths and flow direction in the remote areas of the South Range are unknown. Direct recharge to the South Range aquifers are minimal based on lack of rainfall and low permeability of the sediments. The principal groundwater basin in the Mojave B North land use management unit is the Panamint Valley. Since the basin is believed to have no outlet, groundwater at depth in the center of the basin is expected to be saline. However, potable water is obtained from relatively shallow (400 to 600 feet; 121.92 to 182.88 meters) wells placed on the margin of the basin (U.S. Navy 1989a,b).

Several wells were installed in the Randsburg Wash land use management unit to provide potable water for operational activities. There are three production wells in and adjacent to the main area in Pilot Knob Valley. Navy Well #25A, located at the eastern end of Gunline Road, provides water to the main area. Well DSL #2, located about 1.5 miles (2.41 kilometers) north of Well 25A, provides water to the P454 Facility, and Navy Well #26 provides water to Sea Site #1 facility. All three wells provide water that meets all state requirements, although bottled water is also provided. Potable water in Superior Valley is produced from the Superior Valley Well, which is located along the southern boundary fence line in Mojave B South. This water also meets all state requirements, although bottled water is also provided.

3.8
Socioeconomics

3.8 SOCIOECONOMICS

This section describes recent socioeconomic trends in the region surrounding NAWS. The discussion of socioeconomics includes population, employment, income, housing, and schools. Employment and income affect population, which in turn affects housing and schools. In this section, NAWS refers to resources and activities of both NAWS (the land and land managers) and NAWCWD (the mission and technical programs), China Lake.

Population data include the number of residents in the area. Employment data include labor sectors, labor force, and statistics on unemployment. Income information is provided as an annual total by county and as per-capita income. Housing data include number of units and vacancy rates. School information is provided for the school districts that serve the student population in Kern, Inyo, and San Bernardino counties.

Data presented in this Section are used to describe the area in which principal direct and secondary socioeconomic effects of NAWS actions are likely to occur, and are expected to have the most impact on local jurisdictions. Distribution of residences and of commuting and spending patterns for military and civilian personnel employed at NAWS helps determine where the greatest effects of NAWS mission and operation actions would occur.

Ridgecrest, which adjoins the southern boundary of NAWS's North Range, is the population center of the northern part of the upper Mojave Desert and a major shopping center for the surrounding desert communities. NAWS continues to be the major source of employment for Ridgecrest residents and in turn, is increasingly dependent on Ridgecrest for support services. On the other hand, Inyokern, which is a service-oriented community, depends economically on the agricultural activity in the IWV. Tourism and recreational activities in the Sierra Nevada and in the Death Valley National Park to the east also contribute to the local economy (U.S. Navy 1989a,b).

3.8.1 Management Practices

The discussion of socioeconomic policy and management practices is limited to issues identified by the Navy that support the current and future military mission at NAWS, and issues that Ridgecrest has identified to support current and projected future population. The management philosophy of Ridgecrest is to implement policies (which are included in Ridgecrest's General Plan) that will help the city diversify the employment base (City of Ridgecrest 1994). Ridgecrest's General Plan also includes an element that considers the existing and future housing needs of the local community. Policies relevant to housing and school district funding are described below.

3.8.1.1 Housing

Military personnel with dependents are eligible for government-provided housing. However, the basic policy of the DoD and the U.S. Navy is to rely on the local housing market as the primary source of family housing (U.S. Navy 1989a). Since 1973, a major shift from on-Station to private housing in Ridgecrest has occurred.

3.8.1.2 School District Funding

In July 1996, California passed legislation that provides schools with incentive funding to reduce class size in the primary grades by increasing the number of classrooms and/or teachers. Each participating school must reduce class size to 20 students or fewer: first in grade one, then in grade two, and then in either kindergarten or grade three (at the school's discretion). By law, the program is an ongoing part of participating districts' revenue and is part of a larger effort to improve instruction and student performance (Education Data Partnership 1997).

Numerous funding mechanisms are used by public school systems to offset the cost of educating children of federal government employees. The Improving America's Schools Act of 1994 (Title VIII, PL 103-382) mandates that the Department of Education appropriate funds to schools attended by military family members. This funding can be

applied for by local school districts on a per-child basis. Once received, the funds can be used at the district's discretion for supplementing operating costs or for facilitating construction projects.

Under Section 8003 of this act, the district receives funding for students whose parents work and live on federal property, and for students whose parents are in the uniformed service and live off-Station. However, school districts may not receive funding (or the funding may be at a reduced amount) for students whose parents work at federal facilities but reside off-Station. The exact funding amounts and subsequent impacts of the new legislation are uncertain.

Section 8006 of the act provides additional funding for schools that experience a sudden and substantial increase in attendance of military family members. A district can qualify for the funding if the number of incoming military children is either at least 10 percent or 100 more than the number of children in average daily attendance for the preceding school year.

Some school districts also receive DoD funding under the DoD Authorization Bill (PL 102-484, § 386). For a district to receive this funding, children of military members must account for at least 20 percent of total enrollment. The U.S. Department of Education supplies federal funds to the school board based on the number of students whose parents work and live on federal property.

3.8.2 Population

3.8.2.1 Population Trends

Population trends for Kern, Inyo, and San Bernardino counties and for Ridgecrest and Inyokern are shown in Table 3.8-1. Kern County had the largest population change between 1992 and 1996, increasing by 4.38 percent. Inyo County decreased by 1.34 percent between 1992 and 1996, while San Bernardino County increased 1.94 percent during the same period. The population of Ridgecrest decreased by 2.10 percent between 1992 and 1996, and Inyokern increased by 3.78 percent between 1992 and 1994. Between 1996 and 1997, both Kern and Inyo County populations increased by less than 1 percent, while San Bernardino County increased by 1.12 percent. The population of Ridgecrest experienced a population decline of 2.17 percent between 1996 and 1997.

3.8.2.2 Minority and Low-Income Populations

To enable the identification of potential disproportionate effects on minority and low-income populations (see Section 4.8.6 for further discussion of this issue), data were gathered identifying the census tracts adjacent to and on NAWS. The percentages of minority and low-income residents within each tract are presented in Table 3.8-2 and depicted in Figure 3.8-1. Census tracts adjacent to and encompassing land on NAWS include tracts 6 and 7 in Inyo County, tracts 89.01, 103, and 116 in San Bernardino County, and tracts 53, 55.01, 54.01, 54.02, 54.03, and 54.04 in Kern County. Most of the population in the area is in Kern County and includes the city of Ridgecrest and the community of Inyokern. As shown in Table 3.8-2, in Kern County, all census tracts in the NAWS area have lower percentages of below-poverty-level households than the countywide average of 16 percent. Most of these census tracts also have minority populations similar to or below countywide levels.

Table 3.8-1 Population Trends

Jurisdiction	Year 1992	Year 1994	Year 1996	Change from 1992 to 1996 (%)	Year 1997	Change from 1996 to 1997 (%)	1998 Population Estimates [a]
Kern County	601,805	623,953	628,200	4.38	629,200	0.15	639,000
Inyo County	18,599	18,654	18,350	(-1.34)	18,500	0.82	18,500
San Bernardino County	1,557,173	1,579,502	1,587,400	1.94	1,605,000	1.12	1,621,900
Ridgecrest	29,313	29,895	28,700	(-2.10)	28,077	(-2.17)	28,100
Inyokern	1,427	1,481	NA	3.78 [b]	NA	NA	NA

[a] 1998 population estimates are based on Miller (1998).

[b] Community of Inyokern change in population is based on 1992 and 1994 data.

NA = Data after 1994 are not available. Because Inyokern is an unincorporated area, population data are not gathered on a regular basis. The Kern Council of Governments is in the process of defining an area of Inyokern for which formal census counts can be made (Smith 1998).

Sources: Kern County 1990; City of Ridgecrest 1994; U.S. Bureau of the Census 1994; Wessex 1994; Southern California Association of Governments 1997; Landrum 1998.

Table 3.8-2 Minority and Low-Income Populations by Census Tract for Kern, Inyo, and San Bernardino Counties

Census Tract	% Below Poverty Level	% Hispanic	% African American	% Native American	% Asian
Kern County	16	28	6	1	3
53	11	11	10	1	8
55.01	11	7	1	1	2
54.01	9	6	2	1	5
54.02	7	5	3	1	4
54.03	7	10	3	<1	2
54.04	4	7	2	<1	4
Inyo County	12	8	<1	10	<1
6	12	12	<1	9	1
7	20	6	1	7	1
San Bernardino County	12	27	8	<1	4
89.01	14	12	<1	3	<1
103	8	12	17	1	4
116	8	12	3	1	2

Source: Miller 1998.

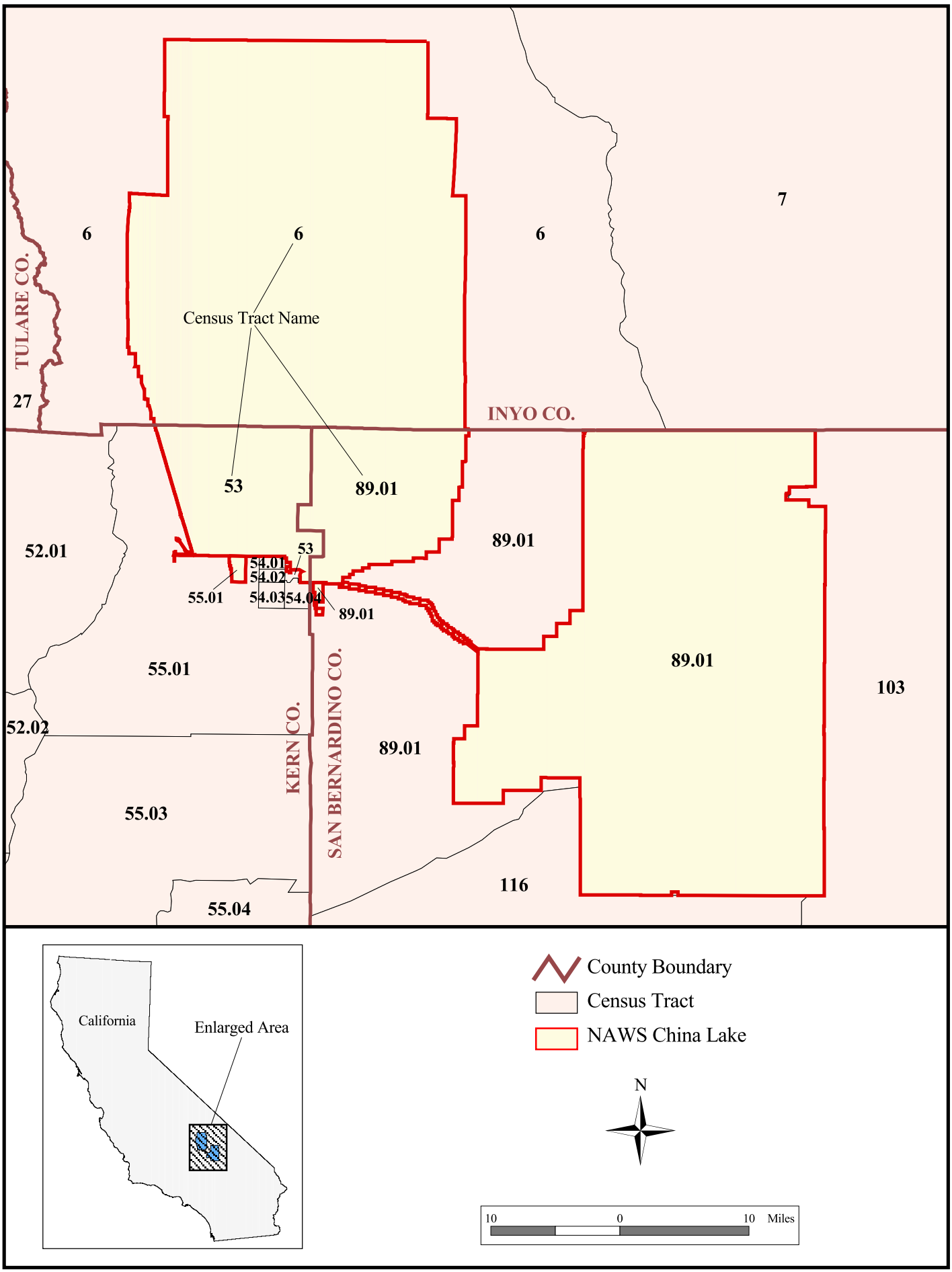

Figure 3.8-1 Census Tracts in the Vicinity of NAWS China Lake

3.8.3 Employment and Income

Table 3.8-3 shows the number and percentage of employees by industry for Kern, Inyo, and San Bernardino counties in 1996. The largest employment sectors for all three counties are services, retail trade, and state and local government. Military employment accounts for nearly 3 percent of total employment across the three counties.

Segmented by county, the military employs 2.37 percent of Kern County workers, less than half of 1 percent of Inyo County, and almost 3 percent of San Bernardino County.

Table 3.8-3 Employees by Industry and by County for 1996

Industry	*Kern County*		*Inyo County*		*San Bernardino County*	
	Number	*Percent of Total*	*Number*	*Percent of Total*	*Number*	*Percent of Total*
Agricultural Services [a]	34,370	12.50	0	0.00	7,882	1.28
Mining	11,771	4.28	0	0.00	1,228	0.20
Construction	14,057	5.11	403	4.35	35,677	5.81
Manufacturing	11,004	4.00	433	4.67	62,552	10.19
Transportation and Public Utilities	11,552	4.20	352	3.80	37,411	6.09
Wholesale Trade	8,888	3.23	216	2.33	28,023	4.56
Retail Trade	45,114	16.41	2,220	23.94	120,458	19.62
FIRE [b]	14,385	5.23	345	3.72	37,202	6.06
Services	68,521	24.93	3,022	32.59	176,869	28.81
Total Private Industry	**219,662**	**79.92**	**6,991**	**75.39**	**507,302**	**82.62**
Civilian	11,658	4.24	335	3.61	12,099	1.97
Military	6,528	2.37	39	0.42	17,910	2.92
State and Local	37,017	13.47	1,908	20.58	76,678	12.49
Total Government	**55,203**	**20.08**	**2,282**	**24.61**	**106,687**	**17.38**
Total Employees	274,865	100.00	9,273	100.00	613,989	100.00

[a] *Includes agricultural services, forestry, fisheries, and U.S. residents employed by international organizations and foreign embassies and consulates in the U.S.*

[b] *FIRE: Finance, Insurance, and Real Estate.*

Source: U.S. Bureau of Economic Analysis 1996a.

The main employer in Ridgecrest is the U.S. Navy (City of Ridgecrest 1994). IMC Chemicals, formerly the North American Chemical Company, located in Trona, is the second largest employer for persons living in Ridgecrest. Inyokern's economic base is primarily service-oriented, with many residents commuting to NAWS or other businesses in Ridgecrest (Kern County 1990). As shown in Table 3.8-4, the unemployment rate for all three counties decreased between 1992 and 1996. In 1996, the unemployment rate was 12.7 percent for Kern County, 8.4 percent for Inyo County, and 7.2 percent for San Bernardino County.

Table 3.8-5 shows the personal and per capita incomes for all three counties. Per capita income for Kern County increased by approximately 12.68 percent between 1990 and 1995. Per capita income for Inyo County increased by approximately 19.55 percent in the same period. In San Bernardino County, per capita income increased by approximately 10.84 percent between 1990 and 1995. Military personnel who live on-Station spend approximately 40 percent of their income in the local community. Those living off-Station spend more because they pay for rent or

mortgage and utilities. Civilians who work at NAWS have an annual payroll of approximately $216 million and spend most of their income in the local community (Boster 1998).

Table 3.8-4 Civilian Labor Force and Unemployment by County

County	*Year*	*Civilian Labor Force*	*Labor Force Unemployment*	*Unemployment Rate (%)*
Kern	*1992*	*270,055*	*40,054*	*14.83*
	1994	*266,264*	*38,037*	*14.29*
	1996	*279,000*	*35,500*	*12.7*
Inyo	*1992*	*7,172*	*799*	*11.14*
	1994	*7,278*	*759*	*10.43*
	1996	*7,360*	*620*	*8.4*
San Bernardino	*1992*	*665,905*	*61,622*	*9.25*
	1994	*684,347*	*57,202*	*8.36*
	1996	*695,000*	*50,000*	*7.2*

Sources: U.S. Bureau of Labor Statistics 1996; Miller 1998.

Table 3.8-5 Personal and Per Capita Income by County

County	*Year*	*Personal Income ($1,000)*	*Per Capita Income*	*Change from 1990 (%)*
Kern	*1990*	*$8,591,974*	*$15,641*	*NA*
	1992	*$9,387,802*	*$15,963*	*2.06*
	1995	*$10,860,225*	*$17,625*	*12.68*
Inyo	*1990*	*$315,502*	*$17,269*	*NA*
	1992	*$333,048*	*$18,118*	*4.92*
	1995	*$381,583*	*$20,645*	*19.55*
San Bernardino	*1990*	*$23,136,846*	*$16,102*	*NA*
	1992	*$25,113,955*	*$16,387*	*1.77*
	1995	*$28,144,439*	*$17,848*	*10.84*

NA = Not applicable.
Sources: U.S. Bureau of Economic Analysis 1996b,c,d.

The NAWS contract office handles all contracts. For major contracts, which comprise the largest dollar amount, DoD contract law requires national competition. However, out of $336 million in contracts during fiscal year 1996/1997, $47 million went to locally owned small businesses. Another $5.5 million in government bankcard purchases went to local merchants, and the Small Procurement Electronic Data Interchange, a computer on-line service for purchasing office supplies, spent $3 million with local area businesses (Boster 1998).

3.8.4 Housing

On-Station

In the past, China Lake has had more than 4,000 family housing units on-Station for civilian and military personnel. Since 1973, emphasis for providing family housing shifted from on-Station family housing to private housing in Ridgecrest. Presently, the Station has 198 housing units but plans to continue to move personnel to off-Station housing (Kenady 1998). The Family Housing Office's plan is to maintain 192 units, including Sagebrush Canyon (also known as Capehart A), which consists of 172 single-family homes, and the 20 units of Senior Officers Quarters, including one flag unit designated for generals or admirals. The Senior Officers Quarters buildings have been recommended eligible as a historic district.

Off-Station

Kern County housing increased by 26,732 units (13.46 percent) between 1990 and 1996. The County's Planning Department credits building and economic prosperity in the South San Joaquin Valley with the increase; however, the movement of military personnel from off-Station housing in Ridgecrest also contributed to this increase. In 1990, 67 percent of the housing in Kern County was single-family, and by 1996 this number had only slightly increased to 69 percent. The vacancy rate remained approximately the same (8.6 percent) during this period (Miller 1998).

Over half of the housing in Ridgecrest consists of single-family residential units constructed over the last 20 years (U.S. Bureau of the Census 1994). There were 11,786 single-family housing units in Ridgecrest in 1997. In Inyokern, the majority of residential units in the older core area and the newer, larger lots that have developed south of State Route (SR) 178 are mobile homes. However, much of the recent growth has been in single-family homes on acreage (Kern County 1990).

Housing in Inyo County increased by 329 units (3.78 percent) between 1990 and 1996. In 1990, approximately 58 percent were single-family, and by 1996 that number had decreased slightly to 57 percent. Inyo County's vacancy rate remained relatively stable at 13.2 percent (Miller 1998).

San Bernardino County housing increased by 50,138 units (9.24 percent) between 1990 and 1996, and the county's vacancy rate increased slightly from 14.3 percent to 14.6 percent during this period. In 1990, 70.8 percent were single-family, and by 1996 that number had increased slightly to 71.8 percent (Miller 1998).

3.8.5 Schools

The Sierra Sands Unified School District in Kern County and the Trona Joint Unified School District in San Bernardino County serve the student population within the region. Sierra Sands provides grades kindergarten through twelve (K-12) in the public education system for students in the NAWS, Ridgecrest, Inyokern, and Randsburg areas. The district owns 11 schools in the region. These include seven elementary schools, two middle schools, and two secondary schools. Total enrollment for the first month in 1997 was 6,307 students, and the total number of teachers within the district is approximately 300 (Brooks 1998). Four of these schools are on NAWS: two elementary schools (Richmond and Pierce), one middle school (Murray Junior High School), and one secondary school (Burroughs High School). Seven schools are off-Station, including one elementary school in Inyokern, one elementary school in Johannesburg, and five schools in Ridgecrest. (General school locations are shown on Figure 3.2-3; because of scale limitations, not all schools are shown.) Groves Elementary School, which is located on NAWS, closed in 1997.

As described in Section 3.8.1.2, schools are provided with incentive funding to reduce class size, thereby increasing the number of classrooms and/or teachers in the primary grades (Education Data Partnership 1997). The student-to-

teacher ratio in kindergarten through third grade classes in the Sierra Sands Unified School District is 20 to one (Brooks 1998), which falls within the number indicated in the 1996 legislation.

The Sierra Sands Unified School District has a total capacity of 7,000 K-12 students. Projections for the 1999-2000 school year indicate that K-12 enrollment will fall below 6,200 students. Therefore, the district is below capacity and can accommodate approximately 800 additional K-12 students. In 1990, the district completed its comprehensive plan for implementing year-round education, which also provides for the accommodation of an additional 25 percent of enrollment. Using a K-12 enrollment of 6,800 as the baseline, this would increase the district's total capacity to 8,500 students (Brooks 1998). All of the schools within the district are operating below capacity except Murray Middle School, which is currently at capacity.

Trona Joint Unified School District provides grades K-12 for students in the Trona area. The district operates one elementary school, one secondary school, and one continuation/independent study school. Total enrollment for the district in 1997 was approximately 513 students which is within the design capacity of the facility (Davis 1997).

3.9
Utilities and Public Services

3.9 UTILITIES AND PUBLIC SERVICES

This section describes and summarizes the utility systems and public services available at NAWS and in the vicinity. Information was collected from the NWC China Lake Master Plan (U.S. Navy 1989a,b), relevant NEPA documents, facility planners, and service agencies.

3.9.1 Current Management Situation

Utilities and public services are subject to federal and state regulations; local municipal codes; permitting requirements; legislation; and federal, state, and local agency requirements. Regulations applicable to the various utilities and public services at NAWS are summarized in this chapter. Where applicable, the sections also include the policies, goals, and guidelines related to utilities and public services of NAWS and Ridgecrest.

3.9.2 Utilities

Major utility-based systems at NAWS include water, wastewater treatment, flood control, electrical service, natural gas, propane, and steam distribution. Most of the systems are at Mainsite and immediately adjacent areas. Facilities located on the North and South Ranges are served by a limited, local distribution network. Typically, utilities are buried adjacent to the roads on each range (U.S. Navy 1997a).

3.9.2.1 Water

NAWS owns and operates its own water supply, storage, and distribution systems, supplied from local groundwater. Agreements with the IWVWD and the Inyokern Community Services District provide for additional water to be supplied to the Station in emergency situations. These connections are near the NAWS geodesic water reservoirs in the Intermediate Well Field on the North Range and in Inyokern (U.S. Navy 1997a).

Permits for drinking water wells are administered by Kern County. Requirements for lead and copper sampling are outlined in the federal SDWA, 42 U.S.C. § 300f et seq. The Navy's Environmental and Natural Resource Program Manual (OPNAVINST 5090.1B) identifies requirements and responsibilities for protecting drinking water supplies at naval facilities.

Deep wells in the IWV are the source of potable water for the population center at North Range. The main water distribution system serves Mainsite and the Michelson Laboratory Complex, the propulsion and ordnance laboratories, Armitage Airfield, and the southern portion of George Range. Currently, six production wells are on line, with a seventh slated for installation by 2000-2001 (Forbes 1998). The new well will enable shorter pumping times, which will increase the life of all wells, decrease the groundwater depressions, and allow more recharge of the aquifer (Forbes 1998). Water for fire protection also is provided by this same system. Both Baker and Charlie Ranges have separate wells that supply water for construction and toilets, but bottled water is supplied for drinking (Stoner 1998). One unused well (17-1) is located on the North Range.

Water supply to South Range is limited to a few wells. Two wells in the Gun Line area of Randsburg Wash supply water to Central Site; however, one of the wells is no longer usable due to a collapsed casing. NAWS is in the process of replacing the damaged well. Two wells are located at Sea Site. Water on the North Range is stored in 16 reservoirs located along the distribution system. Four reservoirs are on the South Range. A deep well turbine and booster pump supply water to a 135,000-gallon (511,000-liter) reservoir. This reservoir supplies the distribution system, which serves the dual purpose of providing both domestic potable water and water for fire fighting. Water for other outlying areas on South Range is trucked in or purchased as bottled water.

Water usage at NAWS ranges from a high in the summer of 4.838 million gallons per day (mgd) (18.31 million liters per day [mld]) to a low of 0.976 mgd (3.69 mld) in the winter. The water supply system is reported to be at capacity during the high-use months, but installing the seventh well will help alleviate this problem (Forbes 1998).

A single line from the main water distribution system at Harvey Field Reservoir distributes water to Well No. 30. From there, distribution is accomplished with a dual-line system, which is comprised of a 20-inch (50.8-centimeters) main line and a backup line. The backup line is actually the original pipe when it was a single-line distribution system. Approximately 140 miles (225 kilometers) of pipe are used in the system. The water main from Well No. 30 to the reservoirs in the Intermediate Well Field was replaced around 1991. The entire main line is in very good condition; however, the backup line is in generally poor condition because of its age. Plans are being made to eventually upgrade the backup line. A new 4.5-mile (7.2-kilometer) water main is currently being installed to the Weapons Survivability Laboratory.

3.9.2.2 Wastewater Treatment

The City of Ridgecrest leases and operates the on-Station wastewater treatment plant (WWTP) (Mainsite) and maintains the plant to meet water quality standards and future loads. The plants operate under the jurisdiction of the Regional Water Quality Control Board (RWQCB). Individual septic systems are under the jurisdiction of the San Bernardino and Kern County health departments. The City's plant operates under two board orders: Waste Discharge #6-93-85 (WDID #6B150116001) and Reclamation #6-93-86 (WDID #6B159101001).

The City plant processes wastewater from NAWS and Ridgecrest areas. NAWS pays for the cost of disposal based on the measured wastewater flow from entities on-Station. Primary treatment consists of removing grit and primary sediment. Secondary treatment is provided by seven oxidation ponds and four evaporation/percolation ponds on approximately 220 acres (88 hectares). Most of the effluent is evaporated or percolated; however, up to 1.4 mgd (5.30 mld) of effluent is used to irrigate the NAWS golf course. If the evaporation ponds reach full capacity, they would overflow into a concrete spillway at the north end of the ponds, which would dump effluent onto the desert floor.

The wastewater collection system and treatment plant have adequate capacity to process the current volume. The plant has a rated design capacity of 3.6 mgd (13.63 mld) and a peak design capacity of 5.4 mgd (20.44 mld). The average daily volume is approximately 2.875 mgd (10.88 mld). The plant is operating at a flow rate ranging from 2.5 mgd (9.5 mld) in the winter to a peak of 3.3 mgd (12.49 mld) in the summer. Total plant flow for 1997 was 1,059.56 million gallons (4,010.43 million liters) with the Navy's portion at 440.93 million gallons (1,668.92 million liters; Kelley 1999). The plant is operating within its rated capacity and can sustain a population increase in Ridgecrest and NAWS.

In addition to the Ridgecrest WWTP, the SWPL is equipped with its own WWTP. The SWPL's treatment plant operates under a discharge permit, Board Order #6-94-53 (Sizemore 1998). The design capacity of the plant is 0.021 mgd (.08 mld). Domestic wastewater generated from SWPL and is treated by two septic tanks. An average of 0.010 mgd (0.04 mld) of domestic wastewater then is discharged to two unlined evaporation/percolation ponds. Other more remote areas of NAWS rely on individual septic systems to treat domestic wastewater (Zellmer 1997). Effluent pumped from the septic systems is treated at the Mainsite plant (Sizemore 1998).

3.9.2.3 Flood Control

As discussed in Section 3.7.2, Surface Water Resources, flooding has occasionally been a significant problem in NAWS developed areas. Flood control at the Station is comprised of a series of drainage channels and culverts with outfalls to the desert floor. Some connections to the sanitary sewer are also present (Forbes 1998). In 1984 and 1986 design improvements were made to handle a 60- to 70-year flood event, but the system may not be adequate for a 100-year flood event (U.S. Navy 1989a,b).

3.9.2.4 Electrical Service

Contracts with SCE to provide electrical service to NAWS are maintained through the Procurement Office at NAVFAC, Southwest Division, San Diego, CA. SCE maintains service easements for operations and maintenance of electrical lines.

Electricity is delivered from Edison's Inyokern substation, which also serves Ridgecrest. The capacity of the substation is about 110 megavolt amperes (mVA), of which 50 to 75 mVA are available to NAWS. There are three overhead feeders to NAWS from the substation; however, two feeders can adequately carry the required load for NAWS (U.S. Navy 1997a).

For local distribution, 34,500-volt power is fed over 6 lines to 33 electrical substations where the power is transformed to 4,800 volts. There are about 3,120,480 linear feet (951,122 meters) of power lines at the two distribution voltages. At each building site, the voltage is further reduced to the building service voltages. The general condition of the electrical service system is reported to be good (Forbes 1998). For 1996, July was the highest electricity use month on Station at 415,554 kilowatt hours (Forbes 1998).

In 1986, NAWS developed its geothermal energy resources at Coso KGRA through a third party contractor. The contractor produces geothermal energy at Coso, which it sells to Edison at the Inyokern substation. Edison continues to supply electric power to NAWS.

3.9.2.5 Natural Gas

The NAVFAC manages the contracts with Pacific Gas & Electric (PG&E) to provide natural gas service to NAWS. PG&E maintains natural gas service easements for operations and maintenance of natural gas lines.

Natural gas is the primary fuel used for space, process, and water heating in the more populated areas. Approximately 1,000 natural gas service connections supply NAWS through a gas main transmission line that was installed in the late 1950s (U.S. Navy 1997a). In 1996, the Station reported that 57,713 deca therms (a measure typically used for measuring natural gas) of natural gas were provided in December, which is typically the highest use month. The natural gas distribution system is reported to be in good condition, and the capacity is more than adequate to meet both existing demand and an increase in demand (Forbes 1998).

3.9.2.6 Propane

Propane is used for space heating, water heating, and other domestic uses in remote areas on Station. Propane is delivered by a private contractor to a series of on-Station storage tanks with a total capacity of 400,000 gallons (1,514,000 liters). Propane is distributed by truck throughout the Station by the Navy. NAWS has about 200 propane service connections and the tanks are installed above ground near the end users. The lines are installed primarily below ground except where they come off the tank. Propane usage is reported by the amount delivered from the contractor. In 1997, 76,610 gallons (289,968 liters) of propane were delivered in January, which represents the highest use month on Station. In general, the individual propane distribution systems are reported to be in poor condition. There are ongoing projects to convert many of the propane connections to the natural gas system where feasible (Forbes 1998).

3.9.2.7 Steam Distribution

Three major steam generating plants operate on Station, each of which contains two or more boilers. Steam Plant #2 is at Mainsite, Steam Plant #3 is at Armitage Airfield, and Steam Plant #4 is in the SWPL area. Steam Plant #1 is no longer in operation. Each plant serves a large area through a distribution system that supplies steam to several buildings. Some buildings are not connected to the steam distribution system, but instead have individual boilers. Boilers are used for space, process, and hot water heating and, in some cases, provide power for absorption chillers and for humidifiers in some laboratories. The steam distribution lines on Mainsite and Armitage Airfield are installed under ground; the distribution lines in the Salt Wells area are mostly above ground (Forbes 1998).

The steam plants are in relatively good condition, but the distribution piping is in generally poor condition because of age. The steam system is gradually being downsized due to the high cost of upgrading. Certain facilities are being refitted with individual boilers or are being refitted with individual heating and cooling units, both of which are fueled by natural gas (Forbes 1998). Operation and maintenance of the steam distribution system is managed by NAWS.

3.9.3 Public Services

NAWS offers numerous public services on Station including health services, police services, and fire protection. In addition, recreational facilities are largely available to the local community as well as NAWS residents and employees.

3.9.3.1 Health Services

On-Station health services are provided by the Navy-operated Branch Medical Clinic. Branch Clinic provides routine outpatient medical care to all eligible beneficiaries. Patients with medical problems that exceed the clinic's capability are referred to local civilian providers or other military treatment facilities. Active-duty emergencies are seen at any time during clinic working hours. After-hours emergency service is not provided but is available off-Station at the Ridgecrest Regional Hospital Emergency Room. The co-located Branch Dental Clinic provides services to eligible beneficiaries (U.S. Navy 1996e).

Off-Station health services are managed by private health care facilities. The general policy of Ridgecrest is to maintain an adequate level of medical services for its residents (City of Ridgecrest 1994). A number of health care facilities are available in the Ridgecrest area. The primary facilities are Ridgecrest Regional Hospital, an 80-bed acute-care facility offering emergency and regular health care services; Drummond Medical Group, a large multi-specialty group with an urgent care center; and Sage Medical Clinic, a nonprofit primary health care center. The Sage Medical Clinic is accessible to all, regardless of ability to pay. In the Ridgecrest area, a wide variety of private general health care practitioners and specialists also available.

3.9.3.2 Police Services

Police services at NAWS are provided and managed by the China Lake Police and Physical Security Division (CLPD). The CLPD has 44 military and civilian personnel including police officers, security specialists, and administrative staff. Division personnel operate over the entire Station and are responsible for maintaining law and order, for developing physical security measures, and for implementing access control policies and procedures. Currently, CLPD is able to meet the demand for police services and mandated response times at NAWS (Levy 1998).

Off-Station police services are provided by the Ridgecrest Police Department (RPD). The RPD's policy is to provide police services commensurate with population levels (City of Ridgecrest 1994). Police services policies stated in the City of Ridgecrest General Plan include:

- Establishment of programs that promote citizen involvement in preventing crime.

- Coordination with the police department to review and develop safety and crime prevention plans.
- Reduction of response times through land use planning.
- Education of the community regarding safety regulations.

3.9.3.3 Fire Protection Services

Fires occurring on the Station may be caused by both human and natural activities. The principal cause of naturally occurring fires is lightening strikes. The most common cause of fires on the ranges, resulting from human activities, is associated with ordnance and pyrotechnic devices used during test and training activities. At Armitage Airfield there is also some potential for fires to be created by fuels, propellants, and explosives, as well as fires that may occur in electronic equipment, on or associated with the maintenance and operation of aircraft. There is also the potential for fires to occur in other buildings and structures throughout the Station.

NAWS manages and operates fire stations at Mainsite, Armitage Airfield, and Randsburg Wash. There are 67 fire-fighting personnel, including 60 fire fighters, two chief officers, four fire prevention inspectors, and a fire chief. Assistance is also available through a mutual-aid agreement with the Kern County Fire Department (KCFD) stations in Ridgecrest and Inyokern. These stations can provide assistance for fires in the NAWS Mainsite area. Cooperation between the two fire-fighting agencies is excellent (Davidson 1998); however, their response times are not adequate to meet DoD requirements for first arriving or second alarm responders.

The KCFD provides fire service to the Ridgecrest and Inyokern areas. Ridgecrest has two stations, each staffed with three fire fighters per 48-hour shift; and one station is in Inyokern with two fire fighters per shift. All three stations have volunteer fire fighting groups available. KCFD's service is adequate to meet the existing demand; however, any substantial increase would require additional personnel (Merrell 1998).

The safety element of the City of Ridgecrest General Plan states that the city's policy is to coordinate with KCFD to determine the adequacy of available fire protection service when assessing proposed developments. City policies also include

- Minimization of fire and emergency response times through improving traffic circulation.
- Concentration of urban development to reduce the need for fire protection beyond the distance associated with a 5-minute response time.
- Support of the water district efforts to upgrade water mains to provide adequate fire flows in all parts of the city.

The Station's fire suppression policy for the Superior Valley management unit is described in Section 3.4, Biological Resources. Fire suppression procedures are implemented for emergency interdiction of fires resulting from military test and training operations at remote target areas in the Superior Valley Target Range. These emergency interdiction procedures have been implemented to ensure the protection of Desert Tortoise Critical Habitat and other sensitive lands within the Station's Desert Tortoise Habitat Management Area (DTHMA).

3.9.3.4 Recreation and Community Facilities

Recreation and community facilities on NAWS are managed through the Morale, Welfare, and Recreation Department. Station policy allows public access to NAWS for recreation on a case-by-case basis only when it does not interfere with military mission and operations.

NAWS provides various recreational programs and facilities to the military, DoD employees, and their family members. Outdoor recreation facilities include riding stables, swimming pools, tennis courts, basketball courts, playing fields, and a golf course. Indoor facilities include a complete gymnasium, indoor pool, and bowling alley.

The golf course and gymnasium are also available to the general public. The Station offers a ticket and tour office, youth activities, and sports programs (U.S. Navy 1989a,b). Current policy allows camping in Birchum Springs in George Range (NAWS 1997).

Ridgecrest provides recreational facilities and opportunities commensurate with population levels and the City's Capital Improvements Plan (CIP). The City's policies also include developing additional parks and trails linking recreational areas to housing and schools; establishing a parks, recreation, cultural, and open-space coordinating committee; and preparing and adopting a parks, recreation, cultural, and open-space master plan.

3.10
Public Health and Safety

3.10 PUBLIC HEALTH AND SAFETY

This section addresses public health and safety programs and procedures associated with military T&E and training operations conducted at NAWS. Topics discussed in this section include management practices, range safety, target and test sites, airspace and flight safety, airfield flight safety, BASH, explosive safety, electro-magnetic frequency operations, laser operations, and ordnance use.

3.10.1 On-Station Management Practices

Health and safety management practices are implemented at NAWS through a variety of programs, guidelines, and instructions. Access to the ranges is controlled by NAWCWD Instruction 5520.2A. This instruction provides the procedures and guidelines that ensure the safety of persons (including government workers and non-government visitors) accessing the NAWS ranges. Safety considerations for airfield flight operations are addressed in the Station's AICUZ Program. The AICUZ Program is a planning tool designed to protect the operational capability of the airfield and ensure safe and compatible land use development in the areas surrounding the airfield. An AICUZ plan was first developed for the Station in 1979. An update to that plan was prepared by NAWS (U.S. Navy 1998a) which describes the noise environment and safety effects of airfield operations on surrounding areas, and provides land use compatibility guidelines for use by local and regional land management agencies. Safety considerations for range flight and ground activities are addressed by two primary directives, the NAWCWD Range Safety Manual (RSM) and NAVAIR Instruction 3960.4A. Instruction 3060.4A provides policies and procedures for the conduct of flight, ground, and laboratory testing of air vehicles, weapons, and installed systems. The RSM establishes the safety planning and management practices that are applied to test and training operations conducted at NAWS. The RSM implements the guidance provided in NAVAIR Instruction 3960.4A and defines the procedures for conducting range test and training operations. Such operations involve the use of live and inert ordnance, lasers, and radar and may include the treatment of accidents and dudded or damaged ordnance. Another effort that has been implemented to ensure flight safety is the Intruder Program (NAWCWD Instruction 3700.1A) which provides guidelines, procedures, and policies for identifying and reporting aircraft that enter restricted China Lake airspace without permission (U.S. Navy 1994b). The goal of this program is to minimize the number of intruder incidents and to segregate nonparticipating aircraft from the hazardous activities that take place in the restricted airspace. Directives and guidelines for the safe handling and use of explosives on-Station are contained in the Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation and Shipping (NAVSEA OP 5, Volume 1). This regulation provides guidance for safely producing, handling, storing, shipping, maintaining, and disposing of explosive materials (U.S. Navy 1995a). The China Lake AMP (U.S. Navy 1989a,b) also provides safety guidelines for a variety of NAWS operations including fire protection, police protection, explosives safety, and electromagnetic and ionizing radiation hazard protection.

3.10.2 Range Safety

The Commander, NAWCWD, has the ultimate responsibility for range safety. He has delegated authority for ensuring Land Range safety to the Pacific Ranges and Facilities Department Range Safety Office (RSO). The RSO has oversight responsibility for all aspects of range safety procedures relating to test and training operations conducted on the NAWS ranges. Range safety policy, procedures, and guidance are provided in the *Pacific Ranges and Facilities Department RSM*, Instruction 5100.2A (NAWC 1999b). The RSM defines range safety requirements, criteria, the safety planning process, and operational procedures applied to range test and training events. This manual provides comprehensive guidance regarding all aspects of air and ground-based test and training events conducted on the NAWS ranges. The RSM establishes guidelines, and includes operating procedures defined for all hazardous air and ground operations such as range access controls, flight termination procedures, flight safety areas, safety hazard patterns, debris patterns, safety planning and documentation processes, and safety procedures for the use of ordnance and laser operations.

3.10.2.1 Range Access

Except for special events, public access to NAWS is controlled for security reasons and to safeguard against potential hazards associated with military test and training operations conducted on-Station. All foot and vehicular traffic enter the Station through three guarded gates. The base is made up of two principal land areas (North and South ranges) that are primarily surrounded by BLM and other federal agency lands. The communities of Ridgecrest and Inyoken are adjacent to the southern boundary of the North Range. Public access to the range areas of the Station for educational, recreational, or other special purposes is strictly controlled through established procedures involving the Station's Police Department and the PAO. Public Access to the Main Site area is controlled via a badging system and security guards at the main gates. Perimeter security fencing, perimeter ditches, and terrain further discourage unauthorized public access (U.S. Navy 1989a,b). In addition, roving patrols regularly check remote areas for signs of unauthorized entry (U.S. Navy 1997a). Personnel requiring range access are logged in and out, and are closely controlled by designated range control authority. Roadblocks, barricades, locked gates, and guards are also used to prevent entry into areas with imminent hazards. Searches are conducted for individuals who do not log out at expected times or who are unaccounted for when test or training exercises are scheduled to begin.

Access to remote range areas and hazardous operations facilities, which include all sites used for storing, assembling, testing, and inspecting energetic materials, is strictly controlled. Permission to enter these areas or sites must be obtained from the controlling authority. Access to areas of the North Range is controlled by Range Control. Access to South Range areas is controlled by the ECR Scheduling Office. Access to other sites is controlled by the site supervisor or facility coordinator. The controlling authority will deny access to non-essential personnel during hazardous operations.

Restricted area R-2505 overlies the North Range. Restricted area R-2524 overlies the South Range. Access to restricted airspace is governed by Federal Aviation Regulations. China Control is the controlling authority for the restricted airspace. The control center closely monitors the airspace during scheduled flight operations and ground operations that create a hazard more than 500 feet (152 meters) AGL. China Control notifies test operations conductors whenever non-participating aircraft might intrude in restricted airspace; operations are not allowed to proceed until the safety of non-participants is ensured.

3.10.2.2 Flight Termination

To prevent an impact off-range, a flight termination system (FTS) is generally required for missiles or air vehicles that have the capability to exceed designated impact limits. An FTS may be required for other test items to prevent impact in protected areas on-range and to prevent any test item from extending beyond the Station boundaries. Flight termination may be achieved by any number of means including parachute recovery, controlled flight into the ground, intentional departure from controlled flight with subsequent ground impact, thrust termination, and air vehicle destruction using on-board explosive devices.

The Missile Flight Safety Officer (MFSO) is required to terminate a missile or air vehicle flight whenever the determination is made that continued flight could pose a hazard to a protected area on- or off-Station, or whenever the MFSO is unable to verify that no such threat exists. Specific conditions that require termination include:

- The test item crosses a predetermined termination boundary.
- The test item threatens to cross the termination boundary later in the flight, but the freedom to terminate the flight at that later point may be restricted.
- The telemetry indicates that the test item performance is diminishing to the point that continued flight will create a safety hazard.

- Loss of trajectory data.
- The telemetry or other information source indicates that the test item is seeking the wrong target.

3.10.2.3 Safety Planning and Documentation

A Range Commander's Package, formally known as a Range Safety Waiver, is prepared for every operation that presents an unusual hazard to the designated impact area or to the personnel or facilities involved in the operation. A Range Commanders Package describes the operational objectives of the event, the risks associated with the operation, and the safety procedures that will be employed to minimize the potential hazard.

3.10.3 Target and Test Sites

Weapons and weapon systems test and training activities are conducted in the air and on the ground at NAWS. Ground-based targets are used to test and evaluate the performance of the weapons systems and to provide realistic training scenarios. Target and test sites are located throughout the NAWS ranges and include the impact areas and associated buffer zones. Three distinct buffer zones have been designated at and around impact areas, including the intensive use zone, the primary buffer zone, and the secondary buffer zone. The parameters and configuration of the buffer zones vary depending on the size and type of weapon tested. The highly disturbed portions of the target and test site impact area are designated as an intensive use zone. The primary buffer zone is the area directly surrounding the intensive use zone and designates the location within which debris associated with the operation is expected to fall. Primary buffer zones are generally applied for areas approximately 656 feet (200 meters) directly adjacent to impact areas. A secondary buffer zone or safety buffer zone is identified at intervals of up to 2,500 feet (762 meters) from impact areas. The secondary buffer zone identifies those areas that must be avoided by all personnel and that cannot be used for the placement of unprotected equipment during test or training events. North and South range target and test sites are shown in Chapter 2 (Figures 2-2 and 2-3), respectively. Weapons footprints associated with range ground operations do not extend off Navy-controlled property.

Different levels of safety precautions exist for range personnel associated with various phases of a test. Typically, there is a high safety hazard to personnel in the immediate target site (intensive use and primary buffer zones); therefore, target sites are evacuated during a typical operation. The secondary buffer zone has a moderate safety hazard and is generally evacuated of all personnel with the exception of essential mission personnel (U.S. Navy 1997a). NAVSEA OP-5, Volume I, NAVSEA and NAWC Instructions, and NAWS standard procedures provide the guidelines and procedures for the safe conduct of any test requiring the use of HE ordnance (U.S. Navy 1995a).

3.10.4 Airspace and Flight Safety

Aircraft operations are conducted within the airspace above and surrounding the Station, including restricted areas and military operations areas. Airspace operations and coordination with surrounding ATC facilities are conducted according to Federal Aviation Administration (FAA) and Navy regulations.

Comprehensive operating procedures are employed at NAWS to reduce the potential for aircraft accidents. These procedures include holding routine briefings for pilots and range operations personnel to review established safety practices and procedures and conducting frequent ground inspections on all equipment related to a test or training event (U.S. Navy 1998a). Pilots also are required to exercise caution to remain within approved flight routes and holding patterns. Flight leaders are assigned the responsibility for monitoring aircraft operations, correcting procedural errors, and directing aircraft to maintain safe operating conditions.

To ensure airspace safety, aircrews have historically been required to maintain a minimum altitude in the R-2508 airspace of 3,000 feet (914 meters) AGL and a minimum lateral distance of 3,000 feet (914 meters) from the pre-1994 boundaries of Death Valley, (R-2508 JPPB 1997). Additional overflight considerations were initiated by the JPPB in

cooperation with the managers of the Sequoia and Kings Canyon national parks and the Domeland and John Muir wilderness areas. In April 2000, the JPPB enacted a policy whereby military flights over the Sequoia and Kings Canyon national parks would maintain a minimum altitude of 8,000 feet (2,438 meters) AGL during the peak visitor months from June through September. Although the FAA requires a minimum of 1,000 feet (305 meters) AGL over inhabited areas (including Ridgecrest, Trona, and Inyokern), aircrews are encouraged to maintain a minimum altitude of 3,000 feet (914 meters) AGL over these areas.

Requests for use of the North Range airspace for test and training events are made through the NAWC China Lake Test Management Office. Each request is assigned to a test manager who is responsible for scheduling use of airspace and range assets with the range's test scheduler and for organizing briefings on airspace, range, and course rules. All aircrews scheduled to operate in this range must receive a range briefing before their activities. The test scheduler compiles test schedules for the North Range to ensure that test events will not conflict with one another. Requests for test and training events using the ECR, located throughout Randsburg Wash in the South Range, and the Superior Valley Tactical Training Range are made through the NAWC China Lake ECR Test Operations Branch. Test and training requests are assigned to a test manager, who is responsible for scheduling airspace and range assets with the test scheduler and organizing briefings. Requests for use of South Range airspace only are made through the NAWC China Lake ECR Scheduling Office. The test scheduler in the South Range compiles test schedules for the range to ensure that test events will not conflict with one another. Schedules for North and South Range operations are coordinated between each scheduling office.

Use of military airspace outside of the Station boundaries is scheduled through the R-2508 CCF located at Edwards AFB. The R-2508 Complex is an airspace complex used by the DoD for the advancement and employment of weapons systems technology and training. The Complex includes airspace presently managed by the three principal military activities in the Upper Mojave desert region: AFFTC, Edwards AFB; NTC, Fort Irwin; and NAWCWD, China Lake. The R-2508 Complex is composed of a number of restricted areas, military operating areas, Air Traffic Control Assigned Airspace (ATCAA) areas, and the Trona Controlled Firing Area (CFA).

The Trona CFA provides a contiguous operational airspace between the airspace above the North Range (R-2505) and the airspace above the South Range (R-2524) for conducting free flight weapons testing. The Trona CFA exists within the already established R-2508 Complex and coexists with currently defined military operations areas and ATCAAs. Testing in the Trona CFA goes through a thorough safety review. Ground and/or airborne radar, and experienced range personnel acting as visual observers monitor each test through the Trona CFA. To help advertise the activation of the CFA, an activation notice is provided at least 24 hours in advance of intended operations to Trona and Inyokern Airports.

Occasionally tests involving the use of aerial target drones (remote-controlled aircraft) are conducted over the George Range and Airport Lake management units. Target drones can be used for destructive and non-destructive tests. During these tests, George Range, Coso Range, and Airport Lake are evacuated of all personnel except essential mission personnel. Target drones are operated with redundant control systems to ensure that when impacted during a destructive test, the test item remains on-Station and within the safety footprint established by the RSO.

3.10.5 Airfield Flight Safety

The DoD established the AICUZ program to effectively plan for compatibility between military airfield operations and on- and off-Station land use in areas surrounding military airfields. NAWS updated the AICUZ plan for the Station in 1998. In the update, APZs and noise contours are identified and graphically defined (for current and projected airfield operations) and suitable land use guidelines are identified for on- and off-Station land use planning. An APZ identifies areas where accidents are most likely to occur rather than addressing the probability of accidents actually occurring. Several types of APZs are designated and land use within the APZs is restricted to protect aircrews and persons and property on the ground. The AICUZ-defined APZs, in order of decreasing accident potential, are the

Clear Zone, APZ I, and APZ II. These zones are depicted in Figure 3.10-1 and the dimensions and applications of each zone are described as follows.

The Clear Zone lies immediately beyond the end of the runway and outward along the extended runway centerline for 3,000 feet (914 meters). The fan-shaped Clear Zone is 1,500 feet (457 meters) wide at the end of the runway and 2,284 feet (696 meters) wide at 3,000 feet (914 meters) from the end of the runway. Because this zone has the highest accident potential, no structures or other obstructions are permitted within its boundaries.

Accident Potential Zone I is the area beyond the Clear Zone that has a significant potential for accidents. This zone normally is provided under flight paths that experience 5,000 or more annual operations. Typically, APZ I is 3,000 feet (914 meters) wide by 5,000 feet (1,524 meters) long, and is curved to conform to the shape of the flight paths.

Accident Potential Zone II extends beyond APZ I and has a lower potential for accidents. APZ II normally is provided under a flight path whenever an APZ I is required. Dimensions of APZ II are usually 3,000 feet (914 meters) wide by 7,000 feet (2,133 meters) long, and is curved to conform to the shape of flight paths (U.S. Navy 1998a).

In addition to the three zones, setback areas also are defined along runways. These areas extend 750 feet (229 meters) from the runway centerline and define a zone parallel to the runway (for the length of the runway) with a high degree of accident potential. The Navy's Facilities Planning Manual (NAVFAC P80) prohibits any structures within this area. Structures may be placed outside the setback limits but are not allowed to penetrate an imaginary plane extending outward and upward at a 7:1 slope starting at ground elevation from the setback line. All existing APZs for NAWS are within Station boundaries (see Figure 3.10-1). Clear zones and APZs have been developed for both existing and projected conditions as part of the 1998 AICUZ study for NAWS (U.S. Navy 1998a). The APZ-II for Runway 21 also extends over the Baker/Charlie approach corridor.

Military aircraft and weapons test and training operations are inherently dangerous and occasionally mishaps or incidents occur. Aircraft incidents include all reportable accidents associated with aircraft and include serious events, such as the loss of an aircraft, to less significant events that may involve the "drop" or accidental release of a piece of equipment from an aircraft. Between 1976 and 1998, 28 aircraft incidents have occurred at NAWS associated with test and training operations. The locations of most of these incidents in the airfield area are shown on Figure 3.10-1. Of the 28 identified incidents or mishaps, 24 occurred on NAWS lands (as depicted on Figure 3.10-1) and 4 occurred off-Station, on unpopulated public lands. The four off-Station incidents were aircraft crashes. One occurred in 1979 in the vicinity of what is now Faller School; one occurred in an unpopulated area in the vicinity of Trona in 1990; one occurred in 1996 on BLM lands, in an unpopulated area northwest of the Wild Horse and Burro Facility which is located on the Randsburg Wash Access Road; and one occurred on undeveloped NPS lands in the Saline Valley Area. None of these incidents affected the public.

3.10.6 Bird-Aircraft Strike Hazards

Bird-aircraft strike hazards (BASH) is defined as the threat of aircraft collision with birds during flight operations. It is a safety concern at all airfields due to the frequency of aircraft operations and the possibility of encountering birds during a flight. Most birds fly close to ground level and more than 95 percent of the reported bird-strikes occur below 3,000 feet (914 meters AGL). Military aircraft are prone to strikes because they fly at high speeds and low altitudes where birds are most active.

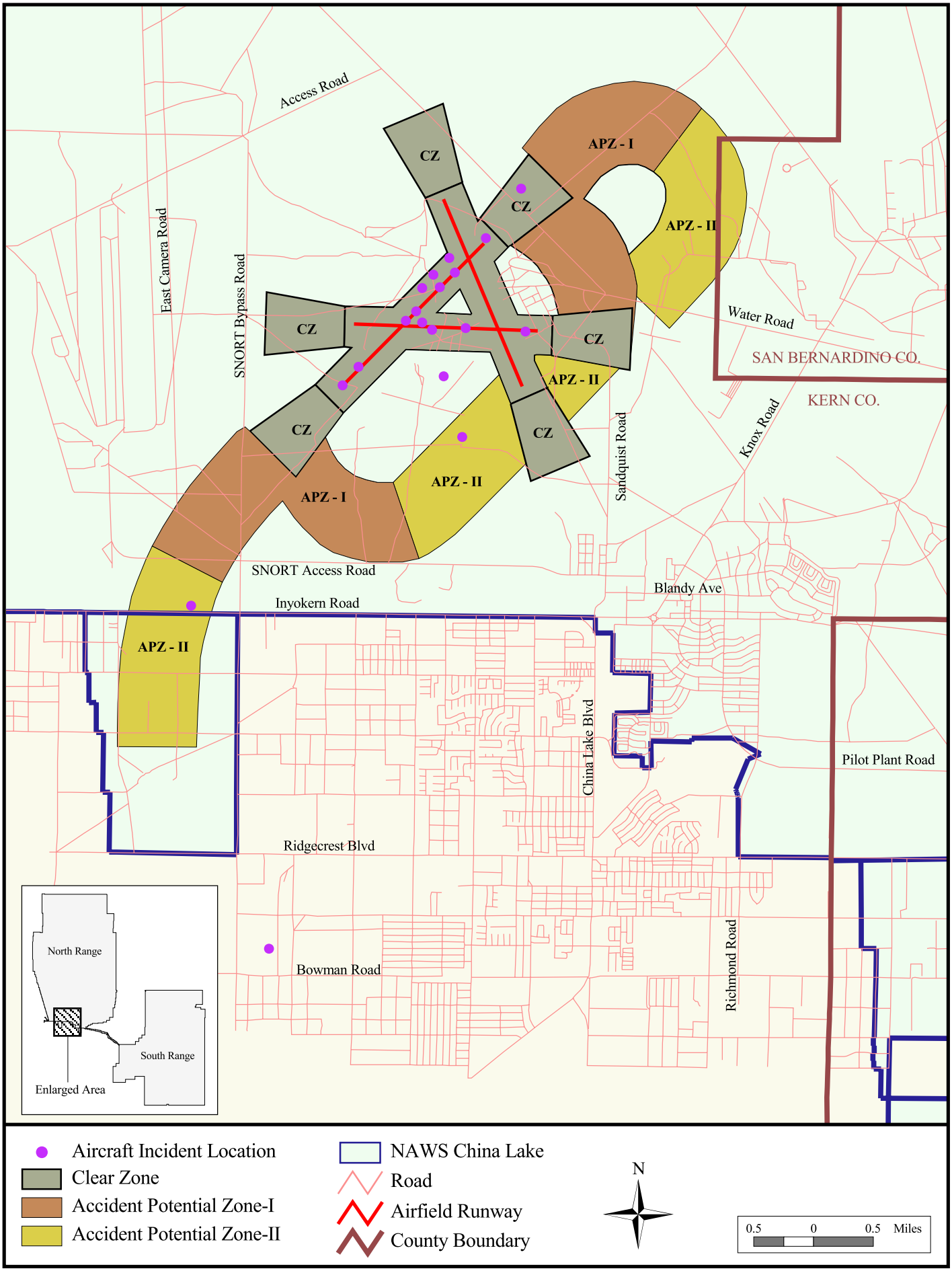

Figure 3.10-1 Existing Clear Zones and Setback Areas for Armitage Airfield

NAWS has maintained records of BASH incidents and the types of birds involved. Between 1981 and 1992, 27 BASH incidents were recorded. From 1993 until 1999 no records were kept of BASH incidents. However, in 1999 NAWS developed a draft BASH plan that formalizes existing BASH coordination procedures. The plan is currently under internal review and will be implemented following Command approval. The plan will implement procedures to minimize the BASH potential through the identification of on- and off-Station areas that are habitat for both resident and transient bird populations. This information will be provided to Station flight and safety operations personnel for distribution to pilots and aircrews operating at NAWS. Areas of potential risk include G-1 Seep and, to a lesser extent, the Lark Seep areas.

3.10.7 Explosive Safety

Ammunition and explosives use is governed by Navy regulations published in NAVSEA OP.5, Volume 1. Explosives use at the Station is managed in accordance with Navy guidance, and standard operations procedures have been established at NAWS to protect NAWS personnel, facilities, and equipment. Ordnance and explosives materials are stored in specialized storage magazines and facilities at designated locations. An explosive safety quantity distance (ESQD) arc has been established for each magazine and facility used for ordnance storage and handling. ESQD arcs create safe distances between ordnance storage and handling operations and inhabited buildings. The distance that an ESQD arc extends from an ordnance facility depends on the types and quantities of ordnance the facility is authorized to store or handle (U.S. Navy 1989a,b).

Activities at NAWS require a wide variety and large quantity of ordnance. NAWS has more than 100 magazines and other explosives storage facilities located throughout the Station, as well as more than 200 explosives storage and operating buildings in the Propulsion Laboratories Areas (U.S. Navy 1989a). The ESQD arcs on both the North and South ranges are shown in Figures 3.10-2 and 3.10-3, respectively. All ESQD arcs are contained within NAWS boundaries with the exception of an arc on the railroad siding between the North and South ranges. NAWS has been granted an easement for this ESQD arc.

3.10.8 Electromagnetic Frequency Operations

The T&E and training mission of NAWS requires use of electronic equipment, such as telemetry, video, microwave, radar, command control, and voice communication equipment. The use of such equipment can produce electromagnetic radiation (EMR), radar radiation, and ionizing radiation (U.S. Navy 1989a). NAWS has established specific areas of operations within the ranges to safely accommodate these types of test and training requirements. As part of the range safety standard procedures described in the RSM, radiation hazard arcs have been designated for those systems that may emit radiation. No radiation arcs created by range operations extend beyond the station boundaries or into the Mainsite areas.

3.10.8.1 Electromagnetic Operations

Radar and other high-energy electromagnetic emissions from electronic support systems can constitute a hazard to personnel exposed to EMR. To protect the health and safety of personnel in proximity to EMR systems, the operation of these systems is managed under the regulations of the Navy Hazards of Electromagnetic Radiation to Personnel (HERP) program. HERP is defined in terms of power density or watts of power flowing through a given area. For a HERP condition to exist, personnel would have to be within proximity of an emitting antenna directing the power into a concentrated area. Therefore, HERP zones are not considered as construction exclusion zones for habitable facilities but as zones where a heightened awareness of the potential hazard should exist. The distances for HERP zones are designated on a case-by-case basis.

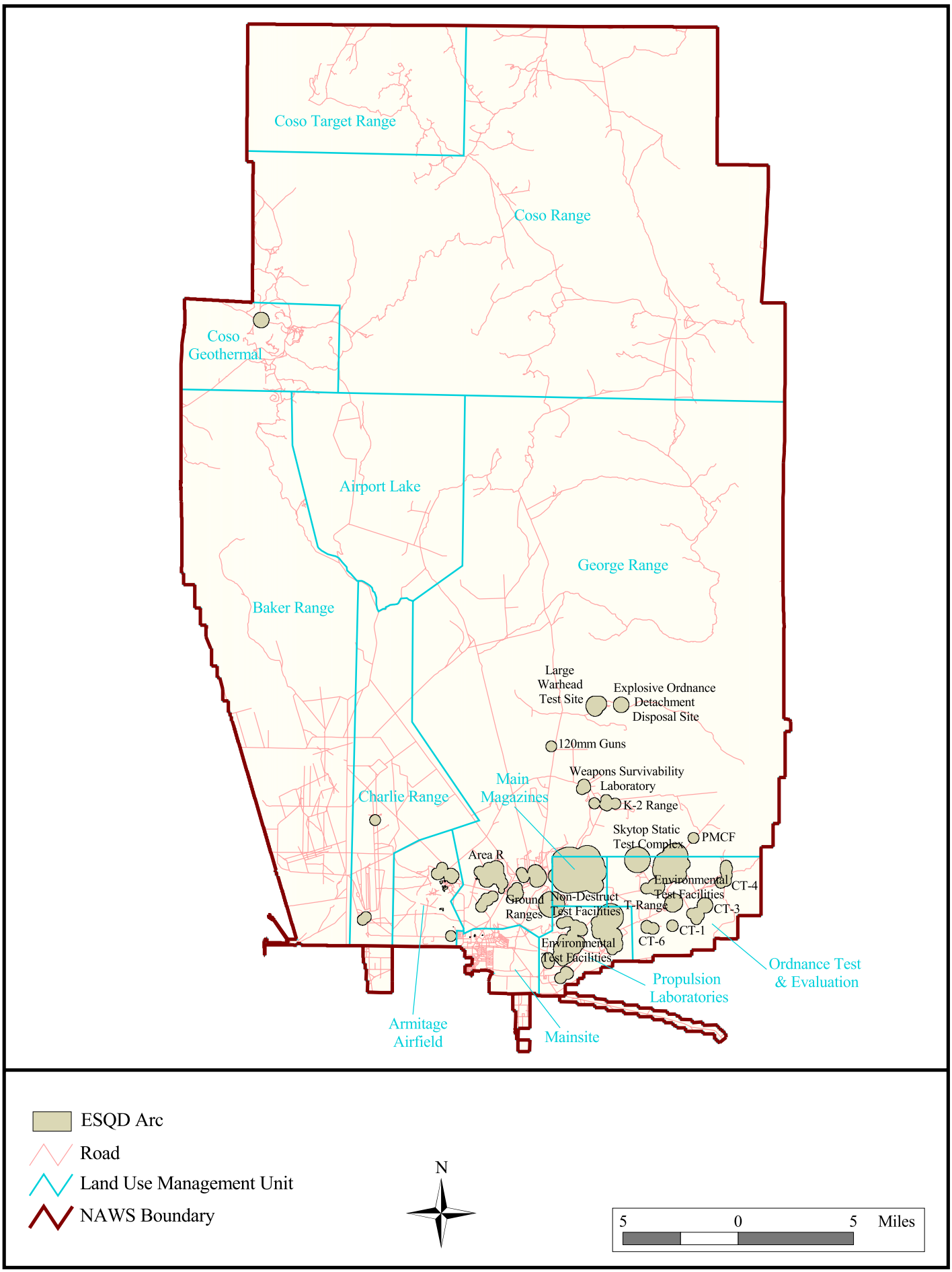

Figure 3.10-2 Explosive Safety Quantity Distance (ESQD) Arcs, North Range

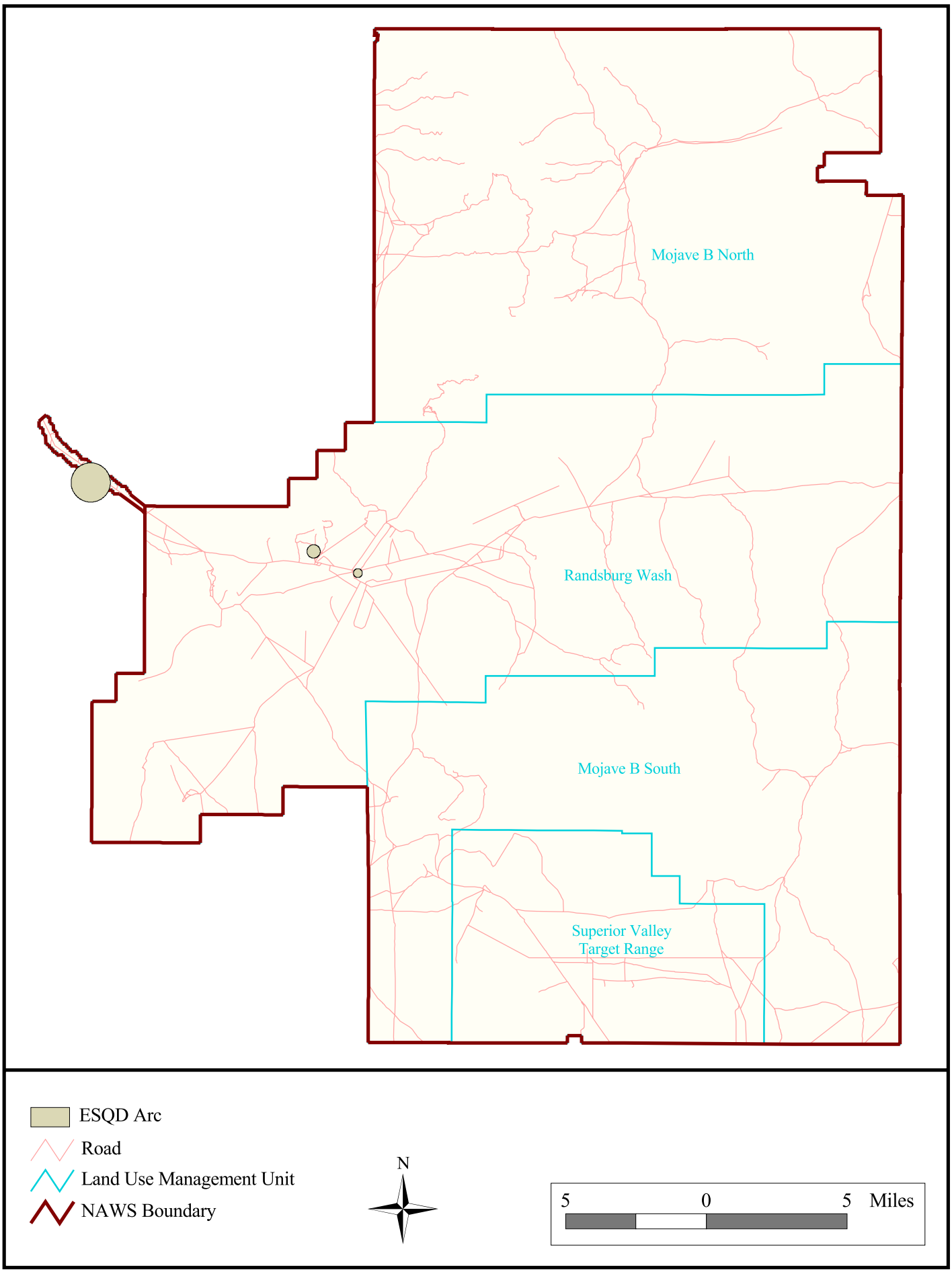

Figure 3.10-3 Explosive Safety Quantity Distance (ESQD) Arcs, South Range

Ordnance and fuel are also susceptible to the hazards of EMR. These effects are managed under Navy regulations for Hazards of Electromagnetic Radiation to Ordnance (HERO) and Hazards of Electromagnetic Radiation to Fuel (HERF). A HERO-susceptible ordnance system is any ordnance system that contains electro-explosive devices that can be adversely affected by radio frequency energy so that the safety or reliability of the system is jeopardized when the system is employed. The distances for HERF zones are designated on a case-by-case basis. No distance guidelines are defined for HERF arc zones (U.S. Navy 1989a).

3.10.8.2 Radar Operations

Radar safety areas are defined for specific radar installations. Potential safety risks to personnel are limited, in most cases, by locating radars on high towers so that no hazard occurs at ground level, and through operating procedures that have been designed to control the exposure of radiation hazards to operating personnel. Warning procedures, such as fences and flashing red lights, are used to keep other personnel from entering the hazard area.

Almost all of the Station's aircraft contain radar and laser optic equipment. Aircraft using the Randsburg Wash test area and the Mojave B Range can generate high-energy electromagnetic emissions associated with guidance systems, detection systems, or electronic attack-evasion systems. All tests are conducted in compliance with Station safety procedures. Ground personnel either are evacuated from the area during tests or are positioned in specially shielded facilities. Strict control of access to the test area, coupled with large amounts of landspace and airspace, serve to minimize these potential hazards.

3.10.8.3 Tomography Operations

The Station uses ionizing radiation (x-ray) at several facilities, including at the High Energy Computerized Tomography (HECT) facility located at Salt Wells (used for nondestructive test inspection of ordnance items). Personnel hazards are controlled for indoor operations by standard procedures and medical surveillance that include the use of shields and personnel film badges that record radiation exposure levels (U.S. Navy 1989a).

3.10.9 Laser Operations

NAWS has accommodated laser systems operations on the range and has established specific areas for the conduct of laser test and training activities. Rigorous standard procedures have been established to ensure that safety requirements continue to be implemented for all test and training events. All test or training events using laser systems are conducted in accordance with the RSM and must receive approval by the Range Laser System Safety Officer. Detailed test plans are required for the conduct of each event whether the system is a ground based or airborne system. Laser hazard areas are established for each test event clearly showing the areas on the ground where personnel may be exposed to laser hazards during a test. Laser safety footprints, always within station boundaries, are established based on the maximum safe range for exposed personnel and the ability to control the pointing angles of the laser system. Appropriate eyewear is required for all personnel with the potential to be exposed to laser hazards.

3.10.10 Ordnance Use

NAWS lands have been used extensively for missions that involved the use of HE ordnance, especially during World War II, the Korean Conflict, and the Vietnam War. In past practices, little or no ordnance cleanup activities were conducted on the ranges, leaving behind ordnance debris and UXO. UXO is defined as explosive ordnance that has been primed, fused, armed, or otherwise prepared for action and has been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, personnel, or material, and remains unexploded. Collectively, UXO and ordnance debris is referred to as range residue. NAWS addresses environmental and explosives safety for range residue through DoD Directive 4715.11, *Environmental and Explosives Safety*

Management on Department of Defense Active and Inactive Ranges within the United States. The Station has implemented extensive efforts in recent years to manage range residue throughout the ranges to ensure the safety of persons using the ranges. Figures 3.10-4 and 3.10-5 show the general locations of historic concentrated ordnance use on the North Range and South Range, respectively.

Currently, HE ordnance testing at NAWS is conducted primarily on Airport Lake with occasional use of target impact areas on Baker, Charlie, George, Coso, Coso Targets, and the Randsburg Wash land use management units. Appendix B identifies those range targets that are authorized for HE and inert ordnance use. Ordnance clearance (collection and detonation) for active range operations is a standardized part of RDT&E activities. Range clearance activities are not regulated under RCRA regulation per the U.S. EPA Military Munitions Rule (MR) (62 FR 6621, February 12, 1997) (see discussion in Section 3.11.2.3). EOD crews have primary responsibility for cleanup from current testing and training on the North Range and clear ordnance from areas of historical contamination as time and budgets permit. On the South Range, most ordnance expenditures are for training exercises on the Superior Valley Training Range. An EOD crew periodically clears ordnance items from Superior Valley and other South Range sites as time and budgets permit. Spent ordnance items visually free of energetics are accumulated in the Range Residue Management Facility located on George Range. Non-ordnance range residue items (i.e. scrap metal) are recycled.

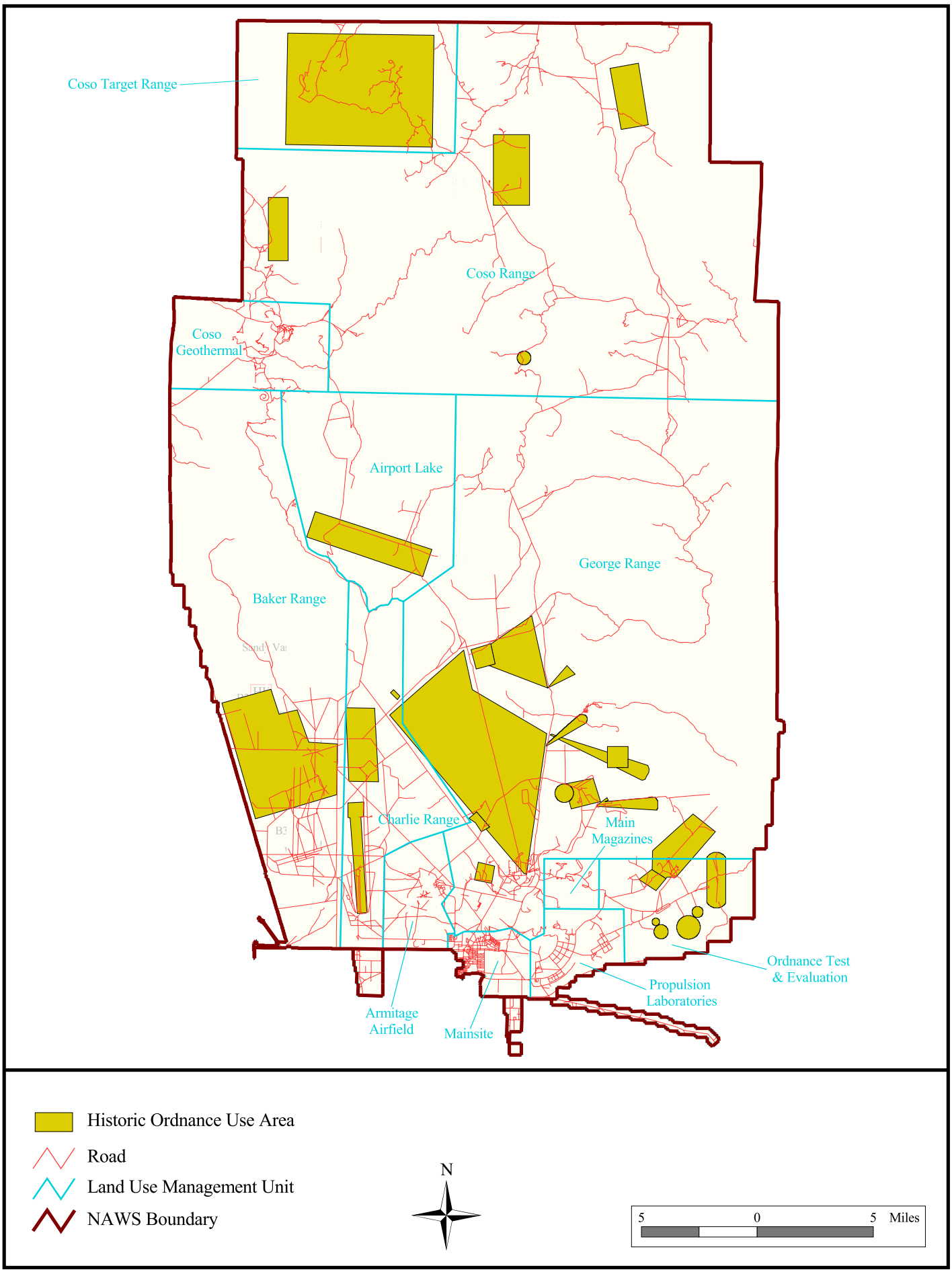

Figure 3.10-4 Historic Concentrated Ordnance Use Areas, North Range

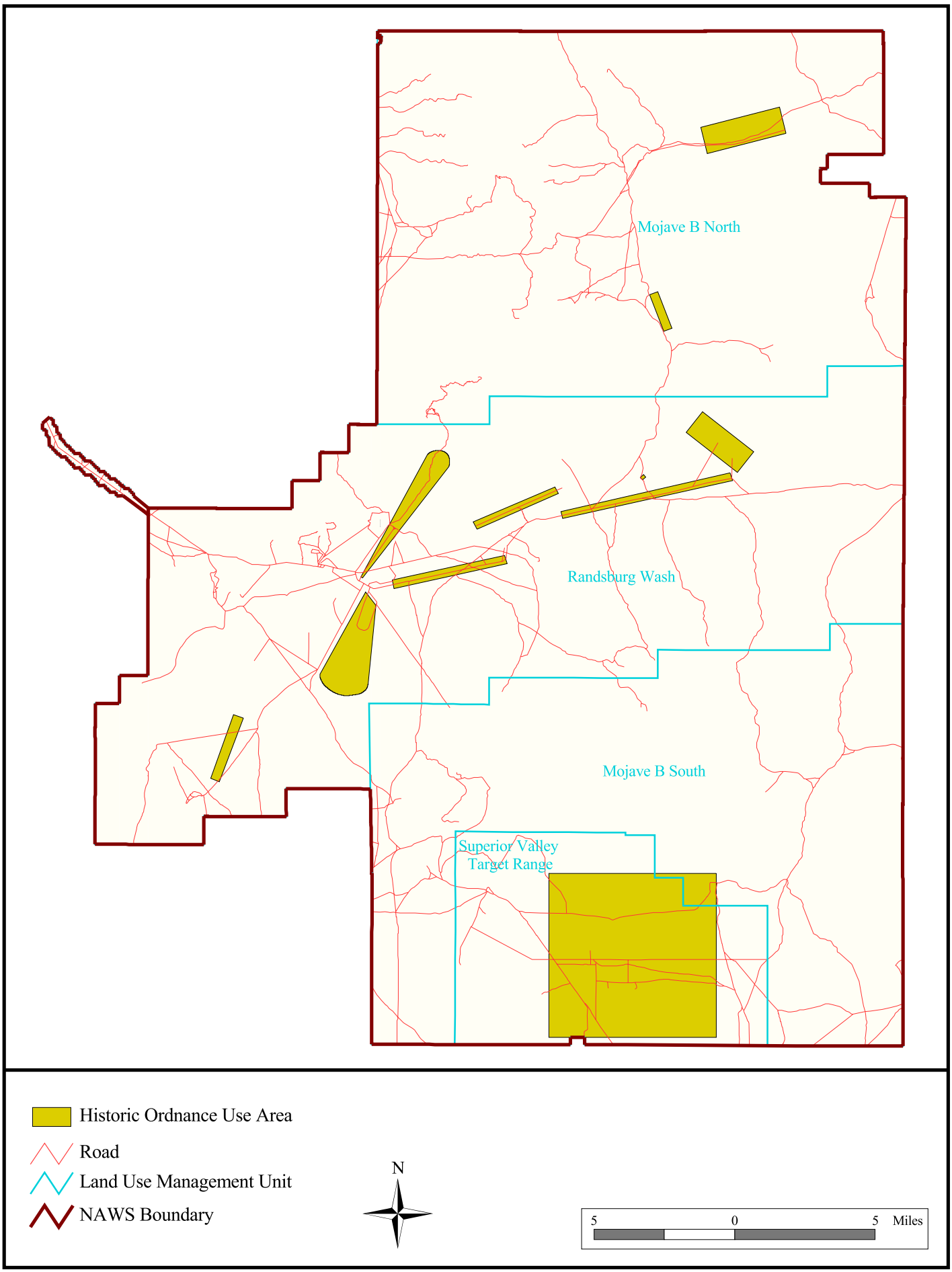

Figure 3.10-5 Historic Concentrated Ordnance Use Areas, South Range

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3.11
Hazardous Materials and Wastes

3.11 HAZARDOUS MATERIALS AND WASTES

This section describes the management of hazardous materials and wastes at the NAWS. In addition, the IRP, asbestos, polychlorinated biphenyls (PCBs), storage tanks, pesticides, and lead are discussed. Unexploded ordnance is discussed in Section 3.10, Public Health and Safety.

Hazardous materials management refers to the handling of hazardous materials and includes the purchase, storage, and distribution of hazardous materials, such as paints, solvents, lubricants, and batteries. Hazardous waste management refers to the handling of hazardous wastes generated as part of industrial activities. These wastes must be containerized, labeled, stored, and transported in accordance with the USEPA, state, and U.S. Navy requirements.

3.11.1 Regulatory Framework

3.11.1.1 Hazardous Materials

As defined by the CERCLA 1980 (42 U.S.C. § 9601 et seq., Sections 101[14] and 101[33]) and the SARA 1986, (PL 99-499), a hazardous material is a substance, pollutant, or contaminant that, due to its quantity, concentration, or physical and chemical characteristics, poses a substantial present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials are managed in accordance with Title III of SARA, also known as the Emergency Planning and Community Right to Know Act (EPCRA). The EPCRA establishes different reporting and planning requirements for businesses that handle, store, or manufacture certain hazardous materials. These plans and reports provide federal, state, and local emergency planning and response agencies with information about the amounts of chemicals that businesses use, routinely release, and spill. Specific requirements of EPCRA include the following:

- Planning for emergency response (Sections 301-303).
- Reporting chemical inventory (Sections 311 and 312).
- Reporting ongoing releases of toxic chemicals (Section 313).
- Reporting leaks and spills (Section 304).

Navy policy is to comply with EPCRA as required by EO 13148 and to encourage compliance with state and local EPCRA programs to the extent that resources allow and where such compliance does not interfere with command mission accomplishment or other legal obligations.

3.11.1.2 Hazardous Wastes

The RCRA of 1976 (42 U.S.C. § 6901 et seq., Title 40 of the C.F.R. Parts 240-280) and Hazardous and Solid Waste Amendments (HSWA) of 1984 (PL 98-616) define hazardous waste as a waste, or combination of wastes, which due to its quantity, concentration, or physical, chemical, or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness, or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, disposed of, or otherwise managed. A waste is hazardous if it is not excluded from regulation as a hazardous waste (40 C.F.R. § 261.4[b]); exhibits any ignitable, corrosive, reactive, or toxic characteristic; or if it is listed in Subpart C of RCRA.

In California, the Department of Toxic Substances Control (DTSC) administers most aspects of RCRA directly. However, beginning in 1997, DTSC delegated oversight of basic generator requirements to the local Certified Unified Program Agencies (CUPAs). The California Hazardous Waste Control Law provides a separate regulatory framework for hazardous waste management within the state. This state framework incorporates all federal RCRA requirements as well as a number of requirements that are stricter than the federal standard.

Since the adoption of the Federal Facilities Compliance Act of 1992, federal agencies that generate or manage hazardous waste are now subject to fines and penalties under RCRA.

The basic requirement of both the federal and state programs is the "cradle-to-grave" management of hazardous waste. This management system establishes requirements for each of the following:

- hazardous waste identification which facilitates the proper identification and classification procedures of hazardous waste;
- hazardous waste generation which ensures proper and safe hazardous waste management at those facilities that generate hazardous waste;
- hazardous waste transport which governs the transport of hazardous waste between management facilities; and
- hazardous waste treatment, storage, and disposal which establish generic facility provisions governing hazardous waste management units and additional precautions designed to protect soil, groundwater, and air resources.

3.11.1.3 Energetic Hazardous Waste and Energetic Range Residue

In 1992, the Federal Facility Compliance Act was signed into law. This law required the USEPA, in consultation with DoD and the States, to publish regulations that identify when conventional and chemical military munitions become hazardous waste and subject to Subtitle C of RCRA, and that provide for the safe storage and transportation of such waste. These regulations, entitled the Military MR (62 C.F.R. 6621, February 12, 1997), became effective at the Federal level on August 12, 1997.

The DoD guidance for implementation of the MR was published on July 27, 1998 and is known as the "Navy Military Munitions Rule Implementation Policy (MRIP). The State of California has not yet adopted the MR. Three areas of the Federal MR are being contested by the State of CA. Two of the areas involve emergency actions by EOD personnel and the other area involves adding a new criterion for identifying military munitions as waste. Public notification for the State of CA MR is expected to be in January 2002. Nevertheless, the MRIP specifies that the definition of when a military munition becomes waste be applied to all DoD installations immediately.

3.11.1.4 Installation Restoration Program

In 1980, DoD initiated the IRP to identify, investigate, and clean up or control the release of hazardous substances from past waste disposal operations and hazardous material spills at military facilities. Concurrent with formation of the IRP, Congress passed CERCLA in December 1980, which directed USEPA to develop and implement a comprehensive national program to manage past disposal sites on private property. SARA expanded CERCLA to cover federal facilities under the Defense Environmental Restoration Program. This provides funding and management structures for the IRP, as well as building demolition and hazardous waste minimization. The IRP provides for compliance with CERCLA requirements, as amended by SARA, as well as regulations issued under these acts or by state law. The IRP also complies with applicable, or relevant and appropriate, regulations under other federal and state environmental laws. OPNAVINST 5090.1B provides Navy policy for identifying, investigating, and restoring contaminated sites (U.S. Navy 1994a).

3.11.1.5 Asbestos

Federal and state laws address the health risks of exposure to asbestos and asbestos-containing materials. These laws are discussed below.

Toxic Substances Control Act (1976)

Implemented by the USEPA, the Toxic Substances Control Act (TSCA) provides restrictions on the manufacture, production, and sale of asbestos. Amendments of TSCA have focused specifically on the hazards of asbestos in schools and in other public and commercial buildings, and imposed training and accreditation requirements for asbestos workers.

Occupational Safety and Health Act

The federal Occupational Safety and Health Act (OSHA) provides protection to most workers exposed to asbestos in their workplace. These requirements are implemented in the state by OSHA.

Clean Air Act (Section 112, as amended, 42 U.S.C. § 7401 et seq.)

The USEPA regulates asbestos as a hazardous air pollutant under the federal CAA, and has issued a National Emissions Standards for Hazardous Air Pollutants (NESHAP) for asbestos that includes the following:

- Requirement of control devices and fugitive emission monitoring, recordkeeping, and reporting for asbestos milling, manufacturing, and fabricating operations.
- Regulation of the demolition and renovation of facilities containing ACM.
- Establishment of comprehensive asbestos waste disposal requirements.

The asbestos NESHAP requires zero visible emissions to the outside air from activity relating to the transport and disposal of asbestos waste. ACM waste must be wet and sealed in leak-proof containers. The containers must be marked with OSHA-specified labels. Federal RCRA does not regulate ACM waste as hazardous, although California does. Asbestos waste may be disposed at landfills that are permitted to receive such waste.

3.11.1.6 Polychlorinated Biphenyls

PCBs are compounds that are a subset of synthetic organic chemicals known as chlorinated hydrocarbons. There are 209 PCB isomers and compounds (congeners), which range from oil liquids to crystalline solids and hard resins. PCBs have unique properties that include non-flammability, chemical stability, low electrical conductance, and high lipophilicity. A mix of these various properties have historically made PCBs suitable for use as dielectric fluids, heat transfer fluids, hydraulic fluids, oils, solvents, paints, coatings, and carbonless paper. PCBs also are found as impurities in manufacturing byproducts and in materials on which they are applied, such as sludge's, slurries, and sediments.

PCBs and PCB waste are subject to the TSCA and regulations (40 C.F.R. Part 761) implemented by the USEPA; additionally, the DoN requires that all activities comply with OPNAVINST 5090.1b. OPNAVINST 5090.1b requires that all Navy shore activities that generate, treat, store, or dispose of PCBs must inventory or validate all PCBs and PCB items annually and must update spill contingency plans accordingly. OPNAVINST 5090.1B states that by October 1998, all electrical equipment (transformers, voltage regulators, switches, capacitors) containing PCB concentrations of 500 ppm or more should be removed from service and be disposed, and that by 2003, any transformers containing PCB concentrations of 50 ppm or more should be replaced or removed. However, in accordance with federal and state laws, these items can remain in use as long as they are not leaking and meet certain

other requirements. PCB-contaminated waste items are disposed in accordance with TSCA and applicable federal RCRA regulations as well as corresponding state regulations.

3.11.1.7 Underground Storage Tanks

Underground storage tanks (USTs) of petroleum, petroleum products, and other hazardous substances are subject to federal regulations under RCRA (40 C.F.R. § 280), as mandated by HSWA. California's UST law adopted under Title 23, Division 3, Chapter 16 of the CCR was originally adopted in 1983 and has been amended many times since. USTs containing hazardous waste, specifically, also fall under state (and federal) RCRA standards (22 CCR, Division 4.5, Chapter 15, Article 10). State standards now conform to evolving federal standards under the federal UST law, while retaining additional unique state requirements.

The USEPA is formally responsible for administering federal UST requirements in California. However, the USEPA leaves the day-to-day regulation to the state. The State Water Resources Control Board (SWRCB) provides statewide guidance for UST regulation, which is administered by RWQCBs in cooperation with local CUPAs. Federal and state UST regulations establish technical requirements for registration, installation, monitoring and leak detection, release reporting and corrective action, recordkeeping, and closure.

3.11.1.8 Above-Ground Storage Tanks

California regulates above-ground storage tanks (ASTs) containing petroleums under the state Above-Ground Petroleum Storage Act (CH&SC §25270 et seq). The primary purpose of this act is to ensure that facilities comply with Spill Prevention Countermeasure and Control plan requirements. The SWRCB provides statewide guidance for AST regulation, which is administered by the RWQCBs in cooperation with local CUPAs.

In addition, ASTs are regulated under the Uniform Fire Code and the National Fire Protection Association regulations. ASTs containing hazardous wastes also fall under state (and federal) RCRA standards (22 CCR, Division 4.5, Chapter 15, Article 10).

3.11.1.9 Pesticides

Federal law requires comprehensive regulation of the manufacture, transport, storage, and use of pesticides. The USEPA, in cooperation with state and local agencies, implements the basic federal regulatory framework governing pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA; 40 C.F.R. § 152 et seq). This law initially was enacted in 1947 and has been amended several times, most recently in 1996. FIFRA requires the registration and classification of pesticides and prescribes controls over their application and use.

California's pesticide laws that are contained in CCR Title 3, Chapter 4, incorporate FIFRA's federal standards and definitions and provide additional detailed state regulations that complement FIFRA.

3.11.1.10 Lead

On the federal level, the use and management of lead paint is regulated under Section 1017 of the Residential Lead-Based Paint Hazard Reduction Act of 1992. Section 1017 is often referred to as Title X ("Title Ten") because it was enacted as Title X of the Housing and Community Development Act of 1992. Section 1017 requires the Secretary of the U.S. Department of Housing and Urban Development to issue "guidelines for the conduct of federally supported work involving risk assessments, inspections, interim controls, and abatement of lead-based paint hazards." This document is known as "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing." The maximum lead content was reduced to 0.06 percent of newly applied dry paint.

Lead in drinking water is regulated by the Lead and Copper Rule of 1991. The purpose of the rule is to ensure that the levels of lead remain below the levels associated with health risks in tap water. Under the rule, public water systems must comply with the control of lead (and copper). Corresponding Navy regulations (OPNAVINST 5090.1B) apply these requirements to Navy installations.

In addition, Navy regulations (OPNAVINST 5090.1B) prohibit the use of lead pipe, solder, or flux in the installation or repair of any public (U.S. Navy) water system or plumbing in residential or nonresidential facilities providing water for human consumption.

Lead-contaminated waste items are disposed in accordance with applicable federal RCRA regulations and corresponding state regulations.

3.11.2 Management Practices

3.11.2.1 Hazardous Materials

The Hazardous Material Control and Management (HMC&M) Division of NAWS oversees the pollution prevention functions and is responsible for planning and implementing all aspects of the Station's Pollution Prevention program. This includes but is not limited to the following items:

- Developing and implementing short- and long-term plans for Pollution Prevention programs to ensure compliance with environmental and safety regulations, and monitoring and responding, as required, to hazardous material procurement, acquisition procedures and data inquiries;
- Maintaining a database for tracking hazardous materials ordered, stored, issued, used and recycled;
- Developing and implementing plans for an accurate hazardous material inventory and maintaining the corresponding Authorized Use List;
- Meeting all aspects of the EPCRA reporting requirements; and
- Providing technical support and administrative oversight to the recycling and hazardous material recovery program and conducting hazard communication and specific hazard training as required.

The HMC&M Division also implements the Consolidated Hazardous Material Reutilization and Inventory Management Program. To accomplish this activity, the HMC&M Division receives and reviews notifications of purchases of hazardous materials, identifies user and location, develops site specific processes with the user, assigns task identification numbers, enters data in system, and tracks items used through final disposal. The HMC&M Division also coordinates with manufacturers and other agencies to obtain all Material Safety Data Sheets (MSDSs) that apply to NAWS to ensure that the MSDS Library for the Station is maintained.

The HMC&M Division gathers data associated with the EPCRA, and prepares and disseminates reports in accordance with guidelines set forth by USEPA. The HMC&M Division updates and maintains the following Station hazardous materials related plans/reports:

- The Chemical Hygiene Plan.
- The California Senate Bill 14 Report.
- The Ozone Depleting Substance Measures of the Merit Report.
- The Risk Management Plan.
- The Pollution Prevention Plan.

Under the Pollution Prevention Plan, the HMC&M Division is tasked to consolidate information obtained from available reports, submit information to the reporting agency, and prepare or update the pollution prevention equipment identified in this plan for submission to a major claimant.

3.11.2.2 Hazardous Wastes

Industrial operations conducted in support of the NAWS mission generate waste items, including hazardous wastes. The hazardous wastes generated at NAWS consists primarily of waste oil, explosives-contaminated wastewater, spill residues, contaminated soil, empty containers, photo processing wastes, and a number of other smaller waste streams (e.g., paints, solvents, and miscellaneous laboratory chemicals). The NAWS Hazardous Waste Management Plan is used as a guide for all hazardous waste-related issues. The hazardous wastes generated must be containerized, labeled, stored, and transported off the Station in accordance with USEPA, California, and Navy requirements for hazardous wastes storage, treatment, and disposal (U.S. Navy 1994a).

Hazardous wastes are stored temporarily at satellite accumulation areas located at or near the point of generation, at 90-day accumulation areas located at various areas throughout the Station, or at the RCRA Part B-permitted Hazardous Waste Storage & Transfer Facility (HWSTF). The HWSTF operates under a Hazardous Waste Facility Permit for USEPA (ID Number CA2170023152), issued by Cal/EPA's DTSC. The facility is operating at approximately 21.7 percent of capacity, with a current RCRA wastes throughput of 266.71 tons (241.96 metric tons) per year and a capacity of 1,229 tons (1,115 metric tons) per year. Once the wastes are located at the HWSTF, these wastes may be stored for up to 1 year. Accumulated and stored hazardous wastes at the HWSTF are transported off-Station to an offsite RCRA-permitted storage, treatment, or disposal facility under hazardous wastes manifest by a licensed commercial hazardous wastes hauler (contracted either by the Defense Reutilization and Marketing Office or by the Base Operations and Support Contract [BOSC]).

California legislation known as the Treatment Permit Reform Act (Assembly Bill 1772) established a five-tier program for facilities that require state authorization to treat hazardous wastes but that do not require a permit under federal hazardous waste regulations. Three treatment units at NAWS operate under tiers 3 and 4 of the program.

NAWS also operates a facility at Burro Canyon under a RCRA interim status permit for treatment by OB/OD of reactive (energetic or explosive) wastes. This facility has been in operation since the late 1960s. Reactive wastes treated at the OB/OD facility includes munitions that are no longer needed for their intended purpose of testing and evaluation and/or items that are considered obsolete or expired. In addition to munitions waste items, laboratory wastes generated at NAWS during the development of new explosives and propellants are also treated.

3.11.2.3 Energetic Hazardous Waste and Energetic Range Residue

Application of the MR to NAWS activities is addressed in the Explosive Hazardous Waste Management Plan (Instruction and Guidance Document; currently under revision). This instruction addresses the definition and management of waste military munitions, hazardous waste that exhibits the reactivity characteristic (i.e. explosive), and energetic range residue.

As a point of emphasis, the MR specifically excludes use of munitions for RDT&E activities conducted on a designated range as well as range clearance activities (i.e. collection and detonation of energetic range residues) from RCRA regulation. However, energetic hazardous wastes generated from laboratory activities not conducted on a designated range are managed under RCRA regulations.

3.11.2.4 Installation Restoration Program

NAWS is assessing and remediating areas of past contamination on its ranges through the IRP. As a result of two Station-wide Preliminary Assessments, 80 IRP sites have been identified and investigated. One site, known as IRP Site 80, is titled "Area of Concern" (AOC) and encompasses more than 200 small locations throughout NAWS.

Several of the 80 IRP sites previously have been determined to need no further action, while investigations are underway at the remaining sites. The investigations are at various stages, from preparation of work plans, through fieldwork (including soil and groundwater sampling), to completion of technical memoranda documenting the results. Feasibility studies may be conducted if the investigation concludes that the contamination requires remediation.

Investigations will be conducted at all AOC's under Site 80 that show evidence of contamination. Currently, only 43 AOC's have met this standard. The purpose of the investigation is to determine whether or not a release of hazardous substances has occurred. If so, a new IRP site will be created.

The full list of IRP sites is included in Table G-3 in Appendix G of this EIS (Volume 2). To date, no IRP sites have been removed from the IRP process under an official ROD.

3.11.2.5 Asbestos

Historically, asbestos was used throughout various NAWS building structures on both exteriors and interiors. Asbestos is abated, where necessary, when exposed in occupied structures or prior to demolition or renovation. The contractor handling the abatement submits an Asbestos Abatement Plan, which addresses procedures for each abatement on a case-by-case basis. State certified personnel in the NAWS EPO review and approve each plan. In addition, certified EPO personnel monitor each abatement to ensure that the abatement contractor is following the Abatement Plan. ACM waste is handled and disposed according to applicable regulations. ACM waste is disposed only in landfills that are permitted for such waste.

3.11.2.6 Polychlorinated Biphenyls

A comprehensive high-voltage equipment survey conducted at NAWS in 1988 and 1990 identified 2,760 electrical items that contained dielectric fluid. All 2,760 items have been surveyed and 965 were found to contain fluids with PCB concentrations exceeding 50 ppm. As part of the Navy's PCB Elimination Program, 910 of the items containing PCBs have been removed from service and properly disposed while the remaining 55 non-leaking items are scheduled for disposal by the end of 2003. Any items currently in service that begin to leak are promptly repaired or removed from service and properly disposed of in accordance with the applicable federal, state, and local regulations.

3.11.2.7 Underground Storage Tanks

Currently, six USTs at four different sites (SNORT, Navy Exchange Gas Station [2 USTs], Public Works Gas Station [2 USTs], and one tank at the Fuel Farm) are used at NAWS. All currently operational USTs at NAWS have been installed since 1992 and comply with the requirements mandated by federal and state regulations.

All known inactive USTs have been removed or closed in place. Remediation is ongoing at several sites including the Navy Exchange Gas Station, old Navy Exchange Gas Station (located north of the current training center), old Public Works Gas Station, Airfield Gas Station, IOB Gas Station, CLPL Gas Station, and Randsburg Wash Gas Station. Table G-6 in Appendix G includes a list of former UST sites where soil and/or groundwater contamination exists. These sites are in various stages of remediation or site closure.

3.11.2.8 Above-Ground Storage Tanks

Table G-5 in Appendix G includes a list of current ASTs. ASTs are used for the storage of petroleum products and waste and, less commonly, for other hazardous substances.

3.11.2.9 Pesticides

Pesticide application is handled by a BOSC subcontractor who is licensed by the state. The subcontractor submits an annual Pesticide Management Plan for approval by NAWS contract personnel. These personnel are certified by DoD as Pest Control Coordinators and by the state as licensed applicators and field representatives. All waste items generated from pesticide application are disposed by the subcontractor according to applicable federal and state RCRA regulations.

3.11.2.10 Lead

Historically, lead was a major base constituent in paint throughout the exteriors and some interiors of various NAWS building structures. Lead paint is abated, where necessary, when exposed in occupied structures (chipped/cracked paint) or prior to demolition or renovation. The contractor handling the abatement submits a Lead Abatement Plan, which addresses procedures for each abatement on a case-by-case basis. State certified personnel in the NAWS EPO review and approve each plan. In addition, certified EPO personnel monitor each abatement to ensure that the abatement contractor is following the Abatement Plan. If lead paint is intact and in good shape, the paint remains in place but is checked periodically by NAWS EPO certified personnel.

Historically, lead solder in piping also was used throughout NAWS (usually on sewer pipelines but not on drinking water lines). NAWS complies with the requirements in the Lead and Copper Rule of 1991 by periodically monitoring lead concentration in drinking water.

Lead waste is handled and disposed of according to applicable regulations. If the concentration is high enough, the waste may be considered hazardous under federal and state RCRA regulations. Lead waste is disposed only in landfills that are permitted for such waste.

3.12
Traffic and Circulation

3.12 TRAFFIC AND CIRCULATION

This section describes key regional and local roads, operating conditions, and traffic volumes for NAWS and vicinity.

3.12.1 Planning and Management Practices

Transportation planning for regional highways serving NAWS is conducted by Caltrans, the Kern COG, and the federal government. As required by the Alquist-Ingalls Act (AB 402), the Caltrans State Transportation Improvement Program (STIP) is used by the Kern COG to develop a Regional Transportation Improvement Program (RTIP). The federal government identifies federally funded projects from the STIP and RTIP that will be included in the Federal Transportation Improvement Program.

Transportation planning for NAWS roadways is included in the Station's Master Plan, which also includes the Base Exterior Architecture Plan (BEAP). The Master Plan describes transportation facilities in each planning area and recommends improvements to those identified as deficient or deteriorated. The BEAP provides design guidelines related to vehicle circulation on-Station. All NAWS streets are classified as either primary, secondary, or service, and the BEAP provides guidelines for each classification. The CIP identifies projects necessary to successfully carry out the proposals of the Master Plan. Most of the projects included in the CIP are funded by military construction project (MILCON) funds that require congressional approval. Funding for roadway improvements is provided separately for administrative and range uses.

Management of the Station's roadway system includes ongoing maintenance and some roadway reconstruction. All roadways are inspected every 3 years. Most roads are two-lane dirt and graded every year, although some roads are graded more frequently to accommodate increased activities (e.g., GTT). Shoulders of the paved roads are graded every quarter. Because of recent funding reductions, maintenance has consisted primarily of grading and patching rather than reconstruction.

3.12.2 Key Regional Roads and NAWS Access

The main highways in the NAWS region, U.S. Highway 395 (U.S. 395) and California State Highway 14 (SH 14), are shown in Figure 3.12-1. State Route (SR) 178 connects with U.S. 395 and SH 14 east and west of Inyokern, respectively.

3.12.2.1 U.S. Highway 395

U.S. 395 runs north from Interstate 15 near Hesperia; through eastern portions of California through Reno, Nevada; and terminates at the Washington-Canada border. U.S. 395 is a two-lane highway that generally follows the rolling desert terrain and is the main regional access road to NAWS from Reno, Las Vegas, and San Bernardino. Access to NAWS from San Bernardino to the south and from Las Vegas to the east is via a turn-off from U.S. 395, approximately 5 miles (8 kilometers) south of Ridgecrest. This turnoff connects with South China Lake Boulevard. Access to NAWS from Reno to the north is via a turn-off from U.S. 395, east onto SR 178, and about 9 miles (14 kilometers) to the NAWS Main Gate. The Kern COG CIP for 2012 to 2016 designates funds to widen U.S. 395 to four lanes through Inyokern (Kern COG 1996).

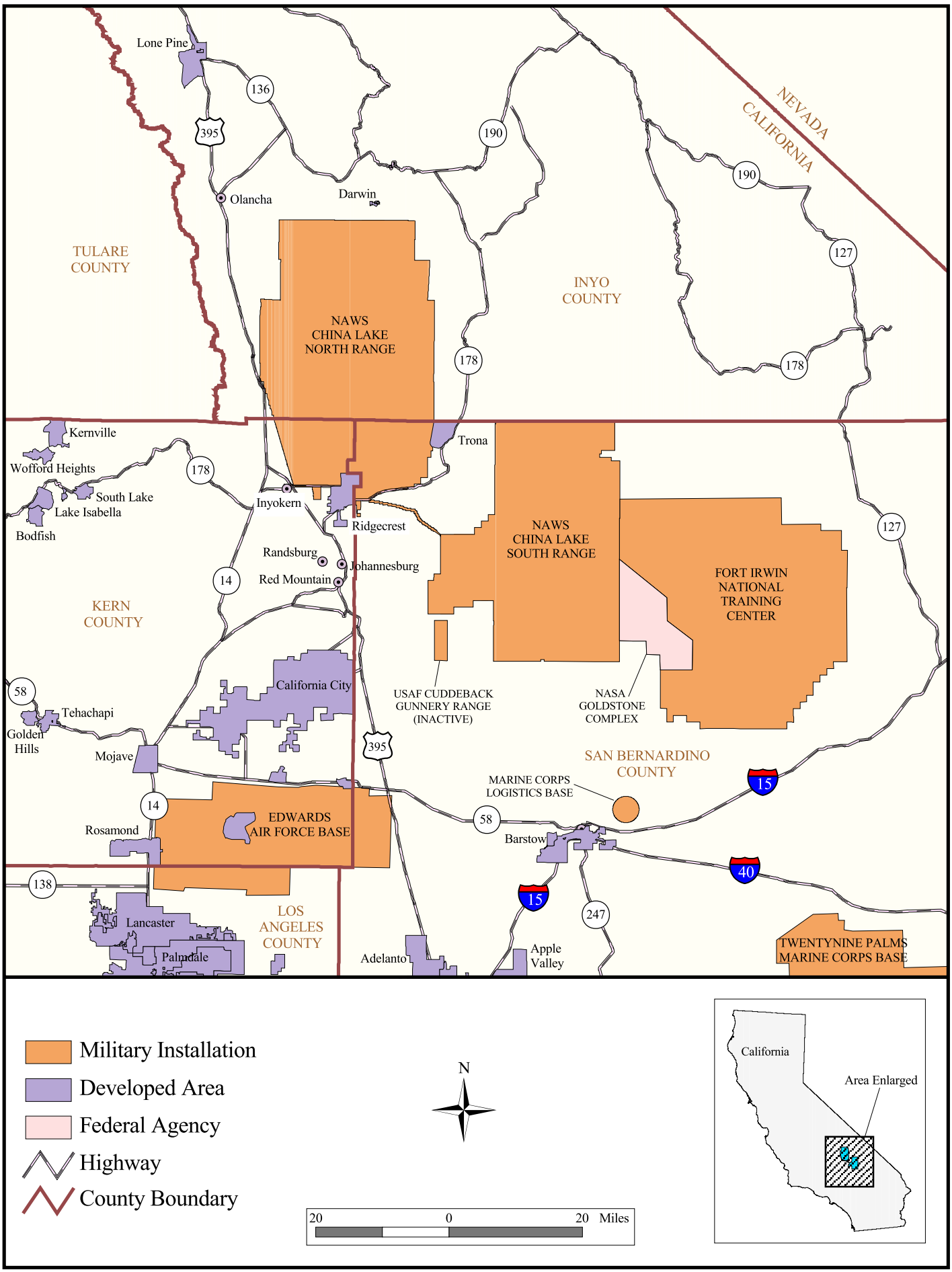

Figure 3.12-1 Key Regional Roads, NAWS China Lake

3.12.2.2 State Highway 14

State Highway 14 originates at Interstate 5 in Santa Clarita as a four- and six-lane highway. North of Mojave, SH 14 is a mixture of two- and four-lanes until it terminates at the intersection with U.S. 395 approximately 5 miles (8 kilometers) northwest of Inyokern. SH 14 is the main regional access road to NAWS from Los Angeles and Bakersfield, and is a major tourist and truck route. Trucks and recreational vehicles, which cause much greater wear on roads than a standard vehicle, account for 26 percent to 50 percent of the annual average daily traffic on SH 14. The Kern COG CIP for 2012 to 2016 designates funds to widen SH 14 to four lanes south from U.S. 395 to its junction with SR 178 West (see Chapter 5, Cumulative Impacts).

3.12.2.3 State Route 178

State Route 178 is the main access road to NAWS from Los Angeles and Bakersfield on SH 14 and from Reno on U.S. 395. SR 178 originates in Bakersfield and heads east past Ridgecrest approximately 15 miles (24 kilometers) over the San Bernardino County line. Truck traffic accounts for about 22 percent of the annual average daily traffic (Kern COG 1996). East of NAWS, SR 178 heads north and runs into SR 190 near Death Valley National Park. The section of SR 178 from Inyokern to Ridgecrest is also known as Inyokern Road. This portion of the highway is divided into four lanes, with a center two-way left turn lane at the Ridgecrest city limit. At NAWS Main Gate, Inyokern Road continues east onto NAWS, while SR 178 turns south on China Lake Boulevard for 2 miles (3 kilometers) before it turns east on Ridgecrest Boulevard. The Kern COG CIP designated funds for drainage improvements for the China Lake Boulevard portions of SR 178 in 2012 to 2016 (Kern COG 1996). Drainage improvements to SR 178 at Richmond Road were completed in 1997.

NAWS has requested and supports the declaration of SR 178 in San Bernardino County from milepost 0.0 (County Line Road and East Ridgecrest Boulevard intersection) to milepost 8.4 (Trona-Randsburg Road and SR 178 intersection) as a “Defense Access Road” to be eligible for federal funds for highway projects. The declaration was initiated in June 1994 to facilitate the acquisition of the necessary right-of-way by the state of California and is ongoing.

3.12.2.4 NAWS Access

Four gates (shown in Figures 3.12-2 and 3.12-3) provide entry to the NAWS major work areas: Main Gate, Richmond Road, Sandquist Road, and Christmas Canyon. The Main Gate is on SR 178 (Inyokern Road) and provides access for traffic arriving on Inyokern Road and China Lake Boulevard. Sandquist Gate, north of the Main Gate, provides access to Armitage Airfield and the North Range, and Richmond Gate provides access to the southern portion of Mainsite. In general, about three times more traffic passes through the Main Gate than the other two gates. In addition to these gates, three higher security control access points exist in the Mainsite area. The Christmas Canyon Gate is on the west side of the South Range on the Randsburg Wash Access Road is the main access point for the South Range (U.S. Navy 1989a,b).

The main roadway network on NAWS is at Mainsite on the North Range (Figure 3.12-2). The major north and south traffic corridors are Knox Road and Richmond Road; the major east and west corridors are Inyokern Road and Blandy Avenue. Sandquist Road, North Knox Road, and North Lauritsen Road are each two-lane roads connecting Mainsite with Armitage Airfield and the rest of the North Range. Sandquist Road provides Armitage Airfield access from the Main Gate area, and Lauritsen Road provides access from the Laboratory Area. Knox Road provides access to the ranges from the Main Gate area. Little Petroglyph Canyon, Bircham Springs, Coso Village, and Big Petroglyph Canyon are accessible from the Lauritsen Gate via Knox Road to G-2 Tower Road, which merges with Mountain Springs Canyon Gate.

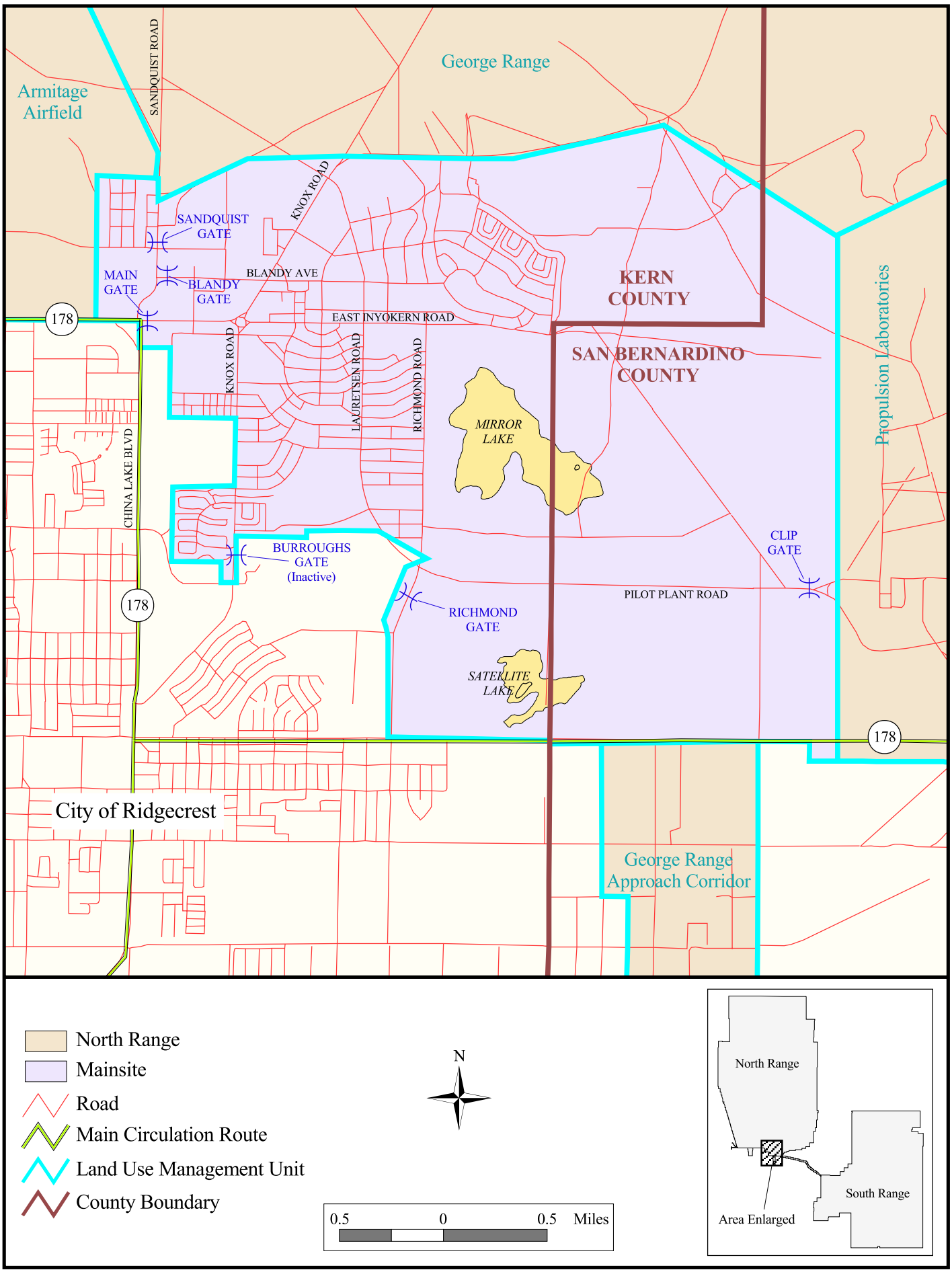

Figure 3.12-2 Key Local Roads on Mainsite Vicinity of North Range

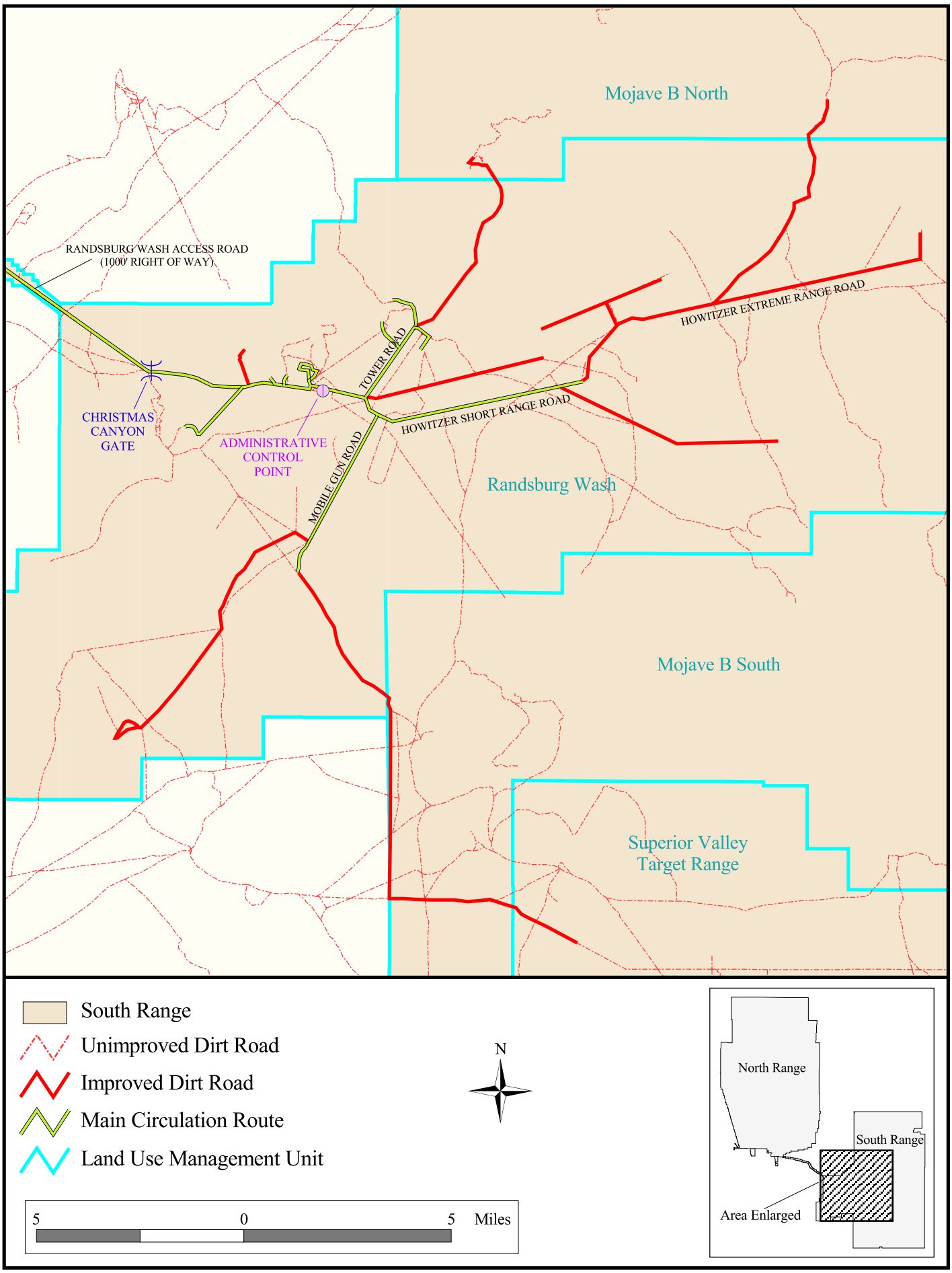

Figure 3.12-3 Key Local Roads on Central and Western Vicinity of South Range

Randsburg Wash Access Road is a 25-mile (40-kilometer) paved road connecting the North Range with the South Range (Figure 3.12-3) and is the most frequently used road on the South Range. The two-lane, restricted access road is maintained and controlled by the Navy. The road enters the South Range at Christmas Canyon Gate and continues east to the ECR administration offices and on to the Gun Line area. Howitzer Short Range Road and Howitzer Extreme Range Road allow improved access further east from the Gun Line area. A dirt road that branches south off of Howitzer Short Range Road provides access to Superior Valley Range. The rest of the roads on the South Range are unimproved dirt roads (U.S. Navy 1989a,b).

3.12.3 Roadway Operating Conditions

Current roadway operating conditions for each regionally significant road segment in Kern County have been identified by the Kern COG in the Regional Transportation Plan. Operating conditions typically are expressed as level of service (LOS), ranging from LOS "A" to LOS "F," and are developed by comparing roadway capacity to traffic volumes. Table 3.12-1 shows traffic volumes of key roads and their associated LOS designations. The Kern COG Congestion Management Plan identifies category E (high density traffic with very long traffic delays) as the minimum acceptable level for regional road segments in Kern County. Traffic volume on-Station is generally free flowing and congestion typically does not occur.

Table 3.12-1 Traffic Volume on Key Roads

Segment	*Lanes*	*Level of Service*	*Two-Way Capacity (vehicles per hour)*	*Peak Daily Volume (vehicles per hour)*
U.S. Highway 395				
Sand Canyon Rd to SH 14	*4*	*B*	*26,500*	*6,042*
SH 14 to SR 178 East	*2*	*C*	*5,600*	*3,710*
SR 178 to South China Lake Blvd	*2*	*C*	*5,600*	*3,074*
South China Lake Blvd to Searles Station Road	*2*	*C*	*5,600*	*3,392*
State Highway 14				
U.S. 395 to SR 178 West	*2–4*	*C*	*5,600*	*3,445*
SR 178 East to SR 178 West	*2*	*D*	*5,936*	*5,600*
State Route 178				
SH 14 North to SH 14 South	*2*	*C*	*5,600*	*2,491*
U.S. 395 to China Lake Blvd	*4*	*B*	*26,500*	*9,540*
China Lake Blvd to Ridgecrest Blvd	*4*	*B*	*39,300*	*25,440*
Ridgecrest Blvd to Kern/San Bernardino County Boundary	*2-4*	*B*	*39,000*	*15,158*
China Lake Blvd				
Ridgecrest Blvd to Upjohn Ave	*4*	*B*	*36,700*	*22,355*
Upjohn Ave to Bowman Road	*4*	*B*	*26,500*	*14,390*
Bowman Road to Norma Street	*2-4*	*B*	*19,400*	*7,323*
Norma Street to Downs Street	*2*	*C*	*5,600*	*4,094*
Downs Street to U.S. 395	*2*	*C*	*5,600*	*2,968*

B Stable flow; presence of other users in traffic stream becomes noticeable.

C Stable flow; operation of users becomes affected by others in traffic stream.

D High-density with stable flow; speed and freedom of movement severely restricted; poor level of comfort and convenience.

Sources: Transportation Research Board 1994 and Kern Council of Governments 1996.

CHAPTER 4

Environmental Consequences

4.0
Introduction

4.0 INTRODUCTION

This chapter describes the potential environmental consequences associated with implementing the No Action Alternative, the Limited Expansion Alternative, and the Moderate Expansion Alternative which is the Preferred Alternative (as described in Chapter 2). The CEQ regulations for implementing NEPA state that the environmental consequences discussion shall include both direct and indirect effects and their significance (40 C.F.R. § 1502.16). Direct effects are caused by the action and occur at the same time and place (40 C.F.R. § 1508.8). Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable (40 C.F.R. § 1508.8). This chapter provides an analysis of potential direct and indirect environmental impacts (and associated mitigation measures) resulting from implementation of the proposed action and alternatives.

Consistent with the discussion of the affected environment (Chapter 3), this chapter has been divided into 12 resource sections to provide a comparative framework for evaluating the impacts of the alternatives on individual resources. For each resource area examined in this EIS, factors considered in assessing the potential for significant impacts are described. Potential environmental effects are identified as significant, less than significant, or having no impact. Where appropriate, mitigation measures are proposed to reduce significant impacts to an acceptable level. Mitigation measures (40 C.F.R. § 1508.20) include avoiding the impact altogether by not taking an action or parts of an action; minimizing impacts by lessening 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 or maintenance operations during the life of the action; or compensating for the impact by replacing or providing substituting resources or environments.

The impact discussion for each resource area includes a description of the region of influence (ROI) applicable to the specific resource area. An ROI is a geographic area in which environmental effects for that resource would be most likely to occur. An approach to analysis follows the identification of the ROI and describes the factors used to assess the potential for significant impacts. Each resource section then identifies the potential impacts that could be expected from implementation of the No Action Alternative, the Limited Expansion Alternative, and the Moderate Expansion Alternative (Preferred Alternative).

A summary of impacts associated with implementation of the alternatives can be found in Table ES-2 in the Executive Summary.

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4.1
Land Use

4.1 LAND USE

This section identifies potential land use impacts that may result from implementation of the proposed action and alternatives. The analysis specifically evaluates those activities that have the potential to affect land use on public and private lands adjacent to NAWS.

4.1.1 Region of Influence

The ROI for land use includes the lands on and within approximately 5 miles (8 kilometers) of NAWS. The ROI includes a combination of lands managed by federal (BLM, NPS, U.S. Department of the Army, USFS), state, and local jurisdictions. Local jurisdictions include unincorporated portions of Inyo, Kern, and San Bernadino counties, as well as Ridgecrest, Inyokern, Trona, and other unincorporated communities in the region.

4.1.2 Approach to Analysis

Factors considered in assessing significance include the extent or degree to which implementation of an alternative would cause substantial change to currently approved or planned land uses. For this analysis, impacts were evaluated by assessing the compatibility of proposed land use with the existing land use described in Section 3.1. A land use incompatibility would arise when a proposed use would preclude or adversely affect an existing or intended use of an area. A land use compatibility analysis was conducted on-Station to identify established land use patterns, characterize sensitive environmental receptors, and identify potential incompatibilities of existing uses. The analysis confirmed that established land uses were compatible with on-Station environmental resources and identified areas where additional environmental resource information was needed. The compatibility of NAWS activities with off-Station land use is addressed in the Update of the draft AICUZ Report (U.S. Navy 1998a) and was confirmed by conducting other comprehensive noise analyses of the Station's test and training activities (Wyle 1998). In addition to the development of a draft AICUZ report, City of Ridgecrest and Kern County planners were contacted to discuss plans for future land use. Based on information provided, established land use patterns are projected to be the same or similar to existing land use patterns in the foreseeable future (Landrum 2001; Oviatt 2001). Potential effects related to noise are addressed in more detail in Section 4.2, Noise, of this chapter.

4.1.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.1.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

<u>Range Flight Operations</u>

Military test and training flight operations are conducted on the NAWS ranges. Test operations typically involve aircraft that are stationed at NAWS. Training operations typically involve aircraft that are located at other installations such as the Naval Air Station, Lemoore, but fly to and from NAWS to conduct their training operations using NAWS range assets. While these flight operations are generally conducted over NAWS boundaries, they traverse public and private lands in their approach and departure from range areas. Overflights of private land include residential areas, as well as commercial and industrial development areas. Overflights of public lands include BLM wilderness and open space areas.

Aircrew training operations typically involve aircraft that traverse the R-2508 Airspace Complex on their way to use the NAWS ranges. These aircraft enter and leave the R-2508 airspace using established corridors or access points over the Sierra Nevada Mountains and may overfly portions of Sequoia National Park and Kings Canyon National Park. Aircraft typically do not fly lower that 3,000 feet AGL over national parks and wilderness areas. The potential effects of these training flights on land use outside the ROI of this EIS are addressed in the *Final EIS for the Development of Facilities to Support Basing US Pacific Fleet F/A-18E/F Aircraft on the West Coast of the United States* (U.S. Navy 1998e). Aircraft operations analyzed in the aforementioned EIS indicated that overflights of NPS lands can result in startle reactions and annoyance to park visitors; however, no significant impacts to national parks or wilderness areas were identified in the EIS.

Under the No Action Alternative, there would be no change to existing conditions. Range flight operations would continue to result in overflights of public and private lands adjacent to the Station's boundary and beyond the ROI in the approach and departure corridors of the R-2508 airspace. These overflights would continue to be of typically short duration (with subsonic and supersonic flights lasting 5-10 seconds and a few seconds, respectively, at any point along the aircraft's flight path) and would not change existing land uses. Further, as discussed in Section 4.1.2, land use patterns are expected to be the same in the foreseeable future. Therefore, continued range flight operations would have no impact on established or future projected land use. Noise and overpressure associated with overflights, as well as compatibility of noise levels with existing and proposed land use, is addressed in Section 4.2 (Noise).

Airfield Flight Operations

Airfield operations create overflights of public and private lands in the area, particularly over the City of Ridgecrest. Overflights are typically of short (generally lasting 5-10 seconds at any point along the aircraft's flight path) and do not adversely affect established land uses on public or private lands. These overflights are consistent with the Station's AICUZ plan and the City of Ridgecrest's General Plan and would not change existing land uses. Further, as discussed in Section 4.1.2, land use patterns are expected to be the same in the foreseeable future. Therefore, continued airfield flight operations would have no impact on established or future projected land use. The compatibility of noise levels with existing and proposed land use is addressed in Section 4.2 (Noise).

Range Ground Operations

Target and Test Site Use. Since continued use of ordnance at these existing target and test sites is consistent with established land use designations, ongoing target and test site use has no impact on land use in the region.

Ground Troop Training. Under the No Action Alternative, GTT activities would be conducted within areas currently designated for such use. Since this type of use is consistent with established land use, and the effects of GTT activities are confined to NAWS boundaries, ongoing GTT has no impact on current land use.

4.1.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education, and recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis.

Native American Use. Native American access to NAWS lands would continue in accordance with the existing MOA between the participating tribes and NAWS. Native American requests for access to other areas not covered by the MOA would continue to be considered on a case-by-case basis. Continued use of NAWS lands by Native Americans is considered a beneficial land use.

Research and Education. Research and educational activities would continue to be hosted on a case-by-case basis. Since research and educational uses are considered beneficial to the Station's environmental resources management efforts, and pre-briefing of safety, security, and environmental considerations would continue, ongoing research and education is considered a beneficial land use.

Recreation. Established recreational uses (camping, golf and gym access, hiking, equestrian use, ORV use, petroglyph tours, bird watching, and photography) would continue to be accommodated either on a case-by-case basis or according to established agreements and procedures. Recreational activities are hosted in areas designated for such use and, therefore, have no impact on current land use.

4.1.3.3 CLUMP and INRMP Implementation

Under the No Action Alternative, implementation of the CLUMP would provide the long-term strategic management framework to accommodate the ongoing and evolving military mission, conserve and protect environmental resources, and facilitate the land use management process at NAWS. Because the CLUMP defines existing land use patterns and provides a unified database to support planning and decision-making, it would serve to facilitate and enhance land use management practices and processes. The CLUMP would provide NAWS with a "living" land management plan that would be updated, as needed, to provide the information and guidance to support military readiness and maintain environmental compliance for activities conducted at NAWS. Since implementation of the CLUMP would incorporate land use compatibility criteria into NAWS planning processes, beneficial impacts on land use at NAWS would be expected (since potential conflicts between military operations and sensitive land uses could be avoided through proactive land use planning).

In compliance with the requirements of the Sikes Act as amended, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP. The INRMP facilitates land use planning through the identification of priority areas for conservation of natural resources. Since these areas are identified in the CLUMP, the consideration of biological resources is integrated into land use planning.

4.1.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.1.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Under the Limited Expansion Alternative, range flight operations would continue to traverse public and private lands in their approach and departure from range areas on NAWS. The tempo of these activities would result in an average of approximately 14 additional flight hours per week and five supersonic events per month. While the actual number of overflights would vary according to the type and purpose of the test or training operation, the frequency of overflights would generally be expected to increase by 15 percent over existing conditions. Overflights of off-Station public and private lands would continue to typically be short duration (with subsonic and supersonic flights lasting 5-10 seconds and a few seconds, respectively, at any point along the aircraft's flight path). Overflights of BLM wilderness areas would increase slightly but also be typically of short duration and continue to be conducted in

accordance with the provisions of the CDPA (Title VIII, Section 802, Military Overflights) and in accordance with R-2508 policies.

The increase in range flight operations would not change existing land uses. Further, as discussed in Section 4.1.2, land use patterns are expected to be the same in the foreseeable future. Therefore, no significant impacts to established or future projected land uses would result from an increase in range flight operations under the Limited Expansion Alternative. Noise and overpressure associated with overflights, as well as compatibility of noise levels with existing and proposed land use, is addressed in Section 4.2 (Noise).

Airfield Flight Operations

Under the Limited Expansion Alternative, increased airfield operations would continue to result in overflights of public and private lands in the area, particularly over the City of Ridgecrest. The increased tempo of airfield operations would result in less than 15 additional flights per day when fully implemented. These overflights would continue to be a routine occurrence in this area and remain consistent with the Station's draft AICUZ plan and the City of Ridgecrest's General Plan. Although the tempo of overflights would increase, overflights would typically be of short duration (generally lasting 5-10 seconds at any point along the aircraft's flight path).

The increase in airfield flight operations would not change established land uses. Further, as discussed in Section 4.1.2, land use patterns are expected to be the same in the foreseeable future. Therefore, no significant impacts to established or future projected land uses would result from an increase in airfield flight operations under the Limited Expansion Alternative. The compatibility of projected noise levels with existing and proposed land use is addressed in Section 4.2 (Noise).

Range Ground Operations

Target and Test Site Use. The proposed increase in use of target and test sites would occur on the NAWS ranges in areas established for such use and the effects of these operations would remain within Station boundaries. The increased utilization of previously disturbed sites, the majority of which are located near other test or target sites, could preclude the need for using undisturbed lands and would be implemented on a case-by-case basis using standard environmental review procedures prior to increased utilization (refer to discussion in section 2.2.6). Re-establishment of HE use within the existing Wingate Target area footprint would represent a continuation of historic use of these lands and would be consistent with land use patterns and designations in the NWC Master Plan and the CLUMP. Since the proposed use would not change approved or planned land use, and the effects of target and test site activities would remain within Station boundaries, proposed operational increases would have no impact on established land use in the region.

Ground Troop Training. Under the Limited Expansion Alternative, increased GTT activities would continue to operate within areas currently designated for such use and the effects of these operations would remain within Station boundaries. Therefore, increased GTT operations would have no impact on established land use in the region.

4.1.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.1.3.2, these activities would have less than significant impacts on land use.

4.1.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP and INRMP would serve to facilitate and enhance land use management practices and processes at NAWS and, thus, would result in beneficial impacts on land use at NAWS.

4.1.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.1.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Under the Moderate Expansion Alternative, range flight operations would continue to traverse public and private lands in their approach and departure from range areas on NAWS. The tempo of these activities would result in an average of approximately 23 additional flight hours per week and five supersonic events per month. While the actual number of overflights would vary according to the type and purpose of the test or training operation, the frequency of overflights would generally be expected to increase by 25 percent over existing conditions. Overflights of off-Station public and private lands would continue to typically be short duration events (with subsonic and supersonic flights lasting 5-10 seconds and a few seconds, respectively, at any point along the aircraft's flight path). Overflights of BLM wilderness areas would continue to be conducted in accordance with the provisions of the CDPA (Title VIII, Section 802, Military Overflights) and in accordance with R-2508 policies.

The increase in range flight operations would not change existing land uses. Further, as discussed in Section 4.1.2, land use patterns are expected to be the same in the foreseeable future. Therefore, no significant impacts to established or future projected land uses would result from an increase in range flight operations under the Moderate Expansion Alternative. Noise and overpressure associated with overflights, as well as compatibility of noise levels with existing and proposed land use, is addressed in Section 4.2 (Noise).

Airfield Flight Operations

Under the Moderate Expansion Alternative, airfield flight operations would continue to result in overflights of public and private lands in the area, particularly over the City of Ridgecrest. The increased tempo of airfield operations would result in less than 20 additional flights per day when fully implemented. These overflights would continue to be a routine occurrence in this area and remain consistent with the Station's draft AICUZ plan and the City of Ridgecrest's General Plan. Although the tempo of overflights would increase, overflights would typically be of short duration (generally lasting 5-10 seconds at any point along the aircraft's flight path).

The increase in airfield flight operations would not change established land uses and, as noted in Section 4.1.2, land use patterns are expected to be the same in the foreseeable future. As discussed in Section 4.2 (Noise), a small residential area (3 acres [1.2 hectares]) would be exposed to noise levels considered "normally unacceptable" per FICON guidelines. Therefore, proposed airfield flight operations under the Moderate Expansion Alternative could have an adverse impact on established off-station land use in a small portion of the ROI. As noted in Section 4.2, this impact is not considered significant due to both the FICON guidelines (i.e., normally unacceptable) and the small area

of potential effect (i.e., 3 acres [1.2 hectares]). Therefore, no significant impacts to established or future projected land uses would result from an increase in airfield flight operations under the Moderate Expansion Alternative.

Range Ground Operations

Target and Test Site Use. The proposed increase in use of target and test sites would occur on NAWS ranges in areas established for such use and the effects of these operations would remain within Station boundaries. The increased utilization of previously disturbed sites, the majority of which are located near other test or target sites, could preclude the need for using undisturbed lands and would be implemented on a case-by-case basis using standard environmental review procedures prior to increased activation (refer to discussion in Section 2.2.6). Re-establishment of HE use within the existing Wingate Target area footprint would represent a continuation of historic use of these lands and would be consistent with land use patterns and designations in the NWC Master Plan and the CLUMP. Since the proposed use would not change approved or planned land use, and the effects of these target and test site activities would remain within Station boundaries, proposed operational increases would have no impact on established land use in the region.

Ground Troop Training. As noted in the Limited Expansion Alternative, the proposed increase in GTT activities in established areas of operations would have no impact on land use. The introduction of GTT at the CTR land management unit would be consistent with the established use of this land and would support military training. The introduction of GTT at Airport Lake is also consistent with established use of this area. The proposed increase of GTT operations in areas established for such use and the introduction of a training function is consistent with designated land uses at NAWS. Further, the effects of these operations would remain within Station boundaries. Therefore, increased GTT operations would have no impact on established land use in the region.

4.1.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.1.3.3, these activities would have less than significant impacts on land use.

4.1.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP and INRMP would serve to facilitate and enhance land use management practices and processes at NAWS, and thus would result in beneficial impacts on land use at NAWS.

4.2
Noise

4.2 NOISE

This section identifies potential noise impacts that may result from implementation of the proposed action and alternatives.

4.2.1 Region of Influence

The ROI for noise issues includes NAWS and the surrounding communities of Ridgecrest, Inyokern, Trona, Homewood Canyon, Pearsonville, and Little Lake (see Figure 3.1-7). The ROI includes areas that could be affected by on-station noise sources such as ground-based and flight-related activities over the North and South ranges, and flight operations at Armitage Airfield.

4.2.2 Approach to Analysis

4.2.2.1 Introduction

Projected noise levels for military test and training operations at NAWS were calculated using several DoD approved noise modeling programs. NOISEMAP and MR_NMAP were used to predict noise exposure generated by military aircraft operations at the airfield and on the ranges, respectively. MicroBNOISE was used to predict the blast noise exposure for ordnance use at target and test sites, and PCBoom3 was used to calculate the noise exposure for NAWS supersonic flight operations. A complete discussion of the various noise analysis methods, metrics, and results pertaining to this EIS is presented in Appendix B.

Noise modeling was performed to establish noise exposure contours for noise generating activities that could be expected from implementing relevant elements of each of the alternatives. This analysis was conducted in accordance with Navy policy and guidelines contained in the AICUZ Program Procedure and Guideline (OPNAVINST 11010.36A) and DoD guidelines implementing the AICUZ noise program (DoD Directive 4165.57). The DoD AICUZ program identifies compatible noise level thresholds for various types of activities, which are encouraged for use by local planning agencies to promote compatible land use management in areas influenced by military airfield operations. The Station's draft AICUZ report was initially updated in 1998. The AICUZ report was revised in May 2001 to update data, incorporate revised noise estimates, correct prior population census projections, and supplement the environmental impact component of the report. A revised AICUZ document will be developed through workshops with city and county planners. AICUZ program noise compatibility guidelines, as shown in Figure 3.2-1, were used in this analysis to determine whether the actions of a given alternative would have a significant noise exposure effect on established off-station activities. Additional acoustical analyses were conducted for range flight operations (including day and nighttime flights), subsonic and supersonic range flight operations, the use of ordnance HE for air- and ground-based activities on the ranges, and range ground operations. Other on-station noise generating activities such as commuter traffic and infrastructure maintenance and operations were also considered but not analyzed further because these activities were determined to have a minimal effect on the overall noise exposure contours for the Station.

Potential changes in noise levels associated with each of the alternatives were compared to established land use criteria developed by FICON (refer to Figure 3.2-2) to evaluate the significance of any projected change. Noise-sensitive receptors considered in this analysis include schools, medical facilities, family residences, sensitive environmental resources (e.g., threatened or endangered wildlife, historic properties) and wilderness areas within the ROI. Potential noise impacts to wildlife and historic properties are addressed in Section 4.4, Biological Resources, and Section 4.5, Cultural Resources, respectively.

Noise exposure levels for airfield and range flight operations are presented in this EIS using the CNEL metric expressed in dB. As described in Section 3.2.1, the CNEL sound level is the energy-averaged sound level

measured over a 24-hour period. The resulting CNEL contours present a graphic representation of accumulated noise resulting from military test and training activities. CNEL contours presented in this analysis incorporate an additional noise weighting penalty for military activities conducted during evening and nighttime hours. Noise exposure levels for supersonic operations are presented using the SEL metric to account for the single noise events (sonic booms) associated with supersonic flights. SEL contours illustrate the overpressures associated with the focus area and carpet boom areas of a single sonic boom event, and take into account the amplitude and duration of typical supersonic noise events.

4.2.2.2 Characterization of Noise Effects

Range Flight Operations

Subsonic Fight Operations. Most range flight operations are conducted within Station boundaries and are not noticeable to an off-station observer. However, some flights do exit the range from the Baker/Charlie Approach Corridor and enter the range through the George Approach Corridor (see Figure 3.1-3). These operations fly over off-station lands, and the noise associated with these flights can occasionally be heard in neighboring communities. These overflights are typically of short duration (5 to 10 seconds) and have the potential to disrupt activities, particularly those being conducted outdoors.

Supersonic Flight Operations. A sonic boom is created when an object moves faster than the speed of sound. While all objects moving faster than the speed of sound create a sonic boom, not all sonic booms reach the ground. As altitude increases, air temperature decreases, creating a layering of temperatures that can focus the boom upward. Depending on the altitude, speed of flight, and prevailing atmospheric conditions, sonic booms may be reflected upward sufficiently that they never reach the ground. For high altitude flights (generally above 10,000 feet [3,048 meters]), a sonic boom may reach the ground approximately once for every 10 supersonic events (U.S. Air Force 2001). Sonic booms differ from most other sounds because this sound is impulsive with generally no warning of the occurrence, and is usually louder than most other types of routine outdoor noise. The perceived noise from a sonic boom is similar to a loud clap of thunder that may occur during a summer storm. The most common effect generated from a sonic boom is a startle or surprise reaction (for both people and wildlife). These effects also can cause annoyance or be disruptive to any preceding activities. A sonic boom is characterized by a very short period (1 to 2 seconds) where air pressure increases in response to the shock wave being generated by the operation. As described in Section 3.2, the principal off-station effect of supersonic flights conducted at NAWS is the generation of carpet booms that reach off-station receptors with relatively low overpressures (1.0 to 2.0 PSF; refer to Section 3.2.1), and with associated noise levels ranging from 101 to 107 dBC. In the off-station areas where localized focus booms may occur, overpressures of 6 to 8 PSF and associated noise levels of 121 to 126 dBC can occur.

Airfield Flight Operations

Airfield flight operations at NAWS include the activities of resident and transient jet, propeller and rotary wing aircraft, and the associated ground-based support activities. Approach and departure flight tracks are established to provide all-weather access to the Station's runways. Flight tracks are also established to accommodate Field Carrier Landing Practice (FCLP) and Touch and Go patterns. Departure tracks route aircraft flights from the airfield through the Baker/Charlie Approach Corridor and, occasionally, over the sparsely populated areas to the east of Jack's Ranch Road. Approach tracks route aircraft through the George Approach Corridor over County Line Road to the east of the City of Ridgecrest. FCLP, Touch and Go, and other related flight tracks are established over the airfield. Several of these flight tracks may route aircraft in patterns paralleling Inyokern Road.

Range Ground Operations

Range ground operations include the use of target and test sites located throughout the NAWS ranges and also include occasional training activities for visiting ground troops. These activities are conducted at established areas well within the range boundaries. Noise generated from these operations typically is not audible off-station.

4.2.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.2.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Subsonic Flights. As shown in Table 4.2-1, the projected noise-exposure contours for range flight operations are well below the 65-dB CNEL level and no noise contours greater than 65 dB occur off-station. Therefore, off-station effects from ongoing subsonic range flight operations fall well below established FICON noise compatibility thresholds (refer to Figure 3.3-1). As such, current subsonic range flight operations have a less than significant impact on off-station noise-sensitive receptors.

Table 4.2-1 Existing Condition CNEL for Individual Ranges

Land Use Management Unit	*CNEL*
North Range	
Airport Lake	*51*
Baker North	*<45*
Baker South	*54*
Charlie North	*56*
Charlie South	*54*
Coso	*<45*
Coso Target Range	*47*
George	*<45*
Mainsite	*<45*
Propulsion Laboratory	*<45*
South Range	
Mojave B North	*<45*
Mojave B South	*<45*
Randsburg Wash	*<45*
Superior Valley	*<45*

Source: Wyle 1998.

Supersonic Flights. NAWS conducts approximately 36 supersonic flight operations per year over the ranges. As described in Section 3.2 and illustrated in Figure 4.2-1, the projected sonic boom peak overpressures and related noise from existing range supersonic flight operations extend beyond Station boundaries for each of the four established flight tracks. Projected carpet boom overpressures ranging from 1 to 3 PSF have the potential to affect schools located on and off-station, local residential areas, and BLM Wilderness Areas. Schools that could be affected by carpet boom overpressures include those located in Trona and at Richmond and Murray schools located on-Station. BLM Wilderness Areas located at the northwest and northeast corners of the North Range, and along the western and northeastern boundary of the South Range also could be affected by carpet booms. If atmospheric conditions deflect boom footprints, the communities of Trona, Argus, Darwin, and Haiwee may also be affected, as well as communities in Ridgecrest, Homewood Canyon, Valley Wells, and Coso Junction.

Areas that may experience focus boom effects, with overpressures projected in the 6 PSF range, primarily include undeveloped areas of the NAWS ranges and a small segment in the northeast corner of the BLM's Golden Valley Wilderness Area. These areas could be subject to overpressures of up to 6 PSF with attendant noise levels up to 121 dBC during a supersonic flight operation. NPS lands along the northeastern and eastern boundary of the South Range, and the western portion of the NTC at Fort Irwin, including NASA facilities located at the Goldstone Complex, could experience sonic boom effects from NAWS supersonic flights. Death Valley National Park lands located at the north and eastern boundary of the South Range could also experience overpressures associated with carpet booms.

Over a 12-year period (from 1988 to 2000), NAWS received 82 complaints associated with sonic booms that were attributed to NAWS range flight operations (see Table 3.2-2). Effects from supersonic operations can range from a simple startle effect, to annoyance or disruption of activities, or under extreme conditions, damage to personal property (e.g., windows). Considering the frequency of supersonic operations (36 per year) and the duration of associated sonic booms (usually 1 to 2 seconds), the potential exists that continued supersonic flight operations could affect sensitive receptors including schools, family residences, and individuals recreating in wilderness areas. While these events occur infrequently (i.e., an average of three supersonic events per month), sonic boom effects can have adverse impacts on individuals. Factors that determine if an individual sonic boom affects a noise sensitive receptor include the atmospheric effects on the sonic boom, where the boom occurs on the ground, the sensitivity and/or expectations of persons within the sonic boom focus or carpet areas, the type and location of activities people are involved with at the time of the event, or, if a sonic boom event creates property damage. On average, NAWS receives one sonic boom complaint for every seven supersonic events conducted on the ranges. This average implies that approximately one in seven sonic booms may reach ground level. This ratio is slightly higher but consistent with that projected by U.S. Air Force noise modeling that suggests that a sonic boom reaches the ground once for every 10 high altitude supersonic events (U.S. Air Force 2001). This difference in ratios may be the result of differing atmospheric conditions during the time of the operations, as well as differing flight altitudes.

Under the No Action Alternative, NAWS would continue to conduct approximately 36 supersonic flight operations annually on established range flight tracks and according to established range flight safety procedures. Based on past records and depending on atmospheric conditions, this tempo of operations would continue to result in approximately 6-7 sonic booms reaching the ground per year. Considering the frequency and timing of NAWS supersonic flights, it is reasonable to assume that some sonic booms will be heard at local schools and residences during regular business hours. It is less likely that sonic boom events would affect recreational activities in wilderness areas because these flight events generally are conducted during the week while the use of wilderness areas generally is greatest on weekends. Based on past records, NAWS would be expected to continue to receive one noise complaint every 2.4 months. Although these figures may underestimate the total number of individuals annoyed by supersonic flight operations, they do provide an indication of the relative infrequency of annoyance.

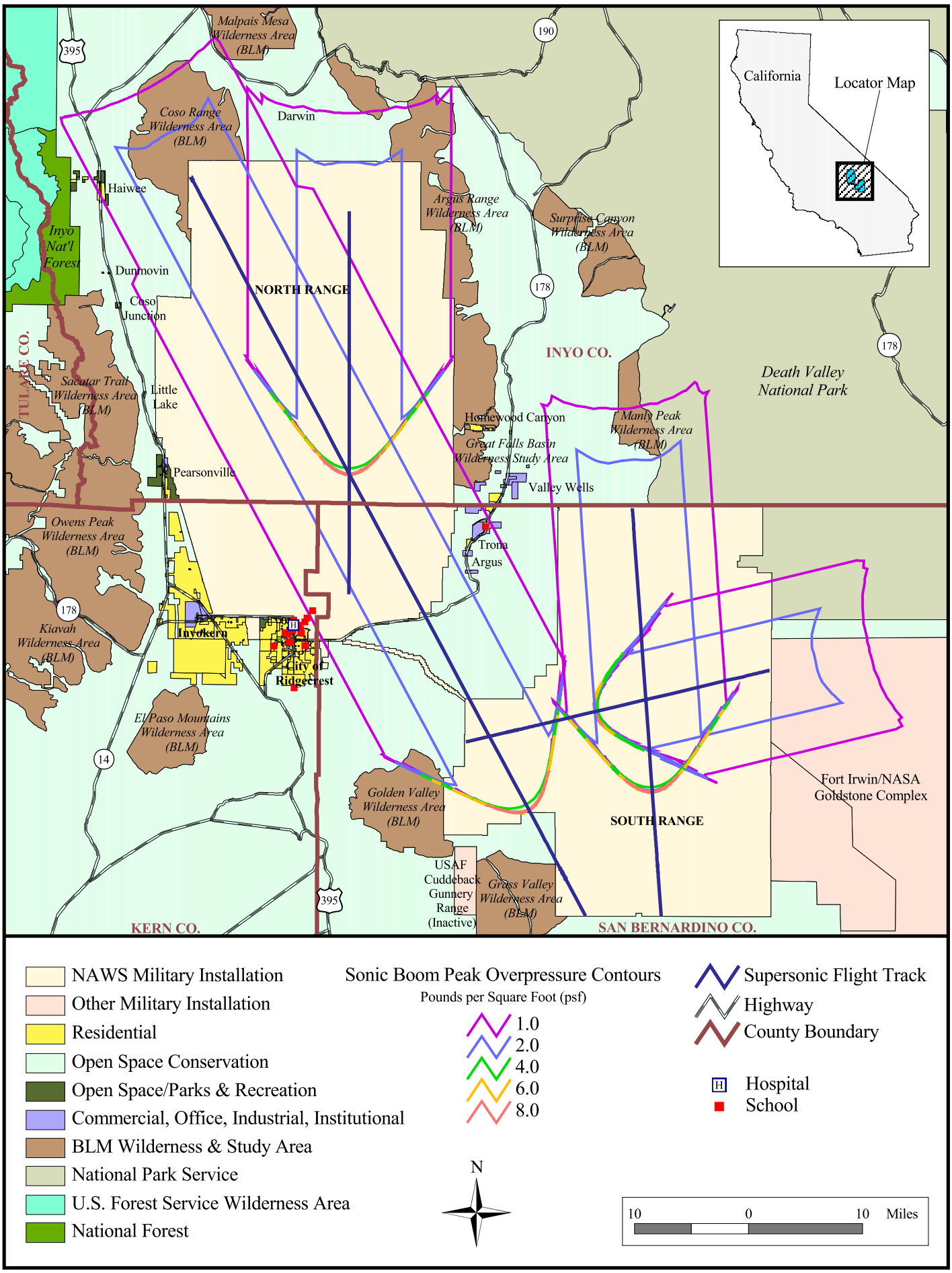

Figure 4.2-1 NAWS China Lake Sonic Boom Peak Overpressure Contours

As a means of lessening potential startle and/or annoyance effects from sonic booms, NAWS provides notification and has established information sharing programs with local agencies, schools, and communities. NAWS continues to work with local communities and agencies to develop improved coordination and education programs regarding the NAWS mission and related noise effects. Collectively, the careful control of supersonic flight operations over the NAWS ranges and the continuing coordination and education programs with potentially affected parties is expected to help minimize the potential effects of existing supersonic operations.

Airfield Flight Operations

Projected noise exposure contours for current flight operations would continue to expose portions of the City of Ridgecrest, BLM lands, and non-incorporated parts of Kern County lands to noise levels up to 65-dB CNEL (Figure 4.2-2). This noise exposure is mainly due to departure flight tracks from runways 14, 26, and 32. Noise sensitive receptors located in areas exposed to noise levels up to 65 dB include low-, moderate-, and high-density residential dwellings. Table 4.2-2 describes the estimated off-station land areas, dwellings, and population affected by noise exposure under the No Action Alternative. The number of dwellings and residents occurring in these projected noise contours were estimated using a standard urban population density method (Wyle 2001) that incorporated population density projections from census data. This method assumes a uniform population and dwelling unit distribution throughout the area of analysis and is used principally to identify the "relative" change in projected densities, rather than the "actual" numbers of households and people potentially affected (Wyle 2001). Since areas under the NAWS airfield noise contours are not uniformly developed, these population and dwelling projections are considered to be substantial overestimates of actual conditions in the areas of potential effect.

Table 4.2-2 Area, Dwellings, and Population Noise Exposure Estimates for the No Action Alternative

CNEL	*Acres*	*Dwellings*	*Population*
65 dB	*889*	*489*	*1065*

Source: Wyle 2001.

Areas exposed to 65-dB CNEL contours are located east of Jack's Ranch Road and north of Drummond Avenue in the northwestern corner of Ridgecrest. These areas are zoned for a combination of light industrial and commercial uses, as well as low-, medium-, and high-density residential uses, and BLM open-space areas. Noise levels up to 65-dB CNEL are identified as "clearly acceptable" for industrial and commercial uses, and "normally acceptable" for residential use and natural recreation areas (see Figure 3.2-2). Therefore, current noise levels are compatible with the FICON guidelines for established land use. In addition, existing CNEL noise conditions resulting from ongoing airfield flight operations are compatible with guidelines contained in the respective noise elements of the Ridgecrest and Kern County General Plans. Further, based on information provided by Ridgecrest and Kern County planners, established land use patterns are projected to be the same or similar to existing land use patterns in the foreseeable future (Landrum 2001; Oviatt 2001). Therefore, current flight operations at Armitage Airfield result in less than significant noise impacts on off-station noise-sensitive receptors.

Range Ground Operations

Target and Test Site Use. Depending on atmospheric conditions, individual detonation events from target and test site operations on-station are sometimes audible off-station, but do not produce modeled noise levels above 65-dB CNEL. Given that these noise levels are below the compatibility threshold for noise-sensitive uses as identified in the FICON noise compatibility guidelines (see Figure 3.2-2), current use of target and test sites has a less than significant noise impact.

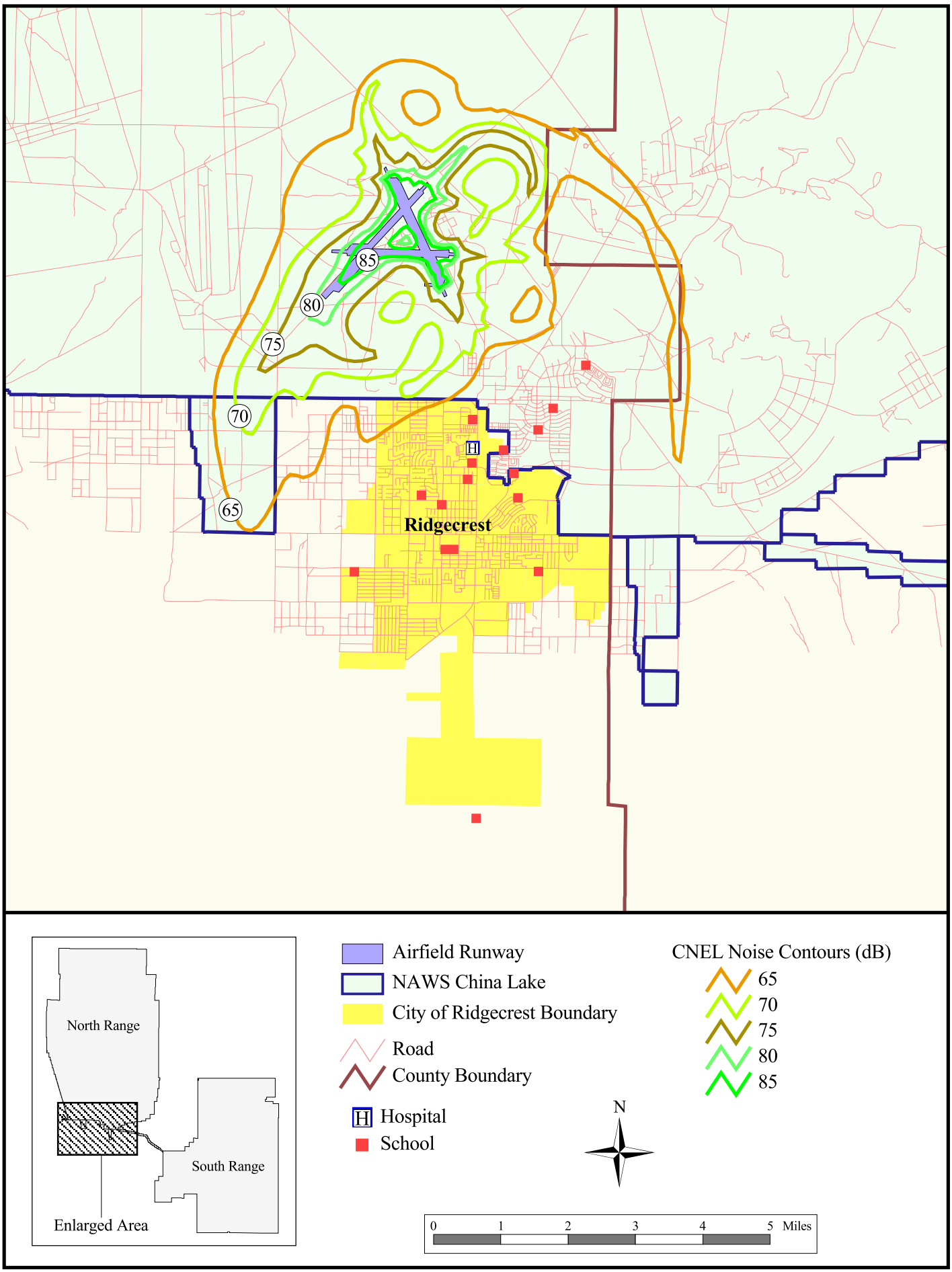

Figure 4.2-2 Noise Contours for No Action Alternative Airfield Operations

Ground Troop Training. Noise sources associated with GTT exercises are not audible at off-station locations. Therefore, current GTT exercises do not produce off-station noise impacts.

4.2.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education, and recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis. Existing nonmilitary uses at NAWS produce a negligible amount of noise. Most activities involve a limited amount of vehicular use but do not generate high noise levels. Therefore, current nonmilitary activities result in less than significant noise impacts.

4.2.3.3 CLUMP and INRMP Implementation

Under the No Action Alternative, implementation of the CLUMP would serve as a mechanism to implement the NAWS's updated AICUZ program. The AICUZ program characterizes airfield-related noise sources and provides compatibility guidelines for on- and off-station land use planning activities. The CLUMP would facilitate the use of land use compatibility criteria presented in the Station's updated AICUZ report to support land use planning and decision processes at NAWS. The AICUZ compatibility guidelines will be provided to local and regional planning agencies with NAWS's recommendation for inclusion in their respective general and specific plans. The CLUMP's use of land use compatibility criteria in planning processes would represent a beneficial impact to noise-sensitive receptors within the ROI since potential conflicts between military operations and noise-sensitive receptors could be avoided through proactive land use planning.

In compliance with the requirements of the Sikes Act as amended, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP. Implementation of the INRMP would not affect the noise environment at NAWS or in the ROI.

4.2.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.2.4.1 Military Uses

Under the Limited Expansion Alternative, limited increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Subsonic Flights. Projected CNEL noise levels resulting from increasing subsonic flight operations on the NAWS ranges are presented in Table 4.2-3. Projected noise levels at individual range land management units would increase by 2 to 3 dB (the minimum change in the time-averaged sound level of individual events which an average human ear can detect is about 3 dB) and no areas would be exposed to levels greater than 65-dB CNEL. Therefore, noise levels at off-station locations would remain below 65-dB CNEL and would be compatible with established noise exposure criteria (see Figure 3.2-2). As such, subsonic range flight operations under the Limited Expansion Alternative would have a less than significant noise impact.

Table 4.2-3 Limited Expansion Alternative CNEL for Individual Ranges

Land Use Management Unit	*CNEL*
North Range	
Airport Lake	*54*
Baker North	*46*
Baker South	*57*
Charlie North	*59*
Charlie South	*57*
Coso	*46*
Coso Target	*50*
George	*47*
Mainsite	*45*
Propulsion Laboratory	*45*
South Range	
Mojave B North	*45*
Mojave B South	*45*
Randsburg Wash	*45*
Superior Valley	*46*

Source: Interpolated from Wyle 1998.

Supersonic Flights. Supersonic flight operations under the Limited Expansion Alternative would increase from 36 annual operations up to approximately 100 annual flight operations. The number of annual supersonic flights per flight track would increase from 24 to 52 for the North Range, from 3 to 16 for the flight track between the South Range and the North Range, and from 9 to 32 for the South Range. The F/A-18E/F would account for the majority of the North Range supersonic flights and all of the South Range flights and flight tracks between the South and North ranges.

Individual sonic boom events would generate peak overpressures and associated noise effects similar to those represented in Figure 4.2-1 and described previously in Section 4.2.3.2; however, the events would occur more frequently. While the schedule of these supersonic flights presently is not known, the average tempo of operations for the Limited Expansion Alternative could increase by up to five operations per month. Under this alternative, sensitive noise receptors in local communities (e.g., schools), and BLM wilderness areas within the ROI would be exposed to more frequent sonic boom events. The number of carpet booms potentially affecting the community of Darwin and the Argus Wilderness Area is expected to increase from 24 to 52 events. The number of carpet booms potentially affecting the communities of Haiwee and Trona (including Trona High School), on-station schools (including Richmond and Murray), and the BLM's Golden Valley, Great Falls Basin, Coso Range, and Malpais Mesa wilderness areas could increase from 3 to 16 events. The number of sonic booms potentially affecting the BLM Manly Peak Wilderness Area, NTC, NASA Goldstone Complex, and NPS lands at Death Valley would increase from 9 to 32 events. Overpressure levels in the carpet boom areas could be in the 1 to 2 PSF range with associated noise levels of 101 to 106 dBC. The focus boom area potentially occurring in the Golden Valley Wilderness Area could continue to produce overpressures of 6 PSF and noise levels in the 121-dBC range. The potential for property damage from the proposed increase in supersonic operations is expected to be very low due to the relatively low overpressures in the carpet boom area (i.e., 1 – 2 PSF; Wyle 2001). All sonic boom focus areas (on- and off-station) created by NAWS operations are located in remote, unpopulated portions of the NAWS ranges and in a very small (narrow) portion of the BLM's Golden Valley Wilderness Area.

Based on the proposed increase in the number of supersonic operations, it is reasonable to expect corresponding increases in the frequency in occurrences of startle events, annoyance, and disruption of activities in the ROI. Similar increases in the number of sonic boom related complaints are also expected. As discussed for the No Action Alternative, past records indicate that approximately 1 in 7 sonic booms may reach ground level. Therefore,

based on the proposed increase in supersonic flight operations (i.e., increasing from approximately 3 events per month to more than 8 events per month), NAWS would be expected to receive approximately 14 noise complaints per year, or an average of one per month. Although this estimate represents an increase in the number of sonic boom events and individuals potentially affected by NAWS supersonic operations, it also indicates that the frequency and duration of annoyance would remain relatively low.

Under this alternative, NAWS would continue to conduct its supersonic flight operations on established range flight tracks and according to established range flight safety procedures. As a means of lessening the potential for startle and/or annoyance effects fom sonic booms, NAWS would continue its established notification and information sharing programs with local agencies, schools, and communities. NAWS would continue to work with local communities and agencies to develop improved coordination and education programs regarding the NAWS mission and related noise effects. Collectively, the careful control of supersonic flight operations over the NAWS ranges and the enhanced coordination and education programs with potentially affected parties is expected to help minimize the potential effects of existing and proposed supersonic operations.

Airfield Flight Operations

Implementing an increase in airfield flight operations would continue to expose portions of Ridgecrest, BLM land, and non-incorporated parts of Kern County to noise levels ranging up to 65-dB CNEL and would extend a 70-dB contour beyond the Station boundaries (Figure 4.2-3). The projected number of dwelling units and population levels potentially affected by this increase in operations is presented in Table 4.2-4.

Table 4.2-4 Area, Dwellings, and Population Noise Exposure Estimates for the Limited Expansion Alternative

CNEL	*Acres*	*Dwellings*	*Population*
65 dB	*1,235*	*616*	*1,374*
70 dB	*18*	*3*	*8*
Totals	***1,253***	***619***	***1,382***

Source: Wyle 2001.

The area exposed to noise levels of 65-dB CNEL would be approximately 1,235 acres (500 hectares), and represents an increase of approximately 346 acres (140 hectares) in comparison to existing conditions. As discussed in Section 4.2.3, off-station noise exposure levels of 65 CNEL are compatible with FICON guidelines for established land uses in the ROI. Further, as noted in Section 4.2.3, current land use patterns are expected to continue into the future. The area exposed to noise levels of 70-dB CNEL would be 18 acres (7 hectares). This area is located in the unincorporated portion of Kern County, adjacent to the intersection of Inyokern Road and Jacks Ranch Road and is zoned for industrial use. Industrial use is considered fully compatible with noise exposure levels up to 70-dB CNEL (considered "clearly acceptable" according to established guidelines; refer to Figure 3.2-2). As such, noise associated with airfield flight operations under the Limited Expansion Alternative would have a less than significant impact on noise-sensitive receptors off-station.

Range Ground Operations

Target and Test Site Use. Under the Limited Expansion Alternative, projected 65-dB CNEL noise contours for increased ordnance use at all target and test sites would remain within Station boundaries. As such, noise exposure levels would be below the compatibility threshold for noise-sensitive uses as identified by established noise compatibility guidelines (see Figure 3.2-2). Therefore, the proposed increased use of target and test sites under the Limited Expansion Alternative would have less than significant noise impacts.

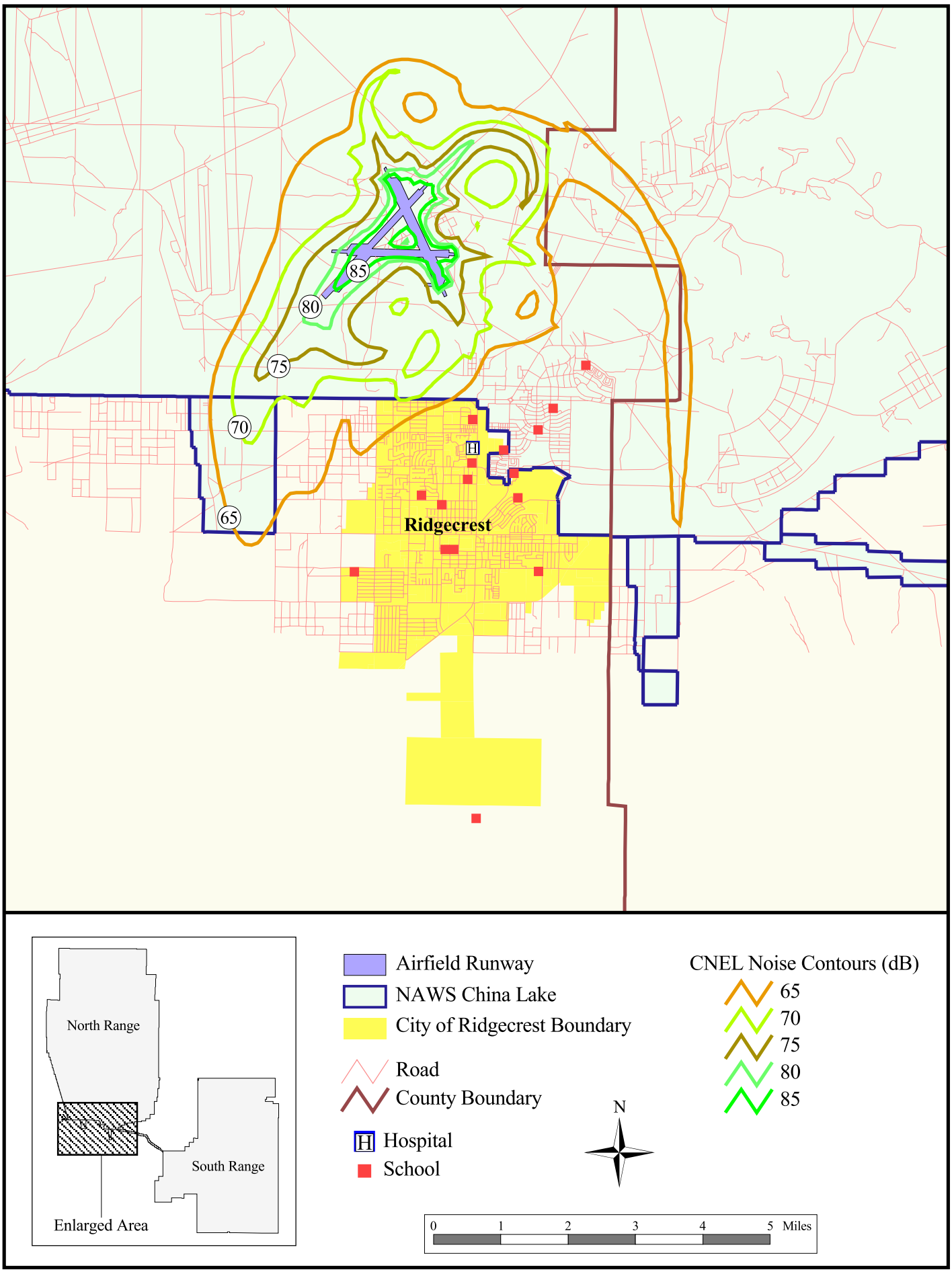

Figure 4.2-3 Noise Contours for Limited Expansion Alternative Airfield Operations

Ground Troop Training. Noise sources associated with the proposed increases in GTT activities are not expected to be audible at off-station locations. Therefore, proposed GTT exercises would not produce off-station noise effects and impacts would be less than significant.

4.2.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.2.3.2, these activities would have less than significant noise impacts.

4.2.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would serve as the vehicle to implement the updated AICUZ program and noise compatibility guidelines at NAWS and, thus, represents a beneficial impact. Implementation of the INRMP would not affect the noise environment at NAWS or in the ROI.

4.2.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.2.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Subsonic Flights. Implementation of the Moderate Expansion Alternative would result in a general increase in noise levels of about 5 dB range-wide over baseline conditions (the minimum change in the time-averaged sound level of individual events which an average human ear can detect is about 3 dB). As shown in Table 4.2-5, projected noise levels from range flight activity would be 47 to 61 dB in the Baker, Charlie, and Airport Lake ranges, 47 dB in the Superior Valley range, and less than 52 dB elsewhere in the North and South ranges. Overall projected noise levels at off-station locations resulting from the proposed increase in subsonic range flight operations would remain below 65-dB CNEL and would be compatible with land use compatibility criteria (see Figure 3.2-2). Therefore, subsonic range flight operations under the Moderate Expansion Alternative would have less than significant noise impacts.

Supersonic Flights. Under the Moderate Expansion Alternative, the number of supersonic flight events and the potential for noise impacts would be the same as those described for the Limited Expansion Alternative. Potential noise impacts resulting from the proposed increase in supersonic flight activity would be less than significant.

Airfield Flight Operations

Projected CNEL contours for increased flight operations under the Moderate Expansion Alternative are presented in Figure 4.2-4 and would represent the noise exposure footprints for the Projected Conditions in the Station's updated AICUZ program. The combined effect of these changes would be a general increase in noise levels of about 1 to 2 dB as compared to existing conditions (as mentioned above, the minimum change that is perceptible to an average human ear is about 3 dB). Airfield operations under the Moderate Expansion Alternative would expose limited portions of Ridgecrest and unincorporated portions of Kern County to CNEL values ranging from 65 to 70 dB. The projected number of acres, dwellings, and population levels that would be exposed to these noise levels is presented in Table 4.2-6.

Table 4.2-5 Moderate Expansion Alternative CNEL for Individual Ranges

Land Use Management Unit	*CNEL*
North Range	
Airport Lake	*56*
Baker North	*47*
Baker South	*59*
Charlie North	*61*
Charlie South	*58*
Coso	*46*
Coso Target	*52*
George	*48*
Mainsite	*<45*
Propulsion Laboratory	*46*
South Range	
Mojave B North	*45*
Mojave B South	*45*
Randsburg Wash	*45*
Superior Valley	*47*

Source: Interpolated from Wyle 1998.

Table 4.2-6 Area, Dwellings, and Population Noise Exposure Estimates for the Moderate Expansion Alternative

CNEL	*Acres*	*Dwellings*	*Population*
65 dB	*1,458*	*673*	*1,528*
70 dB	*44*	*25*	*59*
Totals	***1,502***	***698***	***1,587***

Source: Wyle 2001.

Under the Moderate Expansion Alternative, the area exposed to noise levels of 65-dB CNEL would increase by approximately 613 acres (248 hectares) over baseline conditions. As discussed in Section 4.2.3, off-station noise exposure levels of 65 CNEL are compatible with FICON guidelines for established land uses in the ROI. The projected area exposed to noise levels of 70-dB CNEL would be approximately 44 acres (18 hectares). The majority of this area (36 acres [14.5 hectares]) is located in the unincorporated portion of Kern County, adjacent to the intersection of Inyokern Road and Jacks Ranch Road, and is zoned for industrial use. As discussed in Section 4.2.4, noise exposure levels up to 70 dB are compatible with FICON guidelines for industrial land use. In addition to the area zoned for industrial use, another area projected to be exposed to 70-dB CNEL values includes a portion of Ridgecrest that is currently zoned for a combination of industrial, commercial, and high-density residential use. According to FICON guidelines, land use compatibility noise levels up to 70 dB are identified as "clearly acceptable" for industrial and commercial uses; however, this level is considered "normally unacceptable" for residential use (refer to Figure 3.2-2). The residential area potentially exposed to noise levels of 70 dB includes approximately 3 acres (1.2 hectares). Therefore, proposed airfield flight operations under the Moderate Expansion Alternative could have an adverse impact on established off-station land use in a small portion of the ROI. This impact is not considered significant due to both the FICON guidelines (i.e., normally unacceptable) and the small area of potential effect (i.e., 3 acres [1.2 hectares]).

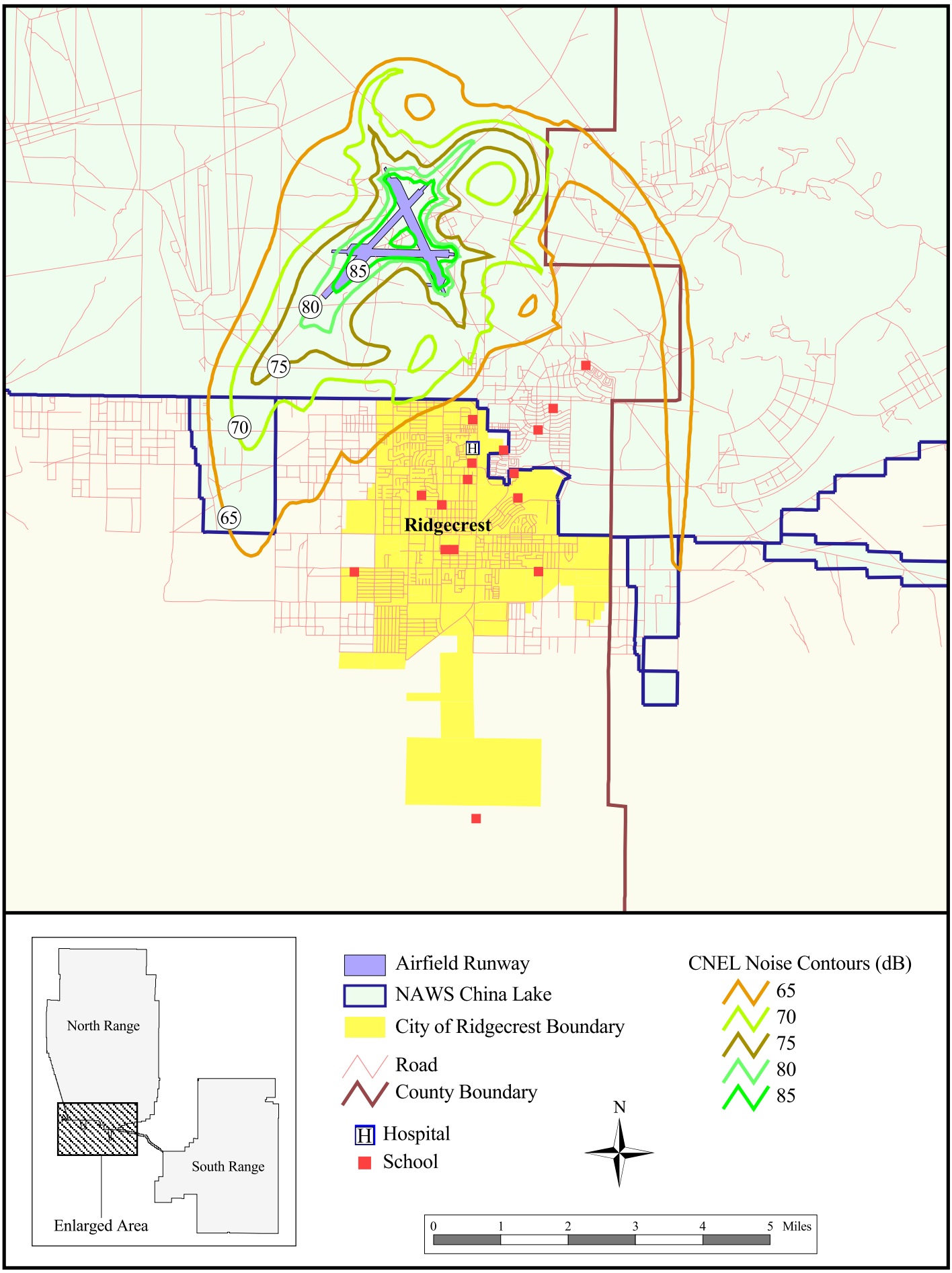

Figure 4.2-4 Noise Contours for Moderate Expansion Alternative Airfield Operations

Range Ground Operations

Target and Test Site. Under the Moderate Expansion Alternative, projected 65-dB CNEL noise contours for increased ordnance use at all target and test sites would remain within Station boundaries. As such, noise exposure levels would be below the compatibility threshold for noise-sensitive uses as identified by established noise compatibility guidelines (see Figure 3.2-2). Therefore, the proposed use of target and test sites under the Moderate Expansion Alternative would have less than significant noise impacts.

Ground Troop Training. Noise sources associated with proposed GTT activities under the Moderate Expansion Alternative are not expected to be audible at off-station locations. Therefore, proposed GTT exercises would not produce off-station noise effects and impacts would be less than significant.

4.2.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.2.3.2, these activities would have less than significant noise impacts.

4.2.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would serve as the vehicle to implement the updated AICUZ program and noise compatibility guidelines at NAWS and, thus, represents a beneficial impact. Implementation of the INRMP would not affect the noise environment at NAWS or in the ROI.

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4.3
Air Quality

4.3 AIR QUALITY

This section identifies potential air quality impacts that may result from implementation of the proposed action and alternatives. The impact analysis compares projected conditions after implementation of each alternative to the affected environment and focuses on those activities that have the potential to adversely affect air quality.

4.3.1 Region of Influence

The ROI for air quality varies according to the type of air pollutant being discussed. Primary pollutants, such as CO, have a localized ROI that is generally limited to less than 2,000 feet (610 meters) from the source of emissions. However, due to the nature of secondary pollutant formation, the ROI for these pollutants (e.g.,O_3) is generally larger and includes portions of the districts that surround NAWS (Kern County APCD 1992, Mojave Desert AQMD 1995a, and the Great Basin Unified APCD 1991).

4.3.2 Approach to Analysis

Air emissions analyzed in this document are comprised of those from both airfield and range operations. While some aircraft operating from Armitage Airfield participate in aircrew training or T&E activities over NAWS ranges, many flights from Armitage Airfield have other destinations. Also, many flight operations over the ranges originate at other military airfields. Flight operations evaluated in this EIS include only those within NAWS boundaries or on the departure or arrival flight tracks for Armitage Airfield.

The analysis of potential impacts to air quality considers whether implementation of an alternative would 1) cause a net increase in pollutant or pollutant precursor emissions that exceeds the CAA conformity rule *de minimis* levels or other established impact significance thresholds or 2) produce emissions that would cause or contribute to new or more frequent violations of state or federal ambient air quality standards.

Air quality issues associated with implementation of the alternatives have been evaluated in terms of predicted changes in air pollutant emissions. Evaluating potential changes in net emissions is the standard analysis approach used for both NEPA impact assessment purposes and CAA conformity analysis purposes.

Although CAA conformity analyses are a major focus of the air quality impact assessment, NEPA impact assessment requirements are separate from, and broader than, CAA conformity analysis requirements. Air quality impact assessments under NEPA sometimes extend to emission sources that are excluded from CAA conformity analysis requirements. Thus, the impact assessment discussions in this section treat overall emissions changes and CAA conformity evaluations as related but separate issues.

Local air quality districts have adopted the conformity rule into their SIP documents (Kern County APCD Rule 210.7, Mojave Desert AQMD Rule 2002, Great Basin Unified APCD Regulation XIII). The O_3 and PM_{10} documents relevant to NAWS do not expressly identify or forecast emissions associated with NAWS operations. When SIP documents do not specifically identify emissions associated with a federal facility, CAA conformity analyses generally require an evaluation of the net change in emissions compared to existing emission source activity levels, extrapolated into the future (40 C.F.R. § 93.158(a)(5)(i) and 40 C.F.R. § 93.158(a)(5)(iv)). Consequently, emission increases that must be considered under the CAA conformity regulations represent the net change from conditions under the No Action Alternative. CAA conformity requirements do not apply to the No Action Alternative.

To maintain consistency with SIP emission inventory procedures, only those portions of aircraft flights conducted within 3,000 feet (914.4 meters) of ground level are included in the emissions calculations. In addition, CAA conformity rules (40 C.F.R. § 51.853(d)(1)) exclude from the analysis those stationary sources that are subject to federal new source review or prevention of significant deterioration requirements. APCD and AQMD stationary

source permit programs incorporate federal air quality permit program requirements and are included as control measures in the relevant SIP documents.

4.3.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.3.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

Emissions

Since the No Action Alternative involves maintaining military operations at current levels, air emissions would not be affected under this alternative. The maintenance of existing levels of military activities would not affect the baseline emissions scenario presented in Section 3.3. As shown in Table 3.3-3, estimated baseline emissions are 192.19 tons (174.35 metric tons) per year of ROC, 132.57 tons (120.27 metric tons) per year of NO_x, 841.64 tons (763.52 metric tons) per year of CO, 6.17 tons (5.60 metric tons) per year of SO_x, and 186.90 tons (169.55 metric tons) per year of PM_{10}. Since there would be no increase in current emissions under the No Action Alternative, air quality impacts would be less than significant.

Clean Air Act Conformity

As discussed in Section 4.3.2, CAA conformity requirements do not apply to the No Action Alternative since air quality conditions under the No Action Alternative would remain similar to those under baseline conditions.

Comparison with Air Quality Standards

As outlined in Section 3.3 (Table 3.3-1), portions of NAWS are currently designated as federal nonattainment areas for O_3 and PM_{10}. State nonattainment designations for PM_{10}, O_3, hydrogen sulfide, and sulfate particles also apply to various portions of NAWS. The No Action Alternative would represent no change to these existing conditions.

4.3.3.2 Nonmilitary Uses

Nonmilitary uses addressed in this document are not associated with any significant identifiable emission sources. Emissions associated with vehicles accessing NAWS for Native American uses, research and education, and recreation are considered negligible, as it is expected that less than 100 vehicles routinely access NAWS for nonmilitary uses daily. Therefore, air quality impacts as a result of current nonmilitary uses are less than significant.

4.3.3.3 CLUMP and INRMP Implementation

Implementation of the CLUMP would formalize and integrate the Station's environmental planning and review processes. The environmental review process is applied to military and nonmilitary actions (including facilities and infrastructure) occurring on-Station and includes new actions or substantial changes to existing uses or operations. This review process provides an analysis of actions that may include increases to existing air emissions, and ensures that these actions are appropriately permitted. As such, implementation of the CLUMP would represent a beneficial impact.

In compliance with the requirements of the Sikes Act as amended, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP. Implementation of the INRMP would not affect the air quality at NAWS or in the ROI.

4.3.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.3.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Emissions

Table 4.3-1 summarizes emission estimates under the Limited Expansion Alternative, with estimated baseline emissions shown for comparison. Detailed emissions calculations for range flight operations, airfield flight operations, and range ground operations under the Limited Expansion Alternative are included in Appendices D1-D3.

Compared to baseline conditions, NAWS annual emissions under the Limited Expansion Alternative would increase by 27.33 tons (24.79 metric tons) per year for ROC, 26.10 tons (23.68 metric tons) per year for NO_x, 123.91 tons (112.41 metric tons) per year for CO, 1.5 tons (1.36 metric tons) per year for SO_x, and 87.47 tons (79.35 metric tons) per year for PM_{10}. Most of the estimated increase in PM_{10} emissions would be due to vehicle activity in unpaved areas during GTT exercises.

Clean Air Act Conformity

Tables 4.3-2 and 4.3-3 compare the emission changes projected to occur in each nonattainment area under the Limited Expansion Alternative with the corresponding *de minimis* levels and the 10 percent threshold for each air basin's emissions budget established in the SIP, respectively. As shown in Tables 4.3-2 and 4.3-3, emissions were apportioned to areas based on the location where they would be emitted. For example, of the additional 27.33 tons (24.79 metric tons) per year of ROG emitted as a result of implementing the Limited Expansion Alternative, it is assumed that 26.44 tons (23.99 metric tons) per year would be emitted in Kern County, while the remaining 0.89 tons (0.81 metric tons) per year would be emitted in other areas.

As shown in the tables, the increase in emissions that would occur under the Limited Expansion Alternative are both below the *de minimis* levels and are not regionally significant because these emissions are below the 10 percent threshold for each air basin's emissions budget established in the SIP. Therefore, the General Conformity Rule is not applicable to the Limited Expansion Alternative.

Comparison with Air Quality Standards

Since projected emissions associated with the Limited Expansion Alternative are below *de minimis* levels, they would not contribute to new violations of state or federal ambient air quality standards.

Table 4.3-1 NAWS Emissions for the Limited Expansion Alternative

Emission Source Category	*Emissions (tons per year)*				
	ROG	*NOx*	*CO*	*SOx*	*PM_{10}*
Range Flight Operations	*1.17*	*24.75*	*12.46*	*1.2*	*19.17*
Airfield Flight Operations [a]	*216.70*	*114.99*	*948.04*	*4.92*	*79.10*
Range Ground Operations					
Ordnance Use at Target and Test Sites	*0.03*	*0.51*	*0.00*	*0.00*	*33.00*
Ground Troop Training [b]	*1.39*	*15.61*	*4.44*	*1.41*	*142.90*
Support Equipment (generators) [c]	*0.22*	*2.82*	*0.01*	*0.14*	*0.20*
Totals [d]	***219.52***	***158.67***	***965.55***	***7.67***	***274.30***
(Baseline)	*(192.19)*	*(132.57)*	*(841.64)*	*(6.17)*	*(186.90)*
Net Increase from Baseline	***27.33***	***26.10***	***123.91***	***1.50***	***87.47***

[a] *Airfield-related flight activity includes in-frame engine run-ups, ground support equipment, and fuel deliveries and transfers.*

[b] *Includes vehicle emissions, fugitive dust from vehicles, and ground troop training ordnance use.*

[c] *For purposes of this EIS, all of these generators are conservatively assumed to be either exempt from permit requirements or registered with the State of California as portable equipment items.*

[d] *Due to rounding, totals may differ slightly than those presented in Appendex D.*

ROG = Reactive organic gases. *NOx = Nitrogen oxides.* *CO = Carbon monoxide.*

SOx = Sulfur oxides. *PM_{10} = Inhalable particulate matter.*

Source: Tetra Tech 1999.

Table 4.3-2 Comparison of Emissions Increases Under the Limited Expansion Alternative with *de minimis* Levels[1]

Nonattainment Area	*Emissions (tons per year)*				
	ROG	*NOx*	*PM_{10}*	*de minimis Level*	*Above de minimis?*
Kern County Ozone Nonattainment Area	*26.44 tons*	*14.11 tons*		*50 tons*	*No*
Searles Valley Moderate PM_{10} Nonattainment Area			*50.12 tons*	*100 tons*	*No*
Mojave Desert Moderate PM_{10} Nonattainment Area			*36.91 tons*	*100 tons*	*No*
Owens Valley Serious PM_{10} Nonattainment Area			*0.31 tons*	*70 tons*	*No*

ROG = Reactive organic gases. *NOx = Nitrogen oxides.* *PM_{10} = Inhalable particulate matter.*

[1] *Emissions increases were apportioned to areas based on the location where they would be emitted. It is for this reason that these numbers do not directly correspond to the "net increase from the baseline" numbers in Table 4.3-1.*

Source: Tetra Tech 1999.

Table 4.3-3 Comparison of Emissions Increases Under the Limited Expansion Alternative with the 10% Threshold

	Emissions (tons per year)				
Nonattainment Area	***ROG***	***NOx***	***PM_{10}***	***10% Threshold***	***Above10% Threshold?***
Kern County Ozone Nonattainment Area	*26.44 tons*	*14.11 tons*		*57.30 tons/ 570.30 tons*	*No*
Searles Valley Moderate PM_{10} Nonattainment Area			*50.12 tons*		*No*
Inyo County				*62.42 tons*	*No*
Kern County				*114.43 tons*	*No*
San Bernardino County				*209.65 tons*	*No*
Mojave Desert Moderate PM_{10} Nonattainment Area			*36.91 tons*	*718.17 tons*	*No*
Owens Valley Serious PM_{10} Nonattainment Area			*0.31 tons*	*310.00 tons*	*No*

ROG = Reactive organic gases. *NOx = Nitrogen oxides.* *PM_{10} = Inhalable particulate matter.*
Sources: Kern County APCD 1992, 1994; Mojave Desert AQMD 1995a,b, 1996; and Great Basin Unified APCD 1998.

4.3.4.2 Nonmilitary Uses

As discussed under the No Action Alternative, nonmilitary uses are not associated with any identifiable significant emission sources. Therefore, air quality impacts from nonmilitary uses under the Limited Expansion Alternative would be less than significant.

4.3.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would formalize the Station's environmental planning and review processes, providing an analysis of actions that may include increases to existing air emissions and ensuring that these actions are appropriately permitted. As such, implementation of the CLUMP would represent a beneficial impact. Implementation of the INRMP would not affect the air quality at NAWS or in the ROI.

4.3.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.3.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Emissions

Table 4.3-4 summarizes emission estimates under the Moderate Expansion Alternative with estimated baseline emissions shown for comparison. Detailed emissions calculations for range flight operations, airfield flight operations, and range ground operations under the Moderate Expansion Alternative are included in Appendices D1-D3.

Table 4.3-4 NAWS Emissions for Moderate Expansion Alternative

	Emissions (tons per year)				
Emission Source Category	***ROG***	***NOx***	***CO***	***SOx***	***PM_{10}***
Range Flight Operations	*1.30*	*27.33*	*13.77*	*1.33*	*21.20*
Airfield Flight Operations [a]	*236.52*	*125.16*	*1031.08*	*5.35*	*86.31*
Range Ground Operations					
Ordnance Use at Target and Test Sites	*0.03*	*0.55*	*0.00*	*0.00*	*36.00*
Ground Troop Training [b]	*2.13*	*19.00*	*8.56*	*1.68*	*169.70*
Support Equipment (generators) [c]	*0.24*	*3.07*	*0.66*	*0.15*	*0.22*
Totals [d]	***240.22***	***175.11***	***1054.06***	***8.51***	***313.42***
(Baseline)	*(192.19)*	*(132.57)*	*(841.64)*	*(6.17)*	*(186.30)*
Net Increase from Baseline	***48.03***	***42.54***	***212.42***	***2.34***	***126.52***

[a] *Includes airfield-related flight activity in-frame engine run-ups, ground support equipment, and fuel deliveries and transfers.*
[b] *Includes vehicle emissions, fugitive dust from vehicles, and ground troop training ordnance use.*
[c] *For purposes of this EIS, all of these generators re conservatively assumed to be either exempt from permit requirements or registered with the State of California as portable equipment items.*
[d] *Due to rounding, totals may differ slightly than those presented in Appendex D.*
ROG = Reactive organic gases. *NO_x = Nitrogen oxides.* *CO = Carbon monoxide.*
SO_x = Sulfur oxides. *PM_{10} = Inhalable particulate matter.*
Source: Tetra Tech 1999.

Compared to baseline conditions, NAWS annual emissions under the Moderate Expansion Alternative would increase by 48.03 tons (43.57 metric tons) per year for ROC, 42.54 tons (38.59 metric tons) per year for NO_x, 212.42 tons (192.70 metric tons) per year for CO, 2.34 tons (2.12 metric tons) per year for SO_x, and 126.52 tons (114.78 metric tons) per year for PM_{10}. Most of the estimated increase in PM_{10} emissions would be due to vehicle activity in unpaved areas during GTT exercises.

Clean Air Act Conformity

Tables 4.3-5 and 4.3-6 compare the emission changes projected to occur in each nonattainment area under the Moderate Expansion Alternative with the corresponding *de minimis* levels and the 10 percent threshold for each air basin's emissions budget established in the SIP, respectively. As described in Section 4.3.4.2 for the Limited Expansion Alternative, emissions were apportioned to areas based on the location where they would be emitted.

Table 4.3-5 Comparison of Emissions Increases Under the Moderate Expansion Alternative with *de minimis* Levels[1]

	Emissions (tons per year)				
Nonattainment Area	***ROG***	***NOx***	***PM_{10}***	***de minimis Level***	***Above de minimis?***
Kern County Ozone Nonattainment Area	*46.34 tons*	*23.95 tons*		*50 tons*	*No*
Searles Valley Moderate PM_{10} Nonattainment Area			*84.28 tons*	*100 tons*	*No*
Mojave Desert Moderate PM_{10} Nonattainment Area			*38.16 tons*	*100 tons*	*No*
Owens Valley Serious PM_{10} Nonattainment Area			*0.62 tons*	*70 tons*	*No*

ROG = Reactive organic gases. NOx = Nitrogen oxides. PM_{10} = Inhalable particulate matter.

[1] *Emissions increases were apportioned to areas based on the location where they would be emitted. It is for this reason that these numbers do not directly correspond to the "net increase from the baseline" numbers in Table 4.3-1.*

Source: Tetra Tech 1999.

Table 4.3-6 Comparison of Emissions Increases Under the Moderate Expansion Alternative with the 10% Threshold

	Emissions (tons per year)				
Nonattainment Area	***ROG***	***NOx***	***PM_{10}***	***10% Threshold***	***Above 10%Threshold?***
Kern County Ozone Nonattainment Area	*46.34 tons*	*23.95 tons*		*57.3 tons/570.3 tons*	*No*
Searles Valley Moderate PM_{10} Nonattainment Area			*84.28 tons*		*No*
Inyo County				*62.42 tons*	*No* [a]
Kern County				*114.43 tons*	*No* [a]
San Bernardino County				*209.65 tons*	*No* [a]
Mojave Desert Moderate PM_{10} Nonattainment Area			*38.16 tons*	*718.17 tons*	*No*
Owens Valley Serious PM_{10} Nonattainment Area			*0.62 tons*	*310 tons*	*No*

[a] *For the Searles Valley Moderate PM_{10} Nonattainment Area, total emissions would be spread among Inyo, Kern, and San Bernardino counties and would clearly be below the respective 10% thresholds.*

ROG = Reactive organic gases. NOx = Nitrogen oxides. PM_{10} = Inhalable particulate matter.

Sources: Kern County APCD 1991, 1994; Mojave Desert AQMD 1995a,b, 1996; and Great Basin Unified APCD 1998.

As shown in the tables, the increase in emissions that would occur under the Moderate Expansion Alternative are both below the *de minimis* levels and are not regionally significant because these emissions are below the 10 percent threshold for each air basin's emissions budget established in the SIP. Therefore, the General Conformity Rule is not applicable to the Moderate Expansion Alternative. A Record of Non-Applicability for this alternative is provided in Appendix D5 and addresses all of the affected areas.

Comparison with Air Quality Standards

Since projected emissions associated with the Moderate Expansion Alternative are below *de minimis* levels, they would not contribute to new violations of state or federal ambient air quality standards.

4.3.5.2 Nonmilitary Uses

As discussed under the No Action Alternative, nonmilitary uses are not associated with any identifiable significant emission sources. Therefore, air quality impacts from nonmilitary uses under the Moderate Expansion Alternative would be less than significant.

4.3.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would formalize the Station's environmental planning and review processes, providing an analysis of actions that may include increases to existing air emissions and ensuring that these actions are appropriately permitted. As such, implementation of the CLUMP would represent a beneficial impact. Implementation of the INRMP would not affect the air quality at NAWS or in the ROI.

4.4
Biological Resources

4.4 BIOLOGICAL RESOURCES

This section identifies potential impacts to biological resources that may result from implementing each of the alternatives at NAWS. The analysis evaluates those activities that have the potential to adversely affect biological resources.

4.4.1 Region of Influence

The ROI for biological resources includes areas within NAWS boundaries.

4.4.2 Approach to Analysis

Activities associated with the proposed action and alternatives involve a variety of operational scenarios that use weapons systems, targets, aircraft, and ground vehicles. Elements addressed in the analysis include, but are not limited to, range flight operations, airfield flight operations, range ground operations, and select nonmilitary uses. Major issues addressed include the following:

- Potential impacts resulting from aircraft overflights and increased noise levels.
- Potential impacts resulting from ordnance impacts.
- Potential impacts resulting from an increased level of personnel and vehicular activity associated with GTT.

Federally listed threatened and endangered species and designated critical habitat are the primary focus of this assessment. In evaluating potential impacts to biological resources, factors considered in assessing significance include the extent or degree to which implementation of an alternative would substantially affect species listed as threatened or endangered by the federal government or substantially affect designated critical habitat.

NAWS staff has maintained coordination with the USFWS throughout the development of the CLUMP, INRMP, and associated EIS. In accordance with the CLUMP, the proposed operational increases would occur within established land use patterns throughout the NAWS ranges and would be conducted in accordance with the terms and conditions of the existing BOs (refer to Section 3.4.1.1 and Appendix E) and the standard impact avoidance and minimization procedures defined in both the CLUMP and BOs. Maintaining compliance with the terms and conditions of the existing BOs would ensure that impacts would not be greater than those analyzed by USFWS during associated consultations and, therefore, are less than significant.

As part of the impact analysis, species warranting NAWS stewardship are also considered. As described in Section 3.4.5, species warranting NAWS stewardship include plants and animals that are not federally protected but are considered important components of the Station's biological resources. Potential impacts are discussed below for the three resident federally listed species and species warranting NAWS stewardship in general. Under each alternative, potential impacts to these resources are identified and, when needed, mitigation measures are proposed to lessen the nature and extent of those impacts.

Current activities at NAWS are not conducted in wetlands and associated riparian areas. Aircraft overflights do not impact these areas, no target or test sites are located in wetlands or riparian areas, and GTT operations are not conducted in these habitats. Likewise, activities proposed under the Limited Expansion and Moderate Expansion alternatives would not be conducted in wetlands or near riparian habitats. Since wetlands and riparian areas are not impacted by the proposed action, these habitats are not addressed further in this section.

4.4.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.4.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

As described in Section 3.2, noise associated with flight test and training operations varies in intensity and duration. Aircraft noise occurs throughout the NAWS ranges at subsonic and supersonic levels and is recognized as a routine component of military activities that are consistent with the terms and conditions of the existing desert tortoise BO. Although range flight activities may have the potential to impact wildlife at NAWS, many desert species have shown an ability to acclimate to high noise levels, including sonic booms. This ability to acclimate to aircraft noise events has been observed by NAWS staff and contractor specialists conducting surveys and monitoring in the field. This finding is also supported by research conducted by the U.S. Air Force (1999) on the effects of jet noise from aircraft, including supersonic noise, on the desert tortoise. The results of this study confirmed field observations that desert tortoise do acclimate to aircraft related noise exposure and do not exhibit significant adverse effects related to their hearing, behavior, or heart rate.

Given the extent and density of populations of desert tortoise on active military bases with aircraft noise in California, Arizona, and Nevada, noise does not appear to have a significant adverse effect on these species. Other species, including falcons, bighorn sheep, and wild horses, are known to successfully and consistently reproduce throughout the NAWS ranges where aircraft operations occur. As discussed above, current range flight operations are consistent with the terms and conditions of the existing desert tortoise BO and do not adversely affect federally listed species or species warranting NAWS stewardship. Therefore, impacts from range flight operations are considered less than significant.

Continued aircraft flight operations over the George land management unit of the North Range would result in a continued, low risk of BASH. BASH concerns relate to the potential for a military aircraft to strike a bird in flight or a bird or animal on the ground. The primary areas of BASH potential are at the airfield and over the Station sewer ponds and associated drainage to the Lark Seep and China Lake Playa. BASH events can also include aircraft hitting terrestrial animals, such as rabbits or burros, on the runway. As noted in Section 3.4, historical records indicate that the potential for BASH incidents is low (i.e., approximately 2 per year for both range and airfield flight operations). In addition, there have been no reported events involving federally listed species or species warranting NAWS stewardship. Therefore, impacts to such species as a result of BASH events associated with current range flight operations are less than significant.

Airfield Flight Operations

Airfield operations include aircraft flights and associated ground-based activities, such as engine maintenance and testing, and aircraft fueling. Ground-based activities are conducted at established facilities throughout the airfield and have no direct effect on federally listed species or species warranting NAWS stewardship. Airfield flight operations do occasionally overfly areas that are identified as low-density desert tortoise habitat, but noise exposure levels are low (see Section 3.2, Noise) and are consistent with the terms and conditions of the existing desert tortoise BO. Noise from NAWS operations would continue to be of a relatively infrequent nature and not of sufficient strength to disrupt tortoise or other species for extended periods. Therefore, ongoing airfield flight operations do not

adversely affect federally listed species or species warranting NAWS stewardship and impacts are less than significant.

Continued aircraft flight operations at Armitage Airfield would result in a continued, low risk of BASH. As discussed above for range flight operations, the potential for a BASH event is low and impacts are less than significant.

Range Ground Operations

Target and Test Site Use. Potential effects of continued target and test site use on federally listed species at NAWS and species warranting NAWS stewardship are discussed below.

Mojave Tui Chub. Current range ground operations at target and test sites do not affect Mojave tui chub since chub habitat is located away from military operations.

Desert Tortoise. Approximately 355 square miles (919 square kilometers) of NAWS lands are identified as potential desert tortoise habitat. Target and test sites in tortoise habitat include specified use areas on portions of Baker, Charlie, George, Airport Lake, and a small section of the Coso land management unit on the North Range (see Figure 3.4-9) and portions of Mojave B North, Randsburg Wash, and Mojave B South/Superior Valley on the South Range (see Figure 3.4-10). The only target and test site areas located in tortoise habitat with populations greater than 20 animals per square mile (i.e., high-density habitat; refer to Section 3.4.4.2) is the airfield target in the Superior Valley Target Range. Because the targets are typically devoid of most vegetation, tortoises are not expected to be present within the target and test areas but could occasionally transit through these areas.

Target areas are cleared, maintained, and surrounded by designated buffer zones. Field surveys conducted in 1998 concluded that impacts outside the designated buffer zones were infrequent (Tetra Tech 1999) and additional impacts beyond those analyzed in the existing desert tortoise BO are unlikely. The likelihood of an ordnance fragment hitting an individual tortoise in the buffer zone is extremely low as no instances of tortoises being affected by ordnance have been recorded. There is a very small potential for tortoises to be hit in their burrows by either ordnance fragments that have impacted the ground surface with such force to create craters or ordnance that has penetrated below the ground surface. Since tortoise density on the North Range and in most portions of the South Range is low, and burrow density is also low, direct impacts to desert tortoise are considered very unlikely.

NAWS would continue to conduct range ground operations in accordance with the terms and conditions of the existing "non-jeopardy" BO issued by the USFWS in 1995. This mitigates any potential effects to a less than significant level. Procedures outlined in the BO include the following:

- Conduct tortoise surveys for new projects in desert tortoise habitat;
- Hold awareness briefings for personnel working in desert tortoise habitat;
- Apply standard avoidance and impact minimization measures;
- Implement project-specific mitigation as needed; and
- Maintain coordination with the USFWS and fulfill annual reporting requirements in accordance with the existing BO.

Inyo California Towhee. Current range ground operations do not directly affect Inyo California towhee habitat because target and test sites are not located within towhee habitat. However, NAWS efforts to maintain safe road access to the range areas were addressed through an informal consultation with USFWS (Vol. II, Appendix E-6) in 1990. Maintenance (trimming) of willows in the Mountain Springs Canyon area is occasionally required to facilitate safe vehicular access to the upper range areas and are conducted (when needed) in accordance with procedures established in 1990. These maintenance procedures call for trimming back the willows that extend onto the paved roadway at several points in the canyon. While vehicular traffic through towhee habitat may pose a very slight

potential for towhees to be struck by vehicles along the paved Mountain Springs Canyon Road, there have been no documented towhee fatalities caused by impacts with motor vehicles to date. Since military operations in these areas do not adversely affect towhees or towhee habitat; there are no impacts to the towhee from current target and test site use.

Plant Species Warranting NAWS Stewardship. Plant species warranting NAWS stewardship have been identified in three target areas at NAWS: the CTR, the Coles Flat targets in the Coso management unit, and the buffer zones of the SAM Site and auxiliary Bullseye targets in Superior Valley. The Darwin milk-vetch, pinyon rock cress, Panamint bird's beak, and a plant tentatively identified as Panamint mariposa lily are known to occur throughout the CTR. However, no direct impacts to these species have been recorded. Target impact areas in the CTR are relatively small in area with little or no disturbed habitat surrounding the target or within the buffer zones. The Mojave fish-hook cactus is known to occur at the Coles Flat target area in the Coso management unit, and is widely scattered throughout the northern portion of the North Range. On the South Range, Mojave fish-hook cactus is known to occur in the buffer zones for the SAM site and the auxiliary Bullseye target in Superior Valley and may have a similar pattern of occurrence as is found on the North Range. There have been no records of direct impacts to this species resulting from the continued use of target and test sites. Because of the large numbers of these plants scattered throughout the ranges and the lack of any identified impacts, the current use of target and test sites at NAWS has a less than significant impact on plant species warranting NAWS stewardship.

Wildlife Species Warranting NAWS Stewardship. The giant fairy shrimp is the only wildlife species warranting NAWS stewardship known to occur within areas designated as a target or test site. Direct impacts to the giant fairy shrimp are avoided as target and test sites are not used during periods of inundation. The giant fairy shrimp are, thus, able to hatch and complete the reproductive phase of their lifecycles. Other invertebrate species such as the Jerusalem crickets, dune cockroaches, dune weevils, and mammals such as Mojave ground squirrel and the Argus Mountain kangaroo rat may occur within the primary buffer zones of the target and test sites. Results of field surveys characterizing the ground disturbance patterns around target and test sites throughout the NAWS ranges (Tetra Tech 1999) indicated that the extent of ancillary impacts to the impact area buffer zones is minimal. While there is some potential for an individual animal to be affected by ongoing ordnance use at these sites, the likelihood of significantly affecting any species warranting NAWS stewardship is considered very low. Therefore, the current use of target and test sites has a less than significant impact on wildlife species warranting NAWS stewardship.

Ground Troop Training. GTT is a routine component of NAWS test and training operations. Potential effects of continued GTT on federally listed species at NAWS and species warranting NAWS stewardship are discussed below. As described in Chapter 2, two types of GTT are hosted at NAWS; Type 1 involves a small number of foot soldiers conducting overland maneuvers and Type 2 involves foot soldiers with wheeled vehicles operating only on the Station's road network and previously disturbed areas. These areas of operation are identified in Figures 2-2 and 2-3.

Mojave Tui Chub. Mojave Tui Chub habitat is not located near GTT areas of operation and current GTT operations on NAWS ranges have no effect on the chub and its habitat. Therefore, there are no impacts to the chub from current GTT activities.

Desert Tortoise. Type 2 GTT operations would continue to be restricted to existing roadways and disturbed areas, and Type 1 activities would continue to be conducted throughout the NAWS ranges. Type 1 activities would continue to be conducted within designated Desert Tortoise Critical Habitat in the Superior Valley Tactical Training Range, including areas that have been assigned a high-density category (i.e., 21 to 50 tortoise per square mile; refer to Section 3.4.4.2) on the east and west sides of Superior Valley. While GTT operations have some potential to affect desert tortoise and their habitat, existing management practices (as defined in the CLUMP and INRMP) are applied to keep Type 2 GTT limited to existing facilities, roads, and other disturbed areas, and environmental awareness briefings are mandatory for all Type I participants. Continued application of the Station's management practices and

conducting GTT operations in accordance with the terms and conditions of the existing desert tortoise BO reduces the potential for adverse effects on desert tortoise. Impacts are therefore considered less than significant.

Inyo California Towhee. GTT operations are not conducted in towhee habitat and current GTT operations at NAWS have no effect on the towhee or towhee habitat. Therefore, there are no impacts to the towhee from current GTT activities.

Plant Species Warranting NAWS Stewardship. Known plant species warranting NAWS stewardship are found in areas that are used for GTT Type 1 operations but not Type 2 operations. Since Type 1 operations are infrequent (approximately one day of use on 2,450 acres [991 hectares]), involve a small number of foot soldiers, and are widely disbursed throughout the NAWS ranges, the likelihood of these activities impacting substantial numbers of plants warranting NAWS stewardship is very low. Therefore, impacts of current GTT operations on plant species warranting NAWS stewardship are less than significant.

Wildlife Species Warranting NAWS Stewardship. Known wildlife species warranting NAWS stewardship are found in areas that are used for GTT Type 1 operations but not Type 2 operations. Since Type 1 operations are infrequent (approximately one day of use on 2,450 acres [991 hectares]), involve a small number of foot soldiers, and are widely disbursed throughout the NAWS ranges, the likelihood of these activities impacting substantial numbers of wildlife species warranting NAWS stewardship is very low. Therefore, the impacts of current GTT operations on wildlife species warranting NAWS stewardship are less than significant.

4.4.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education, and recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis.

Native American Use

Native American access to the Coso Hot Springs and Prayer Site would continue at current levels and be conducted in accordance with the existing MOA. Native American traditional practices do not affect federally listed species, critical habitats, or species/habitat warranting NAWS stewardship. Therefore, current access for Native American activities have no effect on these biological resources.

Research and Education

Scientific research conducted at NAWS by volunteers and professionals has included surveys for rare plants, invertebrates, slender salamanders, shrews, and bats. Because these requests for access undergo environmental review prior to approval, potential conflicts with federally listed species, critical habitat, and species/habitat warranting NAWS stewardship are identified and avoided or mitigated to ensure no significant impacts occur. Research focusing on wildlife species or habitats provides data useful in managing those resources and, thus, represents a beneficial impact to biological resource management.

Recreation

Camping. Camping occurs on a limited basis (4 to 6 times per year) in the Coso Range in the existing campsite area at the Birchum Springs. The camping area is located in an upland Joshua Tree Woodland zone which is towhee habitat. The Birchum Springs camping area is clearly identified by existing facilities, including parking areas and prepared campsites. This camping area is most often used on the weekends by Station employees for recreation and by contractor's field personnel as a convenient over-night location while conducting natural or cultural resources surveys for NAWS EPO. Historically recreation activities, such as hiking and bird watching, have been permitted at

this site. Participants receive the Station's standard environmental awareness briefings developed to prevent impacts to biological resources. Over the years of use, no resource damage or adverse impacts to protected species or habitat has been reported to or observed by NAWS staff. Since camping does not adversely affect federally listed species, critical habitats, or species/habitats warranting NAWS stewardship, impacts on biological resources are less than significant.

Golf and Gym Access. Continued public access to the golf course and gymnasium at Mainsite would not affect federally listed species, critical habitats, or species/habitats warranting NAWS stewardship because access to these developed areas is along existing paved roads. In addition, these areas are outside the boundaries of tortoise, chub, and towhee habitats. Current use of the Station's gym and golf course facilities has no effect on federally listed species, critical habitats, or species/habitats warranting NAWS stewardship.

Hiking. Hiking is permitted on existing roads and is generally performed by personnel with authorized access to the North Range areas. Hiking has no effect on federally listed species, critical habitat, or species/habitat warranting NAWS stewardship.

Equestrian Use. The area currently used for equestrian activities has been extensively disturbed by housing and other developments that were previously located in this area. While the area is near low-density desert tortoise habitat (i.e., 0 to 20 tortoise per square mile), it is also adjacent to rural housing areas. The existing trail, which is on unimproved dirt roadways, is not considered viable tortoise habitat. While the likelihood of a tortoise being on the trail is fairly remote, equestrians can easily avoid tortoise by traversing the trail. To date no reports of tortoise encounters have been reported to, nor observed by, NAWS staff. As such, the current use of this area for equestrian activities has a less than significant impact on biological resources.

Off-Road Vehicle Use. As described in Chapter 2, ORV use is restricted to two locations on-Station–Mirror Lake (for land-sailing vehicles) and a small section of the existing roadway to the South Range, the Randsburg Wash Access Road, for off-road motorcyclists. Land-sailing activities do not occur in tortoise habitat and, therefore, have no effect on desert tortoise or its habitat. The playa dry lakebed at Mirror Lake does contain the giant fairy shrimp, a species warranting NAWS stewardship (see Appendix E). Use of this lakebed could potentially affect the giant fairy shrimp. However, land-sail vehicles are lightweight and have minimal effect on the lakebed surface, which is very hard and not used when wet. Tow vehicles and trailers accessing the lakebed to unload the sail vehicles are heavier but also have little effect on the dense lakebed surface. Therefore, current ORV use has a less than significant impact on biological resources.

Authorized off-road motorcycle activities are restricted to a limited area of previously disturbed portions of the Randsburg access road. Habitat in the area that crosses the Randsburg Road is highly disturbed and is a part of the BLM open area where ORV activities are authorized. Only BLM-sponsored events are authorized to access this portion of NAWS lands. While motorcycles could potentially crush desert tortoise that may be in the area, the likelihood of this occurring is considered to be very low. Since this area is an established roadway and a designated BLM ORV use area, and the likelihood is very low that desert tortoise would occupy this highly disturbed area, adverse effects are unlikely and potential impacts to biological resources are considered less than significant.

Petroglyph Tours. Petroglyph tours are conducted in the Little Petroglyph Canyon area of the Coso Range. This general area may contain plant species warranting NAWS stewardship; however, tours are conducted in accordance with established procedures and are supervised by guides trained and certified by NAWS personnel. The number of visitors are controlled, they are limited to existing roads and trails, and collecting or damaging vegetation or harming wildlife is not allowed. Petroglyph tours provide visitors opportunities to witness the extraordinary environmental resources of the Station and, thus, represent a beneficial impact.

Bird Watching. The annual Audubon Society's annual bird count would continue to be held at Mainsite and George Range. In addition, avian surveys would also continue at the wastewater treatment facility. These activities are

permitted throughout areas designated by NAWS personnel and participants are required to access these areas on foot. Vehicular travel is restricted to existing roads and disturbed areas. Data gathered during these bird counts are provided to NAWS and are used to support management efforts to conserve and protect the Station's natural resources. Since these activities do not adversely affect federally listed species, critical habitats, or species/habitat warranting NAWS stewardships and they serve to generate useful data, bird watching activities are considered a beneficial impact.

Photography. Requests for photographic activities are considered by the Station's Commanding Officer on a case-by-case basis. Participants in authorized photographic activities are given the NAWS environmental briefing, and activities are limited to existing roadways and disturbed areas. As such, these activities have no effect on federally listed species, critical habitats, or species/habitats warranting NAWS stewardship.

4.4.3.3 CLUMP and INRMP Implementation

Under the No Action Alternative, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP in compliance with the requirements of the Sikes Act as amended. The draft INRMP describes the Station's approach to managing biological resources, lists species warranting NAWS stewardship, identifies important biological resource habitats located on-Station, and provides management guidelines and priorities to ensure that these areas are conserved and protected in accordance with applicable laws, regulations, and policies. The draft INRMP provides management direction for the protection of threatened and endangered species; the conservation of habitat; the conservation and protection of ground and surface water resources; the management of feral grazing; and the continuation of resources inventory and data management. An accessible GIS database incorporates the biological resources data provided by the draft INRMP that can be used by operations personnel and environmental planners to ensure that biological resources are appropriately considered in operational planning efforts. This database facilitates the implementation of standard management practices (defined in the CLUMP and the INRMP) to avoid or minimize potential adverse effects to biological resources. Since the CLUMP and INRMP would provide a vehicle for enhanced management of biological resources, its implementation would represent a beneficial impact. As discussed in the following subsections, the provisions for feral grazing management and fire management contained in the INRMP would also represent a beneficial impact to biological resources at NAWS.

Feral Grazing Management

Under the No Action Alternative, feral grazing management practices would continue at NAWS. The management of wild horse and burro populations serves to limit environmental degradation associated with grazing (described in Section 3.4.7, Biological Resources). The ongoing efforts to fence springs would continue to allow appropriate wildlife access to water sources while excluding horse and burro access and associated impacts to riparian areas. Therefore, the continuation of feral grazing management practices at NAWS represents a beneficial impact to both plant species and wildlife habitats.

Fire Management

Under the No Action Alternative, NAWS would continue to suppress any fires that may occur in the NAWS DTMA located in the Superior Valley Management Unit. The goal of the fire management policy is to promptly extinguish all fires created by ongoing test and training operations. Several measures have and would continue to be implemented as part of the fire management policy to reduce the potential for impacts in the DTMA. These measures include the following.

- Control the use of flares, spotting charges, and other devices that have high flame-generating ability (during fire-prone conditions), where practicable.
- Use non-pyrophoric spotting charges whenever possible.

- Maintain previously cleared target areas to reduce the potential for fuel buildup and thereby minimize the potential for fires to catch and spread into undisturbed areas.
- Move target objects from the periphery into the target area center during high fuel-loading years.
- Develop standard procedures for initial response and fire suppression protocols for the Superior Valley Range operators.
- Continue clearing target areas of unexploded ordnance by EOD personnel so that range operations crews can safely access these areas.
- Procure appropriate fire suppression equipment for range operations personnel.
- Implement emergency fire suppression training for range operations personnel at Superior Valley.
- Use existing roads and natural features, such as washes, as part of the fire break system.

With implementation of the measures outlined above, potential adverse effects to designated Desert Tortoise Critical Habitat and to the DTMA from uncontrolled fires in the Superior Valley area are minimized. The control of fires in this area minimizes the potential for impacts to other species as well. Therefore, the NAWS fire management policy has a beneficial impact and is consistent with the terms and conditions of the BO for the implementation of the NAWS DTHMP.

4.4.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.4.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

<u>Range Flight Operations</u>

Under the Limited Expansion Alternative, the addition of up to 64 supersonic operations would increase the number of sonic booms over the NAWS ranges. Based on historic effects of sonic booms at NAWS (see Noise, Section 4.2.2), this increase would likely result in approximately 6 or 7 additional sonic booms reach ground level (US Air Force 2001) throughout the NAWS ranges. However, as discussed for the No Action Alternative, supersonic flights are a routine component of military activities that are consistent with the terms and conditions of the existing desert tortoise BO. Also, many species (including desert tortoise) have shown the ability to acclimate to supersonic noise events. The additional supersonic events would not result in a substantial change to existing conditions, given the limited increase in supersonic operations, the short duration (i.e., approximately 1-2 seconds) of sonic boom events, and the geographic distribution of supersonic flight events over the four established flight tracks on the NAWS ranges. Since supersonic flights are consistent with the existing desert tortoise BO and no additional adverse effects on federally listed species, critical habitats, or species warranting NAWS stewardship are expected, the increase in range flight operations would have a less than significant impact on these resources. As discussed under the No Action Alternative, the potential for a BASH event is low (approximately 2 per year for both range and airfield flight operations). Based on historical records, a 15 percent increase in range flight operations could increase the potential for a BASH event from approximately 2 events per year to approximately 3 events per year. However, there have been no recorded BASH events at NAWS involving federally listed species or species warranting NAWS stewardship. Therefore, impacts to biological resources would be less than significant.

Airfield Flight Operations

Under the Limited Expansion Alternative, the types of airfield operations generally would remain the same as those described for the No Action Alternative. Although there would be an increase in overflights of low-density tortoise habitat, these additional flights are consistent with the terms and conditions of the existing desert tortoise BO and would not result in substantial changes to the existing noise environment (see Section 4.2). As such, increased airfield operations would not adversely affect federally listed species or species warranting NAWS stewardship and impacts would be less than significant. As discussed under the No Action Alternative, the potential for a BASH event is low (approximately 2 per year for both range and airfield flight operations). Based on historical records, a 15 percent increase in airfield flight operations could increase the potential for a BASH event from approximately 2 events per year to approximately 3 events per year. However, there have been no recorded BASH events at NAWS involving federally listed species or species warranting NAWS stewardship. Therefore, related impacts to biological resources would be less than significant.

Range Ground Operations

Target and Test Site Use. Potential effects of increased target and test site use on federally listed species at NAWS and species warranting NAWS stewardship are discussed below.

Mojave Tui Chub. None of the proposed operational increases are expected to affect the Mojave tui chub or its habitat. No target or test sites are in proximity to chub habitat and range ground activity would have no effect on the chub. Therefore, the increased use of target and test sites would not result in impacts to the chub.

Desert Tortoise. The reutilization of previously used test and target sites include areas in the Baker, Charlie, and George management units on the North Range and in the Superior Valley on the South Range. These areas have not routinely been used during the last 10 years, but their use is consistent with the terms and conditions of the existing desert tortoise BO. These areas were previously cleared of vegetation and extensively disturbed. Although the areas have been allowed to re-vegetate, they are considered to have low habitat value, and the likelihood of directly impacting desert tortoise is considered to be low for all these areas, except the areas to be re-utilized in the Superior Valley. Since the target and test sites that would be re-utilized in the Superior Valley are located in designated critical habitat and are managed in accordance with the Station's DTHMP, some potential exists that areas may be actively used by desert tortoise. Although these areas have been previously disturbed, there is a small potential for affecting desert tortoise if the targets are reactivated. After careful analysis of data gathered during field surveys (Tetra Tech 1999), NAWS made the determination that activities associated with the proposed reutilization of Superior Valley test sites are adequately addressed and consistent with the terms and conditions of the existing BO. Maintaining compliance with the terms and conditions of the BO (see Appendix E) would reduce impacts to the desert tortoise associated with the reuse of target and test sites in the Superior Valley to a less than significant level.

Increasing the tempo of ordnance use at existing and reutilized targets on the NAWS ranges and the reintroduction of HE in the Wingate Airfield target for limited use (2 to 3 times per year) of precision-guided munitions is consistent with the historic use of these areas and therefore, is consistent with the terms and conditions of the existing desert tortoise BO. This action is not expected to adversely affect desert tortoise or tortoise habitat. Target areas already are extensively disturbed and void of surface vegetation. Increased use would not involve any construction, grading, or target expansion and, thus, additional tortoise habitat would not be disturbed. The Wingate Airfield target is within the DTMA area where tortoise density is low (i.e., 0 to 20 tortoise per square mile). Maintaining compliance with the terms and conditions of the BO (see Appendix E) would reduce potential impacts to a less than significant level.

Inyo California Towhee. Increasing the tempo of ordnance and target use, and the reuse of previously disturbed target and test sites would not affect Inyo California towhee or their habitat. No target or test sites are located in or adjacent to towhee habitat and no direct impacts to the towhee would occur. The potential for indirect impacts would

be the same as addressed under the No Action Alternative; the towhee and towhee habitat would not be adversely affected. Therefore, increasing the tempo of target and test area use and the reutilization of previously used target areas would have no impact on the towhee and their habitat.

Plant Species Warranting NAWS Stewardship. An increase in ordnance and target use is not expected to significantly impact plant species warranting NAWS stewardship. Biologists did not observe any such species at the NAWS target impact areas during the target disturbance characterization surveys conducted in 1998 (Tetra Tech 1999). Increased utilization of the previously disturbed target areas is not expected to impact plant species warranting NAWS stewardship, since those areas also have been highly disturbed. The Wingate target area is already extensively disturbed and the increased tempo of ordnance use and the reintroduction of precision-guided HE ordnance would not directly impact any plant species warranting NAWS stewardship at these sites. The increase in target and ordnance use and the reuse of target and test sites also is not expected to result in impacts to these plant species that could affect abundance or diversity of that species. Therefore, potential impacts to plant species warranting NAWS stewardship associated with all target and test site use under the Limited Expansion Alternative would be less than significant.

Wildlife Species Warranting NAWS Stewardship. An increase in ordnance and target use is not expected to significantly impact wildlife species warranting NAWS stewardship. These areas are highly disturbed and do not provide habitat for such species. The increased utilization of previously used target areas is not expected to have an adverse impact on wildlife species warranting NAWS stewardship. The Wingate target area is already extensively disturbed and increased use and the reintroduction of precision-guided HE ordnance would not directly impact these wildlife species. Therefore, potential impacts to wildlife species warranting NAWS stewardship associated with target and test site use under the Limited Expansion Alternative would be less than significant.

Ground Troop Training. Potential effects of increased operations on federally listed species at NAWS and species warranting NAWS stewardship are discussed below. As described in Chapter 2, Type 1 training involves foot soldiers only (no vehicle use) and Type 2 training involves foot soldiers and wheeled vehicles operating on existing roadways and in disturbed areas only.

Mojave Tui Chub. Mojave tui chub habitat is not located near GTT areas of operation and no GTT activities are expected to have a direct or indirect impact on the chub or its habitat. GTT operations on NAWS ranges under the Limited Expansion Alternative would not affect the chub. Therefore, GTT operations would not result in impacts to the chub.

Desert Tortoise. As described under the No Action Alternative, Type 2 GTT operations would continue to be restricted to existing roadways and disturbed areas and Type 1 activities would continue to be conducted throughout the NAWS ranges consistent with the terms and conditions of the existing desert tortoise BO. Type 1 activities in the Superior Valley would increase in frequency within designated Desert Tortoise Critical Habitat. GTT activities would be conducted throughout most of the designated Desert Tortoise Critical Habitat in the Superior Valley Tactical Training Range, including areas that have been assigned a high-density category (i.e., 21 to 50 tortoise per square mile; refer to Section 3.4.4.2) on the east and west sides of Superior Valley. Potential impacts from increased GTT in high-density tortoise habitat and designated Desert Tortoise Critical Habitat would continue to be minimized by applying standard avoidance and minimization practices (including environmental sensitivity briefs) in accordance with the terms and conditions identified in the BO (see Appendix E). Therefore, potential impacts would be reduced to less than significant levels.

Inyo California Towhee. GTT operations are not conducted within towhee habitat so proposed increases in these operations would have no effect on this species. Therefore, increases to GTT operations would have no impact on the towhee or towhee habitat.

Plant Species Warranting NAWS Stewardship. As described for the No Action Alternative, known plant species warranting NAWS stewardship are found in areas that are used for GTT Type 1 operations but not Type 2 operations. Since Type 1 operations would involve a small number of foot soldiers, the likelihood of these activities impacting substantial numbers of plant species warranting NAWS stewardship is very low. Therefore, the impacts of GTT operations on these species would be less than significant.

Wildlife Species Warranting NAWS Stewardship. As described for the No Action Alternative, known wildlife species warranting NAWS stewardship are found in areas that are used for GTT Type 1 operations but not Type 2 operations. Since Type 1 operations would involve a small number of foot soldiers, the likelihood of these activities impacting substantial numbers of wildlife species warranting NAWS stewardship is very low. Therefore, the impacts of GTT operations on these species would be less than significant.

4.4.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and education, and recreation activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.4.3.2, these activities would have less than significant impacts on biological resources.

4.4.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would formalize and implement the draft INRMP and provide a vehicle for enhanced management of biological resources in compliance with the Sikes Act, as amended, and therefore represent a beneficial impact.

4.4.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.4.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Under the Moderate Expansion Alternative, the addition of up to 64 supersonic operations would increase the number of sonic booms over the NAWS ranges. Based on historic effects of sonic booms at NAWS (see Noise, Section 4.2.2), this increase would likely result in approximately 6 or 7 additional sonic booms reach ground level (US Air Force 2001) throughout the NAWS ranges. However, as discussed for the No Action Alternative, supersonic flights are a routine component of military activities that are consistent with the terms and conditions of the existing desert tortoise BO. Also, many species (including desert tortoise) have shown the ability to acclimate to supersonic noise events. The additional supersonic events would not result in a substantial change to existing conditions, given the limited increase in supersonic operations, the short duration (i.e., approximately 1-2 seconds) of sonic boom events, and the geographic distribution of supersonic flight events over the four established flight tracks on the NAWS ranges. Since supersonic flights are consistent with the existing desert tortoise BO and no additional adverse effects on federally listed species, critical habitats, or species warranting NAWS stewardship are expected, the increase in range flight operations would have a less than significant impact on these resources. Since no adverse effects on federally listed species, critical habitats, or species warranting NAWS stewardship are expected, the increase in range flight operations would have a less than significant impact on these resources. As discussed under

the No Action Alternative, the potential for a BASH event is low (approximately 2 per year for both range and airfield flight operations). Based on historical records, a 25 percent increase in range flight operations could increase the potential for a BASH event from approximately 2 events per year to approximately 3 events per year. However, there have been no recorded BASH events at NAWS involving federally listed species or species warranting NAWS stewardship. Therefore, impacts to biological resources would be less than significant.

Airfield Flight Operations

Under the Moderate Expansion Alternative, the types of airfield operations generally would remain the same as those described for the No Action Alternative with an increased tempo of 25 percent. Although there would be an increase in overflights of low-density tortoise habitat, these additional flights are consistent with the terms and conditions of the existing desert tortoise BO and would not result in substantial change to the existing noise environment (see Section 4.2). As such, increased airfield operations would not adversely affect federally listed species or species warranting NAWS stewardship and impacts would be less than significant. As discussed under the No Action Alternative, the potential for a BASH event is low (approximately 2 per year for both range and airfield flight operations). Based on historical records, a 25 percent increase in airfield flight operations could increase the potential for a BASH event from approximately 2 events per year to approximately 3 events per year. However, there have been no recorded BASH events at NAWS involving federally listed species or species warranting NAWS stewardship. Therefore, related impacts to biological resources would be less than significant.

Range Ground Operations

Target and Test Site Use. Potential effects of increased target and test site use on federally listed species at NAWS and species warranting NAWS stewardship are discussed below.

Mojave Tui Chub. None of the proposed operational increases are expected to affect the Mojave tui chub or its habitat. No target or test sites are in proximity to chub habitat and range ground activity would have no effect on the chub. Therefore, the increased use of target and test sites would not result in impacts to the chub.

Desert Tortoise. The reutilization of previously used test and target sites include areas in the Baker, Charlie, and George management units on the North Range and in the Superior Valley on the South Range. These areas have not routinely been used during the last 10 years, but their use is consistent with the terms and conditions of the existing desert tortoise BO. These areas were previously cleared of vegetation and extensively disturbed. Although the areas have been allowed to re-vegetate, they are considered to have low habitat value, and the likelihood of directly impacting desert tortoise is considered to be low for all these areas, except the areas to be re-utilized in the Superior Valley. Since the target and test sites that would be re-utilized in the Superior Valley are located in designated critical habitat and are managed in accordance with the Station's DTHMP, some potential exists that areas may be actively used by desert tortoise. Although these areas have been previously disturbed, there is a small potential for affecting desert tortoise if the targets are reactivated. After careful analysis of data gathered during field surveys (Tetra Tech 1999), NAWS made the determination that activities associated with the proposed target and test site use are adequately addressed and consistent with the terms and conditions of the existing BO. Maintaining compliance with the terms and conditions of the BO (see Appendix E) would reduce impacts to the desert tortoise associated with the reuse of target and test sites in the Superior Valley to a less than significant level.

Increasing the tempo of ordnance use at existing and reutilized targets on the NAWS ranges and the reintroduction of precision-guided HE in the Wingate Airfield and Bullseye Target areas is consistent with the historic use of these areas and therefore, is consistent with the terms and conditions of the existing desert tortoise BO. This action is not expected to adversely affect desert tortoise or tortoise habitat. As described for the Limited Expansion Alternative, target areas throughout the ranges are already extensively disturbed and are void of surface vegetation. Increased use would not involve any construction, grading, or target expansion and thus, additional tortoise habitat would not be disturbed. The Wingate Airfield and Bullseye Target areas are within DTMAs where tortoise density is low (i.e., 0

to 20 tortoise per square mile). Maintaining compliance with the terms and conditions of existing BO (see Appendix E) would reduce potential impacts to a less than significant level.

Inyo California Towhee. Increasing the tempo of ordnance and target use, and the reuse of previously disturbed target and test sites would not affect Inyo California towhee or their habitat. No target or test sites are located in or adjacent to towhee habitat and no direct impacts to the towhee would occur. The potential for indirect impacts would be the same as addressed under the No Action Alternative; the towhee and towhee habitat would not be adversely affected. Therefore, increasing the tempo of target and test area use and the reutilization of previously used target areas would have no impact on the towhee and their habitat.

Plant Species Warranting NAWS Stewardship. An increase in ordnance and target use is not expected to significantly impact plant species warranting NAWS stewardship. Biologists did not observe any such species at the NAWS target impact areas during the target disturbance characterization surveys conducted in 1998 (Tetra Tech 1999). Increased utilization of the previously disturbed target areas is not expected to impact plant species warranting NAWS stewardship, since those areas also have been highly disturbed. The Wingate and Bullseye target areas are already extensively disturbed and the increased use and reintroduction of precision-guided HE ordnance would not directly impact plant species warranting NAWS stewardship at these sites. The increase in target and ordnance use and the reuse of target and test sites also is not expected to result in impacts to these plant species that could affect abundance or diversity of that species. Therefore, potential impacts to plant species warranting NAWS stewardship associated with target and test site use under the Moderate Expansion Alternative would be less than significant.

Wildlife Species Warranting NAWS Stewardship. An increase in ordnance and target use is not expected to significantly impact wildlife species warranting NAWS stewardship. These areas are highly disturbed and do not provide habitat for such species. Reuse of targets would not adversely affect large or multiple populations of wildlife species warranting NAWS stewardship that can exist in appropriate habitat in other areas throughout NAWS (for example, invertebrates such as Jerusalem crickets in creosote bush scrub and Darwin Tiemann's beetle near playa lakebeds). Further, the reuse of target and test sites is not expected to result in the loss of a substantial number of wildlife species warranting NAWS stewardship to a degree that could affect abundance or diversity of such species. Therefore, potential impacts to wildlife species warranting NAWS stewardship associated with target and test site use would be less than significant.

Ground Troop Training. Potential effects of increased GTT on federally listed species at NAWS and species warranting NAWS stewardship are discussed below. As described in Chapter 2, Type 1 training involves foot soldiers only (no vehicle use); Type 2 training involves foot soldiers and wheeled vehicles operating on existing roadways and in disturbed areas, and Type 3 training involves foot soldiers with both tracked and wheeled vehicles.

Mojave Tui Chub. Mojave tui chub habitat is not located near GTT areas of operation and no GTT activities are expected to have a direct or indirect impact on the chub or its habitat. GTT operations on NAWS ranges under the Moderate Expansion Alternative would not affect the chub. Therefore, GTT operations would not result in impacts to the chub.

Desert Tortoise. As described under the No Action Alternative, Type 2 GTT operations would continue to be restricted to existing roadways and disturbed areas, and Type 1 activities would continue to be conducted throughout the NAWS ranges consistent with the terms and conditions of the existing desert tortoise BO. In addition, under the Moderate Expansion Alternative a Type 3 GTT area of operation would be established at the Airport Lake management unit. No impacts to tortoises are expected from Type 3 GTT at Airport Lake because tortoises are not expected to occur on or immediately adjacent to the lakebed. Types 1 and 2 GTT in Superior Valley would increase in frequency within designated Desert Tortoise Critical Habitat. GTT activities would be conducted throughout most of the designated Desert Tortoise Critical Habitat in the Superior Valley Tactical Training Range, including areas that have been assigned a high-density category (i.e., 21 to 50 tortoise per square mile; refer to

Section 3.4.4.2) on the east and west sides of Superior Valley. Potential impacts from increased GTT in high-density tortoise habitat and designated Desert Tortoise Critical Habitat would continue to be minimized by applying standard avoidance and minimization practices (including environmental sensitivity briefs) in accordance with the terms and conditions identified in the BO (see Appendix E). Therefore, potential impacts would be reduced to less than significant levels.

Inyo California Towhee. GTT operations are not conducted within towhee habitat so proposed increases in these operations would have no effect on this species. A slight potential exists for towhees to be struck by vehicles along Mountain Springs Canyon Road as a result of establishment of a Type 1 GTT operations area in the CTR. However, a strike is considered highly unlikely since the number of operations using Mountain Springs Road is expected to be approximately 10 per year. Since these operational increases are not expected to affect the towhee or towhee habitat, increases to GTT operations at NAWS would have no impact.

Plant Species Warranting NAWS Stewardship. As described for the No Action Alternative, known plant species warranting NAWS stewardship are found in areas that are used for GTT Type 1 operations but not Type 2 or Type 3 operations (conducted on disturbed areas and roadways). Since Type 1 operations would involve a small number of foot soldiers, the likelihood of these activities impacting substantial numbers of plant species warranting NAWS stewardship is very low. A new GTT area would be established in the CTR, but only Type 1 small-scale exercises would be allowed. A total of 90 annual use-days are proposed, and troops would receive briefings on environmental issues prior to training. Therefore, the likelihood is low that a large population of plant species warranting NAWS stewardship would be disturbed, or that the abundance or diversity of such species would be affected. Therefore, the impacts of GTT operations on these species would be less than significant.

Wildlife Species Warranting NAWS Stewardship. As described under the No Action Alternative, known wildlife species warranting NAWS stewardship are found in areas that are used for GTT Type 1 operations but not Type 2 or Type 3 operations (conducted on disturbed areas and roadways). Since Type 1 operations would involve a small number of foot soldiers, the likelihood of these activities impacting substantial numbers of wildlife species warranting NAWS stewardship is very low. Therefore, the impacts of GTT operations on these species would be less than significant.

4.4.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education, and recreation activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.4.3.2, these activities would have less than significant impacts on biological resources.

4.4.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would formalize and implement the draft INRMP and provide a vehicle for enhanced management of biological resources in compliance with the Sikes Act, as amended, and therefore represent a beneficial impact.

4.5
Cultural Resources

4.5 CULTURAL RESOURCES

This section identifies potential impacts to cultural resources that may result from implementing each of the alternatives at NAWS. The analysis evaluates those activities that have the potential to adversely affect cultural resources (including historic buildings and structures, prehistoric and historic archaeological resources, and Native American traditional cultural properties).

4.5.1 Region of Influence

The ROI for cultural resources includes areas within NAWS boundaries.

4.5.2 Approach to Analysis

When evaluating potential impacts to cultural resources, the Navy follows guidance contained in the NHPA Section 106, and its implementing regulations (36 C.F.R. § 800). This legislation requires the Agency Official to identify consulting parties (SHPO, Native American tribes, and other interested individuals or organizations); identify historic properties within the APE; and assess and resolve potential adverse effects (avoid, minimize, or mitigate the adverse effects on historic properties). These steps take place in cooperation with the consulting parties. Historic properties in this section refer only to those prehistoric or historic districts, sites, buildings, structures, or objects that meet the criteria for inclusion in the NRHP (referred to as the National Register) specified in 36 C.F.R. § 60.

This analysis considers potential direct, indirect, or cumulative effects. Effects may be adverse or beneficial. Direct impacts are those that affect all or part of a historic property (district, site, building, structure, or object), including not only the physical property itself but also the characteristics that qualify the property for the National Register. Indirect impacts also affect an historic property or its value but do so as a secondary consequence of an action. Cumulative impacts result from actions that, if taken one at a time, might have no impact on historic properties, but when added together over time, could have an impact.

Impacts are assessed with respect to their potential to result in a substantial adverse change to the integrity of an historic property's location, design, setting, materials, workmanship, feeling, or association (36 C.F.R. § 800.5). Impacts to historic properties include, but are not limited to, physical destruction, damage, or alteration of all or part of the property; isolation of the property or alteration of the character of the property's setting when that character contributes to the property's qualifications for the National Register; introduction of visual, audible, or atmospheric elements that are out of character with the property or changes that may alter its setting; neglect of a property resulting in its deterioration or destruction; or transfer, lease, or sale of a property without adequate provisions to protect its historic integrity. Beneficial impacts protect, preserve, or otherwise enhance a cultural resource. An example of a beneficial impact would be the adaptive reuse of an historic building rather than allowing the building to deteriorate through vacancy.

When analyzing potential impacts to archaeological sites from the proposed increase in use of target and test areas, it is necessary to separate potential impacts to actual target or test areas from potential impacts to target or test area primary buffer zones (areas defined as 200 meters around a target or test area). This separation approach is applied because target and test areas, which were established at NAWS before environmental protection laws were enacted, have received intensive use over the past 30 to 50 years. Through this repeated, long-standing use, nearly every part of any given target or test area has been subject to extensive ground disturbance. Archaeological sites that may have been located in these highly disturbed target and test areas no longer retain the integrity necessary to meet National Register criteria and are not considered further in this analysis.

When analyzing potential effects to Native American traditional cultural properties, impacts are considered significant if the action could substantially alter the condition of sites important to Native Americans or could reduce

access to sacred or traditional activity areas. Identification of the properties that are important to Native Americans is an on-going resource management activity at NAWS. In compliance with the 36 C.F.R. § 800 regulations (as published in December 2000), representatives of Native American tribes with historic ties to the land and resources within the boundaries of NAWS have been identified, and consultation procedures are being formalized (NAWC 1999a). NAWS continues to apply established procedures addressing Native American burial sites through consultations with the appropriate Native American representatives in accordance with the NAGPRA and 36 C.F.R. § 800.

As described in Section 3.5.3.1, NAWS Section 106 compliance efforts will continue to be implemented in accordance with 36 C.F.R. § 800 requirements (as described in the CLUMP) and consistent with procedures outlined in the Station's PA (Appendix F of this document) and Appendix E of the ICRMP. According to the ICRMP standard technical procedures, each site identified through field surveys within an APE is to be inventoried and evaluated to determine the eligibility of the site for listing in the National Register. The APE for this undertaking includes the primary buffers zones for target and test areas, range-wide. Primary buffer zones around target impact areas will be inventoried in accordance with the ICRMP schedule, and all sites inventoried will be evaluated for National Register eligibility. Any historic properties determined to be eligible for listing within the site boundary will be appropriately treated to ensure the protection of the resource. NAWS employs the standard treatment methods of avoidance and recovery. If an eligible resource is located at the outer edge of the primary buffer zone and no physical evidence indicating any land disturbance related to military use of the area is present, the historic property will be managed *in situ* (left undisturbed in its present location). Conversely, if an eligible resource is found to be in proximity to the boundary of a target impact area or if there is evidence of disturbance from military operations adjacent to the resource, that historic property would be recovered in accordance with ICRMP protocols and curated according to federal standards.

4.5.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.5.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

<u>Range Flight Operations</u>

Since range flight operations typically have no effect on ground-based cultural resources, impacts on prehistoric and historic resources from current range flight operations are less than significant. Native American participation in traditional rites and ceremonies is not adversely affected by current military activities because Native American visitation to the Coso Hot Springs and Prayer Site area for traditional purposes are conducted when the ranges are not being used for aircraft testing or training operations. As such, current range flight operations at NAWS have a less than significant impact on traditional cultural properties and Native American access to established areas for religious and traditional purposes.

<u>Airfield Flight Operations</u>

Under the No Action Alternative, flight operations would continue to be conducted at Armitage Airfield would use existing facilities and operating areas. While Hangar 1 at Armitage Airfield has been identified as a potentially eligible historic structure, continued operation of the facility would be conducted in accordance with the Station's

historic preservation guidelines. In addition, because it has been built to military use specifications, Hangar 2 would not be affected by potential vibrations from aircraft operations. Since airfield flights typically do not affect ground-based cultural resources, impacts on prehistoric and historic resources due to current overflights are less than significant.

Range Ground Operations

Target and Test Site Use. As noted in Section 4.5.2, target and test areas generally are void of any surface features due to the intensive historical ground disturbance received over many years of use. Therefore, no cultural resources that would qualify for listing on the National Register are expected to occur in the target and test areas.

Primary buffer zones may receive infrequent, unintended impacts associated with target and test area use. Continued use of established target and test sites could create incidental and unpredictable impacts within the primary buffer zones of the target and test areas. Adverse impacts are reduced to less than significant levels through implementation of the following mitigation measures (in accordance with the Station's PA and the ICRMP):

- Continuation of intensive surveys of primary buffer zones in accordance with the Station's NHPA Section 106 strategy.
- Development of appropriate treatment plans in the event that eligible resources are identified in accordance with the ICRMP.
- Continuation of management of the areas around the primary buffer zones in accordance with NAWS management practices to avoid, minimize, or mitigate potential adverse effects.

Implementation of the above measures ensures that no adverse effects to cultural resources occur. In addition to the potential for ancillary impacts in the primary buffer zones, the possibility exists that the continued use of the impact areas may adversely affect buried resources. Of critical importance in this regard is the potential for discovery of human remains. The following mitigation measures reduce potential impacts to buried resources to a less than significant level:

- Inclusion of standard halt-work clauses to all construction contracts that curtail work activity at a site upon the discovery of archaeological materials, especially human remains.
- In the unlikely event of the discovery of human remains, suspension of activities in the affected area (in accordance with existing management practices) until the EPO is contacted to initiate consultation with the SHPO and appropriate Native American tribes in accordance with established NAGPRA procedures, which mandate a 30-day work stoppage.

Implementation of the above measures ensures that no adverse effects to cultural resources occur.

Ground Troop Training. Type 1 (soldiers without vehicles) and Type 2 (soldiers with wheeled vehicles) activities would continue to occur on NAWS's established road network and other previously disturbed areas. Although Type 2 activities generally are conducted in areas that are a minimum of 0.25 mile (0.40 kilometer) from significant archaeological resources, and staging areas are confined to previously disturbed areas (or areas that have been determined through surveys to contain no sensitive resources), Type 1 operations occasionally do use areas where sensitive cultural resources are present. These impacts are reduced to less than significant levels through implementation of the following mitigation measures:

- Maintenance of awareness in-briefings prior to training exercises to the participating GTT units.
- Continuation of routine cultural resources post-activity site visits by NAWS personnel to ensure that training operations are performed in accordance with established management practices.

Implementation of the above measures ensures that no adverse effects to cultural resources occur.

Continued Facility Utilization

Under the No Action Alternative, no new facilities or infrastructure are proposed but the operation and maintenance of existing facilities would continue according to current trends. There is some potential that impacts may occur to existing buildings and structures that have been recommended eligible for listing in the National Register from continued or reestablished use. As described in Section 3.5.3.3, 158 buildings and structures at NAWS have been recommended as eligible for the National Register. Impacts to these buildings and structures are reduced to less than significant levels through implementation of the following mitigation measures:

- Management of the continued use of structures in accordance with established historic preservation guidelines developed by NAWS (Mikesell 1997d).
- Implementation and conformance with these guidelines through NAWS's facility maintenance and operations procedures, which are monitored by the Public Works Department EC.

Implementation of the above measures ensures that no adverse effects to cultural resources occur.

4.5.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education, and recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis.

Native American Use

Under the No Action Alternative, access to the Coso Hot Springs and Prayer Site would continue in accordance with the existing MOA between the Navy and local Native American tribes. Access by Native American tribal members not covered under the existing MOA would continue to be considered on a case-by-case basis, as requested. Access for traditional and religious purposes are not expected to have an adverse effect on other cultural resources because these activities do not disturb ground or resource features. Continued access to these resources for traditional and religious practices contributes to a greater appreciation of the resources and the continued importance of the resources in the traditional belief system of contemporary Native Americans. Therefore, continued access to the Coso Hot Springs and Prayer Site is considered a beneficial impact on cultural resources.

Research and Education

Research and education initiatives addressing natural and cultural resources at NAWS are considered to have a beneficial impact on these resources and their management. Research adds to understanding of cultural resources and provides a cost-effective method to contribute data to the Station's resources inventory. Educational projects increase public awareness and appreciation of NAWS resources and the Station's long-standing land stewardship practices. Although some proposed research projects may have ground disturbing potential, (e.g., well drilling, seismic monitoring, etc.), these types of proposals are addressed through the Station's existing environmental review procedures and, when necessary, project-specific environmental documents are prepared. During the environmental review process, potential impacts to cultural resources are identified, evaluated, and mitigated (as appropriate) according to NEPA, Section 106 of the NHPA, NAGPRA, and the AIRFA. As such, continued use of the Station's lands for research and educational activities is considered a beneficial impact on cultural resources management.

Recreation

Under the No Action Alternative, recreational uses (camping, golf and gym access, hiking, equestrian use, ORV use, petroglyph tours, bird watching, and photography) would continue at the current level of activity. Specific activities are addressed below. No adverse effects to cultural resources occur.

Camping. Because campers are provided with a briefing on the protection of natural and cultural resources by a NAWS escort and camping is restricted to an established, previously disturbed area, impacts on cultural resources are less than significant. No adverse effects to cultural resources occur.

Golf and Gym Access. Access to the Station's golf and gym facilities is provided on a case-by-case basis. These facilities have no cultural or historic significance. Impacts on cultural resources from use of these facilities are less than significant. No adverse effects to cultural resources occur.

Hiking. All hiking would continue to be restricted to existing, previously disturbed trails. Since these areas do not contain eligible resources, impacts to cultural resources from hiking are less than significant. No adverse effects to cultural resources occur.

Equestrian Use. All equestrian use would continue to be restricted to existing, previously disturbed trails. Since these areas do not contain eligible resources, impacts to cultural resources from equestrian use are less than significant. No adverse effects to cultural resources occur.

Off-road Vehicle Use. All ORV use would continue to be restricted to the existing, previously disturbed trails. Since these areas do not contain eligible resources, impacts to cultural resources from established ORV use are less than significant. In addition, individuals attending BLM sponsored off-road events are briefed on federal laws regarding archaeological resources. No adverse effects to cultural resources occur.

Petroglyph Tours. No significant impacts on cultural resources have been identified from current public access to Little Petroglyph Canyon. Petroglyph tours contribute to the appreciation of NAWS's cultural resources and are thus considered a beneficial use.

Bird Watching. The annual Audobon Society Bird Count and other bird watching activities would continue to be conducted at established locations throughout NAWS. Individuals attending these events are given the standard NAWS environmental sensitivity briefings, which emphasize the protection of cultural resources and the Station's expectations of participants' compliance with avoidance and minimization procedures. Therefore, impacts to cultural resources from bird watching activities are less than significant. No adverse effects to cultural resources occur.

Photography. All access requests for photographic activities would continue to be considered on a case-by-case basis. Individuals attending these events are given the standard NAWS environmental sensitivity briefings, which emphasize the protection of cultural resources and the Station's expectations of participants' compliance with avoidance and minimization procedures. Therefore, impacts to cultural resources from these activities are less than significant. No adverse effects to cultural resources occur.

4.5.3.3 CLUMP and INRMP Implementation

Under the No Action Alternative, implementation of the CLUMP would serve as the implementing vehicle for NAWS's ICRMP. While the INRMP contains a brief discussion of cultural resources, specific management objectives and guidance for cultural resources are provided in the ICRMP. The ICRMP describes the Station's approach to managing cultural resources, identifies sensitive cultural resource areas located on-Station, and provides

management guidelines and priorities to ensure that these areas are appropriately protected. The ICRMP also provides an accessible database (with a general description of the presence or absence of resources) and can be used by operations personnel and environmental planners to ensure that cultural resources are appropriately considered. This database facilitates the implementation of management practices to avoid or minimize potential adverse effects to cultural resources. Since the CLUMP would provide a vehicle for enhanced management of cultural resources, its implementation would represent a beneficial impact.

4.5.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.5.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Under the Limited Expansion Alternative, test activities generally would continue at the same locations as under current conditions but training activities would increase at the CTR, the Airport Lake Range, and the Superior Valley Range. Range flight activities typically do not directly affect ground-based cultural resources, and NAWS would continue to implement the management practices (as described in the ICRMP) for avoidance and minimization of any potential impacts to sensitive resources. As such, impacts to cultural resources as a result of the proposed increase in range flight operations would be less than significant.

Airfield Flight Operations

Airfield flight activities typically do not directly affect ground-based cultural resources, and NAWS would continue to implement the management practices for avoidance and minimization of impacts to sensitive resources. As such, impacts to cultural resources as a result of the proposed increase in airfield flight operations would be less than significant.

Range Ground Operations

Target and Test Site Use. Ground disturbance effects due to increased use of the target and test sites are expected to be the same as those described for the No Action Alternative, with a slight potential for additional disturbances in the primary buffer zones of the Superior Valley, Airport Lake, and CTR impact areas. As noted in Section 3.5, cultural resource surveys have been completed for approximately 95 percent of these target primary buffer zones. While the likelihood of adverse effects on a National Register eligible resource is considered to be very low, adverse effects could occur. These impacts would be reduced to less than significant levels through implementation of the following mitigation measures (in accordance with the Station's PA and the ICRMP):

- Completion of evaluations of cultural resources in the primary buffer zones and implement appropriate treatment plans in the CTR.
- Completion of evaluation of cultural resources and implementation of appropriate treatment plans for the primary buffer zones in the Superior Valley and Airport Lake management units.
- Implementation of appropriate treatment for eligible resources.

Implementation of the above measures would ensure that no adverse effects to cultural resources would occur. Previously established target and test sites proposed for reuse are areas that have received intensive surface disturbances during previous military activities and, therefore, have no surface integrity. These areas are recognized as potential use areas to be utilized on a case-by-case basis as needed. To reduce potential impacts to cultural resources that may be present in the primary buffer areas to less than significant levels, the following mitigation measure would be implemented (in accordance with the Station's PA and the ICRMP):

- Implementation of standard Section 106 process review (inventory, evaluation, and treatment of eligible resources) in the associated primary buffer zones prior to reutilization.

Implementation of the above measure would ensure that no adverse effects to cultural resources would occur. As noted in Section 3.5, three prehistoric sites and one historic archaeological site have been recorded within the Wingate Airfield primary buffer zone. Although the historic site has been evaluated and found not to be eligible for the National Register, the reintroduction of HE use at Wingate Airfield could adversely affect the prehistoric sites. Impacts would be reduced to less than significant levels through implementation of the following mitigation measures (in accordance with the Station's PA and the ICRMP):

- Completion of the evaluation of prehistoric sites.
- Development of appropriate treatment plans for eligible resources.

Implementation of the above measures would ensure that no adverse effects to cultural resources would occur.

Ground Troop Training. Ground disturbance effects due to increased GTT are expected to be similar as those described for the No Action Alternative. GTT activities would remain within established operating areas. Mitigation measures presented under the No Action Alternative would reduce impacts on cultural resources to a less than significant level. Implementation of the measures presented under the No Action Alternative would ensure that no adverse effects to cultural resources would occur.

4.5.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.5.3.3, these activities would have less than significant impacts on cultural resources. No adverse effects to cultural resources would occur.

4.5.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would serve as the implementing vehicle for NAWS's ICRMP. While the INRMP contains a brief discussion of cultural resources, specific management objectives and guidance for cultural resources are provided in the ICRMP. The ICRMP describes the Station's approach to managing cultural resources, identifies sensitive cultural resource areas located on-Station, and provides management guidelines and priorities to ensure that these areas are appropriately protected. Since the CLUMP and the ICRMP would provide a vehicle for enhanced management of cultural resources, their implementation would represent a beneficial impact.

4.5.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.5.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Under the Moderate Expansion Alternative, test activities generally would continue at the same locations as under current conditions, but training activities would increase at the CTR, the Airport Lake Range, and the Superior Valley Range. Range flight activities typically do not affect ground-based cultural resources, and NAWS would continue to implement the management practices (as described in the ICRMP) for avoidance and minimization of any potential impacts to sensitive resources. As such, impacts on cultural resources from the proposed increase in range flight operations would be less than significant.

Airfield Flight Operations

Airfield flight activities typically do not directly affect ground-based cultural resources, and NAWS would continue to implement the management practices for avoidance and minimization of any potential impacts to sensitive resources. As such, impacts on cultural resources from the proposed increase in airfield flight operations would be less than significant.

Range Ground Operations

Target and Test Site Use. Under the Moderate Expansion Alternative, ground disturbing effects due to increased use of the target and test sites are expected to be the same as those described for the No Action Alternative, with a slightly higher potential for additional disturbances in the primary buffer zones of the Superior Valley, Airport Lake, and CTR impact areas. As noted in Section 3.5, cultural resource surveys have been completed for approximately 95 percent of these target primary buffer zones. While the likelihood of adverse effects on a National Register eligible resource is considered to be very low, adverse effects could occur. These impacts would be reduced to less than significant levels through implementation of the following mitigation measures (in accordance with the Station's PA and the ICRMP):

- Completion of evaluations of cultural resources in the primary buffer zones and implementation of appropriate treatment plans in the CTR.
- Completion of evaluation of cultural resources and implementation of appropriate treatment plans for the primary buffer zones in the Superior Valley and Airport Lake management units.
- Implementation of appropriate treatment plans for eligible resources.

Implementation of the above measures would ensure that no adverse effects to cultural resources would occur. Previously established target and test sites proposed for reuse are areas that have received intensive surface disturbances during previous military activities and, therefore, have no surface integrity. These areas are recognized as potential use areas to be utilized on a case-by-case basis as needed. To reduce potential impacts to cultural resources that may be present in the primary buffer areas to less than significant levels, the following mitigation measure would be implemented (in accordance with the Station's PA and the ICRMP):

- Implementation of standard Section 106 process review (inventory, evaluation, and treatment of eligible resources) in the associated primary buffer zones prior to reutilization.

Implementation of the above measure would ensure that no adverse effects to cultural resources would occur. As noted in Section 3.5, three prehistoric sites and one historic archaeological site (found not to be eligible for the National Register) have been recorded within the Wingate Airfield primary buffer zone and one prehistoric site has been recorded at Bullseye Target primary buffer. Therefore, the reintroduction of HE use at Wingate Airfield and Bullseye Target could adversely affect prehistoric cultural resources. These impacts would be reduced to less than significant levels through implementation of the following mitigation measures:

- Completion of evaluation of prehistoric sites at both Wingate Airfield and Bullseye Target.
- Development of appropriate treatment plans for eligible resources.

Implementation of the above measures would ensure that no adverse effects to cultural resources would occur.

Ground Troop Training. Under the Moderate Expansion Alternative, ground disturbance effects due to increased GTT are expected to be similar as those described for the No Action Alternative, with the additional potential for impacts in the CTR (with the introduction of Type 1 training) and Airport Lake (with the introduction of Type 3 training). These impacts would be reduced to less than significant levels through implementation of the following mitigation measures (in addition to the measures outlined under the No Action Alternative):

- Continuation of implementation of a treatment plan for the management and protection of sensitive resources in the CTR.
- Conduction of all GTT operations in the CTR in accordance with the treatment plan and routine NAWS avoidance and minimization procedures.
- Continuation of restriction of heavy vehicle maneuvers to the playa area of Airport Lake.

Implementation of the above measures would ensure that no adverse effects to cultural resources would occur.

4.5.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.5.3.3, these activities would have less than significant impacts on cultural resources. No adverse effects to cultural resources would occur.

4.5.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would serve as the implementing vehicle for NAWS's ICRMP. While the INRMP contains a brief discussion of cultural resources, specific management objectives and guidance for cultural resources are provided in the ICRMP. The ICRMP describes the Station's approach to managing cultural resources, identifies sensitive cultural resource areas located on-Station, and provides management guidelines and priorities to ensure that these areas are appropriately protected. Since the CLUMP and the ICRMP would provide a vehicle for enhanced management of cultural resources, their implementation would represent a beneficial impact.

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4.6
Geology and Soils

4.6 GEOLOGY AND SOILS

This section identifies potential geology and soils impacts that may result from implementation of the proposed action and alternatives. The impact analysis compares projected conditions after implementation of each alternative to the affected environment and focuses on those activities that have the potential to adversely affect geology and soils.

4.6.1 Region of Influence

The ROI for geology and soil resources includes areas within NAWS boundaries.

4.6.2 Approach to Analysis

Potential impacts on geology and soils at NAWS principally are caused by physical soil disturbance resulting from ordnance use, range support activities (e.g., vehicle movement), and GTT activities. Factors considered in determining whether an impact would be significant include the potential for substantial change in soil characteristics that would preclude established land uses, or would adversely impact a sensitive environmental resource, such as a threatened or endangered species or their habitats. Normal military and nonmilitary activities do not increase exposure to seismic hazards or to other geologic hazards (including landslides, erosion, subsidence, settlement, and volcanic eruption), so these topics are not addressed in this section. In addition, because range flight operations are conducted in airspace above NAWS and do not impact geology and soils, these operations are not addressed further in this section. Finally, because airfield flight operations are conducted on established runways and within airspace at Armitage Airfield, these operations also do not impact geology and soils and are not discussed further.

4.6.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.6.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

<u>Range Ground Operations</u>

<u>Target and Test Site Use</u>. Target and test sites are highly disturbed and generally void of surface vegetation. Minor wind erosion of soils has occurred at some impact areas, primarily in the Baker, Charlie, and George ranges. The soil disturbance is within 328 feet (100 meters) of the eastern and northern borders of the impact areas (Tetra Tech 1999) and has not impacted existing land uses. Because ongoing target and test site use occurs within previously disturbed areas, continuation of existing levels of ground-disturbing activity is expected to have a negligible effect on the rate of soil erosion. Therefore, geology and soil impacts related to the current use of target and test sites are less than significant.

<u>Ground Troop Training</u>. Type 1 operations involve foot soldiers only and are conducted throughout the NAWS ranges in areas that are relatively undisturbed as well as in areas where soils have been previously disturbed. Direct effects on soils resulting from this activity are negligible, and participants in these activities are informed about resource sensitivities prior to any exercises. Type 2 operations include foot soldiers using wheeled vehicles and are limited to existing roadways and previously disturbed areas, and participants in these activities are also informed

about resource sensitivities prior to any exercises. Therefore, the use of NAWS lands for current GTT activities has a less than significant impact on geology and soils.

4.6.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education, and recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis. Native American use, research and education activities, and recreational uses are conducted on pre-established roadways and in previously disturbed areas and thus have a negligible effect on soil resources. Therefore, impacts on geology and soils as a result of these activities are less than significant.

4.6.3.3 CLUMP and INRMP Implementation

Implementation of the CLUMP would formalize and integrate the Station's environmental planning and review processes. The environmental review process is applied to military and nonmilitary actions occurring on-Station and includes new actions or substantial changes to existing uses or operations. This review process provides an analysis of actions that may impact soils and would require that appropriate avoidance, minimization, or mitigation efforts be applied. As such, implementation of the CLUMP would represent a beneficial impact.

In compliance with the requirements of the Sikes Act as amended, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP. Implementation of the INRMP would have no effect on the geology at NAWS. However, because the plan would facilitate feral grazing management and the protection of riparian areas, implementation of the INRMP would represent a beneficial impact to soils.

4.6.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.6.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS. As noted in Section 4.6.2, the only military activities with the potential to affect soil resources are range ground operations.

<u>Range Ground Operations</u>

<u>Target and Test Site Use</u>. Under the Limited Expansion Alternative, the increase in ordnance use at existing target and test sites would not create perceptible increases in impacts to soils (Tetra Tech 1999). Reutilization of previously disturbed target and test sites is expected to have similar effects to those described under the No Action Alternative. HE use would be limited to existing previously disturbed areas, and the reintroduction of HE use at Wingate Airfield is not expected to create substantial new land surface disturbance. In addition, this area has been used historically for HE ordnance delivery, so lands have been disturbed previously. Since increased use of target and test sites is not expected to result in a substantial change to soil characteristics, impacts would be less than significant.

Ground Troop Training. While the tempo of North Range GTT use would double under the Limited Expansion Alternative, it would represent an increase in intensity of only about one use-day per 20 acres (8 hectares). In the South Range, the intensity of use would be about one use-day per 200 acres (81 hectares). The increased GTT operations would occur in the existing areas described under the No Action Alternative. Due to the relatively low intensity of use and the limitation of operations to previously disturbed areas, impacts to soil resources due to increased GTT would be less than significant.

4.6.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described for the No Action Alternative. Therefore, as described in Section 4.6.3.3, these activities would have less than significant impacts on geologic and soil resources.

4.6.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would result in beneficial impacts due to implementation of the Station's environmental review processes. These processes would serve to minimize and mitigate potential impacts to geology and soils, and thus represent a beneficial impact. Implementation of the INRMP would have no effect on the geology at NAWS. However, because the plan would facilitate feral grazing management and the protection of riparian areas, implementation of the INRMP would represent a beneficial impact to soils.

4.6.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.6.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS. As noted in Section 4.6.2, the only military activities with the potential to affect soil resources are range ground operations.

Range Ground Operations

Target and Test Site Use. Under the Moderate Expansion Alternative, the increase in ordnance use at existing target and test sites would not create perceptible increases in impacts to soils (Tetra Tech 1999). Reutilization of previously disturbed target and test sites is expected to have similar effects to those described under the No Action Alternative. HE use would be limited to existing previously disturbed areas and the reintroduction of HE use at Wingate Airfield in Mojave B North and Bullseye Target in Superior Valley is not expected to create substantial new land surface disturbance. These areas have been used historically for HE ordnance delivery and are active target sites; soils within these areas have, thus, been disturbed previously. Since increased use of target and test sites is not expected to result in a substantial change to soil characteristics, impacts would be less than significant.

Ground Troop Training. Under the Moderate Expansion Alternative, the increased Type 1 and Type 2 GTT operations would occur throughout the NAWS ranges in the existing areas described under the No Action Alternative. Due to the relatively low intensity of use and limitation of operations to previously disturbed areas, impacts to soil resources due to increased GTT would be less than significant. Although the new GTT area in the Coso Targets Range would cover about 24,748 acres (10,000 hectares), the intensity of use would be only about 90 use-days and the area would be used by foot soldiers only. Effects on soil resources from this type of activity (i.e.,

foot traffic) would not be significant. The new Type 3 GTT area at Airport Lake is already disturbed and is on the floor of the Coso Basin. This area has been intensively used for target and test activities, including the use of remotely controlled tracked vehicles. The proposed introduction of Type 3 activities in this area would not result in a substantial change to soil characteristics, since soils have been disturbed previously. Therefore, impacts would be less than significant.

4.6.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education, and recreation activities would be the same as described for the No Action Alternative. Therefore, as described in Section 4.6.3.3, these activities would have less than significant impacts on geologic and soil resource.

4.6.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would result in beneficial impacts due to implementation of the Station's environmental review processes. These processes would serve to minimize and mitigate potential impacts to geology and soils, and thus represent a beneficial impact. Implementation of the INRMP would have no effect on the geology at NAWS. However, because the plan would facilitate feral grazing management and the protection of riparian areas, implementation of the INRMP would represent a beneficial impact to soils.

4.7
Water Resources

4.7 WATER RESOURCES

This section identifies potential impacts to surface water and groundwater resources, including water quality and supply, that may result from implementation of the proposed action and alternatives. The impact analysis compares projected conditions after implementation of each alternative to the affected environment and focuses on those activities that have the potential to adversely affect water resources.

4.7.1 Region of Influence

The ROI for the water resources analysis includes the watersheds and groundwater basins that are within the boundaries of NAWS. These watersheds represent natural boundaries for surface water features that are generally contained within the Station boundaries. The Station shares the groundwater basins and water bearing strata in and adjacent to the Indian Wells, Pilot Knob, and Salt Wells Valleys. This analysis focuses on impacts to water resources within NAWS boundaries but also considers the potential for off-Station effects.

4.7.2 Approach to Analysis

Factors considered in determining whether an alternative would have significant impacts on water resources include the extent or degree to which an action would significantly affect surface water quality or supply or significantly affect groundwater quality or supply.

Each of the alternatives was analyzed to identify those actions that could affect the quality or supply of surface and groundwater resources at NAWS. Military uses such as range flight operations and airfield flight operations are not addressed further in this section since they are conducted in the airspace above NAWS and do not impact water resources.

4.7.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.7.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

<u>Range Ground Operations</u>

<u>Target and Test Site Use</u>. No target or test sites are located on or adjacent to surface water resources such as wetlands, springs, seeps, or riparian areas. The closest target or test site to a riparian area is the Area R test site, which is located approximately 1 mile (1.6 kilometers) from the Lark Seep drainage channel. Since activities do not take place in proximity to surface water resources, the current use of ordnance at existing target and test sites does not affect surface water quality or supply; therefore, impacts to these resources are less than significant.

The use of target and test sites typically does not require the consumption of water and, therefore, has no direct effect on groundwater supply. The only type of test that uses large quantities of water is the static firings of rocket motors. These tests consume an average of 200,000 gallons per event with approximately 2 to 3 tests per year. This amount of water is included within the historic use patterns for NAWS and represents a minor portion of overall water usage at NAWS (e.g., during the summer, water usage at NAWS can exceed 4 mgd.) The use of water for the 2

to 3 static firing tests per year is, thus, well within existing water supply capacity and does not significantly affect existing groundwater supply. The water is used during the tests to provide protection of the flame chutes at the static firing sites by cooling the rocket motor plume. The majority of the water is evaporated during the test by the high temperatures of the rocket motor plume. Any remaining water is left to evaporate from the flame chutes. These tests occur in the Skytop area located in the Ordnance T&E management unit. This area is isolated from any groundwater sources and therefore does not affect groundwater quality.

Only one portion of the Station has target and test sites located in areas that could affect potable groundwater quality. Targets in the Baker management unit are located in an area identified as a potential groundwater recharge zone. The Baker management unit has eight individual target impact areas. The use of ordnance for test and training purposes creates debris called range residue. These materials can include the remnants of bombs, bullets, missiles, and targets, as well as the chemical residue of incomplete combustion of the explosive or pyrotechnic charge of an HE or inert round. Since most of the ordnance used in the Baker Range is inert, the potential for chemical residue accumulation is low. Factors that decrease the potential for these materials to affect groundwater sources include the following:

- Cleanup of residue in target impact areas;
- A limited physical mechanism to deliver residual materials to water bearing strata; and
- The rapid degradation of chemical residues in arid environments.

Routine range residue removal is performed after test or training events at target areas to provide a clear arena for subsequent exercises and to ensure that areas are safe for range operations personnel. The transport of ordnance residue to groundwater strata is dependent on a number of factors, including the chemical and physical properties of the residue, soil type, depth to groundwater, and local climate (e.g. amount of precipitation). Since the climate at NAWS is arid (high temperatures, low precipitation), there are extensive barriers (clay layers) between surface targets and water bearing strata, and the distance to groundwater strata is between 200 and 300 feet (91.4 meters) below ground surface, the likelihood of ordnance residuals affecting the groundwater supply is very low. Studies conducted by the U.S. Army at the Yuma Proving Grounds in Arizona focused on the potential for ordnance residue to migrate from HE impact areas. The study (U.S. Army 1999) focused on HE target impact areas and found that ordnance residue was not detected in insects, rodents, vegetation, groundwater, or air at the target impact areas. The study concluded that ordnance residue is not accumulating in soil, air, groundwater, plants or animals in the target vicinity and that the residue did not appear to be migrating through surface wash areas. Because NAWS operational conditions and climate are similar to those at the Yuma ranges, results of this study are relevant to NAWS. Based on these factors, the current use of ordnance at target and test sites throughout the NAWS ranges has a less than significant impact on groundwater quality.

<u>Ground Troop Training</u>. Under the No Action Alternative, Type 1 operations, involving foot soldiers only, would potentially be conducted in areas that may contain surface water features such as springs or riparian habitat. Participants in Type 1 activities are informed about the sensitivity of these resources prior to their exercises. Participants are fully equipped for overland activities and, while they may use these areas, their activities (i.e., foot traffic) do not adversely impact the quantity or quality of water resources. Type 2 operations include foot soldiers using wheeled vehicles and are limited to existing roadway and previously disturbed areas. These operations are not conducted in or adjacent to surface water features, or in groundwater recharge areas. As such, the current use of NAWS lands for GTT has a less than significant impact on water resources.

4.7.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education, and recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis. Native American uses, research and education, and recreational uses would result in additional personal water consumption but amounts would be negligible and would not significantly affect water supply. In addition, these uses have no significant impacts on water quality.

4.7.3.3 CLUMP and INRMP Implementation

Under the No Action Alternative, implementation of the CLUMP would have a positive impact on water resources since the Station's management priorities, as established in the draft INRMP, would be integrated into land use decisions that may affect water resources. Implementing the CLUMP would enhance the conservation and protection of NAWS surface water resources since they would be identified and included in the Station's GIS database. This information would be used to ensure that new and ongoing actions consider these resources, and avoid or minimize potential effects. The CLUMP would also incorporate the management actions defined in the existing cooperative groundwater management agreement between the Station and other participating water purveyors. Therefore, implementation of the CLUMP and INRMP would have a beneficial impact on water resources.

4.7.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.7.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS. As noted in Section 4.7.2, the only military activities with the potential to affect water resources are range ground operations.

<u>Range Ground Operations</u>

<u>Target and Test Site Use</u>. No target or test sites are located on or adjacent to surface water resources such as wetlands, springs, seeps, or riparian areas. Since activities would not take place in proximity to surface water resources, the increased use of ordnance at existing target and test sites would not affect surface water quality or supply; therefore, impacts to these resources would be less than significant. In addition, the previously disturbed target and test areas being proposed for reuse are not located in the proximity of surface water features and, thus, would have no direct effect on surface water quality or supply. Therefore, impacts to water resources would be less than significant.

The increased use of target and test sites would not result in an increase in water use and therefore would have no direct effect on groundwater supply. The increased use of ordnance at existing target and test sites would be similar to the effects described for the No Action Alternative. While there may be some increase in ordnance use at the targets located on the Baker Range, as described for the No Action Alternative, the potential for ordnance residue to migrate to groundwater is extremely low and would have a less than significant impact on groundwater quality. The reintroduction of HE ordnance at the Wingate Airfield in Mojave B North on the South Range would not impact surface or groundwater quality or supply since this target is not located near a surface water feature or in an area where groundwater recharge occurs. Therefore, the reintroduction of HE at the Wingate Airfield target would have a less than significant impact on water resources.

Ground Troop Training. Under the Limited Expansion Alternative, the proposed increase to GTT operations would continue to be conducted in existing areas of operations. As discussed for the No Action Alternative, Type 1 operations (foot soldiers only) would potentially be conducted in areas that may contain surface water features. However, due to the nature of their activities (i.e., foot traffic) and the pre-training briefings, water resources would not be adversely affected and an increase in the tempo of these operations would have less than significant impacts on surface water quality and supply. Type 2 operations would be limited to existing roadways and disturbed areas and would not impact surface water resources. None of the Type 2 GTT operations would be conducted in groundwater recharge areas, and increases to operational tempos would not affect groundwater quality. Increases in GTT activities under the Limited Expansion Alternative would result in a only minor increase in water use by the Station since bottled water is brought in as part of GTT supplies. The small increase in groundwater use by the transient personnel associated with GTT exercises would be negligible relative to current total water demand (e.g., water usage can range up to more than 4 mgd), and would not significantly affect groundwater supply or quality.

4.7.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.7.3.3, these activities would have less than significant impacts on water resources.

4.7.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would have a positive effect by protecting and conserving water resources in accordance with the draft INRMP and respective management agreements, and by implementing improved planning and decision support processes at NAWS. Therefore, implementation of the CLUMP and INRMP would represent a beneficial impact to water resources.

4.7.4 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.7.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS. As noted in Section 4.7.2, the only military activities with the potential to affect water resources are range ground operations.

Range Ground Operations

Target and Test Site Use. No target or test sites are located on or adjacent to surface water resources such as wetlands, springs, seeps, or riparian areas. Since target and test site activities would not take place in proximity to surface water resources, the increased use of ordnance at existing target and test sites proposed under the Moderate Expansion Alternative would not affect surface water quality or supply; therefore, impacts to these resources would be less than significant. In addition, the previously disturbed target and test areas being proposed for reuse are not located in the proximity of surface water features and, thus, would have no direct effect on surface water quality or supply. Therefore, impacts to surface water resources would be less than significant.

The increased use of target and test sites would not result in an increase in water use and, therefore, would have no direct effect on groundwater supply. The increased use of ordnance at existing target and test sites would be similar to the effects described for the No Action Alternative. While there may be some increase in ordnance use at the

targets located on the Baker Range, as described for the No Action Alternative, the potential for ordnance residue to migrate to groundwater is extremely low and would have a less than significant impact on groundwater quality. Since the Wingate Airfield in Mojave B North and the Bullseye Target in Superior Valley are not located near surface water features or groundwater recharge areas, the reintroduction of HE ordnance at these targets in the South Range would not impact surface or groundwater quality or supply. Therefore, the reintroduction of HE at the Wingate Airfield and the Bullseye Targets would have a less than significant impact on water resources.

Ground Troop Training. Potential impacts on surface and groundwater quality from the proposed increase to GTT operations under the Moderate Expansion Alternative would be similar as those described for the Limited Expansion Alternative. Therefore, an increase in the tempo of these operations would have a less than significant impact on surface and groundwater quality. Increases in GTT activities under the Moderate Expansion Alternative would result in a minor increase in water use by the station. The increased water consumption for the additional 1,500 use-days by transient personnel is expected to be negligible relative to current total water demand, and is not expected to significantly affect groundwater supply.

Establishing a new Type 1 operating area in the Coso Targets Range would bring soldiers (maneuvering on foot) into areas containing surface water features. However, troops are advised of the sensitivity of these resources in pre-operations briefings and are required to avoid these areas during their training activities. Conducting Type 3 operations (wheeled and tracked vehicle) at Airport Lake would not directly impact surface or groundwater quality or supply, since GTT operations are not conducted in groundwater recharge areas or on the playa during periods when the surface is wet. Type 3 operations would not affect groundwater quality because potentially hazardous materials are removed from the area after the operations are completed. In addition, as described for the Limited Expansion Alternative, the amount of water consumed during GTT operations is negligible. Therefore, the increases in GTT proposed under the Moderate Expansion Alternative would have a less than significant impact on water resources.

4.7.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described under the No Action Alternative. Therefore, as described in Section 4.7.3.3, these activities would have less than significant impacts on water resources.

4.7.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would have a positive effect by protecting and conserving water resources in accordance with the draft INRMP and respective management agreements, and by implementing improved planning and decision support processes at NAWS. Therefore, implementation of the CLUMP and INRMP would represent a beneficial impact to water resources.

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4.8
Socioeconomics

4.8 SOCIOECONOMICS

This section describes potential socioeconomics impacts that may result from implementation of the proposed action and alternatives. The analysis evaluates those activities that have the potential for effects on socioeconomic indicators, including population, employment, income, housing, and schools. Environmental Justice (i.e., an evaluation of impacts with regard to minority communities and poverty status) is addressed at the end of this resource section.

4.8.1 Region of Influence

The ROI for the socioeconomics analysis includes Kern, Inyo, and San Bernardino counties. This larger ROI is used for those elements of socioeconomics where data are available only at the county level. Because most housing, commuting, and spending patterns of NAWS personnel can be attributed to the City of Ridgecrest and the community of Inyokern, these areas are considered to be the focus of the ROI. The number of residences occurring in the ROI was estimated using a standard urban population density method (Wyle 2001) that incorporated density projections from census data.

4.8.2 Approach to Analysis

In evaluating potential impacts to socioeconomic conditions in the region, the Navy considered whether each alternative would increase employment or unemployment, elevate housing demand, or affect school capacities. For military operations, the socioeconomics analysis combines the analysis of range flight operations, airfield flight operations, and range ground operations and focuses on the overall operational increase associated with each alternative. For purposes of the analysis it is assumed that GTT does not affect socioeconomic indicators since ground troops remain within NAWS boundaries during training, are self-sufficient, and return to their points of origin immediately following training.

4.8.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.8.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

Under the No-Action alternative, no change in personnel would be expected. No workers would move into the local area and, therefore, population would not increase. Because no changes in population are expected, changes in the employment rate and in the demand for housing and school facilities also are not expected.

4.8.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education, and recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis. Select nonmilitary uses at NAWS can attract out-of-town visitors who contribute to the local economy by supporting the service and retail trade industries. This economic contribution is minor, however, because of the limited access to NAWS as compared to other recreational sites in the region, such as Death Valley

National Park. Under the No Action Alternative, this economic contribution would continue at current levels, representing a minor beneficial socioeconomic impact.

4.8.3.3 CLUMP and INRMP Implementation

While implementation of the CLUMP would formalize and integrate the Station's environmental planning and review processes, the CLUMP is not designed to specifically address socioeconomic factors. However, the Station's environmental review process would apply to new actions or substantial changes to existing uses or operations that may impact socioeconomic conditions; therefore, socioeconomic impacts of a proposed action may be analyzed as an element of a NEPA document. As such, implementation of the CLUMP would represent a beneficial impact.

In compliance with the requirements of the Sikes Act as amended, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP. Implementation of the INRMP would not affect socioeconomic resources at NAWS or in the ROI.

4.8.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.8.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

The 15 percent increase in operations proposed under the Limited Expansion Alternative would be accommodated with existing personnel (distributed among all DoD services currently using NAWS facilities for aircrew training). Therefore, there would be no impact on the employment rate or demand for housing or schools. There could be a short-term increase in transient personnel that come to the area to participate in test or training events. However, these occasional increases would have negligible impacts on the local and regional economy. A slight increase in local expenditures on goods and services in nearby communities could occur with increased DoD business on NAWS, resulting in a minor beneficial impact to the local economy. An additional benefit to the local economy could occur with the re-establishment of the target and test area at Wingate Airfield on Mojave B North. Reutilization would provide increased testing capabilities at NAWS, with the potential for attracting additional DoD business to NAWS. Increased military income would be expected to generate minor increases in local expenditures on goods and services in nearby communities, resulting in a minor beneficial impact.

4.8.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and education and recreational activities would be the same as described for the No Action Alternative. Therefore, as described in Section 4.8.3.3, select nonmilitary uses would continue to provide a minor contribution to the local economy and, thus, represent a minor beneficial socioeconomic impact.

4.8.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would formalize and integrate the Station's environmental planning and review processes, which would include the assessment of a proposed project's

potential socioeconomic impacts. As such, implementation of the CLUMP would provide an indirect beneficial impact to socioeconomic resources. Implementation of the INRMP would not affect socioeconomic resources at NAWS or in the ROI.

4.8.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.8.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

The 25 percent increase in operations proposed under the Limited Expansion Alternative would be accommodated with existing personnel (distributed among all DoD services currently using NAWS facilities for aircrew training). Therefore, there would be no impact on the employment rate or demand for housing or schools. Therefore, there would be no impact on the employment rate or demand for housing or schools. There could be a short-term increase in transient personnel that come to the area to participate in test or training events. However, these occasional increases would have negligible impacts on the local and regional economy. A slight increase in local expenditures on goods and services in nearby communities could occur with increased DoD business on NAWS, resulting in a minor beneficial impact to the local economy. An additional benefit to the local economy could occur with the re-establishment of the target and test area at Wingate Airfield on Mojave B North and Bullseye Target in Superior Valley. Reutilization would provide increased testing capabilities at NAWS, with the potential for attracting additional DoD business to NAWS. Increased military income would be expected to generate minor increases in local expenditures on goods and services in nearby communities, resulting in a minor beneficial impact.

4.8.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education, and recreational activities would be the same as described for the No Action Alternative. Therefore, as described in Section 4.8.3.3, select nonmilitary uses would continue to provide a minor contribution to the local economy and, thus, represent a minor beneficial socioeconomic impact.

4.8.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would formalize and integrate the Station's environmental planning and review processes, which would include the assessment of a proposed project's potential socioeconomic impacts. As such, implementation of the CLUMP would provide an indirect beneficial impact to socioeconomic resources. Implementation of the INRMP would not affect socioeconomic resources at NAWS or in the ROI.

4.8.6 Environmental Justice

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, was issued on February 11, 1994. This EO requires that each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations (EO 12898, 59 Federal Register 7629 [Section 1-101]). On April 21, 1995, the Secretary of Defense

submitted a formal environmental justice strategy to the USEPA. To comply with the EO, the following actions have occurred concurrently with preparation of this EIS:

- Economic, racial, and demographic information was gathered to identify areas of low-income and minority populations in the areas potentially exposed to project effects (see Section 3.8.2.2).
- The activities proposed at NAWS China Lake were assessed for disproportionate off-Station impacts resulting from NAWS China Lake activities associated with each of the alternatives.
- Community participation and input from all groups was encouraged through public meetings and extensive public notification, as described in Appendix A.

For all resources analyzed in this document, potential impacts resulting from implementing the alternatives either would not affect off-Station populations or would not result in significant and not mitigable impacts. To determine whether disproportionately high and adverse human health or environmental effects on minority or low-income populations would result from implementation of any of the alternatives, census data were evaluated. Data from each census tract that underlies an impact footprint were reviewed to determine if these tracts contain minority or low-income residents. The percentage of minority and low-income residents in each census tract was then compared with the corresponding percentage of low-income residents in the affected counties.

The information on areas of low-income and minority populations described in Section 3.8 was then used to assess the potential for disproportionate off-Station noise impacts resulting from implementation of each of the alternatives. Figure 4.8-1 depicts the noise contours under the No Action, Limited Expansion, and Moderate Expansion alternatives in relation to the adjacent census tracts. As discussed below, the assessment indicates that minority or low-income households would not be disproportionately affected by any of the alternatives.

4.8.6.1 No Action Alternative

Under the No Action Alternative, ongoing flight operations at Armitage Airfield would continue to expose off-Station areas to occasional aircraft overflights and associated noise. No census tracts experience noise levels greater than 65 dB. A small portion of census tracts 54.01 and 55.01 would be contained within the estimated 65-dB and 70-dB contours. The overall percentages of low-income and minority populations in these census tracts are lower than corresponding percentages for the county. Therefore, noise impacts associated with current flight operations at Armitage Airfield do not have disproportionately high and adverse human health or environmental effects on minority or low-income populations.

4.8.6.2 Limited Expansion Alternative

Under the Limited Expansion Alternative, off-Station noise exposure levels associated with increases in flight operations at Armitage Airfield would increase the acreage exposed to 65-dB noise levels and expose a small area to 70-dB noise levels (see Figure 4.8-1). A small portion of census tracts 54.01 and 55.01 would be contained within the estimated 65-dB and 70-dB contours. The overall percentages of low-income and minority populations in these census tracts are lower than corresponding percentages for the county. Therefore, implementation of the Limited Expansion Alternative would not have disproportionately high and adverse human health or environmental effects on minority or low-income populations.

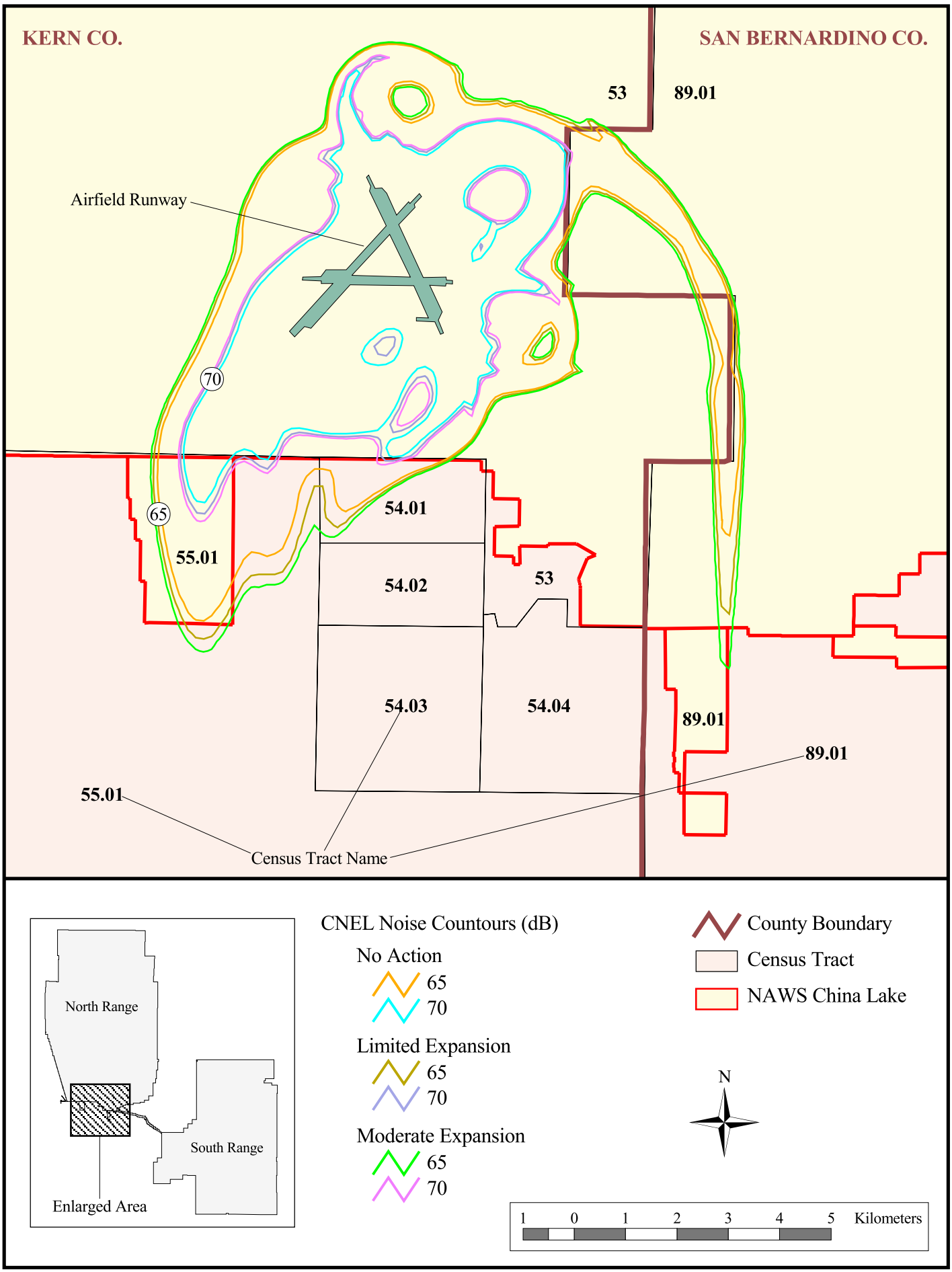

Figure 4.8-1 Census Tracts and Noise Contours for the No Action, Limited Expansion, and Moderate Expansion Alternatives

4.8.6.3 Moderate Expansion Alternative (Preferred Alternative)

Under the Moderate Expansion Alternative, off-Station noise exposure levels associated with increases in flight operations at Armitage Airfield would increase the acreage exposed to 65-dB noise levels and expose a small area to noise levels of 70-dB (see Figure 4.8-1). A small portion of census tracts 54.01 and 55.01 would be contained within the estimated 65-dB and 70-dB contours. The overall percentages of low-income and minority populations in these census tracts are lower than corresponding percentages for the county. Therefore, implementation of the Moderate Expansion Alternative would not have disproportionately high and adverse human health or environmental effects on minority or low-income populations.

4.9
Utilities and Public Services

4.9 UTILITIES AND PUBLIC SERVICES

This section identifies potential impacts to utilities and public services that may result from implementation of the proposed action and alternatives. The impact analysis compares projected conditions after implementation of each alternative to the affected environment and focuses on those activities that have the potential to adversely affect utilities and public services.

4.9.1 Region of Influence

The ROI for public services and utilities includes NAWS and the surrounding local service areas that provide utilities and public services to the Station.

4.9.2 Approach to Analysis

Impacts associated with utilities and public services generally are related to changes in the supply or demand of a particular resource. The supply of a utility or public service also is referred to as its capacity. As long as the capacity of a particular utility or service is higher than the demand for that resource, no impact occurs. However, if the demand exceeds the capacity or if the demand is increased beyond the resource's projected rate of increase, an impact would occur, and the significance of the impact is determined based on the degree to which the capacity is strained.

The total number of permanent personnel at NAWS is the primary factor in determining the demand for each utility and public service. Therefore, proposed changes in the number of permanent personnel are the primary factors used when evaluating potential impacts associated with each of the alternatives. Secondary factors used when evaluating the impacts to utility and public services include new facilities, types of equipment, or testing activities. None of the alternatives include these secondary factors and, thus, would not impact demand for utilities and public services. An additional factor that can affect a utility or public service is a change in the supply of a particular resource, or in the capacity of the utility infrastructure.

When evaluating impacts on a utility or service, consideration is given to whether or not implementing one of the alternatives would result in either a violation of federal standards or requirements that regulate a public utility system or an increase in demand that exceeds the utility system's or public service's capacity and necessitates a substantial expansion, additional facilities, or increased staffing levels.

The analysis of potential impacts on utilities and public services combines the effects of range flight operations, airfield flight operations, and range ground operations and focuses on the overall operational increase associated with each alternative. It is assumed that GTT does not affect utilities and public services since ground troop activities take place in remote areas of the Station during training and the troops remain self-sufficient throughout their exercises.

4.9.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.9.3.1 Military Uses

Under the No Action Alternative, established T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

Since no additional personnel would move to the ROI as a result of this alternative, the demand placed on utilities (water, wastewater treatment, electrical service, natural gas, propane, and steam distribution) and public services (health services, police services, fire protection services, and recreation) would not change and capacities would continue to be able to meet current demand. These systems would continue to meet existing federal regulation requirements. Therefore, impacts on utilities and public services from current military uses are less than significant.

4.9.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis. Continued nonmilitary uses would not place additional demand on utilities or public services. Therefore, current nonmilitary uses have less than significant impacts on utilities and public services.

4.9.3.3 CLUMP and INRMP Implementation

Under the No Action Alternative, implementation of the CLUMP would serve to update the land use component of the NAWS AMP, facilitating improved planning and decision-making with regard to utilities and public services. Therefore, implementation of the CLUMP would represent a beneficial impact to utilities and public services.

In compliance with the requirements of the Sikes Act as amended, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP. Implementation of the INRMP would not affect utilities and public services at NAWS or in the ROI.

4.9.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.9.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

The proposed increases in military uses at NAWS would not result in any increases in permanent personnel or other activities that would significantly affect the supply or demand of utilities and public services on the Station. Increases in GTT activities are expected to result in minor increases in water use; however, the effects would be negligible relative to current water usage. Overall demand placed on utilities (water, wastewater treatment, electrical service, natural gas, propane, and steam distribution) and public services (health services, police services, fire protection services, and recreation) would not exceed existing capacities. Therefore, impacts on utilities and public services under the Limited Expansion Alternative would be less than significant.

4.9.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and education and recreational activities would be the same as described under the No Action Alternative. Therefore, continued nonmilitary uses would have less than significant impacts on utilities and public services.

4.9.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would serve to facilitate improved planning and decision-making with regard to utilities and public services and, thus, represents a beneficial impact. Implementation of the INRMP would not affect utilities and public services at NAWS or in the ROI.

4.9.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.9.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

The proposed increases in military uses at NAWS would not result in any increases in permanent personnel or other activities that would significantly affect the supply or demand of utilities and public services on the Station. Increases in GTT activities are expected to result in minor increases in water use; however, the effects would be negligible relative to current water usage. Overall demand placed on utilities (water, wastewater treatment, electrical service, natural gas, propane, and steam distribution) and public services (health services, police services, fire protection services, and recreation) would not exceed existing capacities. Therefore, impacts on utilities and public services under the Moderate Expansion Alternative would be less than significant.

4.9.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education and recreational activities would be the same as described under the No Action Alternative. Therefore, continued nonmilitary uses would have less than significant impacts on utilities and public services.

4.9.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would serve to facilitate improved planning and decision-making with regard to utilities and public services and, thus, represents a beneficial impact. Implementation of the INRMP would not affect utilities and public services at NAWS or in the ROI.

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4.10
Public Health and Safety

4.10 PUBLIC HEALTH AND SAFETY

This section identifies potential impacts to public health and safety that may result from implementation of the proposed action and alternatives. The impact analysis compares projected conditions after implementation of each alternative to the affected environment and focuses on those activities that have the potential to adversely affect public health and safety. In addition, this section addresses the protection of children from environmental health risks.

4.10.1 Region of Influence

The ROI for public health and safety considerations includes the lands within NAWS boundaries and the local communities including Ridgecrest, Inyokern, Trona, Homewood Canyon, Randsburg, Red Mountain, Johannesburg, Pearsonville, and Little Lake. The public health and safety ROI also includes airspace above these communities.

4.10.2 Approach to Analysis

Factors considered in determining whether an alternative would have a significant impact on public heath and safety include the extent or degree to which implementation of the alternative would subject a non-participant to increased risk of personal injury. The analysis of potential public health and safety impacts considers whether implementing an alternative would increase safety hazards or increase the health and safety risks to the public.

For all test and training events conducted on the NAWS ranges, there are specific and documented procedures in place to ensure that non-participating personnel are not endangered by Navy actions. The RSM (refer to Section 3.10.2) NAWC Instruction 5100.2A provides specific guidance and requirements for range operators and users. Included in the RSM are procedures for conducting range test and training operations. Also covered are the requirements and specifications of FTSs.

Electromagnetic radiation from radar operations and other electromagnetic sources would continue to be conducted in accordance with the procedures defined in the RSM and the HERP, HERF, and HERO programs. Since EMR hazard patterns would remain well within Station boundaries at designated EMR sites throughout the NAWS ranges and would not affect public safety, EMR is not addressed further in this section.

4.10.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.10.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Under the No Action Alternative, implementation of the Station's revised BASH Plan would continue to keep pilots advised of bird movements to minimize the potential for bird strikes. Civilian and commercial air traffic would continue to be restricted from the airspace over the ranges when they are being used for military activities. Range flight activities would continue to be conducted in accordance with established safety and scheduling procedures described in the RSM (see Section 3.10) and would not increase the potential for flight safety risks or risks to the public. Therefore, public health and safety impacts associated with current range flight operations are less than significant.

Airfield Flight Operations

Under the No Action Alternative, all established operating safety procedures that reduce the potential for aircraft accidents would continue to be implemented. As described in Section 3.10.5, of the 28 aircraft incidents related to airfield operations occurring from 1976-1998, only 4 incidents occurred off-station on undeveloped public lands. Most occurred in areas designated as APZs, which are contained entirely on-station. Based on this frequency, one off-station aircraft incident could be expected to occur every 4.5 years (54 months). Based on historic records, it is expected that all off-station incidents would occur in proximity to NAWS lands on adjacent undeveloped public lands. Airfield flight operations would continue to be carefully scheduled and monitored to ensure that flight operations do not conflict with one another. Civilian and commercial air traffic would continue to be restricted from the airspace over the airfield. Airfield flight activities would continue to be conducted in accordance with established safety and scheduling procedures and would not increase the potential for flight safety risks or risks to the public. Therefore, impacts to public health and safety associated with current airfield flight operations are less than significant.

Range Ground Operations

Target and Test Site Use. Under the No Action Alternative, the Test Management Office, in conjunction with the test sponsor and RSO, would continue to conduct test and training operations in accordance with established safety policy and procedures described in the RSM (see Section 3.10). In addition, NAWS would continue its policy of removing UXO items from the ranges after tests are conducted. Use of target or test sites on the ranges would continue to be conducted in a manner that ensures compatibility with existing safety guidelines and procedures and is consistent with established ESQD regulations. With one exception, ESQD arcs would remain within the Station's boundary and would not affect public safety. The one ESQD arc that extends off-station is located on the Randsburg Wash Road and extends onto BLM lands. This arc is established for a railroad siding built for the off-loading of ordnance deliveries to NAWS. NAWS has obtained a perpetual right-of-way authorization from the BLM to address the handling of ordnance items at this remote site. The areas within and adjacent to the arc consist of undeveloped BLM land and ordnance handling at the site is conducted in strict accordance to established safety procedures. The site is used infrequently (approximately 6 times per year) for ordnance delivery. Since the area is used infrequently, in accordance with established safety policies, and is in a remote and undeveloped location, the risk to public safety is considered to be very low. In addition, weapons footprints associated with range ground operations do not extend off Navy-controlled property. Since the current use and associated handling of ordnance at target and test sites is conducted according to established safety procedures, impacts on health and safety are less than significant.

Ground Troop Training. Under the No Action Alternative, GTT activities would continue to be conducted in established areas at NAWS. Since current GTT activities are conducted entirely with station boundaries, they do not pose a risk to public safety. Therefore, impacts to public health and safety from current GTT activities are less than significant.

4.10.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education and recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis. These activities would continue to be conducted in accordance with established safety policy and procedures (described in Section 3.10). These types of activities do not create significant safety risks to the public. Use of ordnance or firearms is not permitted when these types of activities are occurring. In addition, participants in nonmilitary uses are not allowed to carry firearms on-station. Current Native American, research and education, and recreational activities do not expose the public to health or safety hazards; therefore, impacts are less than significant.

4.10.3.3 CLUMP and INRMP Implementation

Under the No Action Alternative, implementation of the CLUMP would formalize and integrate the Station's environmental and operational planning and review processes. The environmental review process is applied to military and nonmilitary actions having the potential to impact health and safety risks. This review process provides an analysis of actions that may increase risks associated with flight operations, ground operations, ordnance use, and EMR use. The process would require that appropriate management efforts be applied to those actions to comply with all established health and safety requirements. As such, implementation of the CLUMP would represent a beneficial impact.

In compliance with the requirements of the Sikes Act as amended, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP. Implementation of the INRMP would not affect public health and safety at NAWS or in the ROI.

4.10.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.10.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

<u>Range Flight Operations</u>

Under the Limited Expansion Alternative, the increase in range flight operations could incrementally increase the potential for aircraft accidents or mishaps. However, current airspace safety procedures (described in Section 3.10) would continue to be implemented and additional range flight operations would adhere to established range safety procedures. Civilian and commercial air traffic would continue to be restricted from the airspace over the ranges when they are being used for military activities. Implementation of the Station's revised BASH Plan would continue to keep pilots advised of bird movements to minimize the potential for bird strikes. The limited amount of time an aircraft is over any specific geographic location, combined with the relatively low population density of the ROI, lowers the probability that an aircraft mishap would occur over a populated area (off-station aircraft incidents are discussed under Airfield Flight Operations). All range flight operations would continue to be conducted in accordance with procedures established in the RSM and with the safety of its pilots and people in the surrounding communities as the primary concern. As described in Section 3.10, the strict control of restricted airspace, the restricted access to range areas, and the use of established FTS minimize the potential for safety risks and ensure the

separation of range operations from non-participants. These ongoing safety procedures minimize the potential risk of increased range flight operations to a level that would be less than significant.

Airfield Flight Operations

Under the Limited Expansion Alternative, the increase in airfield use for takeoffs, landings, proficiency training, and other flights could increase the safety risk to aircrews and personnel due to the increased accident and mishap potential associated with the higher number of aircraft operations. As described in Section 3.10.5, of the 28 aircraft incidents related to airfield operations occurring from 1976-1998, only 4 incidents occurred off-station on undeveloped public lands. Most occurred in areas designated as APZs, which are contained entirely on-station. While the proposed increase in airfield flight operations does pose a potential for increased aircraft incidents, it is statistically modest. With 28 aircraft incidents occurring in the airfield vicinity during a 23-year period, the average number of aircraft incidents is 1.2 per year. Increasing flight operations by 15 percent would increase the potential number of aircraft incidents to an average of 1.3 per year, based on historical records. This increase in flight mishap potential would not be significant. In addition, current airspace safety procedures discussed in Section 3.10 would continue to be implemented and additional airfield flight operations would adhere to established safety procedures. Aircraft activity at Armitage Airfield would continue to be scheduled in accordance with established safety procedures to ensure that flight operations do not conflict with one another. The limited amount of time an aircraft is over any specific geographic location, combined with the relatively low population density of the ROI, lowers the probability that an aircraft mishap would occur over a populated area. All airfield flight operations would continue to be conducted with the safety of its pilots and people in the surrounding communities as the primary concern. These ongoing safety procedures minimize the potential risk of increased airfield flight operations to a level that would be less than significant.

Range Ground Operations

Target and Test Site Use. Under the Limited Expansion Alternative, the Test Management Office, in conjunction with the test sponsor and RSO, would continue to conduct test and training operations in accordance with established range safety policy and procedures (see Section 3.10). In addition, NAWS would continue its policy of removing UXO items from the ranges after tests are conducted. The reintroduction of HE use at the Wingate Airfield target area and the reutilization of previous target and test sites would be consistent with historic ordnance use in this area and would be conducted in accordance with established safety procedures (see Section 3.10). Increased use of ordnance at target or test sites on the ranges would continue to be conducted in a manner that ensures compatibility with existing safety procedures and is consistent with established ESQD regulations. In addition, weapons footprints associated with range ground operations do not extend off Navy-controlled property. A 15 percent increase in use of ordnance at target and test sites on-station would not create significant additional public health and safety risks because these operations would continue to be conducted in established impact areas. Therefore, impacts on public health and safety would be less than significant.

Ground Troop Training. Under the Limited Expansion Alternative, GTT activities would increase in established areas on-station. Given the nature of these activities (i.e., foot and vehicle traffic) and the fact that they are conducted entirely within station boundaries, increased GTT activities would not pose a public safety risk. Therefore, impacts to public health and safety from increased GTT activities would be less than significant.

4.10.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and education and recreational activities would be the same as described for the No Action Alternative. Therefore, as described in Section 4.10.3.3, the impacts of continued nonmilitary uses on public health and safety would be less than significant.

4.10.4.3 CLUMP and INRMP Implementation

As described for the No Action Alternative, implementation of the CLUMP would integrate the Station's environmental and operational planning and review processes. This review process provides for an analysis of actions that may increase risks associated with flight operations, ground operations, ordnance use, and EMR use, and would require that appropriate management efforts be applied to those actions to comply with all established health and safety requirements. As such, implementation of the CLUMP would represent a beneficial impact. Implementation of the INRMP would not affect public health and safety at NAWS or in the ROI.

4.10.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.10.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Range Flight Operations

Under the Moderate Expansion Alternative, the increase in range flight operations could incrementally increase the potential for aircraft accidents or mishaps. However, current range and airspace safety procedures (described in Section 3.10) would continue to be implemented and additional range flight operations would adhere to established range safety procedures. Civilian and commercial aircraft would continue to be restricted from the airspace over the ranges when they are being used for military activities. Implementation of the Station's revised BASH Plan would continue to keep pilots advised of bird movements to minimize the potential for bird strikes. The limited amount of time an aircraft is over any specific geographic location, combined with the relatively low population density of the ROI, lowers the probability that an aircraft mishap would occur over a populated area (off-station aircraft incidents are discussed under Airfield Flight Operations). All range flight operations would continue to be conducted in accordance with procedures established in the RSM and with the safety of its pilots and people in the surrounding communities as the primary concern. As described in Section 3.10, the strict control of restricted airspace, the restricted access to range areas, and the use of established FTS minimize the potential for safety risks and ensure the separation of range operations from non-participants. These ongoing safety procedures minimize the potential risk of increased range flight operations to a level that would be less than significant.

Airfield Flight Operations

Under the Moderate Expansion Alternative, the increase in airfield use for takeoffs, landings, proficiency training, and other flights could increase the safety risk to aircrews and personnel due to the increased accident and mishap potential associated with the higher number of aircraft operations. As described in Section 3.10.5, of the 28 aircraft incidents related to airfield operations occurring from 1976-1998, only 4 incidents occurred off-station on undeveloped public lands. Most occurred in areas designated as APZs, which are contained entirely on-station. While the proposed increase in airfield flight operations does pose a potential for increased aircraft incidents, it is statistically modest. With 28 aircraft incidents occurring in the airfield vicinity during a 23-year period, the average number of aircraft incidents is 1.2 per year. Increasing flight operations by 25 percent would increase the potential number of aircraft incidents to an average of less than 2 per year, based on historical records. This increase in flight mishap potential would not be significant. In addition, current airspace safety procedures discussed in Section 3.10 would continue to be implemented and additional airfield flight operations would adhere to established safety procedures. Aircraft activity at Armitage Airfield would continue to be scheduled in accordance with established safety procedures to ensure that flight operations do not conflict with one another. The limited amount of time an aircraft is over any specific geographic location, combined with the relatively low population density of the ROI,

lowers the probability that an aircraft mishap would occur over a populated area. All airfield flight operations would continue to be conducted with the safety of its pilots and people in the surrounding communities as the primary concern. These ongoing safety procedures minimize the potential risk of increased airfield flight operations to a level that would be less than significant.

Range Ground Operations

Target and Test Site Use. Under the Moderate Expansion Alternative, increasing ordnance use at target and test sites would continue to be planned and coordinated by test managers and test schedulers to minimize safety risks. The Test Management Office, in conjunction with the test sponsor and RSO, would continue to conduct test and training operations in accordance with established range safety policy and procedures (see Section 3.10). In addition, NAWS would continue its policy of removing UXO items from the ranges after tests are conducted. The reintroduction of HE use at the Wingate Airfield and the Bullseye target at Superior Valley and the reutilization of previous target and test sites would be consistent with historic ordnance use in this area and would be conducted in accordance with established safety procedures (see Section 3.10). Increased use of ordnance at target or test sites on the ranges would continue to be conducted in a manner that ensures compatibility with existing safety procedures and is consistent with established ESQD regulations. In addition, weapons footprints associated with range ground operations do not extend off Navy-controlled property. A 25 percent increase in use of ordnance at target and test sites on-station would not create significant additional public health and safety risks because these operations would continue to be conducted in established impact areas. Therefore, impacts on public health and safety would be less than significant.

Ground Troop Training. Under the Moderate Expansion Alternative, GTT activities would increase in established areas on-station. In addition, Type 1 operations would be established on the CTR and Type 3 operations introduced at Airport Lake. Given the nature of all GTT activities (i.e., foot and vehicle traffic) and the fact that they are conducted entirely within station boundaries, GTT operations proposed under the Moderate Expansion Alternative would not pose a public safety risk. Therefore, impacts to public health and safety from increased GTT activities would be less than significant.

4.10.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education and recreational activities would be the same as described for the No Action Alternative. Therefore, as described in Section 4.10.3.3, the impacts of continued nonmilitary uses on public health and safety would be less than significant.

4.10.5.3 CLUMP and INRMP Implementation

As described for the No Action Alternative, implementation of the CLUMP would integrate the Station's environmental and operational planning and review processes. This review process provides for an analysis of actions that may increase risks associated with flight operations, ground operations, ordnance use, and EMR use, and would require that appropriate management efforts be applied to those actions to comply with all established health and safety requirements. As such, implementation of the CLUMP would represent a beneficial impact. Implementation of the INRMP would not affect public health and safety at NAWS or in the ROI.

4.10.6 Protection of Children from Environmental Health Risks (EO 13045)

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (62 Federal Register 1985), states that each federal agency shall make it a priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. Environmental health risks and safety risks mean risks to health or to safety that are attributable to products or substances that a

child is likely to come into contact with or ingest (Federal Register 1997). A task force has been established to recommend federal strategies to the President for ensuring children's environmental health and safety.

The U.S. Navy anticipates that EO 13045 would apply to the noise environment around schools and to impacts associated with the use of hazardous materials and generation of hazardous waste at NAWS. Noise impacts would be considered significant if implementing an alternative would cause public schools to be located within a 65-dB CNEL contour. As described in Section 4.2, neither current nor proposed operations would cause a public school to be located within a 65-dB CNEL contour; therefore, there would be no noise impacts on children's environmental health and safety. In addition, as described in Section 4.11, use of hazardous materials and generation of hazardous waste at NAWS has no effect on public schools.

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4.11
Hazardous Materials and Wastes

4.11 HAZARDOUS MATERIALS AND WASTES

This section identifies the potential hazardous materials and hazardous waste impacts that may result from implementation of the proposed action and alternatives. The impact analysis compares projected conditions after implementation of each alternative to the affected environment and focuses on those activities that have the potential for adverse effects related to hazardous materials and wastes.

4.11.1 Region of Influence

The ROI for hazardous materials and wastes includes areas within NAWS boundaries. Any potential impacts of hazardous materials or wastes are expected to be limited to this ROI.

4.11.2 Approach to Analysis

Current hazardous materials and hazardous waste management practices at NAWS are conducted in accordance with applicable USEPA, California, and U.S. Navy requirements. Factors considered in assessing impacts associated with hazardous materials and wastes include the extent or degree to which an action would significantly increase the amount of hazardous materials used or the amount of hazardous wastes generated (including waste generated from spills). Problems arise if Station facilities would not be adequate to store, treat, or otherwise handle the increased amount of hazardous materials and wastes or such that existing permit conditions would be exceeded.

Each of the alternatives was analyzed to identify those actions that could affect the amount of hazardous material used and the amount of hazardous wastes generated. As a result of that review, range flight operations, airfield flight operations, and range ground operations (including target and test site use and GTT) were identified as having the potential to use substantial amounts of hazardous materials or generate substantial amounts of hazardous wastes. The analysis of range flight operations and airfield flight operations has been combined because the hazardous materials used and wastes generated by both of these activities are managed by means of routine maintenance operations conducted at Armitage Airfield.

4.11.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

NAWS is inspected on a routine basis by a variety of regulatory agencies to ensure compliance with hazardous materials and hazardous materials management regulations. In accordance with hazardous wastes regulations, the State DTSC inspects the permitted RCRA HWSTF annually. Local CUPAs from Kern, San Bernardino, and Inyo counties also routinely inspect hazardous materials requirements and temporary accumulation areas for hazardous wastes under state authority. In addition, the Navy conducts periodic inspections of hazardous materials/wastes activities at NAWS. The beneficial impacts of existing hazardous material and waste management programs at NAWS under the No Action Alternative would remain the same as presented in the baseline discussion (Section 3.11). Current management practices would remain in place, and the volume of materials and wastes handled is not expected to change. In addition, the HWSTF at Mainsite, the OB/OD facility in Burro Canyon, and the temporary hazardous waste accumulation areas throughout the Station would all remain operational. The IRP would also continue to be implemented, and IRP sites would continue to be identified, investigated, and remediated, as appropriate.

4.11.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

Range and Airfield Flight Operations

Under the No Action Alternative, range and airfield flight operations would continue to use hazardous materials that include jet and motor fuels, paints, thinners, adhesives, cleaners, degreasers, coolants, hydraulic fluids, and solvents. NAWS flight operations currently generate approximately 12 tons (11 metric tons) of hazardous wastes per year which, as described in Section 3.11.2.2, is readily accommodated through the HWSTF. Therefore, current flight operations have a less than significant impact on hazardous material and waste management at NAWS.

Range Ground Operations

Range ground operations generate hazardous wastes from maintenance, cleanup, and other activities associated with T&E and training activities as well as wastes referred to as range residue. Range activity wastes include items such as used PCBs, fuels, oils, and solvents. Range residue includes waste materials from spent ordnance and impacted targets which are not always classified as hazardous wastes but are managed according to environmental regulations at NAWS. Range ground operations currently generate approximately 40 tons (36 metric tons) of RCRA hazardous wastes. Approximately 85 percent or 35 tons (32 metric tons) of these wastes are generated through clean-up operations of equipment storage areas known as "bone yards." The remaining 15 percent of hazardous wastes generated by range ground operations are associated with GTT activities and are discussed below.

Target and Test Site Use. Ongoing ordnance use at target and test sites currently generate approximately 300 tons (272.15 metric tons) of range residue annually. In addition, there is an estimated 1,200 tons (1,089 metric tons) of additional range residue from historic range test and training operations (Oldroyd 2001). A comprehensive range residue clean-up program has been implemented at NAWS. Spent ordnance known to contain live explosives and pose a safety risk are either blown in place at the target or test site by qualified personnel from the EOD unit at NAWS or, if appropriate, are transported to the Range Residue Accumulation Area to be processed for recycling. Range residue clean-up efforts are proposed to remove approximately 400 tons (363 metric tons) of residue wastes annually. The Station's range residue clean-up plan addresses the 300 tons (272 metric tons) of contemporary wastes generated annually from ongoing ordnance and target use, as well as 100 tons (91 metric tons) of historic waste materials. Range residue wastes are processed for recycling at the Range Residue Accumulation Area. RCRA wastes identified during processing are sent to the HWSTF for appropriate disposition or, if energetic, to the OB/OD facility for treatment. Wastes generated by ordnance use are within the Station's waste management capacity and have a less than significant impact on hazardous material and waste management at NAWS.

Ground Troop Training. GTT units that enter the Station bring their own vehicles and are otherwise self-contained. It is estimated that GTT operations currently generate approximately 5 tons (4.5 metric tons) of hazardous wastes per year (Wieler 2001), or 15 percent of the hazardous wastes generated by range ground operations. Type 1 training operations, involving foot soldiers only, may generate negligible amounts of hazardous wastes during the transportation of troops to their area of operation. Type 2 operations, using wheeled vehicles during the training cycle, would continue to generate small amounts of hazardous wastes from material spills of vehicular operations including fuels, lubricating oils, hydraulic fluids, transmission fluids, etc. Cleanup of these wastes would continue to be conducted according to established range cleanup procedures in accordance with RCRA requirements. Since the amount of hazardous wastes generated by GTT operations is well within the Station's management capacity (refer to Section 3.11.2.2), current operations have a less than significant impact on hazardous material and waste management at NAWS.

4.11.3.2 Nonmilitary Uses

Nonmilitary uses currently do not affect the Station's supply of hazardous materials and do not generate hazardous wastes that must be managed. A slight potential does exist for fluid discharges from motor vehicles accessing NAWS for nonmilitary purposes. However, any vehicle discharge is incidental and its impact on the NAWS environment is considered negligible. Therefore, current nonmilitary uses have a less than significant impact on hazardous material and waste management at NAWS.

4.11.3.3 CLUMP and INRMP Implementation

Implementation of the CLUMP would formalize and integrate the Station's environmental planning and review processes. The environmental review process is applied to military and nonmilitary actions using hazardous materials and generating hazardous wastes. This review process provides an analysis of actions that may use hazardous materials and generate hazardous wastes, and would require that appropriate management efforts be applied to those actions to comply with RCRA requirements. Additionally, CLUMP land use data would support the identification of additional IRP sites and implement land use controls that would ensure appropriate reuse of such sites. As such, implementation of the CLUMP would represent a beneficial impact.

In compliance with the requirements of the Sikes Act as amended, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP. Implementation of the INRMP would not affect hazardous material and waste management at NAWS or in the ROI.

4.11.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

The beneficial impacts of existing hazardous material and waste management programs at NAWS under the Limited Expansion Alternative would be the same as those discussed for the No Action Alternative. Current management practices would remain in place, and the volume of materials and wastes handled is expected to be well within the Station's operating capacities and permit conditions. The HWSTF at Mainsite, the OB/OD facility in Burro Canyon, and the temporary hazardous wastes accumulation areas throughout the Station would all remain operational. The IRP would continue to be implemented under this alternative, and IRP sites would continue to be identified, investigated, and remediated in accordance with programmed activities and regulatory requirements.

4.11.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

<u>Range and Airfield Flight Operations</u>

Under the Limited Expansion Alternative, an increase in airfield flight operations at NAWS would increase demand for aircraft fuels, oils, hydraulic fluids, transmission fluids, and other hazardous materials. A 15 percent increase in flight operations is expected to increase the amount of hazardous wastes generated by approximately 1.8 tons (1.6 metric tons) over baseline conditions. When fully implemented, the annual hazardous wastes generated by NAWS range and airfield flight activities would be 13.8 tons (12.5 metric tons) per year. As noted in Section 3.11, the HWSTF is operating at approximately 21.7 percent of capacity, with a current RCRA waste throughput of 266.71 tons (241.96 metric tons) and a capacity of 1,229 tons (1,115 metric tons) per year. Therefore, the increase would be within

the Station's permitted hazardous waste management capabilities and would have a less than significant impact on hazardous material and waste management at NAWS.

Range Ground Operations

Target and Test Site Use. Under the Limited Expansion Alternative, ordnance use at target and test sites would increase by 15 percent over the baseline rates described in Table 3.1-3. As such, a 15 percent increase in ordnance use would generate approximately 45 additional tons (41 metric tons) of range residue wastes. When fully implemented, the annual range-residue wastes generated by ordnance use at targets and test sites would be 345 tons (313 metric tons) per year. The additional increase in range residue wastes is within the planned wastes removal objectives of the Station's range residue clean-up efforts. As noted under the No Action Alternative, range residue wastes are processed for recycling at the Range Residue Accumulation Area. RCRA wastes identified during processing are sent to the HWSTF for appropriate disposition or, if energetic, to the OB/OD facility for treatment. In sum, wastes generated by a 15 percent increase in ordnance use at targets and test sites are within the Station's waste management capacity and would have a less than significant impact on hazardous material and waste management at NAWS.

Ground Troop Training. Under the Limited Expansion Alternative, a doubling of GTT operations would increase the demand for vehicle fuels, oils, hydraulic fluids, transmission fluids, vehicle batteries, etc. A 100 percent increase in GTT operations is expected to generate an additional 5 tons (4.5 metric tons) of hazardous wastes. When fully implemented, hazardous wastes generated by NAWS GTT operations would be 10 tons (9 metric tons) per year. An increase of 5 tons (4.5 metric tons) is within the Station's permitted hazardous waste management capabilities (i.e., 1,229-ton [1,115-metric ton] capacity) and would have a less than significant impact on hazardous material and waste management at NAWS.

4.11.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, existing Native American, research and educational activities would continue. Impacts from these nonmilitary uses would be the same as described under the No Action Alternative. Therefore, as described in Section 4.11.3.3, continued nonmilitary use would have a less than significant impact on hazardous material and waste management at NAWS.

4.11.4.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would serve to formalize environmental planning and review processes which provide an analysis of actions that may use hazardous materials and generate hazardous wastes. Additionally, CLUMP land use data would support the identification of additional IRP sites and implement land use controls that would ensure appropriate reuse of such sites. As such, implementation of the CLUMP would represent a beneficial impact. Implementation of the INRMP would not affect hazardous material and waste management at NAWS or in the ROI.

4.11.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

The beneficial impacts of existing hazardous material and waste management programs at NAWS under the Moderate Expansion Alternative would be the same as those discussed for the No Action Alternative. Current management practices would remain in place, and the volume of materials and wastes handled is expected to be well within the Station's operating capacities and permit conditions. The HWSTF at Mainsite, the OB/OD facility in Burro Canyon, and the temporary hazardous waste accumulation areas throughout the Station would all remain operational. The IRP

would continue to be implemented under this alternative, and IRP sites would continue to be identified, investigated, and remediated in accordance with programmed activities and regulatory requirements.

4.11.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Range and Airfield Flight Operations

Under the Moderate Expansion Alternative, an increase in flight operations at NAWS would increase demand for aircraft fuels, oils, hydraulic fluids, transmission fluids, and other hazardous materials. A 25 percent increase in flight operations is expected to increase the amount of hazardous wastes generated by approximately 3 tons (2.7 metric tons) over baseline conditions. When fully implemented, the annual hazardous wastes generated by NAWS airfield activities would be 15 tons (14 metric tons) per year. As noted in Section 3.11, the HWSTF is operating at approximately 21.7 percent of capacity, with a current RCRA waste throughput of 266.71 tons (241.96 metric tons) and a capacity of 1,229 tons (1,115 metric tons) per year. Therefore, the increase would be within the Station's permitted hazardous waste management capabilities and would have a less than significant impact on hazardous material and waste management at NAWS.

Range Ground Operations

Target and Test Site Use. Under the Moderate Expansion Alternative, a 25 percent increase in ordnance use would generate approximately 75 additional tons (68 metric tons) of range residue wastes. When fully implemented, the annual range residue wastes generated by ordnance use at targets and test sites would be 375 tons (340 metric tons) per year. The additional increase in range residue wastes is within the planned waste removal objectives of the Station range residue clean-up efforts. RCRA wastes identified during processing are sent to the HWSTF for appropriate disposition or, if energetic, to the OB/OD facility for treatment. In sum, wastes generated by a 25 percent increase in ordnance use at targets and test sites are within the Station's waste management capacity and would have a less than significant impact on hazardous material and waste management at NAWS.

Ground Troop Training. Under the Moderate Expansion Alternative, a doubling of GTT operations and establishing a Type 3 operation would increase the demand for vehicle fuels, oils, hydraulic fluids, transmission fluids, and vehicle batteries. A 100 percent increase in Types 1 and 2 GTT operations is expected to generate an additional 5 tons (4.5 metric tons) of hazardous wastes. The start-up of a Type 3 operation is expected to generate an additional 5 tons (4.5 metric tons) of hazardous wastes annually resulting from vehicular fluid spills. When fully implemented, the hazardous wastes generated by NAWS GTT operations would be 15 tons (14 metric tons) per year for a total increase of 10 tons (9 metric tons) per year over baseline conditions. This increase is within the Station's permitted hazardous waste management capabilities (i.e., 1,229-ton [1,115 metric ton] capacity), and would have a less than significant impact on hazardous material and waste management at NAWS.

4.11.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, existing Native American, research and education and recreational activities would continue. Impacts from these nonmilitary uses would be the same as described under the No Action Alternative. Therefore, as described in Section 4.11.3.3, continued nonmilitary use would have a less than significant impact on hazardous material and waste management at NAWS.

4.11.5.3 CLUMP and INRMP Implementation

As described under the No Action Alternative, implementation of the CLUMP would serve to formalize environmental planning and review processes which provide an analysis of actions that may use hazardous materials and generate hazardous wastes. Additionally, CLUMP land use data would support the identification of additional IRP sites and implement land use controls that would ensure appropriate reuse of such sites. As such, implementation of the CLUMP would represent a beneficial impact. Implementation of the INRMP would not affect hazardous material and waste management at NAWS or in the ROI.

4.12
Traffic and Circulation

4.12 TRAFFIC AND CIRCULATION

This section identifies potential impacts to traffic and circulation that may result from implementation of the proposed action and alternatives. The impact analysis compares projected conditions after implementation of each alternative to the affected environment and focuses on those activities that have the potential to adversely affect traffic and circulation.

4.12.1 Region of Influence

The ROI for the traffic and circulation analysis includes the primary road networks in the IWV region, with emphasis on the area immediately surrounding NAWS. The analysis focuses on segments of the transportation networks that serve as direct or indirect links to NAWS and those commonly used by NAWS employees.

4.12.2 Approach to Analysis

This analysis focuses on the potential effects of traffic loading on NAWS and the surrounding roadway system that may occur from implementing the proposed action and alternatives. Proposed increases in traffic loading are compared to roadway capacities identified in Section 3.12. Factors considered in assessing significance include the extent or degree to which implementation of an alternative would result in traffic increases that would exceed the design capacity of an affected portion of the roadway system.

Since no increase in employment is associated with range flight operations, airfield flight operations, or target and test site use, the impact analysis in this section focuses on traffic increases related to GTT exercises and nonmilitary uses. In addition, since traffic generated by employees is readily accommodated on local and regional roadways in the area, no further discussion of employee-generated trips is provided in this section.

4.12.3 No Action Alternative

As described in Section 2.2.1, the No Action Alternative includes no changes in the current level of military and nonmilitary activities and implementation of the CLUMP and INRMP.

4.12.3.1 Military Uses

Under the No Action Alternative, established military T&E, training and support operations, and associated military land use would continue at existing levels and within areas currently designated for such uses. Additional information regarding existing levels of military use is outlined in Table 2-1 in Chapter 2 of this EIS.

Types 1 and 2 GTT activities do not permanently affect traffic congestion levels on access roadways. There is a periodic increase in traffic volumes during the arrival and departure of troops. However, this periodic increase does not introduce traffic volumes in excess of roadway capacities, and impacts on traffic and circulation are less than significant.

4.12.3.2 Nonmilitary Uses

Under the No Action Alternative, existing Native American, research and education and recreational activities would continue at NAWS. Proposed nonmilitary uses falling into these general categories would continue to be considered on a case-by-case basis.

Native American Use

Per the existing MOA between the tribes and NAWS, no more than 25 vehicles participate at any one time during Native American activities at the Coso Hot Springs and Prayer Site. Because the trips are limited to the more remote sections of the Station and are well within the capacity of the existing road network, impacts on traffic and circulation from Native American use are less than significant.

Research and Education

Research and education activities periodically introduce small volumes of additional traffic to NAWS roadways. A maximum of 4 vehicles are typically associated with research activities and up to 20 vehicles for education activities. These events typically are conducted during weekends when there is less traffic on NAWS roadways and traffic volumes are well within the roadway capacities. Therefore, current research and education activities have less than significant traffic and circulation impacts.

Recreation

Existing recreational activities periodically increase traffic volumes but do not introduce volumes that exceed roadway capacities. During peak periods, 16 vehicular trips per day are expected for camping activities at Birchum Springs. Traffic generated by equestrian events typically does not exceed 20 vehicles at any one time, based on the highest level of traffic generated by current public activities at the Station. ORV only occasionally cross over NAWS lands. The maximum number of vehicles for a petroglyph tour is 25 per event. The annual Audubon Society bird count creates the periodic addition of a maximum of 40 vehicle trips to access roadways. These events generate traffic volumes that are well within the roadway capacities. Therefore, current recreation activities have less than significant traffic and circulation impacts.

4.12.3.3 CLUMP and INRMP Implementation

Implementation of the CLUMP would formalize and integrate the Station's environmental planning and review processes. The environmental review process is applied to military and nonmilitary actions that occur on-Station and includes new actions or substantial changes to existing uses or operations. This review process would provide an analysis of actions with the potential to significantly increase on- or off-Station vehicular traffic. As such, traffic and circulation considerations would be integrated into the planning process; therefore, implementation of the CLUMP would represent a beneficial impact.

In compliance with the requirements of the Sikes Act as amended, implementation of the CLUMP would serve as the implementing vehicle for NAWS's draft INRMP. Implementation of the INRMP would not affect traffic and circulation at NAWS or in the ROI.

4.12.4 Limited Expansion Alternative

As described in Section 2.2.2, the Limited Expansion Alternative includes a limited expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.12.4.1 Military Uses

Under the Limited Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Training activities would occur periodically throughout the year with vehicles arriving and departing at different times. The Type 1 and Type 2 training events could generate an additional 84 vehicles on the regional roadways accessing NAWS (U.S. Highway 395, SH 14, and SR 178) during initiation and termination of the training activities. As shown in Table 3.12-1, the capacities of all these roads are above 5,000 vehicles per hour. Although none of these roads currently operate at LOS designations indicating "free flow" conditions (LOS designation "A"), the periodic addition of 84 vehicles would have negligible effects on traffic and circulation. Therefore, the additional traffic associated with GTT activities would have less than significant impacts on traffic and circulation.

4.12.4.2 Nonmilitary Uses

Under the Limited Expansion Alternative, impacts associated with existing Native American, research and education and recreational activities would be the same as described for the No Action Alternative. Therefore, as described in Section 4.12.3.3, the impacts of continued nonmilitary uses on traffic and circulation would be less than significant.

4.12.4.3 CLUMP and INRMP Implementation

As described for the No Action Alternative, implementation of the CLUMP would serve to formalize and integrate the Station's environmental planning and review processes. Therefore, CLUMP implementation would represent a beneficial impact to traffic and circulation. Implementation of the INRMP would not affect traffic and circulation at NAWS or in the ROI.

4.12.5 Moderate Expansion Alternative (Preferred Alternative)

As described in Section 2.2.3, the Moderate Expansion Alternative includes a moderate expansion of military activities, continuation of current nonmilitary activities, and implementation of the CLUMP and INRMP.

4.12.5.1 Military Uses

Under the Moderate Expansion Alternative, increases in range flight operations, airfield flight operations, and range ground operations are proposed. Details regarding proposed military uses under this alternative are outlined in Table 2-1 in Chapter 2 of this EIS.

Type 1 and Type 2 GTT activities in the North and South ranges would occur as described for the Limited Expansion Alternative, with a new area designated in the CTR for Type 1 exercises only. Approximately 84 vehicle trips would be generated by these activities. As discussed for the Limited Expansion Alternative, traffic associated with Type 1 and Type 2 training activities would be well within the capacities of the existing regional roadway network. Therefore, impacts on traffic and circulation would be less than significant.

The introduction of one Type 3 training event per year at Airport Lake would generate the highest number of vehicles along the regional and local roadways accessing NAWS. A maximum of 300 military personnel would participate in this event, based on the person days associated with the projected GTT activities. Approximately 100 vehicles would be employed as vehicle support for the training activities. Assuming that all military personnel were transported by truck to the training area and assuming an average of 8 persons per vehicle, a maximum of approximately 40 vehicles would be needed for military personnel transport. The transport trucks and additional vehicle support would generate a total of 140 vehicles on the regional roadways accessing NAWS. As described for the Limited Expansion Alternative, although none of the roads providing access to NAWS operate at LOS designation "A" (indicating free flow conditions), they all have capacities to support more than 5,000 vehicles per hour. The periodic addition of 140 trips to the roadways would therefore be well within the capacity of these roadways and impacts to traffic and circulation would be less than significant.

4.12.5.2 Nonmilitary Uses

Under the Moderate Expansion Alternative, impacts associated with existing Native American, research and education and recreational activities would be the same as described for the No Action Alternative. Therefore, as described in Section 4.12.3.3, the impacts of continued nonmilitary uses on traffic and circulation would be less than significant.

4.12.5.3 CLUMP and INRMP Implementation

As described for the No Action Alternative, implementation of the CLUMP would serve to formalize and integrate the Station's environmental planning and review processes. Therefore, CLUMP implementation would represent a beneficial impact to traffic and circulation. Implementation of the INRMP would not affect traffic and circulation at NAWS or in the ROI.

CHAPTER 5

Cumulative Impacts

5.0 INTRODUCTION

The CEQ Regulations 40 C.F.R. §§ 1500-1508 for Implementing the Procedural Provisions of the NEPA of 1969, as amended (42 U.S.C § 4321 et seq. defines cumulative effects as:

> "The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." (40 C.F.R. § 1508.7)

The contribution of a proposed action to the overall cumulative impacts in a ROI is of particular concern. A single project may have individually minor impacts; however, when considered together with other projects, the effects may be collectively significant. A cumulative impact is, therefore, the additive effect of all projects in the same geographic area.

In general, effects of a particular action or group of actions must meet all of the following criteria to be considered cumulative impacts:

- Effects of several actions occur in a common locale or ROI (i.e., action can contribute to effects of an action in a different location).
- Effects on a particular resource are similar in nature (i.e., affects the same specific element of a resource).
- Effects are long term; short-term impacts dissipate over time and cease to contribute to cumulative impacts.

Section 5.1 discusses relevant past, present, and reasonably foreseeable future actions at the NAWS or in the vicinity of the Station. Specific environmental documentation addressing direct and indirect effects of these actions either has been or will be conducted separately from this EIS. A brief summary of the projects considered for cumulative analysis is included in Section 5.1.

5.1 CUMULATIVE PROJECTS

The cumulative effects analysis may be approached in a variety of ways. In this document, it is approached by identifying other projects, both on-Station and off-Station, that are outside the scope of the CLUMP implementation, but are expected to be implemented during the period of this proposed project. On-Station and off-Station projects have been identified in consultation with the BLM and the following entities:

- Counties of Inyo, Kern, and San Bernardino;
- City of Ridgecrest;
- U.S. Air Force, U.S. Army, and U.S. Navy;
- Caltrans; and
- NPS.

The locations of the principal cumulative projects summarized in this section are shown in Figure 5.1-1. On-Station cumulative projects include laboratory and support facility construction, runway repairs through removal and replacement, facilities demolition, repair and upgrade of housing facilities, the ECR threat dispersion facility, and a production water well repair by replacement. Off-Station cumulative projects include the WMCMP, the Northern and Eastern Mojave Planning Efforts, the Timbisha Shoshone Land Study, highway projects, an expansion of the NTC Fort Irwin, the Western Mojave Land Tenure Adjustment Project, and the Expansion of the Ridgecrest Wastewater Treatment Plant (WWTP).

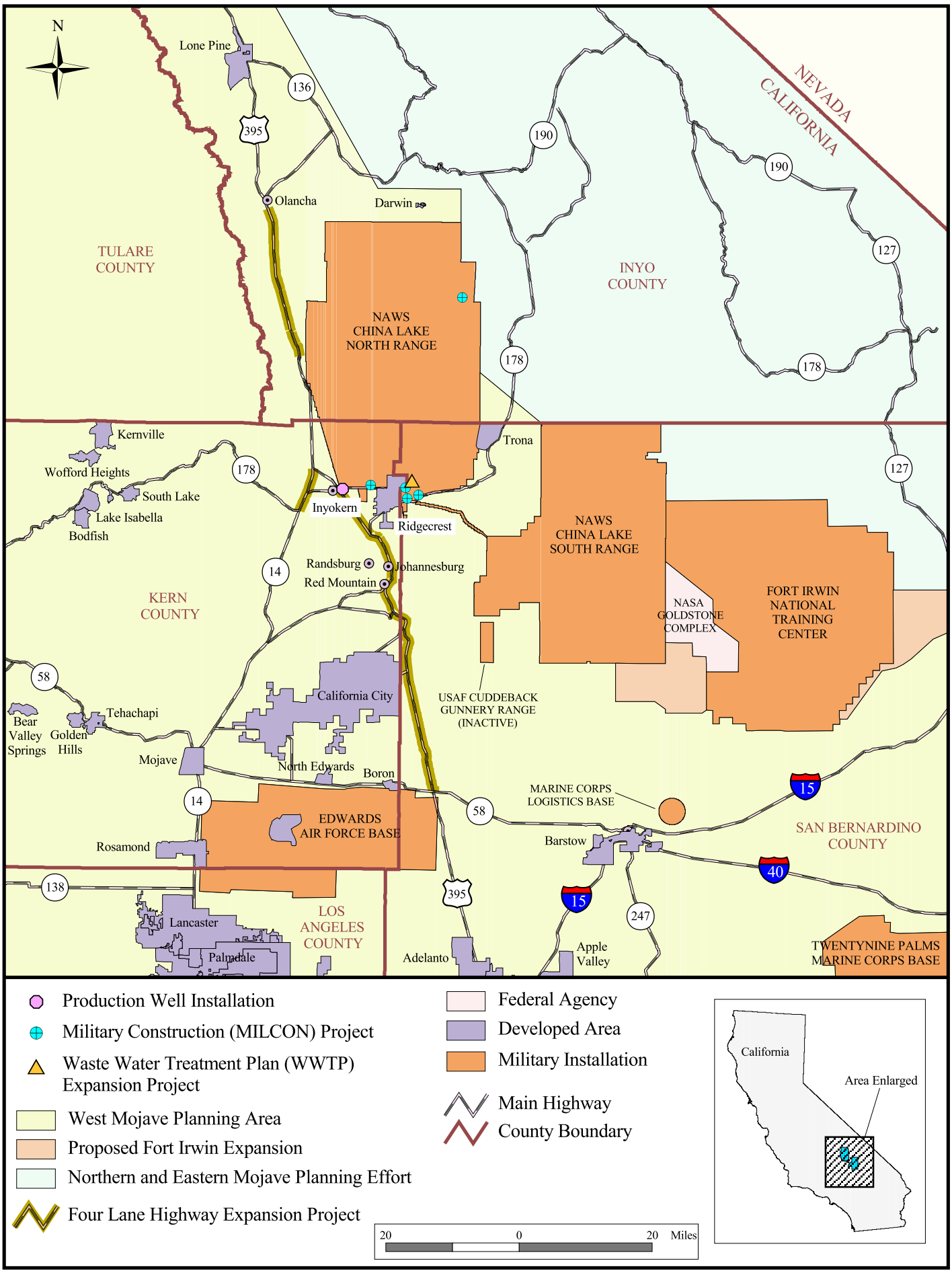

Figure 5.1-1 Cumulative Project Locations

5.1.1 On-Station Projects

5.1.1.1 Facility Upgrades at Weapons Survivability Lab and Junction Ranch (*MILCON P-407, design and build phase)*

MILCON P-407 includes the construction of range facility upgrades at the Weapons Survivability Lab and Junction Ranch. Project components would include a new power substation, a 2,000-square foot fire control building, two 12,000-square foot concrete test pads, a hazardous waste collection/separation system, a fire fighting system, a modular air flow facility, a 6,000-square foot storage building, fiber optic cables, a tilt/turntable pad, a 1,000-foot extension of the bounce strip, paving, roads, and site improvements. The improvements are needed to provide the DoD with essential, up-to-date, live fire T&E capabilities.

5.1.1.2 Propellants and Explosives Laboratory *(MILCON P-453,* p*roposed for future construction*)

MILCON P-453 includes the construction of a 42,075 square foot R&D laboratory made of concrete with explosion-proof features and environmental controls at the CLPL site on-Station. Site preparations would include the deactivation of 35 WWII vintage facilities throughout CLPL and associated infrastructures totaling 67,810 square feet. These facilities are currently inefficiently configured for their R&D purpose and do not have sufficient environmental control systems. The project is needed to replace outdated facilities and consolidate similar functions into one building.

5.1.1.3 Base Operating Support Facility *(MILCON P-515, proposed for future construction)*

MILCON P-515 includes the construction of a 51,000 square foot multi-storied building at Mainsite. The project also includes demolition of 21 outdated facilities totaling 197,828 square feet dispersed throughout Mainsite, and the abandonment of supporting infrastructures in place. When implemented, those infrastructures no longer requiring maintenance would include about 6.6 miles (10.6 kilometers) of roads, 10 miles (16 kilometers) of electrical distribution lines, 1.7 miles (2.75 kilometers) of steam lines, 3.2 miles (5 kilometers) of water distribution lines, 13.3 miles (21 kilometers) of communication lines, 1 mile (1.6 kilometers) of gas lines, and 1.8 miles (13 kilometers) of sewer lines. This project is needed to replace the outdated buildings and to consolidate similar functions into one building for cost savings and to improve service efficiencies.

5.1.1.4 Runway, Taxiway & Parking Apron Repair *(MILCON P-521, proposed for future construction*)

MILCON P-521 includes the repair a total of 632,200 square feet of pavement at Armitage Airfield by removal and replacement. The repair would be conducted by removing existing deteriorated pavement, reconditioning the compacted soil sub-base, and providing new pavement in those areas. Pavement sections to be replaced would be 199,900 square feet (18,581 square meters) of runway, 37,482 square feet (3,484 square meters) of taxiway, 389,800 square feet (35,768 square meters) of parking apron, and 9,995 square feet (929 square meters) of power check pad. The project is needed to minimize safety hazards to aircraft operations and reduce maintenance costs.

5.1.1.5 Repair and Upgrade Three Bachelor Enlisted Quarters (BEQ) Facilities *(MILCON P-524, P-525, and P-526, proposed for future construction*)

MILCON Projects P-524, P-525, and P-526 include the repair and upgrade of three BEQ facilities located at Mainsite (Buildings 01394, 01395, and 01396). Building repairs and upgrades include elevator, kitchenette/service areas, upgraded fire protection system, new electrical distribution system, new heating ventilation and air conditioning system, and upgraded plumbing. Buildings 01394 and 01396 contain 26,810 square feet (2,492 square meters) with 64 rooms. Building 01395 contains 16,438 square feet (1,528 square meters) with 24 rooms. Asbestos has been identified throughout all three buildings; lead-based paint may be present due to the year of construction (1975). The repairs

and upgrades are needed to alleviate overcrowded conditions at existing BEQ facilities and to address potential health and safety conditions that exist at the present facilities.

5.1.1.6 Bachelor Quarters 2+1 *(MILCON P-529, proposed for future construction*)

MILCON Project P-529 would include the construction of a 36,480 square foot (3,390 square meter) single-story BEQ. This project would include DoD 2+0 standard modules. Rooms would accommodate dual occupancy and contain upgraded convenience and safety features including shared bathroom facilities. These facilities would include laundry, lounge/game room, activity/meeting room, exercise room, and storage and administrative spaces. Buildings 01394, 01395 and 01396 would be demolished. The new BEQ is required to alleviate over crowded conditions.

5.1.1.7 ECR Threat Dispersion Facility *(MILCON P-513, proposed for future construction*)

Proposed construction consists of one 1,200 square foot (111.48 square meter) threat emitter pad (30x40x12 inches/76x102x31 centimeters) combined with one 750 square foot (69.67 square meter) system support pad (15x50x6 inches/38x127x15 centimeters) constructed at 20 strategic site locations throughout the ECR in the Randsburg Wash Valley and Mojave B North. Related support construction leading to each of the 20 site locations would include improvements to existing 28 miles (45.06 kilometers) of unimproved dirt roadway/trails, and installation of culverts/concrete wash aprons. Two-way passing turnouts would be required at various locations along the improved roadway. Construction would include 40 miles (64.37 kilometers) of underground electrical service lines and 12 miles (19.31 kilometers) of direct buried fiber optic distribution. In addition, the proposed construction would provide a one-story 5,381 square foot (500 square meters) Research Lab Operations/Storage building. The removal of 6 miles (9.65 kilometers) of abandoned pole lines would be required. The proposed sites for threat emitter locations are vacant areas that have been previously disturbed. This project would enhance and diversify ECR test and training capabilities.

5.1.1.8 Production Well #27 Repair by Replacement, DoN *(Installation planned*)

This project includes installation of a replacement production well at the Harvey well field to maintain the existing supply of potable water to Mainsite and other locations on North Range.

5.1.2 Off-Station Projects

5.1.2.1 West Mojave Coordinated Management Plan, BLM/Interagency *(Draft Coordinated Management Plan projected release is April 2001)*

The WMCMP is a comprehensive, interagency planning effort for conserving biological resources in the West Mojave region. In 1992, agencies within the West Mojave planning area established a multi-agency partnership to prepare this plan, with the BLM as the lead agency. Agencies involved in this partnership include the following:

- Five military installations (NAWS China Lake, Edwards AFB, NTC Fort Irwin, Marine Corps Logistics Base in Yermo, and MCAGCC at Twentynine Palms);
- Four federal land managers (BLM, NASA at Goldstone, National Biological Service, and Boron Prison);
- Five California agencies (Caltrans, the Department of Parks and Recreation, the State Lands Commission, the California Energy Commission, and the University of California Reserve System);
- One special district (IWV Water District);
- Five counties (Inyo, Kern, Los Angeles, Riverside, and San Bernardino); and
- Eleven incorporated towns and cities (Adelanto, Apple Valley, Barstow, California City, Hesperia, Lancaster, Palmdale, Ridgecrest, Twentynine Palms, Victorville, and Yucca Valley).

The goal of the West Mojave planning process is to develop a cost-effective and efficient compliance strategy for participating agencies regarding the federal and state ESA. The purpose of the plan is to facilitate the recovery of listed species and minimize the need to list species in the future. In addition, the process would also accommodate community growth and resource utilization. Adoption of the plan would benefit land users, land management agencies, and regulatory agencies by providing a streamlined permit process and defining consistent mitigation and compensation obligations. It would also reduce the need for biological surveys in certain areas, project-specific incidental take permits, and the uncertainty related to requirements for long-term species and habitat conservation. Management alternatives are being developed, and a draft habitat conservation plan (HCP) will be included in the Coordinated Management Plan. Public distribution of the WMCMP is expected in April 2001.

5.1.2.2 Northern & Eastern Mojave Planning Effort, BLM/NPS/Interagency *(Two Draft EISs) were released by the NPS in August 1998 for the Death Valley and Mojave Preserve portions of the region with Final EISs being issued for each in 2000. A third Draft EIS was released by the BLM in April 2001. Following the release of the BLM Final EIS, a ROD will be prepared that integrates the management direction of the NPS and BLM efforts regarding endangered species management.)*

The Northern & Eastern Mojave Planning Effort would provide a coordinated regional approach for managing federal lands in the planning area and would update agency general and specific management plans to reflect changes made by the CDPA of 1994. The Northern and Eastern Mojave interagency planning team consists of representatives from the NPS, the BLM, and the USFWS. Cooperating agencies include the Bureau of Indian Affairs; NTC Fort Irwin; NAWS China Lake; USACE; USEPA; CDFG; California State Parks; Caltrans; State Lands Commission; California and Nevada SHPO; San Bernardino, Inyo, and Mono counties in California; Clark, Nye, and Esmeralda counties in Nevada; and the Timbisha/Shoshone, Mojave, and Chemehuevi Native American Tribal Councils. The management goals of the planning effort are to provide a coordinated management direction for the CDPA additions to Death Valley National Park and the Mojave National Preserve, to amend the CDCAP to reflect the changes directed by the CDPA, and to support the recovery of the threatened desert tortoise and other protected species in the planning area. These NEPA documents will address several issues, including changes in land use categories as a result of the CDPA, protection of endangered and threatened species and related habitat, and local implementation of the 1995 Rangeland Reform Act (DOI, BLM 1996).

5.1.2.3 Timbisha Shoshone Land Study *(Legislation signed)*

This project was initiated by the BLM and the NPS in response to the CDPA. The CDPA required the DOI to conduct a study to identify land areas that may be suitable for possible conveyance to the Timbisha Shoshone tribe. The BLM, NPS, Timbisha Shosone tribe, and other agencies completed a study identifying several parcels in the region that were suitable for conveyance to the tribe. A legislative EIS was prepared for the proposed action to convey approximately 7,500 acres (3,035 hectares) of public lands to the tribe. The legislation also calls for the purchase of approximately 2,400 additional acres (971 hectares) of private sector lands to be transferred to the tribe. On Nov. 1, 2000, President Clinton signed the Timbisha Bill into law.

5.1.2.4 Four-lane Highway Project, Highway 395, Kern and Inyo Counties, Caltrans/Kern COG (*Early planning/construction planned for 2011 to 2016*)

This project would include expansion of Highway 395 to four lanes through Kern County from Johannesburg to the Highway 14 interchange. The Kern COG CIP for the years 2011 to 2016 has designated funds to widen Highway 395 to four lanes in Inyokern. The expansion of Highway 395 to four lanes in Inyo County is planned through Olancha.

5.1.2.5 Four-lane Highway Project, SH 14, Kern County, Kern COG *(Early planning/Construction planned for 2012 to 2016)*

This project would include expansion of SH 14 to four lanes from Inyokern to the junction with SR 178.

5.1.2.6 Highway Drainage Project, SR 178, Kern County, Kern COG *(Early planning/Construction planned for 2012 to 2016)*

This drainage improvement project is planned for China Lake Boulevard portions of SR 178.

5.1.2.7 NTC Fort Irwin Expansion, BLM/U.S. Army *(DoD and DOI agreed on proposed legislation for initiating the NTC land expansion project on 30 October 2000.)*

The revised NTC Fort Irwin land expansion project would withdraw 110,111 additional acres (44,560.52 hectares) of public lands to support the training mission of the U.S. Army NTC at Fort Irwin, CA. This proposal would request the withdrawal of these BLM lands located to the southeast and southwest of the current NTC base boundary. Under the legislation the Army and DOI will prepare a joint plan for the expansion of Fort Irwin. The joint plan will identify the lands needed to meet the NTC mission requirements and recommend conservation measures to promote the survival and recovery of threatened and endangered species in the West Mojave Desert. After review by the USFWS Director, the plan will be forwarded to Congress and additional legislation would be implemented to withdraw and reserve the lands identified in the plan. The proposed legislation requires the completion of consultation under the ESA and NEPA review process (Final EIS) within 24 to 30 months, respectively.

5.1.2.8 Western Mojave Land Tenure Adjustment Project, BLM/Air Force/Local Governments (*Ongoing Project*)

This project implements a voluntary land exchange program to create more logical and manageable ownership patterns, protect important resources, ensure protection of critical DoD airspace assets in the region, and promote the disposal of isolated public lands in developed and developing areas. The program is funded by the U.S. Air Force and is administered by the BLM.

5.1.2.9 Expansion of WWTP, City of Ridgecrest *(80 percent preliminary design phase completed; project currently on hold)*

Ridgecrest is planning an expansion of their WWTP, located adjacent to the existing WWTP on NAWS lands. The project would upgrade the system capabilities of the existing plant. The project is currently on hold due to slowing population growth.

5.2 CUMULATIVE IMPACTS

This section addresses the potential additive effects of implementing the Preferred Alternative (the Moderate Expansion Alternative) in combination with the projects identified in Section 5.1. No significant impacts have been identified for the Moderate Expansion Alternative in this EIS. Since environmental analysis for many of the projects

listed in this chapter are not complete and quantitative data are not available, cumulative impacts have been addressed qualitatively and are described below.

5.2.1 Land Use

Under the Moderate Expansion Alternative, there would be no cumulative impacts to land use at NAWS. MILCON projects proposed on-Station would occur within compatible land areas and would not result in cumulatively significant impacts. Land uses under this alternative would be compatible with other regional federal planning efforts for the Mojave Region being conducted by the BLM and others for conservation of natural resources. This alternative also would be compatible with upgrades in regional roadways from two to four lanes and with upgrades to Ridgecrest and NAWS utilities. Since proposed changes to land use would occur within compatible land use patterns and designations on-Station, cumulative land use impacts would not result from the additive effects associated with proposed expansion of training activities at NTC Fort Irwin and withdrawal of public lands under BLM management. Therefore, no significant cumulative land use impacts would occur.

5.2.2 Noise

The cumulative projects identified for the NAWS area would not have any significant cumulative noise impacts in conjunction with the Moderate Expansion Alternative. As discussed below, noise impacts from cumulative development projects either are very localized or would affect areas that are distant from the NAWS ranges. Consequently, there would be no significant cumulative noise impacts from the projects in the ROI in combination with the noise issues discussed in Chapter 4.

Projects of potential interest from a cumulative impact perspective include the on-Station infrastructure construction projects, three highway widening projects, a highway drainage project, the Ridgecrest WWTP expansion project, BLM/interagency land management planning studies, a land exchange program, and the potential expansion of NTC Fort Irwin. The BLM/interagency West Mojave and Northern/Eastern Mojave planning efforts and the BLM/Air Force/local government land exchange program have no readily identifiable noise impacts and thus have no potential for cumulative noise impacts.

The highway widening projects may result in increased vehicle traffic and higher traffic speeds along the widened sections. Traffic noise levels may increase slightly due to higher traffic volumes and speeds. However, traffic noise levels would fall to background levels within a few hundred feet (approximately 60 meters) of the affected roadway sections. Consequently, these projects would not have any effect on overall noise conditions at NAWS or in adjacent off-Station areas. Widening Highway 395 through Kern County and Inyo County and widening SH 14 in Kern County would have minor noise effects associated with temporary construction activities and permanent traffic conditions. Constructing drainage improvements along SR 178 would have temporary construction noise impacts. Expanding the Ridgecrest WWTP also would have minor noise effects associated with temporary construction activities and permanent equipment operation.

Demolishing buildings in the Mainsite area would have temporary, localized noise impacts, as would the construction of facilities and the installation of a replacement production well. Noise from the construction and demolition projects would be temporary and thus would have no long-term cumulative impacts. Construction and demolition noise would drop below background noise conditions at distances of more than 1,000 feet (305 meters) from the construction or demolition site. The limited area of impact from such noise sources prevents construction and demolition projects from having any appreciable effect on overall noise conditions at NAWS or in adjacent off-Station areas.

The WWTP and the well facility would create permanent new noise sources (mostly pumping facilities). However, pumps for wastewater treatment and well operations are contained within facilities and are not expected to be significant noise sources. Noise levels would drop below background levels at a distance of a few hundred feet

(approximately 60 meters) from the facilities. Consequently, these facilities would not have any effect on overall noise conditions at NAWS or in adjacent off-Station areas.

Land withdrawals and expansion of NTC Fort Irwin would alter the location of noise sources associated with training programs at the NTC. A portion of the lands being considered for expansion of Fort Irwin are adjacent to the southern boundary of the NAWS South Range and the increased operations at NTC may have a cumulative noise effect that is expected to be addressed in the NTC's land expansion project EIS. Due to the distances between the NAWS and NTC areas of operations, no cumulative impacts to overall noise conditions at NAWS or in the NAWS ROI are expected.

5.2.3 Air Quality

The cumulative projects identified for the NAWS area are not expected to have any significant cumulative air quality impacts in conjunction with the Moderate Expansion Alternative. As discussed below, air quality impacts from cumulative development projects either are very localized or would affect areas away from NAWS. Consequently, no significant cumulative air quality impacts would result from the projects in the ROI in combination with the air quality issues discussed in Chapter 4.

Projects of potential interest from a cumulative impact perspective include the on-Station building demolition program, infrastructure construction projects, three highway widening projects, a highway drainage project, the Ridgecrest WWTP expansion project, BLM/interagency land management planning studies, a land exchange program, and the proposed expansion of NTC at Fort Irwin. The BLM/interagency West Mojave and North/East Mojave planning efforts and the BLM/Air Force/local government land exchange program have no readily identifiable air quality impacts and thus have no potential for cumulative air quality impacts.

Widening Highway 395 through Kern County and Inyo County and widening SH 14 in Kern County would have minor air quality effects associated with temporary construction activities and permanent traffic conditions. Constructing drainage improvements along SR 178 would have only temporary construction-related air quality impacts. Expanding the Ridgecrest WWTP also would have minor air quality effects associated with temporary construction activities and permanent equipment operation. Demolishing buildings in the Mainsite area would have temporary, localized air quality impacts, as would installing fiber optic lines and a new well. However, air emissions associated with these projects would be minimized by controlling fugitive dust and are not expected to contribute to significant cumulative air quality impacts. The highway widening projects may result in increased vehicle traffic and higher traffic speeds along the widened sections. However, vehicle emissions may decrease somewhat due to reduced traffic congestion during peak periods. Consequently, these projects would not have any adverse cumulative impacts on overall air quality conditions at NAWS or in adjacent off-Station areas.

The proposed expansion of NTC Fort Irwin has the greatest potential for cumulative air quality impacts. A comprehensive Draft EIS will be required to assess the potential for air quality impacts that may result from the proposed action and other alternatives. Considering prevailing meteorological factors and the type of activities conducted on the NAWS South Range, and their separation from the lands being considered for the NTC expansion, ambient air quality conditions at NAWS would not be significantly affected by use of the areas added to Fort Irwin. The physical separation between the land withdrawal area and NAWS, in combination with prevailing winds, could prevent air pollution emissions at either base from significantly affecting ambient air quality conditions at the other base. Consequently, although regional air pollution emissions are expected to increase with the NTC expansion, they are not expected to have cumulative effects on the magnitude or frequency of violations of federal and state air quality standards in the NAWS ROI.

5.2.4 Biological Resources

The analysis for cumulative effects differs somewhat from the impact analysis conducted for the NAWS on-Station effects because off-Station projects do not have to be conducted in accordance with the NAWS INRMP. The NAWS INRMP integrates the legal requirements for compliance with the federal ESA with long-standing and ongoing conservation practices at NAWS. The NAWS INRMP provides additional conservation benefits to non-listed species in accordance with DoD and Navy policy and directives, and in accordance with the land use planning guidelines in the FLPMA; 43 U.S.C. § 1712).

Although existing data do not allow for a comprehensive analysis at this time, it is expected that the proposed expansion of Fort Irwin NTC has the greatest potential for cumulative biological resources impacts in combination with implementation of the Moderate Expansion Alternative. As the proposed action for the land expansion is finalized between the Army and BLM, the EIS for this project will address the potential for adverse effects to protected biological resources in the expansion area and in a regional context in accordance with the provisions of the federal ESA. The potential impacts to biological resources that could result from implementing the NTC expansion project also are expected to be considered in the context of other regional endangered species management efforts, such as the WMCMP.

The WMCMP and the Northern and Eastern Mojave Planning Effort are focused primarily on establishing improved resources management processes and procedures in the planning area. These projects do not include construction, ground-disturbing activities, or the sale or transfer of land, and projects that are conducted under the terms of the plan will comply with the federal and state ESAs. Therefore, these projects, considered in combination with the Moderate Expansion Alternative, would not result in cumulative significant impacts to biological resources.

The Western Mojave Land Tenure Adjustment Project could result in significant impacts if the lands to be transferred contained sensitive biological resources that would be subject to greater risk of disturbance as a result of the land transfer. However, a goal of the land exchange is to protect important resources, and transfer of federal land would be subject to conditions of the ESA. As such, this project, considered in combination with Moderate Expansion Alternative, would not result in cumulative impacts to biological resources.

Widening Highway 395 through Kern County and Inyo County and widening SH 14 in Kern County could result in both temporary and permanent impacts to biological resources. Desert tortoise habitat could be permanently lost in areas needed to accommodate the new lanes. Desert tortoise habitat would be temporarily disturbed as a result of construction activity. Habitat adjacent to roadways can often be of low quality for desert tortoises, but could be occupied by tortoises at times. It is expected that biological surveys and construction monitoring would be required pursuant to the state and federal ESAs prior to any project-related ground disturbance. Construction of drainage improvements along SR 178 could result in temporary and permanent impacts to biological resources. However, it is expected that biological surveys and construction monitoring would be required prior to ground disturbance and project implementation would have to be conducted in accordance with state and federal ESAs and applicable requirements. Therefore, implementation of these projects is not expected to have significant cumulative impacts to biological resources.

Expanding the Ridgecrest WWTP could result in impacts to biological resources. However, all projects at NAWS are reviewed early in the planning process by environmental staff and standard procedures would be applied to ensure that these projects avoid or minimize impacts to threatened and endangered species, species warranting NAWS Stewardship, or sensitive habitat. Facilities construction, replacement, and demolition in the Weapons Survivability Lab, Junction Ranch, Propulsion Laboratory, Mainsite, and Armitage Airfield would not result in impacts to biological resources due to the developed nature of the proposed sites. Therefore, these projects, considered in combination with the Moderate Expansion Alternative, would not result in cumulative impacts to biological resources.

The ECR Threat Dispersion Facility project with emitter sites and fiber optic cable installation is not expected to result in impacts to biological resources, because the alignment of the cable installation would follow existing roads, and emitter sites are planned for construction at previously disturbed areas. In addition, all projects are reviewed early in the planning process by NAWS environmental staff, and standard procedures will be applied to ensure that impacts to threatened and endangered species, species warranting NAWS Stewardship, and sensitive habitat are avoided or minimized. Therefore, this project, considered in combination with the Moderate Expansion Alternative, would not result in cumulative impacts to biological resources.

Installing a replacement production well is not expected to affect biological resources, because the well would be placed in proximity to the existing production well, which is located on a previously disturbed site. However, all projects are reviewed early in the planning process by NAWS environmental staff, and standard procedures would be applied to ensure that impacts to threatened and endangered species, species warranting NAWS Stewardship, and sensitive habitat are avoided or minimized. Therefore, this project, considered in combination with the Moderate Expansion Alternative, would not result in cumulative impacts to biological resources.

5.2.5 Cultural Resources

The WMCMP and the Northern and Eastern Mojave Planning Effort are focused primarily on improving resources management in the planning area. These projects do not include construction, ground-disturbing activities, or the sale or transfer of land. Therefore, these projects, considered in combination with the Moderate Expansion Alternative, would not result in cumulative impacts to cultural resources.

The repair of runways, taxiways, and parking aprons (MILCON P-521) consists of removing and replacing existing pavement. If construction and staging is limited to existing paved surfaces, impacts to cultural resources would not be expected and no cumulative impacts would occur. The repair and upgrade of BEQ facilities (MILCON P-524, P-525, and P-526) consists of internal structural and utility upgrades to properties that are not historic and, therefore, no cumulative impacts to cultural resources would occur.

The remainder of the cumulative projects identified for the upper Mojave Desert, both off-Station and on-Station, include construction, facility demolition, or the sale or transfer of land. All of these projects could result in the loss or destruction of prehistoric, Native American, or historic resources. Projects involving construction of new facilities (MILCON P-407, P-453, and P-515) and widening of highways have the highest potential to result in the loss or destruction of archaeological resources. The demolition of WWII structures (MILCON P-453) would result in the destruction of historic-age buildings; however, these building have been evaluated and are not eligible as historic properties. Because not all areas of potential effect have been defined for these cumulative projects, it is unknown how many cultural resources would be affected. In addition, because not all areas within the region have been fully investigated, it is unknown what types of cultural resources may be affected. Avoiding NRHP-eligible cultural resources and implementing the projects in compliance with the NHPA Section 106 and other applicable requirements would reduce impacts to a less than significant level.

5.2.6 Geology and Soils

Implementing the Moderate Expansion Alternative, in conjunction with the cumulative projects identified for NAWS China Lake, could result in significant cumulative effects if they substantially increased the potential for soil erosion or the number of acres subject to soil erosion. The cumulative projects focused primarily on improving resources management in the planning area do not include new construction or ground disturbing activities. Therefore, these projects, considered in combination with the Moderate Expansion Alternative, would not result in cumulative geology and soils impacts.

The off-Station construction projects, including the road improvement projects, have the potential for increasing soil erosion during construction. However, these impacts are not likely to be regionally significant because they would

involve relatively small areas within existing developed corridors. Similarly, none of the less than significant geologic impacts discussed in Chapter 4 are expected to increase in significance when considered in combination with impacts from off-Station regional planning projects or the proposed NTC Fort Irwin expansion. Therefore, activities under the Moderate Expansion Alternative are not expected to result in cumulative effects on soils or other geologic resources in combination with off-Station projects.

On-Station construction projects also have some potential to contribute to cumulative impacts. Demolition of outdated facilities in Mainsite, removal of runway pavement at Armitage Airfield, implementing the Ridgecrest WWTP expansion, and demolition or abandonment in place of existing buildings in the Propulsion Laboratory area could result in soil disturbance and short-term exposure of the soil to wind or water erosion. However, the affected areas are relatively level and the water erosion potential is low, and wind erosion is not likely to result in a significant geologic impact from loss of soil. Demolishing outdated facilities would not have an impact on soils as these areas are already disturbed. The construction of the ECR Threat Dispersion Facility, remote emitter pads, and associated fiber optic lines would cause soil disturbance and increased potential for soil erosion during construction. However, the activities that would occur under the Moderate Expansion Alternative are unlikely to lead to significant erosion potential in the project areas and no cumulative impacts to geologic or soil resources are expected.

5.2.7 Water Resources

The cumulative projects identified for the NAWS ROI are not expected to have any significant cumulative water resources impacts in conjunction with implementing the Moderate Expansion Alternative. Projects could contribute to significant cumulative impacts on water resources if they would substantially change regional groundwater or surface water quality, or if they affect regional water resource supplies.

Implementing the on-Station projects identified in Section 5.1 is not expected to result in cumulative impacts to water resources. Demolition and construction activities could result in short-term increases in soil erosion and associated sediment transport. However, the amount of short-term sediment loading is expected to be negligible due to the distances between construction sites and surface water features. Potential cumulative effects to water resources due to the removal of pavement at Armitage Airfield would be minimized through the implementation of best management practices (BMPs) pertaining to spill and sediment control practices. Additional BMPs to protect water resources include placement of barriers to control runoff velocity and creation of sediment basins. Therefore, on-station construction projects, considered in combination with the Moderate Expansion Alternative, would not result in cumulative water resources impacts.

Local short-term effects on surface water quality could occur during the installation of the ECR Threat Dispersion facilities and underground fiber optic communication cables on the South Range. All fiber routes would follow existing roadways. Short-term effects could include localized erosion and possible increases in turbidity of runoff. The short-term effects are not expected to be significant because of implementation of standard procedures for construction sites to reduce erosion. No long-term cumulative impacts to water resources are expected.

Installation of a replacement production well on-Station is not expected to result in any groundwater impacts since this replacement is not expected to increase the total volume of groundwater pumped from the aquifer. Production rates from on-Station and off-Station wells would continue to be operated in a manner consistent with objectives under development by groundwater users for sustaining groundwater yields from the regional aquifers. Therefore, no cumulative impacts to water resources are expected.

The WMCMP and the Northern and Eastern Mojave Planning Effort are planning projects focused primarily on improving resources management in the planning area. These projects do not include new construction or ground disturbing activities. Therefore, these projects, considered with the Moderate Expansion Alternative, would not result in cumulative water resources impacts.

The highway widening and drainage improvement projects have the potential to increase soil erosion and increase the flow of sediments to surface waters on-Station; however, the likelihood is considered very low. Potential impacts to surface and groundwater resources will be evaluated during the design process, and it is assumed that mitigation measures will be included in the project design to ensure compliance with applicable requirements. Therefore, these projects, considered in combination with the Moderate Expansion Alternative, would not result in cumulative water resources impacts.

Expanding and upgrading the Ridgecrest WWTP would increase the discharge capacity of the plant but would not be expected to affect surface or groundwater quality or quantity. Therefore, no cumulative impacts to these resources are expected from the construction and operation of this project.

5.2.8 Socioeconomics

Regional planning projects, such as the WMCMP, Northern and Eastern Mojave Planning Effort, and the Western Mojave Land Tenure Adjustment Project, are focused primarily on improving management of resources in the planning area. The proposed NTC Fort Irwin expansion could result in a loss of county property tax revenues (the amount varies depending on the alternative) due to the potential incorporation of private sector lands into military ownership through purchase; however, these potential revenue losses would not be significant. These projects would not generate employment or income in the NAWS ROI, and therefore, would not increase population or increase demand for schools or housing. Consequently, these projects would not contribute cumulatively to socioeconomic effects in the NAWS ROI.

The highway expansion projects and the expansion of the Ridgecrest WWTP would generate temporary construction employment and income. However, since these projects are generally of short duration, it is unlikely that enough employment and income would be generated to affect the local population or the demand for housing or schools. Even if added to the Station-related employment and income conditions anticipated with implementation of the Moderate Expansion Alternative, no significant cumulative impacts would occur.

The six on-Station demolition and construction projects also would generate temporary employment and income. However, these projects are also typically of short duration and are scheduled to be completed before highway project construction begins; therefore, employment and income generated by these on-Station projects would not overlap with the highway projects. The expansion of the WWTP is not anticipated to occur in the near future and also would not be expected to overlap with the on-Station projects. The temporary increase in income and employment for these projects and the Station-related employment and population conditions associated with the Moderate Expansion Alternative (i.e., continuation of current conditions) is unlikely to be large enough to affect the local population or the demand for housing and schools. Therefore, no cumulative impacts would occur.

5.2.9 Utilities and Public Services

Implementation of the Moderate Expansion Alternative would not result in increases in personnel or activities that would increase utility demand. Several cumulative projects could affect utility service at NAWS, as described in the following paragraphs; however, these impacts are not expected to be significant.

Installing the replacement production well would not directly affect utility resources on NAWS since it only replaces an existing well that has experienced a casing failure. The planned demolition, construction, and renovation of facilities at Mainsite and the Propulsion Labs would have beneficial effects on utilities and public services on the Station. There would be approximately 113,076 square feet (10,505 square meters) of new construction and 197,828 square feet (18,379 square meters) of demolition for these projects. The buildings to be demolished represent inefficient extensions of the utility supply systems and public service coverage areas that would be replaced by more efficient new systems. Therefore, these projects would represent a cumulative beneficial impact to the utility systems.

Construction of the ECR Threat Dispersion Facilities and installation of the fiber optic cables could temporarily affect some of the utility systems at the Station. The cables would be buried along existing roadways on the South Range. Since other utilities also are located along existing roadways, they could be disrupted during construction. However, this disruption would only be temporary. Expanding the Ridgecrest WWTP also could affect utilities at NAWS. Expanding the WWTP would increase the capacity of the wastewater treatment system and would be a beneficial impact to this resource. However, due to current decreases in local population, the project, which is still in the design stage, is not expected to be completed in the near future. Therefore, any beneficial impacts related to this project are not likely to occur in the near term.

The remaining cumulative projects, which include two planning efforts, highway construction projects, the expansion of NTC Fort Irwin, and the Western Mojave Land Tenure Adjustment Project, do not involve any actions that would change the supply or demand or otherwise affect the utilities on NAWS. These projects by themselves would not have any impact on these resources. However, if all of the construction activities associated with the cumulative projects were to occur simultaneously, there could be a temporary increase in demand for utilities and public services caused by temporary construction personnel in the area. This increase in demand could have a minor but negligible impact on these resources. Therefore, no cumulative impacts would occur.

5.2.10 Public Health and Safety

The cumulative projects identified for the NAWS area would not have any significant cumulative public health and safety impacts in conjunction with the Moderate Expansion Alternative.

MILCON Projects P-515, P-524, P-525, and P-526 involve construction activities at Mainsite. MILCON Project P-453 involves both construction and demolition activities at the Propellants and Explosives Laboratory in the Propulsion Laboratories Area. Persons accessing Mainsite to use the golf course and gymnasium could be exposed to safety hazards from the construction activities associated with MILCON projects P-515, P-524, P-525, and P-526. However, safety risks to the public would be minimized by access controls to Station lands, fencing of construction sites, and implementing standard construction safety procedures. There are no target/test sites, ordnance use areas, ESQD arcs, or radiation hazard arcs in Mainsite where construction activities are planned. Therefore, persons involved in demolition activities in Mainsite would not be exposed to these safety hazards. However, there are ESQDs and active test sites in the Propulsion Laboratories Area, and construction crews could be exposed to safety hazards associated with ESQDs and test sites. To reduce these impacts, construction workers would be advised and briefed on the safety hazards of ESQDs and active test sites, and access to hazardous areas would be restricted. Construction activities would be scheduled so as to eliminate conflicts with test events. Due to the implementation of the safety procedures and access restrictions, cumulative impacts associated with public health and safety would be less than significant.

Construction of other planned projects (e.g., range facility upgrades at Junction Ranch and Weapons Survivability Lab, installation of ECR Threat Dispersion facilities, Ridgecrest WWTP expansion, and production replacement well installation) could expose on-Station personnel to temporary safety risks associated with construction activities. However, standard construction safety procedures would be implemented and construction sites would be fenced to limit access. Therefore, these projects, considered in combination with the Moderate Expansion Alternative, would not result in cumulative impacts to public health and safety.

Construction crews and personnel working at Armitage Airfield could be exposed to safety hazards associated with MILCON P-515. In order to reduce these safety risks, all construction activities at Armitage Airfield would be coordinated to not conflict with flight operations. Safety risks to construction workers would be further reduced by implementing standard construction safety procedures. Construction sites would be fenced off in order to reduce the potential for injury to Station personnel. Therefore, this project, considered in combination with the Moderate Expansion Alternative, would not result in cumulative impacts to public health and safety.

NTC Fort Irwin expansion is proposed for areas along the south-eastern boundary of the South Range. South Range air operations may occasionally pass over lands proposed for withdrawal by NTC Fort Irwin. However, all military operations would be conducted in accordance with established safety procedures. Therefore, this project, considered in combination with the Moderate Expansion Alternative, would not result in cumulative impacts to environmental conditions at the station.

Off-Station highway projects on Highway 395, SH 14, and SR 178 could expose the public and any Station personnel using these roads to temporary safety risks associated with construction traffic and activity. These hazards could be minimized with the enforcement of standard construction safety procedures, such as traffic controls, and traffic restrictions. If necessary, detours could be established to route traffic away from construction hazards. Road construction crews also would be exposed to occupational safety risks associated with road construction activities, such as traffic and heavy machinery. These safety risks would be reduced by implementing standard construction safety procedures, traffic controls, and restrictions. Therefore, these projects, considered in combination with the Moderate Expansion Alternative, would not result in cumulative impacts to public health and safety.

No cumulative public health and safety impacts are expected due to the regional planning projects. Because these planning efforts involve lands located off-Station, they would not conflict with on-Station testing events or areas of existing hazards, such as historic concentrated ordnance use areas. Furthermore, these projects are regional planning efforts that involve developing management plans and conservation strategies. The projects would not involve or develop activities that expose people to existing or increased safety hazards. Therefore, no cumulative public health and safety impacts would occur.

5.2.11 Hazardous Materials and Wastes

Three off-Station planning projects, the WMCMP, the Northern and Eastern Mojave Planning Effort, and the Western Mojave Land Tenure Adjustment Project, are interagency efforts designed to improve resources management and protection in the planning area. These projects do not include construction, demolition, ground-disturbing activities, or increased military operations, and therefore would not result in increased hazardous materials use or hazardous waste generation above current volumes. Consequently, these off-Station planning projects, considered in combination with the Moderate Expansion Alternative, would not result in cumulative impacts to environmental conditions at the Station.

The proposed off-Station construction projects, including highway development, drainage improvement, and expansion of the Ridgecrest WWTP, would result in a short-term increase in hazardous materials use as necessary to support construction-related activities. These construction projects would create a small increase in vehicular and heavy equipment traffic that could result in small spills or discharges of asphalt, fuels, and other petroleum-based materials. Normal spill control practices would be adopted during construction and all activities are planned in previously disturbed and developed areas adjacent to existent roadways, thus facilitating potential emergency spill responses. In addition, the off-Station construction projects would not affect the Station's generation or management of hazardous materials and would not generate hazardous wastes that must be collected, stored, and disposed. Therefore, although hazardous materials would be used and hazardous wastes would be generated temporarily during off-Station construction activities, the standard procedures used in their handling and disposal would cause the overall cumulative impact to be less than significant.

Expansion of NTC Fort Irwin would be expected to require greater quantities of hazardous materials for troop training and would generate slightly greater quantities of hazardous wastes under proposed increased military land uses. While most units training at NTC Fort Irwin bring their own vehicles and are otherwise self-contained, an increase in troop training could significantly augment demand for vehicle fuels, oils, hydraulic fluids, transmission fluids, fog oil, and vehicle batteries. These amounts used off-Station, however, would be insignificant when compared to those required by the normal training operations at NAWS, and only incidental spills are likely to occur. Aircraft supporting GTT exercises would come primarily from off-Station and would not require refueling or the disposal of

hazardous waste. In addition, the continuation of existing hazardous material and hazardous waste management programs at NTC Fort Irwin would be expected to result in no cumulative impacts to the environment. Overall, the expansion of NTC Fort Irwin, considered in combination with the Moderate Expansion Alternative, is expected to produce a less than significant impact.

Construction projects planned on-Station at NAWS have the potential to result in cumulative impacts because of their location. Proposed on-Station projects include the construction of a propellants/explosive laboratory, a base operating support facility, production well replacement, and three BEQ facilities at Mainsite, in addition to the ECR Threat Dispersion Facilities and fiber optics cable installation on the South Range. These construction-related activities on-Station could result in localized, short-term increases in hazardous materials use at NAWS due to an expansion in vehicular and heavy equipment traffic. Incidental spills or discharges are likely to occur and normal spill control practices would be adopted during construction. In addition, current practices for the management of hazardous materials and wastes at the Station would continue to be implemented and the volume of materials and wastes handled long-term is not expected to change and would be well within the Station's Hazardous Material Storage Transfer Facility capacity. Consequently, although hazardous materials would be used and hazardous wastes would be generated temporarily, the standard procedures used in their handling and disposal would ensure no cumulative impact to the environment.

The proposed on-Station range facilities upgrades at the Weapons Survivability Lab and Junction Ranch would involve construction of a new power substation and a hazardous waste collection/separation system. Both of these facilities upgrades represent an extension of existing activities and services at NAWS and would therefore be subject to current HMC&M Division requirements regarding minimization and management of hazardous materials/waste. In addition, the Hazardous Material Minimization Branch would continue to inventory all hazardous materials used at the Weapons Survivability Lab and Junction Ranch and would integrate the proposed range facilities upgrades into NAWS's Hazard Communication Program. Accordingly, although hazardous materials would be used and hazardous wastes would be generated, collected, and stored temporarily, the standard procedures used in their handling and disposal would cause the overall cumulative impact to be less than significant.

Repair and replacement of the runway and associated paved areas at Armitage Airfield would increase the amount of hazardous materials used and the amount of hazardous wastes generated at the Armitage Airfield. However, the runway repair projects would continue to be operated under established NAWS hazardous materials management procedures and the amounts of wastes generated are expected to be well within the handling capacities of the NAWS HWTSF. Therefore, the overall cumulative impact to the environment from proposed pavement repairs at Armitage Airfield is expected to be less than significant.

On-Station demolition of facilities associated with proposed construction of the propellants/explosive laboratory and the base operating support facility area at NAWS would require temporary, localized increases in hazardous materials use at levels necessary to support proposed deconstruction activities. However, these demolition projects would not be expected to result in long-term, cumulative impacts to the on-Station environment. The limited geographical area of impact from projected demolition activities would essentially preclude any appreciable effect on the overall environmental conditions at NAWS or in adjacent off-Station areas. Standard ordnance handling and safety practices would be employed during blasting activities and emergency treatment and disposal procedures specific for ordnance and explosive wastes at the OB/OD facility in Burro Canyon at NAWS would be maintained. The transport and disposal of all demolition-related materials and waste would be conducted in compliance with all applicable federal and state regulations, DoD and U.S. Navy instructions, and Station policy. Consequently, although hazardous materials would be used and hazardous wastes would be generated temporarily, the standard procedures used in their handling and disposal during demolition would cause the overall cumulative impact to be less than significant.

5.2.12 Traffic and Circulation

Regional planning projects, such as the West Mojave Planning Effort, Northern and Eastern Mojave Planning Effort, and the Western Mojave Land Tenure Adjustment Project, are focused primarily on improving management of resources in the planning area. As such, these projects would not generate additional local or regional traffic. Consequently, these projects would not contribute cumulatively to traffic in the project area.

The proposed NTC Fort Irwin expansion would result in possible dust impacts to local highways (Interstate 15 and Highway 127) and restricted access to some local roads (impacts vary depending on the alternative). However, the proposed NTC Fort Irwin expansion would not affect roadways in the NAWS ROI; therefore, this project would not contribute cumulatively to traffic in the project area.

The planned demolition, construction, and renovation of facilities at Mainsite and the Propulsion Labs and the construction of the ECR Threat Dispersion Facilities and installation of underground fiber optic communication cables on the South Range at NAWS temporarily would generate traffic from worker vehicles and trucks during the construction period. Construction vehicles typically enter and leave the construction area at different times during the day, adding a few trucks at a time to roadways accessing the area. The small addition of truck traffic would not be expected to cumulatively affect operational conditions. Expansion of the WWTP by the City of Ridgecrest would temporarily generate traffic from worker vehicles and trucks during the construction period. This small addition of traffic would not be expected to affect roadway operational conditions and cumulative impacts would be less than significant.

Widening Highway 395 through Kern County and Inyo County and widening SH 14 in Kern County would have minor traffic impacts associated with temporary construction activities. However, it is unlikely that these projects would be constructed at the same time and that any one of them would generate enough trips to exceed roadway capacity in the area. Temporary disturbances to traffic flow may occur because of the need to detour or stop traffic during construction activities. The highway widening projects would result in a cumulatively beneficial effect by increasing capacity of these roadways and improving traffic flow.

CHAPTER 6

Other Required Considerations

6.0 INTRODUCTION

This chapter addresses issues related to possible conflicts with the objectives of federal, state, and local land use plans, policies and controls; energy requirements and conservation potential of the proposed action and alternatives; irreversible or irretrievable commitment of resources; the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity, and unavoidable adverse impacts.

Based on evaluation of the proposed action with respect to consistency with land use guidelines for the area surrounding and including NAWS, the proposed action is consistent with the objectives of federal, regional, state, and local land use plans, policies, and controls. Table 6-1 provides a summary of environmental compliance for the proposed action.

Table 6-1 Status of Compliance with Relevant Land Use Plans, Policies, and Controls

Plans, Policies, and Controls	*Responsible Agency*	*Status of Compliance*
National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] § 4321 et seq.) Department of the Navy Procedures for Implementing NEPA (32 Code of Federal Regulations [C.F.R.] 775)	*U.S. Navy*	*This Environmental Impact Statement (EIS) has been prepared in accordance with the Council on Environmental Quality (CEQ) Regulations implementing NEPA and Navy NEPA procedures. The preparation of this EIS and the provision for its public review are being conducted in compliance with NEPA.*
Endangered Species Act (ESA) (16 U.S.C. § 1531)	*U.S. Fish and Wildlife Service (USFWS)*	*The U.S. Navy initiated several informal Section 7 consultations with the USFWS during development of the CLUMP, INRMP, and the Draft EIS. Informal consultations were conducted during May and June 1998 for the CLUMP, and during April and May 2001 for the INRMP and Draft EIS. The USFWS determined that the existing Biological Opinions adequately address both current and proposed operations at NAWS China Lake. "No jeopardy" Biological Opinions were received for the Mojave tui chub in 1997, for the desert tortoise in 1992 (reissued in 1995), and for the Inyo California towhee in 1990. Therefore, formal Section 7 consultation is not required.*
National Historic Preservation Act (NHPA) (§ 106, 16 U.S.C. 470 et seq.)	*Advisory Council on Historic Preservation, California State Historic Preservation Office (SHPO)*	*The proposed action could have adverse but mitigable effects on cultural resources. NAWS has coordinated with the SHPO to develop a PA to facilitate Section 106 compliance.*
Sikes Act (as amended)	*U.S. Navy*	*The proposed action, and each of the alternatives, implements the Station's draft Integrated Natural Resources Management Plan (INRMP) which is a principal component of NAWS's overarching CLUMP. Implementation of the draft INRMP via the CLUMP complies with Sikes Act requirements.*

Plans, Policies, and Controls	***Responsible Agency***	***Status of Compliance***
Clean Air Act (CAA), as amended (42 U.S.C. § 7401 et seq.)	*U.S. Environmental Protection Agency (USEPA)*	*Per CAA regulations, the proposed action would not compromise air quality attainment status in California or conflict with attainment and maintenance goals established in its State Implementation Plan (SIP). Therefore, a CAA conformity determination is not required.*
Clean Water Act, Section 401/402 (§§ 401-402, 33 U.S.C. § 1251 et seq.), Section 404 (§ 404, 33 U.S.C. § 1251 et seq.)	*USEPA/U.S. Army Corps of Engineers (USACE)*	*The proposed action would not discharge dredged or fill material into waters of the U.S. Therefore, a Section 401, 402, or 404 (b) (1) permit is not required.*
EO 11990, Protection of Wetlands (U.S.C. §§ 1221-1226)	*U.S. Navy*	*The proposed action would not have a significant impact on wetlands.*
California Desert Protection Act (CDPA) Public Law 103-433, Section 8	*Bureau of Land Management (BLM)/U.S. Navy*	*The proposed action, and each of the alternatives, implements the Station's CLUMP. The CLUMP has been developed in cooperation with the BLM and complies with the CDPA.*
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (Executive Order 13186, 66 Federal Register 11)	*U.S. Navy*	*The proposed action would not have a measurable negative effect on migratory bird populations.*

6.1 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL OF THE PROPOSED ACTION AND ALTERNATIVES

Energy required to successfully implement the proposed action would include fossil fuels and electricity needed to power aircraft, missiles, targets, vehicles, and equipment. Fuels for Navy and contractor vehicles are currently available and are in adequate supply from Navy-owned sources or from area commercial distributors. Required electricity demands would be supplied by the existing electrical service at NAWS or by generators at some of the Station's remote locations.

Direct energy requirements of the proposed action are limited to those necessary to operate established facilities, vehicles, and equipment. No superfluous use of energy related to the proposed action has been identified, and proposed energy uses have been minimized to the maximum extent possible without compromising the integrity of the testing, training, and facility management activities. Therefore, no additional conservation measures related to direct energy consumption by the proposed action are identified.

6.2 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires a discussion of any irreversible or irretrievable commitment of resources that would be involved in the proposal should it be implemented (40 C.F.R. § 1502.16 [1997]). Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of nonrenewable resources such as metal, wood, fuel, and paper. Human labor is also considered an irretrievable resource. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Another issue that falls under the category of the irreversible and irretrievable commitment

of resources is the unavoidable destruction of natural resources, which could limit the range of potential uses of that particular environment.

Ongoing operations at NAWS would require small amounts of nonrenewable resources (e.g., fuels, wood, metals, etc.). Implementation of the Limited Expansion Alternative or the Moderate Expansion Alternative would require slightly elevated amounts of nonrenewable resources in comparison to the No Action Alternative. However, implementation of the proposed action or alternatives would not result in the destruction of natural resources such that the range of potential uses of the environment would be limited. The proposed action or alternatives would not affect the biodiversity or cultural integrity of NAWS.

6.3 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The majority of the activities addressed in this Draft EIS would be categorized as long-term. For example, although the use of target areas for individual test or training events may be of short duration, the target areas would continue to receive increased and repeated use for the foreseeable future. The same is true of the increased use of the NAWS ranges under the Limited and Moderate Expansion alternatives. However, these uses would not adversely affect the long-term productivity of environmental resources at NAWS. The proposed action would be consistent with the Navy's long-term goal of accommodating current and future business technologies, and the land and resources management directives contained in the Federal Land Policy and Management Act (43 U.S.C. 1701 et seq. 1976).

6.4 UNAVOIDABLE ADVERSE EFFECTS

NEPA requires a discussion of any adverse environmental effects that cannot be avoided (40 C.F.R. § 1502.16 [1997]). With the exception of an adverse but less than significant impact associated with projected noise levels affecting a 3-acre (1.2-hectare) area zoned for residential use (see Section 4.2.5), all potentially adverse impacts of the proposed action would be mitigable to a less than significant level by the implementation of procedures described in this document.

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CHAPTER 7

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CHAPTER 8

Consultation and Coordination

8.0 AGENCIES AND REPRESENTATIVES CONTACTED

The military representatives and agencies that were contacted during the course of preparation of the EIS are listed below.

Military

Edwards Air Force Base, NEPA Group
National Training Center, Fort Irwin
NAWS Department of Safety and Physical Security
NAWS Fire Division
NAWS Restoration Advisory Board

Federal Agencies

Advisory Council of Historic Preservation
Bureau of Land Management - Bakersfield District
Bureau of Land Management - California Desert District
Bureau of Land Management - Carson City, Nevada
Bureau of Land Management - Ridgecrest Resource Area
Department of Interior Clearinghouse
Federal Aviation Administration
National Park Service - Death Valley National Park
U.S. Army Corps of Engineers- Los Angeles District
U.S. Bureau of Economic Analysis
U.S. Bureau of Labor Statistics
U.S. Bureau of the Census
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Forest Service - Inyo National Forest
U.S. Forest Service - Sequoia National Forest
U.S. Public Health Service

State Agencies

California Air Resources Board
California Department of Education
California Department of Finance
California Department of Fish and Game-Region 4
California Department of Fish and Game-Region 5
California Department of Transportation
California Environmental Protection Agency
City of Ridgecrest
City of Ridgecrest Police Department
Great Basin Unified Air Pollution Control District
Indian Wells Valley 2000
Indian Wells Valley Water District
Inyo County Planning Department
Inyokern
Inyokern Airport District
Inyokern Community Services
Kern County Air Pollution Control District
Kern County Fire Department
Kern County Planning Department
Kern County Water Agency
Regional and local agencies
San Bernardino County Planning Department
Sierra Sands School District
Southern California Association of Governments

Tribal Groups

Big Pine Reservation
Bishop Paiute Shoshone Tribal Council
Bridgeport Indian Colony
Fort Independence Paiute Community Council
Lone Pine Paiute Shoshone Community Council
TimbiSha Shoshone Tribe
Utu Utu Gwaitu Benton Paiute Tribal Council

Organizations

Center for Land Use and Interpretation
Desert Managers Group
Maturango Museum
National Park and Conservation Association
Rotary Club – Ridgecrest
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8.2 SCOPING

The federal and local agencies, organizations, and individuals listed below responded to the scoping request.

Federal Agencies

Department of the Interior, National Park Service
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State Agencies

California Environmental Protection Agency
Department of Toxic Substances Control
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Local Agencies

Indian Wells Valley Water District
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Industry

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Organizations

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Owens Peak Group - Sierra Club
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Ridgecrest Area Convention & Visitors Bureau
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CHAPTER 9

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CHAPTER 10

Distribution List

This chapter provides a list of public officials, agencies, tribal groups, organizations, and individuals who will receive an executive summary of the EIS and notification of public hearings. Full copies are made available upon specific request.

Elected Officials Federal

Senator Barbara Boxer
U.S. Congress
Washington D.C.

Senator Dianne Feinstein
U.S. Congress
Washington D.C.

Representative Jerry Lewis
U.S. Congress
Washington D.C.

Representative William Thomas
U.S. Congress
Washington D.C.

State Elected Officials

Governor Gray Davis
State Of California
Sacramento, CA

Senator Pete Knight
State Of California
17th Senate District
Sacramento, CA

State Assemblyman
Phil Wyman
State Of California
34th Assembly District
Victorville, CA

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City Of Ridgecrest
Ridgecrest, CA

Supervisor Butch Hambleton
Inyo County
District Fourth
Independence, CA

Supervisor Michael Dorame
Inyo County
Fifth District
Lone Pine, CA

Supervisor Jon Mcquiston
Kern County
First District
Bakersfield, CA

Supervisor Bill Postmus
San Bernardino County
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California Desert District
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Wilderness Specialist
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Ridgecrest, CA

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Bakersfield, CA

Bureau of Land Management
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Barstow, CA

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Mary Grimsley
BLM Steering Committee
Ridgecrest, CA

Bill Maddux
BLM Steering Committee
Ridgecrest, CA

Craig Mattson
BLM Steering Committee
Lancaster, CA

Dave Johnson
BLM Steering Committee
Bakersfield, CA

Dennis McKinney
BLM Steering Committee
Ridgecrest, CA

Derek Cooper
BLM Steering Committee
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John Hunter
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Olancha, CA

Mary Ann Henry
BLM Steering Committee
Ridgecrest, CA

Paul Barber
BLM Steering Committee
Mojave, CA

Sean Roberts
BLM Steering Committee
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Ron Schiller
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NASA George C. Marshall
Space Flight Center
Huntsville, AL

Superintendent
Deke Cripe
National Park Service
Washington, D.C.

Wilderness Coordinator
Ralph Moore
Sequoia-Kings Canyon National Park
Three Rivers, CA

Superintendent
Mike Tollefson
Sequoia-Kings Canyon National Parks
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Chief Dave Castenon
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General Manager
Arden Wallum
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Air Pollution Control Officer
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Air Pollution Control Officer
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Mojave Desert Air Quality
Management District
Victorville, CA

Local Agencies

William Boyd
Southern California Association
of Governments
Los Angeles, CA

President
Roe Darnell
Cerro Coso Community College
Ridgecrest, CA

Howard Auld
City Of Ridgecrest
Ridgecrest, CA

George Hansen
City Of Ridgecrest Planning
Department
Ridgecrest, CA

City Administrator
Harry Jensen
City Of Ridgecrest
Redevelopment Agency IWV
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Committee
Ridgecrest, CA

Lois Landrum
City of Ridgecrest
Planning Department
Ridgecrest, CA

Burmah & Steve Reese
Darwin Community Services
District
Darwin, CA

East Kern County Conservation
District
Inyokern, CA

Planning Director
Peter Chamberlain
Inyo County Planning
Department
Independence, CA

Manager
Janet Stuebner
Inyokern Community Services
District
Inyokern, CA

Kern County Department
Planning Department
Bakersfield, CA

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Kern County Planning
Department
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Joel Hampton
Owens Valley Unified School
District
Independence, CA

San Bernardino County
Department of Planning
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Searles Valley Community
Services Council
Trona, CA

Superintendent
April Jones
Sierra Sands Unified School
District
Ridgecrest, CA

Military

Dennis Shoffner
Edwards Air Force Base
Environmental Public Affairs
Edwards AFB, CA

Commanding Officer (B505)
Art Gleason
Marine Logistics Base
Barstow, CA

Public Affairs Officer
Phillip Thompson
Marine Corps Air Ground
Combat Center
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Marine Corps Air Ground
Combat Center
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Twenty-Nine Palms, CA

Lt Col K.W. Quigley
Marine Corps Air Ground
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Twenty-Nine Palms, CA

Major Larry Seefeldt
Fort Irwin National Training
Center
Fort Irwin, CA

Public Affairs Officer
Major Barry Johnson
Fort Irwin National Training
Center
Fort Irwin, CA

Chief Martha Shelby
Fort Irwin National Training
Center
Environmental Division
Fort Irwin, CA

Tribal Groups

Ron Wermuth
Advisory Council California
Indian Policy
Kernville, CA

Chairman Joseph Saulque
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Chairperson Dona Duckey
Big Pine Reservation
Big Pine, CA

Chairman Allen Summers
Bishop Paiute Shoshone Tribal
Council
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Chairperson Herb Glazier
Bridgeport Indian Colony
Bridgeport, CA

Chairperson Richard Wilder
Fort Independence Paiute
Community Council
Independence, CA

Interim Chairperson
Sandra Yonge
Lone Pine Paiute Shoshone
Community Council
Lone Pine, CA

Chairperson
Pauline Estevez
Timbi-Sha Shoshone Tribe
Death Valley, CA

Chairperson
Rose Maire Bahe
Utu Utu Gwaitu Benton Paiute
Tribal Council
Benton, CA

Industry

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Dane Starling
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Antelope Valley Press
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Bakersfield Californian
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Barstow Desert Dispatch
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Daily Independent
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Inyo Register
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Mojave Desert News
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Charles Guizzo
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CHAPTER 11

Glossary

Term	***Definition***
Accident potential zones	Areas immediately beyond the ends of DoD runways that have a higher potential for accidents than other areas.
Advisory Council on Historic Preservation	A 19-member body appointed, in part, by the President of the U.S. to advise the President and Congress and to coordinate the actions of federal agencies on matters relating to historic preservation, to comment on the effects of such actions on historic and archaeological resources, and to perform other duties as required by law (Public Law 89-655; 16 U.S.C. 470).
Air installation compatible use zone	A concept developed by the DoD to promote compatible land use development near its airfields in a manner that protects adjacent communities from noise and safety hazards associated with aircraft operations and to preserve the operational integrity of the airfields. The AICUZ program recommends land uses that will be compatible with noise levels, accident potential, and flight clearance requirements associated with military airfield operations. CNEL, shown as noise contour lines on AICUZ maps, prescribe what kind of land uses may occur at certain noise levels. Similarly, APZs limit the types of land uses that may occur below the zone.
Ambient air quality standards	Standards established on state or federal level that define the limits for airborne concentrations of designated criteria pollutants (NO_2, SO_2, CO, O_3, Pb) to protect public health with an adequate margin of safety (primary standards) and public welfare, including plant and animal life, visibility, and materials (secondary standards).
American Indian Religious Freedom Act	AIRFA establishes as U.S. policy the protection of the rights of American Indians to practice their traditional religions, including "access to sites, possession of sacred objects, and freedom to worship through ceremonies and traditional rites" (42 U.S.C. 1996).
Annual average daily traffic	For a 1-year period, the total traffic volume passing a point or segment of a highway facility divided by 365 days. The traffic count year for Caltrans is October 1 to September 30.
Aquifer	A layer of underground sand, gravel, or spongy rock in which water collects.
Archaeological site	Any location where humans have altered the terrain or discarded artifacts. The location of past cultural activity; a defined space with more or less continuous archaeological evidence.
Archaeology	A scientific approach to the study of human ecology, cultural history, and cultural process, emphasizing systematic interpretation of material remains.
Attainment area	An area that meets the NAAQS for a criteria pollutant under the CAA or that meets CAAQS.
Bird-aircraft strike hazard	The potential for a collision between an aircraft and a bird. Most bird-aircraft strikes do not result in aircraft damage, but some bird strikes have led to serious accidents, which has made BASH an important safety consideration. BASH also may include aircraft strikes with other animals, such as bats or rabbits.
California Desert Protection Act of 1994	CDPA (Public Law 103-433) acknowledges the value of federally owned desert lands in California and provides for their protection. CDPA requires development of a management plan for all lands withdrawn under CDPA.
Capacity	The maximum rate of flow at which vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified period under prevailing roadway, traffic, and control conditions.
Clean Air Act	The CAA legislates that air quality standards set by federal, state, and county regulatory agencies establish maximum allowable emission rates and pollutant concentrations for sources of air pollution on federal and private property. Also regulated under this law is proper removal and safe disposal of asbestos from buildings other than schools.
Clear zone	The area immediately adjacent to a runway where aircraft accident risk is the highest and where the most severe restrictions to land use are recommended.
Comprehensive Environmental Response, Compensation, and Liability Act	CERCLA, also known as Superfund, was enacted in 1980 to ensure that a source of funds is available to clean up abandoned hazardous waste dumps, to compensate victims, to address releases of hazardous materials, and to establish liability standards for responsible parties. The Act also requires creation of a National Priorities List, which sets forth the sites considered to have the highest priority for cleanup under Superfund.
Council on Environmental Quality	Established by NEPA, the CEQ consists of three members appointed by the President. CEQ regulations (40 C.F.R. §§ 1500-1508, as of July 1, 1986) describe the process for implementing NEPA, including preparation of EAs and EISs and timing and extent of public participation.

Term	***Definition***
Criteria pollutants	The CAA required the USEPA to set NAAQS for common and widespread pollutants after preparing criteria documents summarizing scientific knowledge on their health effects. Today there are standards for six criteria pollutants: SO_2, CO, PM_{10}, NO_2, O_3, and Pb.
Cumulative impacts	The combined impacts resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes them.
Day/night average sound level	A-weighted sound pressure levels averaged over 24 hours with 10 dBA added for events occurring between 10 p.m. and 7 a.m.
Developed	A lot, land, parcel, or area that has been built upon or where public services have been installed prior to construction.
Diversity	A measure of the richness of species in a community relative to the number of individuals of each species.
Drainage	An aboveground area that supplies the water to a particular stream.
Easement	An interest in land owned by another that entitles its holder to a specific limited use.
Effluent	A gas or fluid discharged into the environment.
Employment	The total number of persons working, both civilian and military.
Endangered species	A species that is threatened with extinction throughout all or a significant portion of its range.
Endangered Species Act	An act of Congress of 1972; 16 U.S.C. §§ 1531-1543. The Act requires federal agencies to ensure that their actions do not jeopardize the existence of endangered or threatened species.
Energetic wastes	Wastes associated with energetic materials, including high explosives, propellants, and rocket fuel.
Environmental Impact Statement	A document required of federal agencies by NEPA for major projects or legislative proposals significantly affecting the environment. A tool for decision-making, the EIS describes the positive and negative effects of the undertaking and lists alternative actions.
Fault	A fracture or a zone of fractures within a rock formation along which vertical, horizontal, or transverse slippage has occurred.
Federal Land Policy Management Act	FLPMA (Public Law 94-579) was enacted by Congress in 1976 to direct the management of public lands and the renewal of all public land withdrawals. The act also requires that BLM inventory, study, and review all 17 million acres (6,879,683 hectares) of public lands in California for their wilderness characteristics, as described in the Wilderness Act of 1964.
Fog oil	Used to obscure tactical vehicle during training or a test.
General plan	A comprehensive planning document required for each California county and incorporated city. Each general plan must have seven elements: land use, circulation, housing, conservation, open space, noise, and safety.
Geology	The science that deals with earth; the materials, processes, environments, and history of the planet, including the rocks and their formation and structure.
Geothermal	Relating to or using the heat of the earth's interior.
Groundwater	The supply of water found beneath Earth's surface, usually in aquifers, which may supply wells and springs.
Hazardous material	A substance or mixture of substances that poses a substantial present or potential risk to human health or the environment.
Hazardous waste	A waste or combination of wastes that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Regulated under RCRA.
Imaginary plane	The maximum safe height of buildings, towers, poles, and other possible obstructions to air navigation are defined by imaginary planes; another way to describe clearances for air navigation. These planes are invisible planes that radiate, at various increasing heights, from the runway or helicopter pad. The FAA considers any terrain or human-made objects that extend above the imaginary plane an obstruction. Imaginary planes include the primary surface, the approach-departure surface, and the inner horizontal surface, the conical surface, and other outer horizontal surface, and transitional surfaces.

Term	***Definition***
Impacts	An assessment of the meaning of changes in all attributes being studied for a given resources; an aggregation of all the adverse effects, usually measured using a qualitative and nominally subjective technique.
Infrastructure	The basic installations and facilities on which the continuance and growth of a locale depend (roads, schools, power plants, transportation, and communication systems).
Installation Restoration Program	A program established by the DoD to meet requirements of CERCLA of 1980 and SARA of 1986 which identifies, assesses, and cleans up or controls contamination from past hazardous waste disposal practices and hazardous material spills.
Interbedded	Occurring between beds or lying in a bed parallel to other beds of a different material.
Level of service	In transportation analysis, a qualitative measure describing operational conditions within a traffic stream and how they are perceived by motorists and pedestrians. Usually given a letter grade from A to F, with A being free-flow, E, capacity, and F, forced-flow. Factors considered in LOS analyses include speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort, and convenience. In public services, a measure describing the amount of public services available to community residents, generally expressed as the number of personnel providing service per 1,000 population.
Long-term impacts	Impacts that would occur over an extended period of time, whether they start during the construction or operations phase. Most impacts from the operations phase are expected to be long-term since program operations essentially represent steady-state conditions (i.e., impacts resulting from actions that occur repeatedly over a long period). However, long-term impacts also could be caused by construction activities if a resource is destroyed or irreparably damaged or if the recovery rate of the resource is very slow.
Master plan	For U.S. Navy installations, a land use planning document compiled according to the U.S. Navy's Shore Facilities Planning Systems. A master plan provides guidance for future development at the facility.
Mitigation	A method or action to reduce or eliminate program impacts.
National Environmental Policy Act	Public Law 91-190, passed by Congress in 1969, established a national policy designed to encourage consideration of the influence of human activities on the natural environment. NEPA also established the CEQ. NEPA procedures require that environmental information be made available to the public before decisions are made.
National Historic Preservation Act	The NHPA protects cultural resources. Section 106 of the act requires a federal agency to take into account the potential effect of a proposed action on properties listed on or eligible for listing on the NRHP.
National Register of Historic Places	A register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under the authority of Section 2(b) of the Historic Sites Act of 1935 and Section 101(a)(1) of the NHPA of 1966, as amended.
Native American Graves Protection and Repatriation Act	NAGPRA defines the ownership and control of Native American human remains and associated funerary objects discovered or recovered from federal or tribal land.
Native Americans	Used in the collective sense to refer to individuals, bands, or tribes who trace their ancestry to indigenous populations of North America prior to Euro-American contacts.
Ordnance	Weapons, ammunition, and other military equipment.
Peak daily volume	The volume on a given section of roadway at the hour of highest traffic.
Perched water-bearing zones	A body of groundwater of small lateral dimensions lying above a more extensive aquifer.
Permeability	The ability of rock or soils to transmit a fluid.
Petroglyph	Native American or prehistoric rock art.
Playa	A dry lake bed in a desert basin or a closed depression that contains water on a seasonal basis.
Pleistocene	Geologic time that began approximately 3 to 5 million years ago.
Plume	The elongated pattern of contaminated air or water originating at a point source, such as a hazardous waste disposal site.

Term	***Definition***
Porter-Cologne Act	California statute that established the SWRCB to coordinate functions dealing with water rights, water pollution, and water quality.
Recharge	Replenishment of water to an aquifer.
Record of Decision	The document prepared under the federal government that documents the reasoning behind the decisions.
Region of Influence	For each resource, the region affected by the proposed action or alternatives and used for analysis in the affected environment and impact discussion.
Resource Conservation and Recovery Act	RCRA was enacted in 1976 as the first step in regulating the potential health and environmental problems associated with hazardous waste disposal. RCRA and the regulations developed by USEPA to implement its provisions provide the general framework of the national hazardous waste management system, including the determination of whether hazardous wastes are being generated, techniques for tracking wastes to eventual disposal, and the design and permitting of hazardous waste management facilities.
Restricted airspace	Restricted airspace is an area of limited dimensions wherein military activities must be confined because of their nature or wherein limitations may be imposed upon aircraft operations that are not a part of those activities.
Runoff	The noninfiltrating water entering a stream or other conveyance channel shortly after a rainfall.
Seismic	Pertaining to any earth vibration, especially an earthquake.
Seismic zone	An area defined by the Uniform Building Code (1991), designating the amount of damage to be expected as the result of earthquakes. The U.S. is divided into six zones: (1) Zone 1- no damage; (2) Zone 2 - minor damage; corresponds to intensities V and VI of the modified Mercalli intensity scale; (3) Zone 2A - moderate damage; corresponds to intensity VII of the modified Mercalli intensity scale; (4) Zone 2B - slightly more damage than 2A; (5) Zone 3 - major damage; corresponds to intensity VII and higher of the modified Mercalli intensity scale; (6) Zone 4 - areas within Zone 3 determined by proximity to certain fault systems.
Short-term	Transitory effects of the proposed program that are of limited duration and are generally caused by construction activities or operations start-up.
Shrink-swell potential	Refers to the potential for soils to contract while drying and to expand after wetting.
Significance	The importance of a given impact on a specific resource, as defined under the CEQ regulations.
Silt	A sedimentary material consisting of fine mineral particles intermediate in size between sand and clay.
Superfund Amendments and Reauthorization Act	SARA was enacted in 1986 to increase the Superfund to 8.5 billion dollars, to modify contaminated site cleanup criteria scheduling, and to revise settlement procedures. It also provides a fund for leaking UST cleanups and a broad, new emergency planning and community right-to-know program.
Surface water	Water on earth's surface, as distinguished from water in the ground (groundwater).
Toxic Substances Control Act	TSCA provides authority to test and regulate chemicals to protect human health. Substances regulated under TSCA include asbestos and PCBs.
Unconfined aquifer	A permeable geological unit having the following properties: a water-filled pore space (saturated), the capability to transmit significant quantities of water under ordinary differences in pressure, and an upper water boundary that is at atmospheric pressure.
Unemployment rate	The number of civilians, as a percentage of the total civilian labor force, who are without jobs, but who are actively seeking employment.
U.S. Environmental Protection Agency	The independent federal agency established in 1970 to regulate federal environmental matters and to oversee the implementation of federal environmental laws.
Wetlands	Areas that are inundated or saturated with surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil. This classification includes swamps, marshes, bogs, and similar areas. Jurisdictional wetlands are those wetlands that meet the vegetation, soils, and hydrology criteria under normal circumstances or that meet the special circumstances as described in the USACE, 1987, wetland delineation manual where one or more of these criteria may be absent.